PAO Good afternoon welcome to the STS-9 postlanding press conference. Our participants this afternoon are. To my immediate left, Dr. Burton I. Edelson, Associated Administrator, office of Space Science and Application, NASA Headquarters. To his left is Lt. C. G. James A. Abrahamson, Associated Administrator, office of Space Flight NASA Headquarters. To General's Abrahamson's left is Mr. Michelle Benjeau, Director of ESA Space Transportation. And we will start our remarks with General Abrahamson.

ABRAHAMSON First of all, I guess, I assume that there is nobody that doesn't think that this was a fabulous mission, at least that's the way I do and although it did prove one thing. We, you know, we have many scientific firsts that came out of this mission and Burt and Michelle Benjeau will talk about that a little bit, but we also have one that has been proven time and time again, and that's that the level of uncertainty in the Universe is a constant. So when you have a fabulous mission there's always got to be someplace where a little uncertainty comes in. But, I'd like not to focus, frankly, on that and I'm sure you'll want to get some better fuel for the particular problems at the end of the mission. But I think in general, what we saw this time, was just a fabulous success, first of all for international cooperation, and that means cooperation in development kinds of programs. Secondly for the tremendous start for the science and operational phase of this Spacelab program. So the international cooperative part of Spacelab is not stopping at all, it's really now going into a new phase and if you were able to ask each of the scientists who participated in this program as investigators, and saw just how happy they are about the data they've gotten and some of the exciting things so far, I think that you'll all understand that what we really have is something absolutely new in the science, Space Science activity. And I think it's been said many ways, but if I tried to say it as simply as I can, what we have is a laboratory that we've proven can work and work extremely well. And what we have done is that we have mixed the very best of unique set of communications in space along with a capability on the ground so we have mixed together the introlects of the investigators, who have worked for years and dedicated themselves to this mission and their instruments and their specific endeavors. And the astronauts who again have trained for years with these people and are in a position then to best what's happening, and happening in realtime. And by doing that, they can get the most from these experiments. Now you saw a demonstrations of sometimes we had a scientific objective, we got data and as a result of that data, and seeing what was happening in realtime, we were able to exploit and focus in and get new data, or to capitalize on something unique that was happening. In other cases we did some dramatic repairs, and I hope in particular, I hope that shows again, between the cooperation between the air was the camera, and that's been described, but again I hope you keep in mind just
what really happened here. I saw on the ground and worked with some of the astronauts that developed the ground procedures for finding a way to solve what we thought was the camera problem. And it was very clear, it's a very large magazine that goes into that camera about like that, and it's a rather complex mechanism with springs and threads and various kinds of things and of course the problem was to be able to repair that in space in absolute darkness. And that's the part when the people work the procedures on the ground, transmitted those to the astronauts themselves and then they went into the sleeping area and did it entirely by feel and corrected the problem. And I think you all knew that the Principal Investigator was so delighted that he got many of his shots afterwards and then presented to the crew a, what was his greatest gift actually, and that was an opportunity to take additional shots of the Earth that they thought were important. So I think that's a lovely example of the repore that developed between the ground crew and the air and what can come out of that kind of operation. So it's, what we've done, is we've demonstrated that this kind of laboratory can work, tying all of these people together, in a very complex communication network and in the process conduct just the most richly varied science menu that we have ever seen before, and I'll leave the rest of that to them. Just a few figures here, just to kind of, obviously we went, you know, a little over 167 orbits, 4 million miles on the Columbia, remember it's been out of service for some time, it was modified so that we could update it partially, and by doing that insure that we could effectively put the Spacelab in and be ready for this mission. So it was out nearly a year. Any time you take an airplane or a complex vehicle such as this out of service for a period of time, you expect that there are going to be nagging types of problems, but this job was done extremely well and we only had, although some of them (garble) we traumatic, we only had 28 problem reports. And that's on the order of magnitude of what we had with the Challenger with the last mission. The Spacelab which was truly, lovely surprise, it came through 10 years of development, 10 years of intensive reviews so that we could come up with a vehicle that just performed magnificently. We had a couple of nagging problems, such as our remote access unit, this is the unit that provides an interface into the group of experiments you probably are familiar with it as the RAU-21. And we worked hard to work our way around them. In fact we made some 31 software patches and we did a lot of definition with temperature work and so we could understand when the problem would occur and how to work around it. But outside a few of those kinds of small things and clearly some of getting complex experiments working in the beginning, what we had was a new vehicle that had approximately a dozen problems reports. That's incredible, that's just something that's just unexpected, for something as complex as this. And we are just delighted because again, it shows the quality of our partnership program. Our TDRS, you know that we all had a lot of trouble and we've been concerned as that's kind of been going along. That
turned out to be, in the clutched here over 98% of the time, the TDRS was available and that started before the mission with our jest with getting ready for the countdown. So we had two orbits where we had some significant problems, but all the rest of the time it was basically available, only two significant outages themselves. I think it was just a fabulous performance, now I haven't really mentioned the crew, because I think more than anything, the crew showed us just what a professional and discipline crew can really do. The 24 hour operation again, one of our most important demonstration and it was very clear that the crew could do that, do it effectively and just maintain that work pace for an extended mission. With the difficulties that came on today, John and certain members of the crew were up nearly 24 hours, as near as we can tell, we don't know exactly how well he slept the night before. Nonetheless, that was a perfect landing out there, just a few thousand feet from the, we don't know yet exactly here, but from the nominal touchdown point about a 10,000 foot roll out, that's what it looks basically like from our preliminary looks at the machine. So we had a magnificent crew, I know it was a great mission. Tonight is the Chronical, congratulations to the Chronical.

Well not to me, thank you.

PAO I think most appropriate to get some reaction from ESA at this point, Michelle?

***
MICHELLE  Yes, Abe. I will explain the point of view and the feeling of update in ESA (garble). It is not sufficient to say that we are pleased and all satisfied with the flight. I am sure that from all (garble) so lucky to participate to this operation here and to this flight. It will be certainly the most greatest event in their life. As you know it was not simple at all, we (garble) it is a first year, he was a first in (garble) as in man in space here. It was decided 10 years ago and the walk was a hard walk, fortunately the industry, the European industry involved, (garble) we are very very good and make excellent work. This mission should give to us, and it is very encouraging for us that the Spacelab is operational from its first flight. It was not so (garble) before. (Garble) of difficulty we get in the flight were extremely small, very low, very low and small as expected. I think that it is for the industry we were participating of that and for the ESA/NASA group mission a very good thing. We are proud and happy to deliver to NASA a valuable space (garble). Further is a (garble). If he knows that it was decided before the flight that half the payload will be American run, half the payload will be a European one. For the European part, it was 1.4 (garble) and representing of the note 24 major experiences, 56 small experiences, and about 110 scientific groups, scientific - 110 scientific groups working all together for the mission (garble). It was six fields, Europe was working in the six field, and it was a very, very important one. One mission in which one few experiences were coordinated and working supporting all the (garble). We get (garble) a very acceptable (garble) present that of that attitude, certainly superior to 80 - 90 percent, probably closer of 95. I share what Geanna Bomson said, the crew was extremely very fine crew. I was very lucky to be invited by the crew to share their last lunch before the flight and I was very impressed unto the fact that it was not six men, but it was a team, and it's here that during every other phases of the mission, the fact that it was a team was extremely clear to anyone. It's clear, also, that the whole of the crew was not exactly the same as the past missions. They were obliged to operate the experience onboard. In seven cases, the operated more of 30 experiences simultaneously, and they have, as Geanna Bomson said, be obliged to repeat certain of them and they were successful for all of them except one, and they established a very fruitful dialog between them and the ground. It is the first time when I attend so excellent and good dialog between them. At this point for me, is to prove and prove the interest of manned space. It's sure that in unmanned space, automatic flights, robotic flights, we cannot get these (garble). I also give my appreciation for the performance made by NASA itself. The Orbiter and TDRS for the flight were nominal in (garble). Every one of the NASA centers from my point of view, are fully optrational and make a very good excellent (garble). I was appreciating too, it was not only during the flight but before the flight and during the flight, the excellent (garble) of cooperation between ESA and (garble) every step. And I would
achieve from (garble) few days for the (garble) too. It is clear that for us European, the future is twice, two things here. The first one is to make good use of the Spacelab. This investment was quite important one here and I think that we have the advantage to make good use of this. Probably, decision will be made during the next month for that here and I hope that we will make a large use of the shuttle (garble). There's good point that if one day, and I hope that it will be not too far from here, to long, I hope that we could (garble), a new joint (garble) with very ambitious goals, and it will be my last word, Spacelab is far as achievement, she's (garble) of 10 years of work that I wish that it will be also (garble).

ABRAHAMSON Before I pass it to Surt, to talk really about the science achievements, we're searching for a perspective here and I don't want to overlook, and I think that it's important that you all fully appreciate the rest of the team. I mentioned the flight crew themselves. It started also as a team effort, of course, all the way back through the beginning of the program, and a cooperative one between Europe and NASA, but I think for the flight itself, please don't remember, don't forget rather, that we had, we started at Kennedy with some problems, we had a team at Kennedy that had to roll out twice, and yet they maintained a schedule and processed the vehicle perfectly for our launch and they're standing by out here tonight to get it ready to take it back. Hopefully, no later than Monday. And again, they have done just yeoman service in terms of that job. In terms of this flight, we didn't only, obviously, have 24-hr a day kind of operation in the air, we had it on the ground, and at Johnson, we had people from all over NASA and the scientists from outside of NASA, but in particular now, I'd like to call attention to the flight directors, the flight control team, the people that were making them work, and behind them, the group of contractors who are providing additional support. Particularly today, Jerry Griffin, the center director at Johnson, offered a perspective. He said that the way the whole team was working our problem today made him think back to some of the real challenges that the Apollo program and the Mercury and the Gemini had. Said it really made him feel good because he saw that that team was not only still there but more polished and more oiled than before, so, this whole thing is a very human program. It always bothers me when we talk about technology like it's made up of computers and equations and natural laws. It's not, it's people, and it's people making things happen. In science, Dr. Edelson.

EDELSON Well, I'm very pleased to follow up on the splendid remarks of Abe and Michelle, my colleagues in this venture. This is my first shuttle landing and I'm as excited and thrilled as I'm sure anyone in this room is to have seen that bird land. It's just -- it was a great surprise to me. I didn't realize how it would come in and how it would land and how much my heart would pound watching it. Of course, I was particularly thrilled
to know of the accomplishments that went on onboard and I'd like to make some comments about scientific achievements. I'm not going to, by any means, try to run down every instrument and every item that we had. I'm going to make some generalized remarks, and I think we'll have a question and answer period afterwards where we can pull that together. I think that I would echo the sentiments of my colleagues by saying that it was very much a team effort, and the fact that it was an international team effort makes it really a stupendous accomplishment. We're very pleased with the success of the mission. I think that it is, the first thing to say is that this was a very successful mission in showing what the space shuttle could do for science in its capability and its very extreme flexibility. We did get, in many of our scientific experiments, many major findings, which, of course, we'll be reviewing and subjecting to scrutiny over the coming months and publishing and presenting in scientific journals and its symposium, but the findings and the nature of the findings are there, in atmospheric physics, and in astronomy, and in plasma physics, and in microgravity science, and in life science. I think we've demonstrated some things that many of us have been talking about for a long time but it was heartening to see the demonstration of the role of man in space that many of us have thought about, talked about, and analyzed from a theoretical point of view for such a long time, to see it implemented and accomplished. I think that the point I would make here is that we've shown that there is a real purpose, a need, and the capability of the scientists in space. We had two mission specialists, we had two payload specialists, each of those were PHD's, scientists. They were not merely mechanics or adjusters or manipulators in some minor degree. They were behaving as scientists, performing scientific experiments in space.

***
EDELSON

It was equally important but just a slightly different point to show that people, these same four individuals were able to make repairs, to make adjustments, to make modifications to experiments and to the procedures in space the way they were to adapt to it. It was surprising I think to all of us how much energy there turned out to be between the scientific instruments and between the scientist. The earth-space interaction between the scientist, the PI's, principle investigators and other experimentalists on the ground with the scientist in space in this interaction and the realtime changing modifications altering, interpreting and revising the scientific experiments as they were going through them is very exciting and opens up many possibilities that we've thought about but never realized before. We were involved in a real system demonstration, as I mentioned the experimenters on the ground in the POCO, the payload operation center and the scientist in space. This was a team represented by the three of us up here. It was the Space Shuttle, it was the Spacelab itself, the pressurized module and the pallet that carried instruments behind it in the payload bay. And it was the set of instruments that were inside the module and on the pallet, all working together in an overall system including the TDRS satellite. I'm sure many of you have seen descriptions of how it worked and to think for a moment that the Shuttle in orbit going around the earth roughly every hour and a half was providing a great amount of data back from the Space Shuttle through our radio link to the tracking and data relay satellite and then down to earth at our major receiving center, at White Sands, New Mexico. And then by a domestic communication satellite to the Johnson Space Flight Center and also incidentally to the Goddard Space Flight Center where it was analyzed and utilized and then the return path had to go back over the domestic satellite, back to the tracking and data relay satellite to the Spacelab in orbit. And it had been a troublesome system before, we really only had a partial test with the, for the STS-8 mission and also with a LANDSAT satellite. And then they hadn't been very successful. In fact, we had gotten individual transmission rate no higher than about 80% and in this mission, as they've mentioned we got something like 98.5% of continuity of service through TDRS. A really remarkable achievement with a system which we, had been troubling us for sometime in which we were continually adjusting right up to the moment of launch and then, as a matter of fact, slightly afterwards. I think that this very large system involving Shuttle, Spacelab, the instruments, the TDRS system, the people in orbit and the people on the ground at various NASA centers and in Europe and all the contractors involved. It's an enormous achievement and it seems striking to me that this was done on an international basis. I can't think offhand and I would assert that this has got to be the greatest international single scientific and engineering achievement that has ever been achieved. So I think we've got some really there, now as far as the science is concerned, in the various areas of science, I
think we've made major general achievements of great significance. I think in two areas in life science and microgravity science, we have really created new scientific fields. I think that there have, from now on, those are going to be and will be, I'm sure of it, recognized new fields of science. We, there have been incidental experiments in those fields before but and they were't trivial, but they were small short time and very limited in their capability or their scope. In both of these two areas with the 15 life science experiments that we've carried on during this and the 30 microgravity science experiments, we have a wide ranging scientific scope and we've really created two new scientific fields. In the area of space plasma physics, we've done something very significant and we've entered into an experimental area of active plasma physics where we use for example in the SEPAC experiment which some of you followed. We, using it, an ionic accelerator, an electron accelerator, we injected charge particles into space and depending upon the attitude of the Space Shuttle and the corresponding magnetic lines of force in the earth's magnetic field and so-called magnetosphere, we were able to provide beams that spiraled or that branched one way or that shot or crooked plume out another way. It was thrilling of course to sit there in the payload operation center at Johnson and see the whole Space Shuttle light up in many colors and this big plume come out and light everything up and it was exciting and thrilling. But the idea that contrary to past experiments where we had done passive (garble) measurements from spacecraft with small limited instruments. In this case, with some fairly large and powerful instruments were up there perturbing the environment and measuring the results. And incidentally, that indicates this energy because we had planned to observe this with two instruments. We actually were able to bring as many as five different instruments to bear on observing the space plasma physics experiment. In the other areas, in astronomy, in earth observation, in atmospheric physics and we had experiments in all of those, which are all well established areas of space scientist, we showed something else and that is that extremely worth while, science can be done in short periods of times and in this case, on a 10 day mission carrying very large and very powerful and very heavy instruments with lots of power, I mean lots of capability. And we for example, the imaging spectrometer instrument is a mammoth instrument, an extremely powerful instrument, a kind of an instrument which would as principle investigator Dr. Marsha Torr said, "would do credit to any laboratory on the ground to be able to take this marvelous scientific instrument with a great capability of going from infrared all the way through the optical to the ultraviolet and make these continuous across the electromagnetic spectro observations is just a really great move capability. I think we've been able to take these large instruments and of course, the other factor which is not unimportant in big science now days is that this is a very cost effective way of doing it. We have
flown these instruments, many of these instruments will be
modified to some extent and flown again and again and again. We
have other Spacelab missions planned. The next one for example
we will be, next time we'll use the module; we'll be with
Spacelab 3 which will be dedicated to life science and
microgravity science in November, a year from now, November,
1984. We will, one thing we will never do again, we'll never
have a mission as complicated as this one with as many different
experiments. It is not as efficient as, I'm glad we did and we
proved a great deal; it is as not as efficient as it would have
been if we had a dedicated mission to only one branch of
science. For example, the astronomy observations obviously point
up away from the earth and I guess you have to be careful about
saying up in space, away from the earth and the earth
observation mission will want to point down and you can't do
them at the same time so there were about 200 separate maneuvers
in order to do that. But all of that is new and it's all good
science but we have a number of future missions, I wouldn't be at
all surprised, in fact I'm sure, we'll get a lot of clamouring
for the scientific community to fly in space in the future. I
think I'll end it on that thought and that is, that this mission
has been so successful ... *
Edelson

I wouldn't be at all surprised, in fact I'm sure that we'll get a lot of clammering for the scientific community to fly in space in the future. I think I'll end on that thought and that is that this mission has been so successful and it has proved so many things about the role of man, the ability to do a really first rate science in so many space science fields that we entered into a new era. We'll now have a community of science, there are 72 separate experimental scientific teams here, I think we've got 72 teams of scientists now in this world, in Europe, in United States, in Japan, in Canada, who have had a favorable experience in space science. And they'll be advocates for Shuttle science and they will be interested in and all these new, all this science will grow and I'll add, not (garble) that I think this is going to lead to this major step in space which is the space station program for which NASA is planning as a big future operation. I think those of us who are interested in the program and who have been planning and thinking about the program are very much heartened now that we really have an opportunity to accomplish a great deal in this area. Thank you.

PAO

Okay great, that you. Let's start the questionings now, hear from Dryden. If you will please wait for the mike, give your name and affiliation and then we'll go on to the other Centers for questions. Let's start off with John Wellford, New York Times.

WELLFORD

Right here, right here. (garble) do you feel that you had the confidence to attempt the landing today, even though you apparently didn't really understand the problem.

ABRAHAMSON

The key was the development of the strategy as we went ahead. When we had the first computer failure, I frankly remember, there are 5 computer redundant, general purpose computers, that by itself was of not any great concern. However, when there was a relationship clearly between the first one and the second one and the firings of the RCS jets, and we didn't understand that, then the right things to do and the proper thing was just kind of slow down. And that's an old test pilot rule by the way, and that's when you're in trouble, you just kind of stop where you are and then see if you can back slowly out of it. So that was the first part of the problem, however, as we were troubleshooting that and when we had the failure of the navigational measurement unit that became, that showed that there was a time dimension that we had to be concerned with. So given that selection of failures, we felt that the least risk, solution and one that had the highest priority was to excellerate going into what we call and OPS 3 mode, and what that meant, was rather than continue to take time to try to understand what happened, while the computers were configured for essentially onorbit and pre-deorbit maneuver kinds of operations. We shifted gears earlier into a configuration and using the computers in the way that they would be used during the reentry phase, the OPS 3 portion. We
did that earlier in a normal reentry, and when we did that, that strategy allowed us to get an early look at the, whether or not we really had a lingering general purpose computer problem that would be something that would effect our mission. So it was really a question of changing the strategy and then once with that changed strategy, gaining the confidence as we did some of the early checkouts with firing the, operation in the OPS 3 mode, and doing that in preparation to descend itself.

WELLFORD Is there an assumption then that all those problems were related?

ABRAHAMSON Well we found some relationships and we're not absolutely sure, I think it's a little premature. In some cases, you know, the natural thing is, there is a time relationship so that says that you just have to look there to say that they're related. On the other hand as we look through and as we gain confidence by getting computer dumps primarily of the second computer and analyzing what we saw there and we did find some errors in addresses that were clearly transient kinds of problems and then later on when we in fact looked and satisfied ourself that the third computer did not have those kinds of problems that all added confidence to the process. But, you know, obviously when these kinds of things occur together there's a very high probability that you may indeed have a related event. But we do not know enough about to say for sure that that's the case yet. John. You can be sure we're going to look at it very carefully.

Wyatt Andershore (CBS News) For Mr. Edelson. You know, it was clear throughout the mission that everyone was, in the scientific community was clearly excited about this. I guess my question is, is there anything about the mission that you could tell us now that every man on the street should know about, should care about. Outside of the scientific community.

EDELSON Well, that's a question I really didn't prepare for. And I want to answer the question without offending any particular part of the community. I'd, I don't think there's any particular area that had an exclusivity on finding, it seems to me that the most significant area of work is in the Life Sciences. Where we first got the great body, for the first time got a great body of information on this, the things that we were interested in is adaptation to space and of course what's going on right now is readaptation. We're interested in the vestibular dysfunction of the, in the ear, we're interested in in the fluid shifts in the body, we're interested in calcium lost in bones and changes in the cardio vascular system and so in like that. It isn't as if we discovered, I think what you'd like me to say is that we discovered a brand new thing that we never knew about before. Some statements were made like that during the flight and I'm reluctant to repeat them here because the scientific community is sort of interested in analyzing the results over a
long period of time. In the life science area, as you know we've got a baseline over many months before they report it. So for any particular phenomena measure baseline. Then in space for 10 days, they got some changes and then after they landed, from now on, for the next 7 days, they'll be under close scrutiny. At the end of that time we'll have an enormous amount of knowledge for the very first time about adaptation to space and we will also have a great deal of information on the normal human response to the 1-g field. Abe has underlined some things here for me here. I've got a long list of things that I could read here, but I think I'll not, I have one, let me just go down one list of things here. It's interesting that just before the end of the mission we went through the, what amounts to the 38 scientific teams and we asked each principal investigator to rate his own results as completely or highly successful and incidently some of them rate it as more than 100% because they got more then they expected. In astronomy and solar physics of the 6 experiments in that row, everyone of them was in the highly or completely successful. Same goes for plasma physics, 6 experiments all highly or completely successful. In atmospheric physics and Earth observation, 5 out of 6 highly successful, the 6th one was the radar which burned out his transmitter. We think it was the traveling wave tube that failed. So they just got half the results of radiometric results. In Life Sciences, 15 successful ones out of, and one partially successful, and in material sciences we had 4 facilities, the ISOL thermo furnace, the radian furnace, the mirror furnace and the physics facility we got 3 out of 4. So that's a total of 35 highly or completely successful out of 38, the remaining 3 were partially successful. I don't think I can be (garble).

***
ROBERT BRAZELLE (NBC)  For General Abrahamson. How serious was the computer problem and when do you think you're going to know what happened and do you think it'll -- particularly how serious is your assessment of -- does your assessment of how serious it was changed, is changed by the fact that the second computer number 2 failed when the nosegear touched the ground.

ABRAHAMSON  No, not at this point. Again, remember we've got five redundant computers here. The way it would be serious, obviously, and we won't know this until we really begin to look into it, is if there was the kind of a problem that would ripple through all of the set. And that's what, of course, our initial concern was about, and as I said, as we gain confidence that by reading out and by looking at computer dumps, particularly on 2 and 3, and understood that 2 had a transient phenomenon and 3 did not, then we felt much better about that. Oh, there's clearly a problem and I don't want to minimize that, but as some are fond of saying, we were not, you know, on the edge of some huge problem.

BRAZELLE  When do you think the people at JSC will have a complete understanding of what happened.

ABRAHAMSON  It's very hard to predict, Bob. Obviously, a key part of it is how much is really retained now in the computer memories and we are going to have to go in and look at the hardware, particularly on number 1 because on GPC 1, we think that that may well be a hardware failure and that takes extensive analysis. It's going to be a matter of weeks, Bob.

BRAZELLE  You don't think there's any chance that it could be so bad that you would delay subsequent scheduling.

ABRAHAMSON  We have no indication for that now, no.

PAO  Let's take a question back here.

First of all General, could you comment on the failure of the computer, as he mentioned, what actually happened and if I could extend the computer question a bit further, was there ever concern about the safety of the astronauts? That seems to be -- when people hear about failures in space, when people are stranded, all these things come to mind. Was there any (garble)?

ABRAHAMSON  That's what I'm trying to get across, you know. Surely, there is always concern and we want -- our philosophy is to run a very safe and a very routine mission and this was nonroutine. We don't like that, but we were not in one of these kinds of conditions where, yes we have potentially a disaster out
there. As much as some people like to have that in order to have it in the news, we were just flat not in that kind of condition. We are going to be very careful, obviously, and we were, and I mentioned, in terms of the problem, we don't really know yet, but what we did know is that we had a strategy and that strategy showed us that we had a safe way to return.

PAO

Please use the mike.

How about the computer failing upon touchdown, did that take place.

ABRAHAMSON Yes it did, but I don't know anymore about it except that there was some kind of failure in there.

With one computer, or --

ABRAHAMSON It was number 2 that failed. It was the one that had transients in it.

The one that failed didn't come back --

ABRAHAMSON Yes.

PAO We'll take the questions. Gentleman in the red shirt, you got a question?

HERB ROSEN (Mitchell Publications) Mr. Benjeau, you said that your European future is key to two things. One was making good use of the Spacelab and the other was a new joint venture, which I didn't quite understand. Would you elaborate on that?

BENJEAU Yes I could elaborate a little on that. First (garble) for the future use of the Spacelab. At that time, what is sure that it will be, I think, it now (garble) 85. The flight is called G1, it is a German flight, German flight paid by the (garble) and for which one ESA will have at the (garble) about the third (garble), one third of the payload including the sled which was initially planned for the (garble) on flight, but for which one for reason of weight during the flight, it was decided to shift to the (garble) flight. As of this flight, it will be quite (garble) and it will be for the second time, Europe (garble) manned experimenter onboard in the crew. Then we would have the (garble) flight during few flight in 84 and 85, four experiments were excepted by ESA and NASA (garble) as strongly impacted by the delay of the flight from September to November. No (garble) observation. As of the real flight, two flight in 84 and 85, and for the present time, it is all what is decided. We have some idea of (garble) that we would have flight participating, for example, in the international microgravity lab. We were (garble) for which one we disagreed at that time between the (garble) ESA mentioned member state, what could be
the interest of that, and I hope that we will after the success of the present flight decide to use more the Shuttle Spacelab (garble). It is for the first point. For the second point, it is (garble) to the space station that I have in mind. It is sure that if and when NASA would decide to make space station, it will be sure that we will be interested in (garble) and in ESA to cooperate in this so important joint venture. I don't when, I don't know in which percentage, I don't know for which it is lot of problem for which one that we make from few months a lot of (garble), but it may be few decision in 84 or in 85, or in 86 I don't know. It is a view, that at that time we think that the best way for operating the space station is to make a complimentary cooperation with you.

PAO The gentleman right here.

MARK BERBACK (United Press International) Gen. Abrahamson, I realize you folks only had time to give the Orbiter a very cursory examination, but I'm wondering what the condition of it is.

ABRAHAMSON On a preliminary basis, it really looks very fine. As I mentioned, probably after each flight, I really like used spacecraft.

PAO Do we have any further questions from Dryden? Okay, if not, we'll now go to the Johnson Space Center in Houston and take questions from there.

PAO Craig.

CRAIG COVAULT (Aviation Week) For Abe. Abe, do you believe that the performance of both the Orbiter and the Spacelab on this flight helps make a stronger argument for NASA to develop an extended Orbiter capability?

ABRAHAMSON Well, we're studying that, Craig. I think the real question, surely, it does show that the capability is there and we can get a great deal out of it. Just how much you can build on an extended capability depends on starting out with an objective right from the start to do that. For example, we perhaps, and we had additional time on this mission, we could have gotten another day or so, but each day, the scientific return would have probably gotten a little less. The marginal return would have been less, so we would have been looking economically and from every way of looking at it, as a kind of a diminishing situation. If there were a longer capability Orbiter that were developed, it would offer us an earlier opportunity to look at long term things, but those long term kinds of investigations, there hasn't been a good definition of that yet at this point in time. That's why I think it's both important that we study not only the capability of the Orbiter to do that
but just how it is that User's would be able to use such a thing, and those answers aren't in, Craig.

PAO       Lady back here.

SUE BUTLER  I don't think we heard, but were they able to penetrate the blackout during reentry and communicate with TDRS?

ABRAHAMSON  We only expected to be able to penetrate through and get some additional TDRS data on the order of about 2 min of extra data as you went through, and I think we are somewhere near that in our calculation. I don't think that we clearly have a way yet defined that we can get through the blackout periods.

***
Perhaps with something, some better antennas or some more signal strength available at the satellite, we could go further, but we only got a couple of extra minutes as I could tell and that's very preliminary.

Dave Dooling, the Huntsville Times.

Abe, excuse me, Abe, when all this got started back early this morning, did I understand John Young correctly to indicate that those two thruster firings seemed to be unusually hard?

He did indicate that. And we did investigate that, remember there are several things that go on, one is we had not used the large primary thrusters for a long time now during the mission so in that since obviously that, that was a capability. There may have been something that was in terms of a little larger thrust but we couldn't find it in that we didn't have an extended period, they were the standard 80 second period of firing, at least that's what the preliminary analysis showed and we don't have any other indication. Now, of course what John indicated is an important part of our investigation so we're going to go back and look at that and use those inputs as we try and figure out what did happen. But on a preliminary basis, we did not see things on the ground that would really say, ah ha here's something that, that we've all pointed to that begins to look at where this thing came about, or where the problem got generated.

Okay, and what I was driving at there was, if there was a possibility perhaps that that particular thruster had a, some sort of hardstart (garble) imbalance and might have sent a transient g-load through the airframe and perhaps knocked something loose in the GPC to cause that hardware failure. And apparently set it up so that you don't have the second failure when the nose wheel came down.

Obviously, that's always a potential, and as I say we can only speculate at this point and we'll certainly follow up the observations that the crew made in our investigation. But I don't have any specific thing that points to it at this point.

Gentlemen over here, name and affiliation please.

Doug Miller, with KTRH. General Abrahamson, you indicated just a little bit earlier that some erroneous information if I understood you correctly, had been fed into the computer, can you give us some indication of what you know so far about what went wrong? Can you give us just a rundown of what is apparent at this point?
ABRAHAMSON    Yes, in computer number 1, and that's the one we were operating in, in the orbital operation, we had the kind of a failure where we could not reinitialize the machine. That suggests what we have often called a hard failure, meaning an irreversible software failure or a hardware item that failed itself, and again we won't know what that is until later on and after we get a chance to kind of dissect the problem. In computer number 2, we had a transient, we know that because in our data dumps, we saw that certain addresses were changed and were changed in one readout and in a later, in another readout they were not. It was a transient character, and they were spread through different portions of the memory all reflecting back to one what we call a software page and again we don't know the specifics of that, if that's induced by a hardware transient failure or something else but those are the only things that we know about in the orbital phase of the mission.

MILLER     Okay, one final point, is there any relationship as far as you can tell so far by the popping and the banging that was heard earlier in this mission, the problems we've heard today, and finally can you elaborate just a bit on your thoughts about the possibility or what your thinking is on perhaps how this might effect the schedule for future missions.

ABRAHAMSON    One would not expect that the popping and banging was related to this, the popping and banging is what one expects in a thermal test, remember we had it on the first four flights, we had some long heat soaks and some long cold soaks, and the crew's heard that and everybody kind of got use to that, well that's what we were doing on this flight, primarily for the Spacelab. So it was those noises and vibrations that were going down through the shift, were related to that, I think its highly unlikely although I guess anything is a possibility that that was related to the computer problem. Again depending on what that computer problem really is, that's, I don't see anything yet that would tell us we shouldn't continue to work for our next flight. So we're going to just hustle out and try to do that. Avionics problems are sometimes, they have a shorter half life than some of the other kinds of problems that we've had, in that you can go if you find that its a transient problem, you can go change components rather quickly and in addition you can make software corrections, so I, I would hope that certainly whatever we fine, that we probably have a high probability of maintaining our flight schedule.

PAO     That's all the questions here...

I understand that's all the questions we have Houston, moving on across the country, we'll go to the Kennedy Space Center in Florida.
Frankie Sender from Today. Just one question, at
the risk of provoking other extended discussion on this, is there
any indication that we've learned anything new on the human
system and microgravity, that the Soviet Union hasn't already
learned in their extensive (garble) program.

ABRAHAMSON That's a hard question to answer, because we don't
have complete information on the Soviet program, but there never
has, to our knowledge, there's never been nearly as comprehensive
a program as we've had on this mission. We had as I mention
these 4 facilities all of which were exercised with multiple
samples, we had lubrication experiment and technology and we have
gained a wealth of knowledge in that area that we don't believe
the Soviets have even touched. I think the answer to your
question is a positive one that yes, we've gathered a great deal
of info... and have many findings some of which have exciting
potential for future processing in space or for use on the ground
and with no indication that the Soviets have done anything at all
that is as comprehensive or across the board as what we've
done. Is that a scientific way of saying, you think we're ahead
Burt?

EDELSON I think we're, I think this particular mission has
put us very far ahead, very far ahead indeed.

It seems that in the field of material processing
in space, with the information that I get at that time it was one
first, it was the first time that it was floating (garble) in
space. It was the first time when the operation was made and
with information that we get, then the operation was successful.
But it is quite difficult to say more.

Gary Ballenoff, from WCPX TV. I'll rephrase
(garble) Anders earlier question to General Abrahamson. We
understand that the science went well, but to put it another way,
why should the average person on the street in London or in
Orlando, or in Dallas or anywhere else, be particularly excited
about this particular mission?

ABRAHAMSON I would really prefer to let Burt or Michelle
answer that because that's really in their area. Let me see if I
can kind of reduce it to human terms. When a scientist who is a
leading expert in the world on, in a particular discipline, comes
out and says even though he had a less opportunity to get all his
data because of the time of year, that we went, and I'm speaking
now of the gentlemen who was working on the gross spectrometer,
and says, my gosh I can write at least 7 wonderful papers here, I
think the man on the street, even though they may not know what
the gross spectrometer means, that means that this man who has
dedicated his life to an important scientific discipline has come
to the conclusion that this flight was worthwhile and the
investment of many years in that instrument will pay off not only for him but for all his colleges. That's got to mean something.

And that's all the questions from the Kennedy Space Center, we will come back here to Dryden and if there's any further questions? There appear to be, okay. Okay the gentlemen in the blue shirt.

Yes, I'm Phil Carso with the Space Calendar. I'd like to know about the TDRS, I understand that because we only had one to begin with, we lost a good bit of data or had to record it and then it was with some problems during the flight, how did it actually affect the flight? Did we lose any data and are you going to replace it?

***
ABRAHAMSON Well, as I indicated in terms of availability and remember this was planned availability, if we had had the second TDRS in orbit, we would have been really had nearly around the world coverage in each case and what I believe and Burt, I'd like to ask you to add to this, but I believe what that meant, I don't think that we lost data as such what we lost were opportunities to have the scientist working again in real time and having full real time access to both the astronauts and the data. Now, because we had such well trained people and they had planned so long and hard for this mission, I don't think it was a major impact because they work so well together, on the other hand, it could have been a very significant loss and in that sense I think that the TDRS really did a great job for being one and having several hardware failures. Burt would you like to add to that.

EDELSON Well, what I was going to say is that originally what we planned to have two TDRS in orbit and that would have given us more coverage. However, we knew we were only going to have one TDRS quite a long time ago and since the middle of last spring, we are planning on having only one TDRS, and so we arranged our timeline accordingly. It complicated the timeline a great deal and there were more orbital maneuvers to reposition the spacecraft and some of the observations were shorter period of time than we will, we would of liked. However, all instruments weren't affected and we have high data rate recorder onboard, some of the experiments had a good deal of interaction with the ground and some had no reaction, interaction with the ground and some had moderate. It worked out extremely well, we would have been pleased to have both in orbit but I would say that it did not have the, any adverse effect of any magnitude on it. With regard to that length of time in orbit, which Abe addressed before, from the science point of view, we were delighted to have 9 days and the fact that we got a bonus 10th day was wonderful for us. We would of course like to have had an 11th day or a 12th day but what we really showed in this mission is that for a period like 10 days, we can get an enormous amount of data and there are many observations for example, solar observations of solar size mology and so on where the period of observation is such that you can get a complete set of data on much of it in a short period of time. And so I'll keep the pressure on Abe to try and extend it a little bit, the, its really the giant step that we need and that is the ability to make scientific observations and conduct scientific experiments for a very long period of time in space, measured from months to years so that although I think its somewhat extended its day of the spaceshuttle in orbit, well be desirable, it will never replace what we hope to get with the spacestation, which is very long periods of time in space so that we can make observations over annual cycles and make complete sky surveys and so on. (garble).
...what I would say is that the high data tape recorder was planned as a backup of the two TDRS in (garble). As of the fact that it was decided to make the (garble) fly only with one is necessary to the high data rate recorder to be a backup during half, half, half one orbit, half (garble). And so it was eventful (garble) view of the high data rate recorder was a very, very, bad (garble) view here. Fortunately, it's duration was only a little more (garble). We were (garble) about 1 to 2 percent of loss of the data (garble) and in the 10 (garble).

Okay, we'd like to take two more questions and then rap it up, right here.

Yes, Gen. Abrahamson, why was it so important to so quickly (garble) the four scientist today? And what test will they be undergoing?

ABRAHAMSON  Well its not because we had something to hide. Unless the doctors are really planning something quite diabolical in which I don't think, I was going through some of their equipment although some of it looks diabolical and it doesn't fall in that category, I think. I think their attentions are honorable. Maybe you should answer that.

The answer is very simple, and that we want to get a baseline data on recovery from zero gravity. We, the idea we had is that we take the two mission specialist, the two payload specialist and, and put them immediately, (garble) them into, and start making tests. It was our idea, in fact, they were suppose to have come down to the middeck, lie down and rest until they could, leave the, leave the spacecraft and then we thought it would be a good idea to put them on stretches and carry them down and put them in the ambulance and whip them over there without any exposure at all, because the idea would be to make all these medical tests on them immediately. The thought was that that wouldn't look to good to have these guys come out on a stretcher, so they walked down, but as you can see we got them in the van right away and layed them down in the van and took them right over to the very large vestibular facility that we have here and we're subjecting them to many kinds of tests. (garble) tests where they move back and forth and the spinning globe test and testing, and obviously blood test and fluid (garble) check, and cardiovascular test and so on. It isn't really known whether the real adaption of various body functions take place over minutes or hours or days, and so they will be under close surveillance for 7 days. They won't be in there all that time in fact on the fourth day their going to come out and do some flying and then go back in again, but that's the reason because in order to make the inorbit test valid we have to reestablish the baseline on the ground.

Okay, lets take the last question over here.
Yes, this for the General. Early in the mission we saw some of the crewmembers become irritated in the tradition of Skylab, Skylab 4 and Apollo 7, was the work load in the early part of the mission a factor to the crew feeling like their being pushed too hard?

ABRAHAMSON First of all, I think that again people have focused wrongly on this issue. It's, certainly there was a workload problem and I think the crew held up magnificently in that process but I think what you saw happening was, we just indicated earlier that this whole mission, one of the wonderful things about it is that their is this close communciation between the ground, many scientist on the ground and the crew and whenever you're attempting to communicate particularly with people whom may not be quite as use to doing the task that's going on, then there are difficulties in communication and I don't, you know I think you ought to be focusing on the irritibility, I think what people were trying to do was to accomplish that communications and get it straight and where it was a problem to get it straighten up quickly. And that's the real issue. You know lets not focus on the style and lets focus on the substance, and the substance was that out of that communication came just a marvelous new operating mode in space, for man in space and for science.

Okay, thank you and good night.

END OF TAPE
briefing at the Ames Dryden Flight Research Facility. The eleven o'clock weather briefing indicated the weather for tomorrow's landing will be clear with no problems. Winds will be light and the temperature is predicted to be 42 degrees. Lake bed 17 is prime for the landing still. When we get to the questions, please remember to wait for the mikes and give us your name and affiliation. With us today, we have Dr. Robert Clark, Baseline Data Collection Test Manager, Dr. Jerry Bannock, Spacelab 1 NASA Life Sciences Project Scientist and from ESA, Dr. Allen Benson, Co-investigator on the 201 Life and Sciences Investigations from RAF Fairbough Institute of Aviation Medicine. Dr. Clark.

CLARK Good morning, we'd like to describe for you today the activities that will take place in the life sciences baseline data collection facility here at Dryden. This will be activity involving the mission specialist and the payload specialist that will start very quickly, approximately 1 hour after landing. These tests that we'll be doing in the baseline collection facility will involve the MS's and PS's are mentioned and will take place on approximately 23 tests of the life sciences experiments that are onboard Spacelab 1. There are 16 total, 7 of those are ESA experiments and 9, pardon me, 9 are ESA experiments and 7 are U.S. experiments and of those, there are 11 that involve human test subjects. Five of those are NASA and 6 are ESA. The facility test that will take place, 23 tests that will take place on the crew and the baseline data collection facility. It is located here at Dryden, it's about 5,000 square feet in size. These tests will vary from approximately 10 minutes to an hour and 15 minutes each. There are 14 of these tests that are accomplished preflight, inflight, and postflight and 9 that are done pre and postflight only. There are tests involving the vestibular system and measuring the body's equilibrium system. The test involving blood work, venous pressure measurement, ballistocardiography, the measurement of the body's recoil from the pumping of the heart and there's mass discrimination and physiological monitoring of EKG and EKG or sleep monitoring that is for the EKG that's done inflight. These tests that will be done postflight will start approximately as I mentioned about 1 hour after landing and there will be approximately 9 hours of testing on the mission specialist, one, Bob Parker, payload specialist 1, Ulf Merbold. There will be approximately 12 hours of testing on landing day on Owen Garriott and on Byron Lichtenberg. The preflight measurements were made in 5 different test periods. Preflight at 120, 90, 60, 40, and 10 days preflight and the purpose of that testing was to measure the baseline of the crew or the normal response of the crew on these various 23 tests. The inflight measurements measure how those tests behave in zero g and how adaptation to zero g takes place and the postflight tests will be measuring the readaptation to earth gravity. The readaptation times of the various parameters, some of them may be as short as minutes, some of them...
may be as long as days. So the series of tests that takes place postflight will be done on landing day 1, day 2, day 4, day 6 and day 7 after landing. There is also some KC135 zero gravity aircraft flights that will take place on the third day after landing that will measure the crew's motion sickness susceptibility to those flights. The operation of the facility during this testing, it requires about 60 people for the operation of the facility. There is some support people, there are central facilities in there that i. will see and there's also investigators from the United States, Canada, England, Scotland, Federal Republic of Germany, Belgium, France and Italy. We have some film that's on video tape now of the activities on these various tests. This film was taken at approximately 60 days preflight on the testing that we've done there and we'd like to go to that and show you some of the tests. We use two facilities for the baseline collection, one is the dreyden dispensary and the other is the baseline data collection facility itself. In order to minimize readaptation of the crew after landing, when they're moving between these facilities, we will be moving them on gernies and also between tests when there's a slight break, they will be placed on gernies in order to minimize readaptation. It was Byron Lichtenberg, the United States payload specialist from MIT that you saw on the gerney. This is Dr. Michael Hampton who is the alternate payload specialist from University of California at Berkeley. There are blood draws to take place in the dispensary and there are several investigators with the series of blood experiments. There are two U.S. investigators for experiment 103, Dr. Carolyn Leach from NASA Johnson Space Center. And experiment 105, Dr. E. Voss from the University of Illinois. The two European experiments, experiment 27 and experiment 29, the principle investigator is Dr. Karl Kirsch from the Freien University of Berlyn of the Federal Republic of Germany. Dr. Kirsch is measuring hormones in the blood, he is also doing this venous pressure measurement. The measurement of the venous pressure is a reflection of the central venous pressure as you can see the crewman is in what's called a arm/down table so that there's no pressure around the arm that would restrict that flow. Another experiment that's done in the dispensary is the experiment 026, ballistocardiology experiment. This is Dr. Byron Lichtenberg again. This experiment measures the recoil of the body that is caused by the pumping of the heart. In zero g, you may have seen the inflight video, the crewman is suspended in the middle of the Spacelab, he is wearing accelerometers on the backpack that you saw there and they're measuring the acceleration forces to the body that is caused by the pumping of the heart. In one g, this is measured only in two dimensions. It's measured while the crewman is at rest and also while the crewman is exercised to raise the heart rate. Also they're measuring respiratory function during this exercise and during a portion of the test. This is Dr. Rosideaux and Dr. Frondel from the University of Rome.
One of the central facilities in the SDOF itself is a laboratory sled. This provides linear acceleration to the crewman and it is primarily for investigating the response of the otolith organs or the ishnomes to linear acceleration. The responses are the eye movements that can be seen and the various eye rotations, we'll describe those a little bit more fully when we get to the individual experiments. Each of the three experiments that use the sled use a helmet in which the subject's head is restrained. This is Dr. Lichtenberg in the sled. There is also a joystick present in which he can indicate the direction that he senses that he is moving. The 35mm camera that records the eye movements for the 102 MIT experiment. The MIT experiment, the principle investigator is Dr. Larry Young from Massachusetts Institute of Technology.

YOUNG       This sled set various acceleration profiles, it's approximately 30 feet long and in that short acceleration period, can achieve speeds of about 17 feet per second. There is also for the 102 experiment, a closed loop threshold test in which the sled is moved in various random profiles and the crewman by using the joystick is asked to knock out that motion. It's a detection of linear threshold perception.

***
CLARK They have camera magazines that have to be changed between the various runs on the 35mm camera. The camera measures the eye movements both on a horizontal plane and also there is rotational motion of the eyes as they are stimulated by the various vestibular cans. These accelerations will go up to about 6/10 of a g acceleration force. If you noticed, there's an American flag on top of the sled to tell them there. There will, of course, be a flag from the Federal Republic of Germany when Dr. Herbold is in the sled.

This is the helmet that's used with the European vestibular experiment. The European vestibular experiment is experiment 201. The Principal Investigator is Dr. R. Uri von Baumgarten from the University of Biele, Federal Republic of Germany. They have a digital video camera that measures the eye movement, and then that can be measured by using the computerized version of that signal. In this helmet, they have the EOG electrodes for measuring the electrical stimulus to the muscles in the eyes. They also have a video pattern that is produced. This is an aystigmatic that's caused by a caloric experiment where they put warm air in one ear and cool air in the other, and it produces rapid eye movements. That's the trace of the aystigmatic that you see on there on the oculiscope. They have this video camera in there also, as you can see, Dr. Parker, who is the Mission Specialist on the Red Shift. You can see the electrodes there on his forehead for the electro-oculargram, or EOG. This is Dr. Uri Herbold, the European Payload Specialist. This particular test is BLTDD, or Benson Linear Threshold Detection Device, a experiment developed by Dr. Benson here on my far left, and they're measuring the linear threshold in several axes on the crewmen. This is a miniscule or microscale. It has very low g acceleration forces and the crewman is asked to indicate with the switch when he senses motion and the direction of that motion. Protocol for the test is much like a hearing test where you have decreasing til the crewman senses the loss of threshold and increasing til he does sense the threshold. It was done in the forward axis originally and then this upright axis. In space jargon, that was the X-axis first and the Z-axis was just performed, and the Y-axis will be accomplished here as soon as they rotate the chair around.

You'll not be able to see the motion of the sled. It's a very slight amount of very gradual acceleration and this particular device has ear bearing surfaces in order to get the smoothness that is needed. This is Dr. Michael Lampton who is the subject, the US alternate payload specialist. This is a rotating chair which is part of the ground investigations and used by the Massachusetts Institute of Technology. Co-investigator who is also the test operator here is Chuck Oman from MIT. This measures the EOG, or the electrical imputs to the eye movement. The chair is rotated and that stimulates the semi-circular canals within the inner ear and you will see some rapid
eye movement associated with that. That will be recorded by the EOG electrodes. The rotating chair is moved up to about 30 revolutions per minute and then the breaks are applied and you will get rapid eye movement after that. The head is then pitched forward which tends to damp this rapid eye movement in a so-called nystagmoid dumping experiment. This is Bob Parker again putting on EOG electrodes with Dr. Benson. This is another measurement called angular VOR, or vestibular oculo reflex in which the body is rotated, not only on center but off center on this rotating device. There is a video camera inside the helmet that measures the eye movement. There's also EOG electrodes and there is also accelerometers that measure the motion of input. The eye movements are in response to the various inputs that the vestibular organs receive, both to the otolith organs and the semicircular canal. This is Ulf Merbold being fitted in another helmet for the European 201 experiment. This particular test is the optokinetic test. They have a camera inside again, a video camera, they have a video tube in which an image is projected and the eye will try to follow that image. There's also accelerometers in the helmet. There's also EOG electrodes and he's standing on a platform that consists of a series of load cells. He goes through various body movements and the responses to all those movements by the eyes and the otolith organs is measured. This is the sock pattern that you see on the is what the crewman sees and then they are measuring the response of the eye on the other camera. Some of this data are recorded, EOG data is recorded, and the accelerator data are recorded on a strip chart recorder. This is Dr. Byron Lichtenberg, again, being fitted with electrodes on his leg. This is a precursor to the experiment 104 test which is the Hoffman reflex experiment. An electrode is applied in the leg, a needle electrode applies a very small electrical current as a stimulus and then the EMG or Electromiogram response is made in the shape of the waves, two types of waves indicate the response to that electrical shock. This has been shown and to change in zero g based on KC135 flight data. Also there were some measurements made in flight of this and will be measured postflight also. This shock is applied while the crewman is dropping off a T-handle under various acceleration modes. The crewman is being accelerated at 1 g by earth's gravity. The targets that you see there there in order to record the movement of the body with high speed motion picture photography. Preflight, this experiment is also accomplished on the ground using the laboratory sled as the acceleration force at various levels. Same basic measurement is made. The electrical shock is applied in the response and the Hoffman reflexes is measured in response to that shock. This is the 102 hop and drop experiment. Crew investigator is Dr. Douglas Watt from Magille University. They're measuring the electrical input to the muscles on the leg, the EMG, under a controlled condition, a controlled movement which is stepping off of the platform on to the pad and then measuring the EMG during hopping. This experiment is accomplished inflight and also STS-9
during dropping. The counter balances they have there reduces
the fall rate for purposes of the portion of the ground test.
The inflight experiment has bungee cords that pull, give the
acceleration force to the crewman. Those are just in three
different sets. You can achieve accelerations at .3.6 in 1 g.
Let me see, MIT posture platform which measures the leg muscle
electrical activity and this is measured during a sudden tilt of
the posture platform. Another type of measurement on a posture
platform, this is in experiment 104 posture platform, experiment
104 is Dr. Miller Reschke who is co-investigator for this portion
of it, Dr. David Anderson of the University of Michigan. Dr.
Reschke is with the NASA Johnson Space Center. And the muscle
response, the EMG response of the leg is measured.

***
This is Owen Garriott the Mission Specialist on the Blue Shift putting in contact lenses with special markings on them prior to doing a test on a rotating dome. This is an inflight experiment, we're doing pre- and postflight here. The dome was rotated, the eye rotated somewhat in order to track the visual field and the body contains a sense of motion from this. A 35 mm camera is photographing the movements of the eyes. Dr. Garriott is, his head is fixed by means of a bite board during that experiment. That experiment is done when a person is standing up direct and there is also the supplying dome which Dr. Parker is preparing for test in here. Both of these dome experiments are part of the 102 series of experiments from MIT. Doing some final adjustments there on the supplying dome. This is Dr. Young from MIT, the Principal Investigator of the 102 series of experiments. Data are taken with strip charges and also recorded on 81/2 tape recorder for the supply dome. In just a second here you can see the flashes of the camera and then the dome will start to rotate. This is the awareness of position experiment, Dr. Garriott is the subject, the coinvestigator from one of two, is Dr. Ken Money from the Defense Canadian Institute of Environmental Medicine. This is a measure of the disorientation that the crewmen may experience in zero-g. Part of inflight protocol that takes place during the day and also one when the crewmen first wakes up in order to measure the disorientation that the subject may have. The rod and frame experiment from MIT, the subject is in a darkened room, a series of rods that are in form of a square are positioned at various angles and the crewman is asked to line up a central rod so it's at true vertical. Also there's a balance being tested, it's called reels and (garble) experiment. This is Michael Lampton performing the mass discrimination experiment, the principal investigator is Dr. Helen Ross from University of Sterling of Scotland. The crewman is asked to compare various sets of those balls, as far as the mass is concerned there's only about a one gram difference between some of these, and is asked to compare them. This measurement is a measure of weight, when you're in one gravity, when you're in zero gravity it's a measure of mass. The day is recorded on a card, this test was performed inflight by the Mission Specialist, the Payload Specialist and also Brewster Shaw performed this experiment inflight. This is Dr. Wubbo Ockels the alternate Payload Specialist from Europe. Wubbo is being fitted with EEG electrodes by Dr. Ovin Kadense the coinvestigator on the experiment. The experiment principal investigator is Perry Green and Prank Stote from England. EEG electrodes are being applied here, there are also, this is done for sleep recording inflight and this is the pre- and postflight measurements associated with that. During the day inflight this physiological tape recorder, for the O30 experiment is used to, for the measurements. There is one experiment that we didn't photograph, it's part of the 201 vestibular experiment, which is a dark lab and tilt table. We neglected to make that measurement but it was rather dark to make the measurements anyway. Okay
we'd like to, to my immediate left is Dr. Jerry Romlick from NASA Johnson Space Center, if he has any comments.

ROMLICK I think that the only comment that I'd like to make at this time is that for the majority of the life sciences investigations the landing of the Shuttle vehicle tomorrow will represent only about 2/3 of the total inspected data of collection. And as Dr. Clark pointed out, it's critical to most of the life sciences investigations to collect data, postflight here at Dryden in order to characterize re-adaptation to E-g. I can probably add more to that later but that's all that I would add at this point.

Okay, Dr. Allen Benson.

BENSON No, I was going to simplisticize the point that the data collected both pre- and postflight is just as important as the data collected in flight and neglect the activities here, would be to neglect a major part of the mission itself.

Okay, are there any questions from the audience, please raise your hand. Front row, John Wolford, New York Times.

WOLFORD How are they going to be transported over to this facility? And could you tell us where the facility is?

BENSON The facility is located across from the Dryden dispensary. They will be transported...

Where's the Dryden dispensary?

BENSON ...it's to the west of us about 300, maybe 400 yards. The transportation of the crew, the crew when they come out of the Orbiter will walk over to the vehicles that are available, the crew astrovers, there will be two this time, and the crew will lay down in those vans, the purpose of the laying down is to minimize the re-adaptation, and they will be transported laying down in those vans to the Dryden dispensary. After the, that is the, a precursor to the blood experiments, where they do the blood draw, there must be a 30 minute wait time before the starting of the blood experiments. Some of the crew physicals will also be accomplished in this same time period. They will then after the completion of the blood work and the crew physicals start in the baseline data collection activities of the other baseline data collection activities, other then the blood. The Ballisto Cardiography is in the dispensary, the other experiments are over across the street in the BDCF. They will be moved from the dispensary to the BDCF on gurneys when there are long periods of time or long distances to move, we will have them horizontal to minimize the adaptation.
WOLFFORD A gurney is a stretcher on wheels?

BENSON Yeah.

Dr. Hommick, could you explain, you mentioned how important these were, these rather uncomfortable looking experiments, and weeks more of them. Could you explain in a nontechnical way, exactly why they're important and how it is that they're going to contribute to the knowledge that you've been getting from Spacelab?

HOMMICK The majority of the experiments that were highlighted in the film, dealt with vestibular physiology, or space motion sickness. As you probably know, space motion sickness, or what we now call space motion adaptations syndrome is a biomedical problem that has presented itself to us for a number of years now, we still don't fully understand the causes of this syndrome or do we have totally effective counter-measures for it. It's our hope that with the data that are being collected with the set of experiments that you saw highlighted in the film, that we will gain more insight into the mechanisms or the etiology underlying space motion sickness, and then being able to apply some of that information to a solution to the problem.

Dr. Clark? I understand that most of these experiments are in vain of pure science. You're looking simply for statistical data on these individuals, but can you give us an idea of how this might apply to medicine in general some time in the future. We've gotten so many other products in innovations from the space program, but how can Spacelab and these medical experiments effect the general public medical facilities and so on in the future?

***
CLARK All of the same mechanisms that are being measured here are, the measurements are applicable to ground based motion sickness and ground based problems with the vestibular system. I would rather like, Jerry Hammock, if you don't mind amplified that some what.

HAMM ock Well the only thing that I might add to that is not only are the data or much of the data we're collecting should be applicable to dealing not only with motion sickness during spaceflight but also on the ground. But a lot of more sophisticated measurement techniques are being developed both in measurement and analysis of responses that should go a long way in terms of dealing with similar problems with disequilibrium and motion sickness and man on Earth.

Can I, I'd like to (garble).

(garble) that the techniques used for particularly recording eye movements and the analysis of eye movement recordings have already found their way into clinical research and examinations of patients with ear, nose, and throat disorders. So there was already covered the long time it's taken before this, those experiments have got off the ground. Then they have already found application and are being used (garble) at a few centers. Particularly not necessary recording eye movements but it has provided a big importance to the analysis, computer analysis of the eye movements.

Yes, next question please.

I didn't quite understand the (garble) of (garble) posture platform test, or the idea behind it, do we have some reason to believe that people's posture changes after so many days in weightlessness.

I'll comment briefly and then Dr. Brown, or Dr. (garble) may want to add to it. Yes, most definitely, we observed all the way back to the Apollo crewmen I guess that when crewmen return from some period of time in weightlessness, there is a (garble) or postural disequilibrium that's manifested in how they walk. This was shown even more dramatically following the long duration Skylab missions when crewmen had some difficulty maintaining balance particularly with eyes closed for up to 10 days per flight, some of the measurements that you saw in this film are intended to better understand the (garble) underlining the postural adjustments that occur in weightlessness and the readjustments that occur on return to 1-g.

(garble)

Since the balance, yes. Yes.
But it's not only the sense of balance it's how they deal with cultivations of balance, it's certainly, Russian experiments have shown and the French have shown that if, if you would pose a small disturbance in the way in which the crewmen react to that, having been exposed modify his patterns of motor activity in the weightless environment, then this inference is low he behaves on return to the 1-g environment and became interested in how long it takes for the readaptation to this familiar environment, how long that takes place. In addition to posture can I also add that at the 201 experiments also looking at posture merely the visual vestibular interactions, such as their there putting in a visual stimuli that's creates a illusion or movement and looking at the postural adjustments that occur to that kind of stimulus.

PAO John Brooks, KNBC News.

BROOKS For Dr. Clark. Are these, looking at that film, are these tests particularly stressful on the astronauts, is there any danger to the health from the experiments themselves, and have you got any complaints to this type of rigorous procedure?

CLARK We have gone though a series of the tests preflight with tests days on the order of 10 to 12 hours, the tests are rigorous test, however, the crew has been in fine spirits through all of this and these tests have all been reviewed through both the ESA medical board, and through the JSC medical board to ensure that there's nothing harmful with the tests. It is a long day, it is quite tiring to do these tests but there's nothing harmful about them.

BROOKS Will there be an opportunity for, will they be in complete isolation or will there be an opportunity for their families to see the four astronauts who will be in this testing procedure?

CLARK The, during the testing itself, there cannot be any interruptions because it upsets the measurements, however, there is a slight break I believe I had mention might have a schedule on that one, they will be able to visit their families during the dispensary activities.

PAO Okay, if there are no more questions at Dryden, we'll go to Johnson Space Center for questions. Are there any more questions here at Dryden?

Jerry had a couple of comments here about (garble).

And also for the other members of the crew?

Repeat your question, please.
Alright, this is Jeff Levenworth with Time Magazine. Will one of you tell me how long this assortment of post flight tests will take for the Payload Specialist, the cumulative length of time and also for the other members of the crew.

The total amount of time of these testing, the initial test will take place on landing day, day 1, 2, 4, 6, and 7 so it will be 8 days from landing day when the test are complete. There is also another test on R plus 14 day that is currently scheduled in order to ensure that all of the parameters have returned to their preflight baseline. So, one week and one day for the initial series and then one day, one week later.

Do you have a followup?

LEVENWORTH Is there no distinction then between different members of the crew, are they all going to be tested equally?

...like to tour the facilities we'll be happy to take you on a tour after this and thank you very much..

END OF TAPE
PAC: Good afternoon, we're here to discuss the future Spacelab missions that are coming our way in the next few years. For those of you joining us on NASA select, I would direct your attention to room 135 in Bldg 2, where this briefing is being held. With is Mr. Mike Sander director of the Spacelab flight division at NASA headquarters. Mike I'll let you go ahead and summarize the future events and programs.

SANDER: As this mission now comes to it's last stages we're spending a few minutes looking to the long term. We have been working and waiting for this shuttle opportunity to do science in space for a long time, there have been many different discipline areas involved in preparing experiments. What I'd like to do is skip over the missions in the near term, talk a little bit about our philosophy in putting mission together for the next decade really, and then open it up for questions. Let me talk a little bit about the philosophy behind Spacelab One. It was originally intended to provide a test of the Spacelab itself. And the best way to test Spacelab is to drive it with a lot of experiments, experiments that utilize the full breath of capabilities that the Spacelab has to offer. We also intended to pick experiments in a large number of different discipline areas. Both to give those members of the science community in those discipline areas a taste of what the Spacelab and the shuttle system together can do, to do further investigations in their areas. As well as, make sure that we had in fact exercised that system to it's fullest extent. The kind of tests that astronomers would put the system to are really very different than the tests that material science community would put the system to. So, by selecting a multi-disciplinary flight, we gave a large number of people access to space in this first flight. And at the same time made very sure that all the various aspects of capabilities that the Spacelab had when (garble) exercised. And I think in trying to put this mission together we ran into considerable difficulties timelining fundamentally contradictory kind of discipline requirements. For example, astronomers wanted to look into dark deep space, people with experiments from the atmosphere and the Earth, of course wanted to have the cargo bay pointed down toward the Earth. The material science disciplines wasn't that important to them where they were pointed. But, it was very important that the shuttle be stable and there be very few vibrations, and be a very low g environment. Those are very difficult contradictions to all fall into one single timeline. And it was a massive job, and I think a lot of credit goes to the people who managed to pull this complex mission off. In the future however, I think our eyes are going to be turning toward single discipline missions. And if I could have the first chart. A discipline lab by definition is a mission that is focused on one, or at the most two of the various disciplines that we have flown so far. In some cases the disciplines in fact
are comparable, for example, from the point of view of resources used in the shuttle, life sciences, and material processing are related, one uses a lot of coolant, the other does not. One uses a lot of power, the other does not. So obviously, where we can combine disciplines we will, but for the most part, the emphasis would be on single discipline missions. One thing that's very useful is the observation that by flying a number of different instruments looking at the same subject or the same phenomena from a variety of angles if you will, you get a lot more data and a much better view of what we're measuring. And so we would hope to fly instruments that view the atmosphere or view the Earth, or view celestial objects through a variety of frequencies or with a variety of different techniques. We proposed that from mission to mission, these laboratories, these discipline laboratories, grow and evolve. But in a controlled way, at a controlled rate. Experiments would not be given just a single flight, but would have access to a number of different flight opportunities, have the opportunity to evolve as new information about how that instrument operates in the environment is brought to light. Similarly as the scientists begin to analyze their data, they will get new ideas on how to apply that or related instrument, to solving the particular problem their addressing. We would also hope to establish instruments that are fairly easy to modify and upgrade as we get new ideas for making measurements. This mission was very tight on margins. You notice on how although the timing activity proceeded a pace, it nevertheless was a real challenge to take into account all the constraints associated with power, with crew time to make changes, and by leaving working room if you will, in the various resource dimensions, power weight, crew time. I think we're going to find these missions a lot more efficient and a lot easier to put together. And finally, rather than returning them down to Cape Kennedy, and completely disassemble them, we hope to have the instruments (garble) fundamentally remain attached to the Spacelab components, then bring them back through the assembly line as new instruments are created, and there by growing these discipline laboratories. Only the early concepts of the program was that you completely take apart Spacelab One for example, put the Spacelab components back on the shelf for their next call, and send all the instruments back to the PIs, all the cables, mission (garble) equipment and so on. Put that back in stowage. Well, the change of philosophy of here has suggested we should try to leave as much of that together as possible. And, in fact the pallet that has flown now on Spacelab One, will be the heart of a mission called the Environmental Observation Mission, which will fly in the middle of 1985. So, we're going to be, I think, saving a good deal of time and effort by keeping as much of this equipment assembled as possible. By evolving one could imagine a sequence of events where missions grow, get new instruments, added capability and finally that
collection, or related collection of instruments end up in the environment of the space station. By this illustration, I don't presume to say that plans called for Spacelab hardware actually getting bolted to a space station, but just the concept that the kind of laboratories that we would be building, could in fact very well end up in the space station environment, in the long run. Next slide. Now this is probably the chart I'd like to spend most of the time on to illustrate the point of the discipline laboratories. Over the last two years, we've identified some 11 different collections of equipment that focus on particular scientific disciplines or areas of study, and I think what you want to get out of this chart, rather than making a point of exactly when each mission is flying. The theme is that these laboratories will rely at regular intervals. Spacelab sciences laboratory which on many manifests has carried Spacelab 4, will fly in 1995 again in 63, again in 60, and the hope would be even to reduce the interval between these flights, so fundamentally, the same or related equipment sets will fly and rely and that way we will grow, another the equipment to evolve keep teams of people together, and yet allow new investigations to be accomplished with these laboratories. (garble) as an example of a fairly near term mission will be flown is conjunction with (garble) comet, first flight of (garble) will be in March of 86, and then followed in short order of about 8 month intervals with the second and third flights. It's quite possible there will be more, it depends very much on what the science community discovers with those particular instruments. And I'll be going down through some of those payloads a little bit later. Spacelab One, you see here clustered with Spacelab two and three, as multi-discipline missions, again those payloads were designed, to try to give a variety of disciplines access to space, in the fairly new term. But we find it is not a particularly cost effective way of putting the payloads together. Instruments from these three missions will in fact be placed and flown multiple times, in each of the unique discipline unique laboratories. I think I'd like to spend a moment talking about the very next mission that will be coming up. The shuttle radar laboratory is flying in late August of next year.

***
MIKE SINGER: ...the very next mission that will be coming up, the shuttle relay laboratory, is flying in late August of next year, it in fact has one flight already, it was called the AUSSP mission. It flew on the second shuttle flight, and you might recall there was an extremely successful experiment, using the radar tool to look at the earth and the oceans. That was preceded by what you might recall by the SASSP satellite. The Earth Resources Organizational at NASA headquarters plans to use the shuttle radar laboratory as a means of building up and involving the radar as a tool for investigating of the Earth. Each success of flight will fly an instrument that's been upgraded and is more sophisticated than its predecessor. The so-called shuttle imaging radar A flew on the second shuttle flight, this will be sir B, 1986 then will be flying sir C, and onward. The shuttle radar lab will have on it, since it's basically an earth looking mission, other (garble) instruments. So that is scheduled for August. Following very closely on the heels of the shuttle radar lab will be the Spacelab 3 mission, which will be the next flight of the double module. It's a mission that will then have two disciplinary involved, life science and materials processing.

You saw the materials science double rack in action here on Spacelab 1, at Marshallen's they have been working on a similar but not quite as broad a system called the fluid experiment system and the vapor crystal growth system. There are a pair of instruments, large instruments occupying together 3 racks of space on the Spacelab, to grow crystals from a fluid and to grow crystals mercury iodine from a vapor. At the same time photograph them, take holograph of the crystals as they grow, bringing back all the data of course to allow repeated investigation of the growth process. There will also be on that, some test flights, of some devices called the Research Animal Holding Facilities. There's four racks of equipment which will be flying some rats and some small pyramides (squirrel monkeys), in preparation for the Spacelab 4 mission, where detailed investigations will be done on the various changes in the human physiology at 0g and try to understand how those changes might show up in animal counter parts or models. So Spacelab 3 will be a test flight of those fairly sizable facilities. In addition there will be a number of other instruments, there will be some atmospheric instruments, device called the ATM0ST, build at the jet propulsion laboratory, talked to Barry Farmers, the Principle Investigator, and it will be looking at the atmosphere in the infrared region. A very high resolution, very high data rate spectrometer interferometer actually. There will be a system known as the geophysical fluid flow cell, in essence the experimenters have reduced the earth to approximately a 4" diameter ball and have placed a fluid around that ball and are heating it as much as the sun would heat the atmosphere, and then they are looking at the behavior of that fluid and looking at the circulation patterns around that sphere, to see if they can come up with an analog with the earth's atmosphere, and how it is heated by the sun. Again other ways of looking at the earth's atmosphere and
trying to understand and build these complex's models that are so important to us all. The next major mission after Spacelab 1, after Spacelab 3, will be Spacelab 2. Date somehow decided that Spacelab 2 and 3 get's switched in the manifest. It's the second of the test and checkout flights of the Spacelab system. If you recall Spacelab 1, was a double module with a pallet behind. Spacelab 2 is 3 pallets, and another very large instrument on the special structure. The key feature of this mission will be the instrument pointing system. A very high accuracy, high precision, pointing system, that will point some telescopes, in this case they will be solar telescopes, looking at the sun. This is a complicated system that now is in assembly in Germany and in the final major component of the Spacelab system to be developed. That's due to be delivered at Cape Kennedy about a year and 1/2 from now. So the Spacelab 2 mission will then fill up the entire cargo bay, probably be outstanding characteristic of Spacelab 2 is the size of the instrumentation involved. One of the instruments for example the cosmic ray detector, will just barely fit inside the envelope of the cargo bay, it's a huge device about, shaped like an egg, some 13 feet high, and 13 feet wide. It's an very impressive looking instrument. There will also be an X-ray telescope swinging on it's own gimbal so you'll see this telescope nodding back and forth. There's a separate infrared telescope, it's of great interest to the astronomy community. Find out how the shuttle can be used for infrared observations. Technically the infrared telescopes are cooled down using liquid helium and possibly if the shuttle environment isn't suitable, might end up changing or accumulating lot of gases in the vicinity of the shuttle, so this is sciences communities way of experimenting with the various dimensions and capabilities of the shuttle, to see what kind of investigations are suitable for it. There are also the first test flight of the Egloo, you recall the discussion of this mission of the computer system onboard the Spacelab. The Egloo is about a telephone booth size enclosure, in which the three computers (garble) pressurized module are contained. The same computers will serve as experiment where there is no pressurized module. We fly them instead in this pressurized container that's been nicknamed Egloo. Finally after that, in late 1985, we'll be flying the Space life science laboratory. It's the first flight had been in previous manifext, called Spacelab 4. There are some 20 investigations, 25 investigations there. In various aspects, changes in human physiology, what you saw Drs. Young and von Baumgarten, and their colleagues doing in this mission will be done in spades on the Spacelife science laboratory in addition to a variety of that other investigation looking at plant growth. And specifically making use of animals as analogs for humans. One other mission which I think deserves mention, is the ASTRO mission. Or the (garble) manifext, ASTRO will be really our first attempt and a very rapid turnaround refights. The PI's won't have much change to calibrate their instruments, instruments will be landed, brought back to the assembly area at


the Cape, basically cleaned up, reconditioned and turned right around. It’s going to be another challenge, challenge of a different kind. I could have the next few (garble) please. To give you a brief idea of why some of the configurations are the international microgravity lab will be done inside, we have system collection of experiments known as the materials science laboratory, we expect that to be changing as we get closer about how to do material science experiments in space. If we first on flight 7, you saw it as a large white bow, on this special structure. The sciences laboratory, also a double module, the radar laboratory will be a single pallet, with an antenna, that then unfolds from that pallet and occupies over half of the cargo bay. (garble) observation mission will be two pallets, two pallets because several of the experiments from Spacelab 1 will be reflow on that mission. (garble) opportunity carrier is one of the special structures similar to the one that supported the material science laboratory. Next vignette please. We are now in the early stages of designing the solar optical telescope. It will be a dedicated mission in the early 90’s, with that telescope we will be able to resolve features on the sun, somewhere between 50 and 60 kilometers in size. And it’s felt that at that scale, very fundamental processes in the transfer of energy from the interior of the sun, out to the outer layers, take place. The shuttle high energy astrophysics laboratory will be a collection of large area x-ray instruments. Again it is a fairly new field, in space science and there’s a lot of new ideas about detectors and instruments. This will be the test bed for those instruments. Space plasma lab will be flying in 1988, that will include the SIRPAC instrument that you saw flying on Spacelab 1, plus a number of other experiments, including radio transmitter with an antenna some 300 meters from tip to tip. This case (garble) radio frequency energy to stimulate the plasma on the magnetic field environment around the shuttle. Shuttle infrared telescope, possibly candidate for a free flyer, given a startling results from IRAS. The moment it still unattached shuttle payload. This is a one meter telescope, it’s about almost

***
... at the tip, in this case NASA's radio frequency energy to stimulate the plasma in the magnetic field environment around the Shuttle. Shuttle infrared telescope, possibly (garble) free flyer give the startling results from IRAS but currently still on attached Shuttle payload, this is a one meter telescope. It's about – almost 100 percent larger than IRAS was and in this case, (garble) would be used to look at specific objects where IRAS was a survey instrument to try and map the entire sky. And finally, astro which is a collection of telescopes, one of them about a meter in diameter which will take up half the cargo bay and as I say, it's first flight will be coincidence with Hubble's component. So just to cap off this very brief tour of our plans for the future, we see that the Shuttle with the Spacelab and the Spacelab components will be a tool to help us understand how to best use the manned capability. Orbital man capability orbital man capability to do science. We learned an awful lot of lessons on this mission. I'm sure we haven't learned all the lessons that are yet to be learned. By using this very capable and flexible system I think we'll have opportunities to build and grow and try and change and still go further in terms of our ideas about instruments and investigations. Also if you looked at that manifest you saw that there were many, many flights, in fact, toward the late 80's we ended up with some 11 to 12 flights per year of significant scientific payloads. That's a rare opportunity for payloads as large and as capable as those instruments. And finally, during a period in time when NASA hasn't been building too many free flyers we will have an opportunity to give data to a very scientific discipline areas that have basically not been getting the data they would like to be getting.

PAO: Okay, thank you Mike. Okay we'll take questions here in Houston. Name and affiliation please.

DAVE DOOLING (Huntsville Times) I'll let you take a long drink. One of the - there's a lot of ambitious hardware and investigations laid out there but one of things that has emerged from my talking with principle investigators and specially in the survey that Bob Paste did is that NASA on Spacelab I treated the scientist, essentially air space contract (garble) buying a piece of hardware built to a certain specification, rather than researches from whom they were purchasing a line of investigation and who were as vitally interested in mission success as NASA was, in fact the researchers will probably be heard more by a science failure than NASA would. This is bound to be a basic philosophical change for NASA. How has the pace report been accepted, how aggressive is NASA going to be in trying to accommodate some of the criticisms the PI's had.
SANDER: Well we've in fact already worked with the Marshall Space Flight Center, and made some fundamental changes in how we are interfacing with the investigators. We're trying to go from a mode that has NASA placing requirements on the investigators to a mode that says how can we NASA assist you in putting your instruments together and flying. There was a great deal of assistance provided to the investigators on Spacelab 1. Also to the investigators on Spacelab 2, I think what we're trying to do is systematic and structured about how we're going about it giving them a single interface, an engineer who is responsible, who's roll in life is to help make their investigation fly on the shuttle. So I think the investigators will see a rather marked difference over the next year. This again was one of the learning experiences of how do you interface with that many people.

If there are any others, because I have a whole bunch.

PAO: Go ahead and follow up, Dave.

Okay, well it's not exactly a follow up but on the payload of opportunity carriers, has the order been signed to Abrahamson office yet on hitchhiker and the Goddard Shuttle Payload Opportunity Carrier and you discussed it with me, but let's bring it out a little bit of how the science would be solicited for these - between these missions between Spacelab and the getaway special.

SANDER: The order was still pending when I came down and I'm not aware of whether they've had time to actually get that out. I believe the expectation fully is that it will get out here in very short order. We would see the payload opportunity carrier as an ongoing opportunity. Each of the science discipline offices I think will treat it slightly differently but typically the mechanism would be to send out a dear colleague letter, it's called, which then provides an entry into the NASA system for proposals for experiments to fly in this carrier.

PAO: Any other questions before Dave begins to monopolize. Okay, go ahead and monopolize, Dave.

Okay, with reflying the Spacelab 1 Pallet in 85 as the first of the EOM's series, what impact is that going to have on Space Plasma Lab. Is that going to draw down on the resources for it and push it back? Will building the air tight boxes actually give you a head start towards SPD or what.
SANDER: Well, it's my hope that we can afford to do this job which of course is one that we hadn't planned on doing at that time scale, our budget was sized to have it flying Flight 96 and all of a sudden here we're having to put it together and by the way, delighted at the opportunity of being able to put it together earlier. The resources all come from the same pot. There are a number of doing other things we're doing like science down contingencies, not doing studies we've planned to do and try to scrape together the resources to bring it together. It's my hope that we will not in fact, impact space plasma lab or the pioneer (garble) mission in order to fly any earlier than we planned.

With regard to astro, you got three flights there, targeting mainly for (garble) since that's an excellent opportunity (garble) an early shot at it. In earlier (garble) they were suppose to be when this was still the OSS 3 pallet, it was suppose to be a flight of astro sometime before (garble) and then after (garble) was going to go into an annual reflight for general astrophysics. Now I just see the three highly dedicated missions. What is happened is has the budget gone away for the reflights or what?

SANDER: The reflights themselves are very much a bargain. We found that reflights tend to run about 10 to 20 percent of the cost of the original payload and I fully expect that as time draws near the number of flights of astros will get relooked at again, but right now as far as the astrophysics division is concerned at NASA Headquarters, that particular set of experiments and so on merits about 3 flights and I think you know, wait to - we'll have to wait to see some results before that get reexamined.

PAO: Dave, lets cut to KSC and we can come back. Go ahead KSC.

REG TURNELL (BBC): First of all will you promise even if you don't fly them in sequence, you won't rename the Spacelab 2 and 3?

SANDER: It's not our intention to rename them at all. It's confusing enough to have them out of order but if suddenly Spacelab 2 comes a module mission and Spacelab 3 becomes a pallet mission, it will be more confusing than ever.

TURNELL: Can you tell me will the all future Spacelab flights land here at the Cape or will the heaviest ones still have to go to Edwards?

SANDER: I believe its the intention to have Edwards (garble). It has a contingency landing site and all the Shuttle flights have a primary site, the Kennedy Space Center.
TURNEILL: And I'd be grateful if you could help us a bit more about the proposal to fly animals. I remember how much had to give up flying animals because of public protest in Mercury days and is this a long-term ongoing program of flying animals?

SANDER: Well, the equipment has been built with a number of animal flights in mind. I think obviously the rationale for flying them and the number of flights will depend on the need for specifically flying animals. There have been two missions identified for animal flights, the first in Spacelab 3, that strictly a benign test of the equipment and then Spacelab 4, where there is some specific investigations that have been selected through the science selection process that will make - conduct studies using the animals.

TURNEILL: In the Mercury days, there was an opposition from the astronauts themselves to flying animals on the ground, that they could do the work better than any animal because they could respond with descriptions of their symptoms. Could you help us to - what can animals - what information could animals provide you with that men can't?

SANDER: You're not asking a question that would probably better be addressed to a life science researcher. I'm afraid that's a little bit out of my ballpark.

TURNEILL: And the final one, you've been sharing with the ---
... before when there were some specific investigations that have been selected that the science selection process that will conduct studies using the animals.

In the Mercury days there was opposition from the astronauts themselves to flying animals on the grounds that they could do the work better than any animal because they could respond with descriptions of their symptoms. Could you help us to what our animals, what information the animals provide you with that the men can't.

SANDER: You are now asking a question that should probably better be addressed to a life science researcher. I am afraid that is a little bit out of my ballpark.

And the final one, you've been talking with the Russian new capacity for flying animals in recent years. Will the Russians be getting the data on the results on these animal flights?

SANDER: Well, of course the data on any NASA flight is intended to be published and its intent a requirement that investigators funded by NASA deposit their results in the National Space Science Data Center, so its there for anyone who wants to write a letter and pay for a magnetic tape. So in that sense, certainly the data will be shared.

SANDER: Sorry, and one last one. Presumably on future Spacelab flights, there will be an extension of the mission as in this one unless the scientists are willing to pay for that extra day.

SANDER: I'm not quite sure what you mean by the scientists paying for the extra day. We have longer missions planned. This was wants called a 5 day orbiter. Spacelab 2, specifically, the science community is interested in getting a longer flight. On Astro we would hope to get a longer flight. In fact we would hope to make 10 to 11 day flights very much part of the menu.

DICK DARBYO (Countdown Magazine): The flight rate for Spacelab is a lot lower than originally conceived. Is the present flight rate enough to sustain the type of mission to mission evolution you've been talking about?

SANDER: Well, as a matter of fact, several of the communities indicated, for example the life sciences community ended up with about 2 years between flights on the basis that between from 1 flight till they got the data back on the ground, thought about the changes they'd like to make to equipment, modify the equipment, test the modified equipment and re-integrate it, 2 years is about minimal. So on a discipline by discipline basis, we're trying to schedule the flights to suit the individual
requirements of those disciplines. I don't think any disciplinary has come to me and has identified that a specific flight rate is too low for their particular desires. The original flight rate, and I recall some early literature that talked about some 20 Spacelab flights per year, at that same time, someone might correct me, but I think they were talking some 90 Shuttle flights a year in the same breath. So the decrease in the rate of Spacelab flights has been to a great extent in concert with decrease in the overall projected Shuttle flight rate. As we grew smarter about the Shuttle system over the last 5 years.

PAO That's all from RSC.

PAO: Ok, back to Houston, before we go into questions here, we've had some phone-in requests for copies of your charts Mike, and I think your handout probably covers all of that, doesn't it?

SAUNDER Yes, to a great extent. You're welcome to try to make some copies.

PAO If we can xerox those we will, but we have some handouts available in the Building 2 News Center. Jules, did you have a question?

JULES HERMAN (ABC) Mike, could you sum up briefly, I mean briefly with the accomplishments of this Spacelab.

SAUNDER We have been putting lists together for the last 2 days: its been the longest Shuttle mission to date, its certainly been the largest number of investigators over pooled together for a NASA science flight, its been the largest number of disciplines that have ever coordinated their activities on a single flight, and along with that go the number of instruments. Certainly under the list of accomplishments I think it has got to be added to as the various discoveries come to light as the data get analyzed. I think this is the first mission where we've had such an intensive interaction between scientists on the ground and the crew on board. And I think that's been a real accomplishment. A, that its worked out so well, and B, that we've demonstrated (garble) by a scientist with his extra pair of hands on orbit.

BERNHARD: Seconds question. What do these success mean for the future.

SAUNDER As you may be aware, Jules, the science community has been somewhat divided about the value of man in the loop in doing science. A lot of people were looking at Spacelab 1 to see whether in fact it would be a successful mission. I think that the kinds of repairs that were done on orbit, the interaction between the scientist on the ground, I hope has demonstrated that
its a very powerful way to do many different types of investigations. And I would hope that in the future perhaps there might be even greater interest in using Spacelab as a tool.

BERNHARD And lastly I can recall some of those difficult weeks in Washington when we spoke, as the flight was slipping from week to week and month to month. Did you ever think this first flight would be so successful.

SANDER I didn't. In fact I've commented and like had other people have commented in the corridors, that had we put together a script for how this mission could have come together in our most optimistic sense, we would never have written down something as good this particular flight ended up being. It was absolutely first rate. We're just absolutely delighted.

PAO Dave, we've got 20 minutes.

DOOLING (Huntsville Times) Well that ought to take care of the rest of them. One potential discipline lab that wasn't up there on the chart was the Sunlab, the reflight of the Spacelab 2 solar telescopes booked for '88. Does NASA intend to turn that into a discipline lab that will nicely fill in that gap between then and when solar optic telescope becomes available. And more important to the scientists, would this become a national facility with immediate access to the data for solar community rather than continuing to be a cluster of instruments first to the Principle Investigators who initiated them?

SANDER Let me take them one at a time. Yes, this is specifically intended to be a fill in, if you will. They're very capable instruments of course on their own right. But with the fact that the solar optical telescope has now slipped several years down into the early '90's, we hope that Sunlab will be a source of data for the community at large. There will be for the follow-on flights of Sunlab, an announcement of opportunity which will call for Guest Investigators. The follow on flights for Astro will be treated the same way. And this way investigators other than the Principle Investigator who built the instrument can get access to, specify requirements for, and obtain data for his own use for a year from these instruments.

DOOLING Ok, to make sure I understood. I missed a word there at the start. You do hope to have annual or 18 month whatever, reflights of Sunlab between the Sunlab flight and SOR.

SANDERS We would expect Sunlab to be a continuing series of flights. How many remains to be determined, would be very much a function of what the science community proposes and suggests.

PAO That's it we will adjourn, thank you.

END OF TAPE
Good morning. Change-of-Shift Briefing with offgoing Flight Director Larry Bourgeois. Larry, why don't you take it from there and then we'll go to press questions.

Okay. Good morning. The flight is again, as I reported yesterday, the same thing. Progressing nominally. Everything's looking fine. Our cryo margins and propellant margins are still excellent. We're in excellent shape. The primary activities my team had this morning were reviewing and uplinking the entry messages. This morning we have uplinked all of the required entry messages for landing with the exception of one which is the final message we send up. And most of the data on that message is based on weather conditions at the landing site so we have essentially completed all of the entry planning activity. Entry tomorrow, tomorrow morning is planned at Edwards. Landing time would be 9 days, 23 hours, 58 minutes, 51 seconds which is 9:50. Approximately 9:59 central standard time. Weather at Edwards looks good. Predicted to have scattered clouds - 3 layers of scattered clouds but good visibility and light variable winds. And that's basically all I have to say. Any questions?

Wait for the mike please, Sue. Sue (garble) back here.

Would you please repeat these numbers about 9 days, 23 hours?

Okay, certainly. The landing time is 9 days, 23 hours, 58 minutes, 51 seconds. Central standard time it's 9:58:51, 9:59:51, excuse me.

Mark Kramer, CBS.

Can I trouble you for somemore numbers? Do you have entry interface, rather do you have deorbit burn, entry interface, begin blackout, exit blackout and all that stuff?

I've got deorbit burn time is 9 days, 23 hours, 1 minute even MET.

Burn time?

Burn time is 2 minutes, 34.3 seconds. Terry do you have those other numbers?

I brought over the entry elapse time table and Brian Welch has it and ought to be able to xerox it. It's kind of dim but it does have all the begin and the blackout.
KRAMER  Okay. And I guess the final question is with the increased duration of the mission, how does that shift the ground track. Are they some degrees further west on a parallel track?

BOURJEOIS  Just looking at it this morning it looks like it's basically the same ground track essentially. In fact, he crosses, we sent up a message this morning which told John he crosses the (garble) pretty much at the same point he would have nominally, nominally in the mission.


Can you give them in central standard? Do have them in central standard?

PAO  Not on this table but it's simple enough to figure if you just sit down and go from landing time and back up. Need velocities, altitudes but anyhow we can get this xeroxed for everybody if you need it. Okay, next question back over here. Yes, okay.

MIKE MECHAM (Gannett News Service)  There's some confusion as to exactly where it does cross. The press kit is talking about like San Diego. Now I understand it's really north of Los Angeles. Is that correct?

BOURJEOIS  I was thinking of San Diego as fairly far south. I'll have to find that out for you because I'm not exactly certain.

MECHAM  Yes I would like you to give us a city of some kind that ...

PAO  Craig Covault, Aviation Week.

CRAIG COVAULT (Aviation Week)  Larry, some additional entry numbers. Do you have the crossrange?

BOURJEOIS  Yes, crossrange is 318.

COVAULT  And do you know what the crossrange would have been on the normal end of mission if you hadn't extended?

BOURJEOIS  No, I don't. I don't but I can get that.

COVAULT  Okay perhaps something else. Do you have your roll reversal numbers?

BOURJEOIS  Sure don't.
COVAULT And a third one, as far as you know are all the flight test maneuvers still to be included.

BOURGEOIS Yes.

COVAULT With no conflicts on the roll reversal.

BOURGEOIS As far as I know all the details are predicted. I will confirm that after this conference.

PAO Okay, front row up here.

PETE SPOTTS (Christian Science Monitor) As long as we're playing the numbers game, a couple of trivia questions. After Columbia lands, can you give me the total number of orbits it will have completed and the number of nautical miles it will have traveled?

BOURGEOIS No I can't. I don't know off the top of my head.

PAO You can take the number of orbits and in the STS-8 Press Kit we had a table in there giving the average altitude and the orbit and gave the circumference. You multiply that out and it'll give you kind of rough mileage. Mark Kramer. Or let's go to Carlos and then back to Mark.

CARLOS BYARS (Houston Chronicle) Larry, anymore comments from the crew as far as the rattling, rolling, thumping, groaning that was going on during the hot and cold test.

BOURGEOIS I've heard no more comments since yesterday when I left here. I don't know if they had any last night while I was off shift but it appears to have settled out.

BYARS Anything else on the 2 hertz or whatever it was oscillations.

BOURGEOIS The oscillation, we saw a coincidence with the noises. No. No additional oscillations.

BYARS Since the Shuttle is bringing back a heavier payload than I think it has brought back in the past. I don't believe you've ever had a landing weight approaching this. Correct me if I'm wrong. Will the entry and the landing itself be different if not to us, to them? That is will they fly the Spacecraft in a different fashion than they would have if it were 35,000 pounds lighter or is it essentially the same thing with the computer taking or making up for the additional weight.
BORGEIOS: Basically, the entry is the same as it has been for other landings. I believe with this heavier weight they go into a steeper glide, a shallow glide slope what they call the heavy weight glide slope.

BYARS: What is that number?

BORGEIOS: I think it's 17 degrees which is a little more shallow than the nominal 19.

PAO: Second row back there.

GARY SCHWEITZER (CNN): I'm counting back time and allowing for stowage time and I assume the science agenda really has to stop about what 6 tonight?

BORGEIOS: This next shift coming on will basically complete the science objectives if I remember correctly and I believe that handover is somewhere 5 to 6 tonight I believe so. I think you're probably very close to being correct. Plus or minus an hour I would guess.

PAO: Craig Covault.

COVAULT: Larry, are you familiar with an attempt whether or not they're going to try and penetrate blackout with TDRS. Perhaps try and intercept the Orbiter with a TDRS (garble).

BORGEIOS: They will try to acquire with TDRS. I suspect that we will try to acquire throughout blackout but I don't think we're expecting to be able to.

COVAULT: On STS-8, the idea before TDRS went down was to point to a point in the entry since they could not actively track because the vehicle was changing its orbit essentially every second as it came in. Do you know what mach altitude regime they're going to try and penetrate?

BORGEIOS: In fact I think I've got the time. I know the time they're going to do it but I'm not sure I've got the altitude. 9:43 expected AOS of TDRS and have TDRS basically through landing if required.

COVAULT: But you, this entry has far less comm than any previous shuttle entry. I believe you don't see the burn at all. You don't really see them until after TDRS LOS.

BORGEIOS: That's right. Deorbit ignition to TDRS.

COVAULT: And you'll give them a go for the deorbit burn over Madrid even though TDRS is working?
BOURGEOIS  I don't know how Gary ... Gary Coen is the Entry Flight Director and I don't know where he's giving his final go. If he's going to wait till TDRS LOS or if he's doing it at Madrid.

PAO        Okay, let's go to Cologne for a few questions.

COLOGNE-PORZ You answered our questions. Thanks a lot.

PAO        Okay, let's go to Kennedy then.

***
PAO: Okay, let's go to Kennedy then.

REG TURNEILL (BBC): We may have (garble) but we had to drop out. Can you give us the actual landing weight and weather how much this is heavier than any previous shuttle landing. Did you get that?

BOURGEOIS: Yes, I'm looking to see if I got the landing weight. Okay, the landing weight is 228,694 pounds and the actual previous heaviest weight, I do not recall what the maximum weight was, but I believe it was, I'd rather not speculate, I'm not sure what the previous landing weight was. We can certainly find that out though.

PAO: Are you through? Back to Houston. Craig.

COVALT: Again, on your landing weight I wanted to reconfirm you said 228,694, Larry?

BOURGEOIS: That's correct.

COVALT: Prelaunch they were predicting 221 (garble)?

BOURGEOIS: A little bit (garble).

COVALT: Is that pre --

BOURGEOIS: I'll tell you I'm ready off of a display here and I believe I'm giving you the deorbit rate, not the landing rate and I'm not sure if that's the landing rate here. Let me check something. I'm going to have to confirm that because the weight I did give you was an error. That was a deorbit weight, the weight after the deorbiting mission.

COVALT: Yes, so they burned down a lot of RCS and OMS?

BOURGEOIS: Yes, they will be significantly lighter than that.

PAO: Looks like STS-4 was the heaviest at landing at 209,500 prior to this one and a note from Steve Nesbitt on the console said that coast crossing is just south of Santa Crisu Island crossing the coast just midway between L.A. and Santa Barbara. But we're (garble) directly over (garble) and then to Lancaster overflies, Edwards makes a left turn to runway 17. Any further questions in the back here?

LEE DIE (LA TIMES): Why is that different than what we were told preflight briefing? What accounts for that change? We were told it would be coming in over San Diego and that's quite a ways North of --
PAO The preflight briefing was based on October 28 launch.

BOURGEOIS That would explain it.

PAO And coming out of — this is a day later also to, coming out of a different orbit. Mike Mecham.

MIKE MECHAM Can you give us some time just to what happens to the 4 mission scientist after the landing. Do they go into hibernation immediately? How does that work?

BOURGEOIS As I understand they will walk out of the vehicle and be transported to (garble) at Edwards at which time they will be placing a protocol a complete there, there experimental (garble). And the details of specifically what happens to them during that time frame, the mission manager would have to answer it.

KRAMER Is the plan manning the opportunity tomorrow the next to the last for that day at Edwards or is it the last for that day at Edwards?

BOURGEOIS It's the only opportunity for that day.

KRAMER It's the only one.

BOURGEOIS Well the only ascending opportunity in Edwards that day. There was one earlier with inadequate lighting at Edwards.

KRAMER So this is the only good one that day and —

BOURGEOIS This is the only good one that day. There is a descending opportunity later in the after but nominally we plan to land on ascending opportunity. But in the afternoon there is a descending pass where the track is descending towards the equator which we could land if we wanted to.

KRAMER Why — is there an automatic reason why ascending is better than descending. Is there a matter of cross range in these particular orbits?

BOURGEOIS Ascending is better primarily because the delta V is less even though we got excellent margin we actually do have the capability to do a descending landing but the ascending is preferrable because of the delta v and I also think its preferrable because there's less chance of gusting winds developing at Edwards in the afternoon, in the morning.
I hate to be this adept, but I'm curious. But why is the delta v different for ascending versus descending. Does it get to a matter of cross range? That particular (garble).

That's probably a function of the geometry of the orbit. If you think of the orbiter being inertially fixed and your earth rolls under it, in the morning the position of Edwards relative to the orbit is different than it is in the afternoon because you're intersecting Edwards at a different point, inertially in the orbit.

(Garble).

No.

Larry, if the weather is unacceptable tomorrow and the reason I got here late was on the other channel I just heard CAPCOM read up the current weather to Brewster Shaw and describing his 3 scattered layers of 10 17 25 or 7 10 and 25 and visibility of 7 miles, he said, is that going to be any better tomorrow and they said, no we don't think so.

That's the predicted word. There was 3 scattered layers and good visibility at 25 12 and 05.

My question is, if you have to wait till Friday to land, is the weather to be forecast to be better, the same, or what?

The weather forecast for Friday is essentially the same as the forecast for Thursday.

Is there an opportunity to land at Edwards Friday?

Yes there is.

On what REV?

I don't have the REV maneuver.

And 16, the one we're going in on it would be about that one.

Oh, Terry, your so smart. You should be a flight director. And anybody else here while we pitching the lebony here.

Lebony did you say?

Yes, okay. Thank you very much.
PAO: Good morning again, good morning again ladies and gentlemen, we're going to talk Spacelab now. I almost feel like Johnny Carson when I say this is the last science briefing for Spacelab 1. Where here with Dr. Rick Chappell, Spacelab 1 Mission Scientist and Dr. Karl Knott, ESA Project Scientist, and I'll let Rick start.

RICK CHAPPELL: We wanted to change our agenda just a bit this morning. Let me tell you what we want to work through. First a very brief discussion of the last two shifts and then we'd like to give you a very brief synopsis of the science results and each one of the disciplines without any detail and then we can certainly answer questions on those. Then each of us would like to make a closing remark when we get to the end of the synopsis of the science results, so let me start, ask Karl to start with the next to the last shift. Karl.

KARL KNOTT: Okay, yesterdays blue shift was fairly light on the crew. I think they deserve this after the very hard work during the previous days. Byron Lichtenberg spent most of the shift, as you have probably all have seen on TV, helping the fluid physics investigators to add to their science basically and rerun a few runs where they still had questions. Owen was not heard of for sometime so I guess he was busy with ham radio for sometime, but later on he came back very strongly and supported the, a couple of the plasma physics investigations in a very helpful way. PICPAP, SEPAC and other diagnostic experiments had very good runs toward the end of yesterdays shift. Then unattended experiments, there was a couple of successful runs of the microwave experiment which operated in its passive mode, or it's designated targets and the x-ray spectrometer from the astromony facility which fortunately can work in day light, got a good number of opportunities which they took care of. So all in all it run very well in a fairly relaxed atmosphere and was as we can, very successful. I think that is all I wanted to say, but very briefly on yesterdays shift.

CHAPPELL: In the next shift, let me point out that we have gone into a slightly different mode of operations for this additional day, which has been most interesting. Since it was a bonus day for everyone, we have sort of shared the bonus, we worked to share to bonus with the crew and we've have gone through for example once we have blocked out the first cut at the time line, that was sent up to the crew, and they made comments on the things that they would like to do, and some other things they'd like to try, and maybe gave us little indication of their priority, based on both things they have enjoyed doing so far, and the things the scientifically they found to be important in the early days of the mission, that they felt they could get more very significant information on it. So we then got a feedback from the crew and we approached this shift as a, with a sort of a shopping list concept. We had blocked out approximate areas, we
blocked out the attitudes because that needs to be done ahead of time. But then we sort of blocked out general areas for the crew and then we just interacted with them, see the things they wanted to do, work with them to fit their desires into, desires of the investigators and it's been a very interesting sort of a free flow of operations. By free flowing I mean unplanned but just more relaxed then the previous ones. We did a number of, a couple vestibular experiments, the linear threshold and chloric experiment that Dr. von Baumgarten talked about with us yesterday. We've did a number of, the crew used up the rest of the metric camera film, with photographing predominantly the United States and Europe, I think in fact it was entirely the United States and Europe. A couple of passes of the east coast. We did fluid physics module work, another run of the vestibular, the other vestibular experiment 102. There doing, they've completed a run on the third vestibular experiment 104 as you may know the adaptation is very important issue, so this extra day gives yet another measurement of their adaptation and it was important for that reason. We did some more, the crew did the master discrimination experiment again, experiment 25. Then they had one, that I found most interesting, that Larry Young suggested, that came from some, it was based on some indication results that came from Skylab. In that mission a number of the crewmen talked about the help that they got in as far as stability and all, the vestibular type stability with having a strong vertical, local vertical to depend up. You may remember that Skylab was oriented so that in the workshop part of the cylinder, the vertical was along the axis of the cylinder, but when you went up in the multiple darkening adapter, which was where the AT and telescope was run, the vertical was sideways. And a number of the crewmen mentioned sometimes the conflict that they would feel in moving from one vertical region into, just going through a door, and then having the vertical be in a different direction. So Larry Young worked with Byron Lichtenberg to do, to have him conduct a, you know the Spacelab is set up very strongly with the vertical in one direction, there's a floor and a ceiling and the racks, it's very clear the way the vertical is and so Larry had Byron do the enough of the same task, 3 or 4 different times. Once upside down, using, he was working with an oscilloscope, so he had him be upside down next to the racks and worked on it, then he worked on it in the ceiling, and I believe he did one run on the floor, but he did 3 different runs, just for, Byron then to record his sensations, how that sort of folded into his feeling of orientation. I thought that was a very interesting one. And there will be probably several experiments over the remainder of this extra day, that are in that category of things that you would have done if you'd had time, and now having the time to get a little extra scientific information. Let me switch now to giving you a quick synopsis of some of the preliminary science results. And I have to say, that the magnitude in terms of just numbers of results, that Karl and I will talk about is limited by nature because we've, most, many of
the people don't have their data down yet, so one can't take just these preliminary results and draw conclusions about the success of the mission scientifically. One can get indications from the things the scientist have seen in quick look, that we've got a tremendous number of significant results. But the real extent of that won't become known until they get their samples back. And in the case of life science, which is the first one I will talk about, you don't really know until you've gotten in many of these experiments, ten of them in fact have gone through the base line data collection activity and have gotten there samples back from on Orbit. So there will be much more that is not, that we don't cover in the next few minutes. Let me start, from man himself and work outward to, through out the universe and so we'll start with life science. They, I'm sure, you've been following all the vestibular things and there is about 15 different experiments in life sciences. Some of the results that appear from the quick look to be significant, are the following: first, the rotating dome experiment, which was experiment 102, Larr Youngs, experiment, has indicated that there is an increase reliance upon vision, for establishing your orientation in space. So what he has done in the dome is to have, use the can a rolling of the phenomenon of watching the dots. And then compare their sense of rotation as, when they are floating free and when they are bungeed down and doing this can a rolling experiment. And he finds that there's a very strong increase in the reliance of what the eyes are telling you and this would also be, could be connected to the sense of the local vertical in establishing your orientation, as oppose to your vestibular organ or your appropriate septive or your, the nerves in your muscles that tell you your position. Secondly, Larry has fields, based on the work that he has done, that the space has adaptation syndrome's studies suggest that you can do mildly provocative testing, that, that's a practical thing to do on the crew and that it does not really interfere with a normal crew operations. This is to say that one can anticipate doing further life sciences investigation using the crew members as we have done here without significantly affecting their performance for the rest of the mission.

Thirdly, as Dr. von Baumgarten talked about yesterday, there's been a number of experiments that were successfully performed, which help to better understand the physiological mechanism of what we talked about is chloric stagment. Which is a special process that takes place in (garble) when you put a temperature differential on it, and Dr. von Baumgarten talked extensively about that yesterday.

***
CHAPPELL  We found, as was also mentioned a couple days ago, that the (garble) fungus growth shows that in the case of that organism that the 24 hours (garble) rhythm growth that it shows on Earth, is maintained in microgravity, which indicates that the stimulus for this growth is probably endogenous or within the organism itself as opposed to induced by subtle changes in the environment. So those are some of the just very preliminary results in life sciences. Again, those that could be determined by initial looks at the data without the complete evaluation being done on the crew until they get back. So let's switch next to material sciences, Karl.

KNOTT  Okay, Material Science, as Rick quickly pointed out, the investigators have so far only seen, have basically only seen the tip of the iceberg of their results, only a few quick looks at selective results, or I think what we are reporting on here, and that is true for all (garble) they have just seen the tip of the iceberg, and it takes several months or even years of studies to really evaluate the results they have obtained in all detail and depths. And this is particularly true for material science. I think material science has not even seen the tip of the iceberg, I think the iceberg is completely under water for them. So, the only ones who have seen something are the fluid physics people, the fluid physics scientists, they have had a lot of real-time TV, and TV debriefings from the crew, they have discussed with the crew, and they have already obtained a few results. Therefore, for the non-fluid physics material science, I just would like to give you a few figures on what has been achieved. In the isothermal heating facility for example, we have 11 out of 22 samples processed, that's because this facility went down about halfway in it's operational program. The gradient heating facility processed 15 out of 15 planned samples, the mirror heating facility had 4 experiments planned, of which 2 were completely done, and 2 were about half done, so we achieved about only half of the processing time. It remains to be seen what can be learned out of these samples. From the long duration experiments, 3 out of 3 have not yet been completed because some of them are still running, but it's sure already now that 3 out of 3 will be completed. And, other facilities like these high temperature thermostat and the (garble) high vacuum facility worked very well. As far as the fluid physics module is concerned, I think you all witnessed when professor Napolitano for the first time saw the famous marangoni convection in space, it was in fact the first time that this phenomena was demonstrated, was observed was recorded, and I'm sure that if the high speed of these processes will be available after the mission, that the marangoni effect can also be quantified. For the first time, we have really seen fluid physics behavior in a closed containers, both the scheduled experiments of Dr. Vreeburg and a number of add on science enhancement experiments which were
is this emission in the upper atmosphere that you find on the day side of the Earth. The orbit now being in full sun, the orbit’s sampling a great number of latitudes and she said the (garble) and then was able to do a complete latitude scan all the way around the Earth with simultaneous altitude and spectral information over the entire spectral range from 1000 (garble) to 13000 (garble) and that will be an encyclopedia of information that has never been seen on the chemistry and dynamics of the upper atmosphere. She also in the course of her observations obtained the first broad band spectrum of day glow from 300 (garble) in the ultra violet all the way to 12, 800 (garble) in the infrared, at very good spectral resolution as you saw yesterday in the plot that we had. And she has through the number of observations during this week obtained a data base for detailed assessment of the shuttle environment for optical remote sensing in the visible and ultra-violet and near infrared. Because her instrument looks throughout that spectral range she can see in certain orientations the emissions that come from the gases that are near the shuttle, or that come from the shuttle itself. So, give us once she is able to analyze the data indications of what the shuttle environment is like for future optical measurements. The glow spectrometer is observed CO2 in the (garble) very high up in the (garble) as well as water and methane in the mesosphere the first observation of those constituents at that high an altitude. They've also made detailed measurements on nitric oxide and nitrous dioxide, carbon monoxide, and HCl, all of which contribute to middle altitude chemistry, if you are trying to understand what causes the creation and destruction of ozone in the stratosphere, those are important species to understand in the chemical balance. We've the discovery of (garble) in the upper atmosphere and the 100 to 150 kilometer range, which is we talked about early in the week, gives you a way of measuring the way gas is diffused up through the atmosphere, and we've had interplanetary measurements of lime and alpha that were made just in the operations today, and those measurements can be used to get an idea of the (garble) hydrogen or the flow direction of the (garble) hydrogen and then you can use the orientation of the Earth and the Sun and the absorption of this neutral hydrogen by these solar wind protons through charge exchange to get information on mass flow out of the sun, which is an extremely interesting experiment, and with the theory being or the early observations indicating that there seems to be a lower mass flow out of the poles of the sun, than out of the (garble) regions. Those measurements came, the determination of relative mass flow, came from a spacecraft about 5 years ago, and now we've repeated the measurement with the idea of seeing how solar cycle variations effect the mass flow out of the sun. So, that's a very interesting set of observations that (garble) has carried out. I think Karl, I guess you'll move further out with space plasma physics.

***
CHAPPELL  ... in the flow direction of the instellar hydrogen and then you can use the orientation of the Earth and Sun and the absorption of this neutral hydrogen by the solar wind protons through charge exchange to get information on the mass flow out of the sun which is an extremely interesting experiment with the theory being the early observation indicating that there seems to be a lower mass flow out of the poles of the sun than out of the equatorial region. Those measurements came, that determination of relative mass flow came from a spacecraft of about 5 years ago and now we've repeated the measurement with the idea of seeing how solar cycle variations effect the mass flow out of the sun, so that's a very interesting set of observations that Dr. Bertoe has carried out. Karl, I guess you'll move farther out with space plasma physics then.

KNOTT  Okay, very quickly, a summary on the observations carried out in plasma physics. This is (garble) in which in fact (garble) the tip of the iceberg and they had numerous results from quite a number of passes, passes done. Investigations into plasma physics was done by an assemble of 4 experiments basically, it was a SEPAC experiment, it was the PICPAB experiment, both being active, being able to stimulate the environment with ION beam, electron beam and with MPD hard jets, plasma blobs released into the plasma and they are supported by their own diagnostic instrumentation, but moreover by the electron spectrometer which has very high observation capabilities and by the low light level TV of the AEPI instrument. So these group of investigations worked very, very closely together and looked into the following areas, Shuttle charging, electrical stuffing charging of the Shuttle and discharging of the Shuttle, certainly it was (garble) on this one, in this area have been obtained even though (garble) results are not yet available. They looked into the phenomena like the so called plasma rate which is generated by the Shuttle. I think we have never had an object of this style of magnitude moving, at least not an official object, this magnitude moving toward the ionosphere sweeping out quite significantly the plasma which is in it's way creating a plasma wake which can lead to all times instabilities and uneven charge distributions of (garble) Shuttle so this has been thoroughly investigated by this group of experiments. Then the - I think the main basic plasma physics aim of these investigations was to study how does the environment react to stimulation by an electron beam or by an ion beam or by (garble) plasma in the ionosphere or by an (garble) of a neutral gas plume into the ionosphere and the cause of these experiments, Professor (garble) pointed out already yesterday the phenomena of plasma beam discharge has been observed and plasma blobs, plasma bobblutes, you could call them, or plasma enhancement have been generated in the ionosphere but also plasma (garble) have been generated. If at least, for example, a neutral gas, a certain
amount of neutral gas into the ionosphere you created a kind of a
hole, an ionization hole in the ionosphere and how does this
actually happen and what (garble) would be has been studied by
this assemble of experiments. The electron spectrometer has made
very, very nicely 25 measurements of the effect how electrons
which I omitted, by the electron (garble) from the Shuttle.
However, this triggers the return of a quite different population
different in energy and also pitch angle returning to the
Shuttle. Anc this is in the phenomena which gives information
about basic plasma physics (garble) perhaps (garble) particle
interaction phenomena but in any case the mechanism, the basic
plasma mechanism which accelerates these electron population back
to the Shuttle, so very interesting it was out in this area it
can be obtained. The investigators stated unanimously that the
combination of Spacelab, Shuttle, and their different instruments
was a real was operated as a real plasma laboratory and that was
not only because the operational mode of the instruments could be
changed to change request relatively easy, but also the attitude
of the Shuttle other changes could be made in almost real time,
they just ask for different attitudes with respect to the
magnactic field and this could be implemented. That was a very
important factor for this discipline was that the planned
inclination of the orbit was achieved. The plasma investigators
towards the mission preparation phase always made a very, very
strong point and said we would like to have at least 57 degrees
in latitude and we are hoping that the Shuttle (garble) was
sufficient to reach this latitude, it was the first time in fact
that Shuttle reached this kind of high inclination, in fact it
was achieved and this allowed the plasma physics investigations
to carry out investigations into natural aurora phenomena at high
gemagnetic latitudes, so let me make it very, very clear to you
what the plasma physics community tried to do on the Shuttle.
The environments to which the Shuttle is flying is perfectly
known as the ionosphere and plasma density, plasma temperature,
and composition and so on, this is well understood, has been
investigated by (garble) and has been investigated by low flying
satellites, however, what was not understood yet, are these
different interactions (garble) which I just described the
reaction of a new environment to a known stimulus injected into
it and these will give us inside into basic plasma physics
(garble). So all in all the plasma physics community is quite
happy with the achievements. They had plenty of operational
opportunities, they had many, many more than they had planned,
the flexibility which was shown by the (garble) and by the MCC
was very helpful in supporting these investigations. So plasma
physics team is extremely happy with the observational
opportunities the Shuttle and Spacelab combination gave them over
the last few days.

CHAPPELL  Okay, finally moving outward from the Earth in
solar physics and astronomy, we carried out absolute measurement
of the solar constant to very high accuracy as well as the solar
Chapelle: I think, at least from my viewpoint, you have to feel overwhelmed about the enormity of accomplishment that this mission represents. In me at least, that experience drives very strong feelings. One is, one feels very thankful to all of the engineers and scientists and operations people who are responsible for the STS System, the Shuttle and the Spacelab and the Spacelab payload, and the TRRS, all of which have worked so well for us. I think you really can't say enough good things about the Spacelab concept. In this 10 days we've witnessed the very successful merger of manned spaceflight and space science and these are 2 mainstems of NASA activities. They've come together marvelously well in this mission and I think they show us a promising and exciting collaboration in the future. The merger is also to me, is exemplified by the close interaction that we've seen between the Principle Investigators and the science crew. They system is now set up so that the scientist almost from his lab, can interact with his colleague, the scientist on orbit utilizing the marvels of manned space flight and do experiments that are just not possible any other way. We've seen splendid success by the on board science crew. They are experts in conducting the experiments and in fact many instances, being the subjects of the investigations. And
believe they have had an unprecedented success in the repair of science equipment. That is not to say that everything on board broke down, but those things which did, those parts of facilities that did have problems were fixed. The flash camera, the high data rate recorder, the metric camera, the isothermal heating facility sample jammed, the mirror heating facility, the video camera, and the sunflower experiment, bubbles out of the fluid physics module, and all the way down to the crew being able to occasionally glance out the window to make sure the Shuttle was closed or a protective device was closed on an instrument as if, say as the Shuttle was moving toward a solar pointing. So all of these sorts of things have shown the success of the on board science crew. We've watched a smooth operation of a very comprehensive payload. We've seen science done around the clock, around the world that had never been before. And its an operation that involves close interact air-to-ground with replanning constantly going on to follow the science developments as we learn early in the mission to be able to respond to that. And the amount of changing and modifying to respond to results that we have in these 10 days has been really astounding. I think that if you ask the question has Spacelab proven itself as a multidisciplinary space-born laboratory, the answer is very self-evident. I would I guess choose to answer that with a story that happened this morning in the science planning group meeting. The material sciences group and the life sciences group were talking about how great the Spacelab had done for them as a micro-gravity environment and were glowing over how well the crew had done in both repairing problems that some of their experiments had had, and in improvising new experiments. Byron Lichtenberg had improvised an entirely new fluid physics module experiment this morning or late yesterday afternoon, I guess it was. And seeming, almost in a jeolous way, one of the atmospheric scientist who was sitting in the back of the room, raised his hand and said, "Hey wait a minute, don't forget about Spacelab as an observing platform for atmospheric physics." And one of the space plasma guys said, "Wait a minute, don't forget about Spacelab as base from which to do accurate experimentation." Almost a competition to say how well a Spacelab had done for each of their disciplines. I think that is very clear that it is doing a great job. You have to be excited about the new capability that Spacelab offers. I think it will open tremendous new opportunities for space science, and it's very clear to me that with Spacelab and Shuttle the excitement has just begun. I guess we'll stop and take questions.

PAO Ok, we'll take questions here in Houston. Dave Dooling.

DAVE DOOLING (Huntsville Times) First off Rick, it sounds like your lending a new definition to Shuttle glow with the reaction of the scientist. One area that on the VFI side, the verification flight side that Spacelab was meant to tackle, was
the human factor side and crew operations. And we heard and perhaps picked up, whether we should have about Parker sounding off to the ground at times. Do you in CIC feel that maybe at times the crew has been unduly loaded with tasks because, perhaps for a lack of tv or perhaps they don't say I'm free now, your not fully aware at times that, about how much work they are doing because they have seemed to be pretty busy. Is this an area that needs to be worked very intensely.

CHAPPELL No it is not area that needs to be worked intensively, and they have had some days, if you work 12 hours a day, you a little bit tired at the end, even if, no matter what conditions your working in, I think 12 hours a day is demanding. There was an occurance today where Bob, I forget what he said, but there was something that could be interpreted as not irritation, but just shortness in a reply and that was, and Larry Young mentioned to me at the planning group meeting that we just finished that that, he said for those who think that Bob, that the conditions aren't good and Bob's not feeling good and all this sort of thing, he said Bob and I have been close friends for 30 years, Larry was on the loop when Bob made that response to his good friend Larry Young. And Larry said you know that is just evidence that that is just Bob Parker, I mean that is the way Bob is. We've been good friends for 30 years and that's the way Bob is. And there is no, and that should never be interpreted as, that he's been put into a condition in which he's unhappy. That is just the way Bob is. And all of who work with Bob, and we all have a great deal of respect for him, all thru the simulations, that's the Bob is.

PAO Carlos Byars.

CARLOS BYARS (Houston Chronicle) If the people that put this magnificent thing together, learned something about things not to do next time, such as routing banks of experiments for everything for one discipline going thru 1 particular RAU for example, that sort of thing. What are some of things you'll think about doing different next time. Both from a mechanical or electrical standpoint and from an operational or personnel type stuff.

CHAPPELL Let me encourage you to ask the mechanical or electrical part of that to Harry Craft who I think is in a better position to talk about the reactions and feelings that they have about the overall Spacetlab System. From an experiment point of view, one wants to evolve in the course of Spacetlab missions toward more discipline dedicated missions. And that's always been the plan. Spacetlab 1 was to illustrate and to prove that Spacetlab could support support science in any one of . . .

***
CHAPPELL -- support science in any one of the number of disciplines. I think it's done that very well. And in the future the missions will evolve towards more concentration on a given discipline. By doing that then your able to bring a larger number of instruments to bare on a given particular area of science and that will increase things. And you'll be working with a group of people, all of whom are all familiar with the other members of their group. And they will do, will be able to do more joint investigations. So there will be changes in that direction, but that's something I think we've always felt we wanted to do, and not necessarily doing just in response to this particular mission.

PAO Greg Covault

GREG COVAULT (Aviation Week) - For perhaps a comment from both Rick and Karl. Going in to this you knew of course that if you got the function out of the hardware that you have received, that you'd have made your mission success here. In the context of the extreme air-to-ground interaction with the investigators in the POCC, things of that nature, what really impresses you now beyond the success that you expected? What went better that, then you would have earlier thought might have had some rocks in the road?

CHAPPELL I think the ability of the group of investigators to work in the operational environment, so successfully together and between themselves and the crew. Just the intensity and the success of the air-to-ground interaction. I think that's brand new, I'm sure all of you who have spent time here in Houston with previous flight, are really surprised by the personality of the air-to-ground in respect to the payload. And it's all good scientifically. Some of these things that the public affairs people have been able to do, showing the scientist as he talks to crewman, showing his place as he finds new things as the experiment develops. That's just amazing to watch to me.

KNOTT May I comment on this one too? What impressed me apart from what Rick already pointed out, was the flexibility shown in the science operations, which of course are related to Orbiter and Spacelab operations. We have about, what did we say, more than 200 replanning request throughout the mission and we've had several hundreds, I think close to 800 operations change request from the investigators. The (garble) majority of these change requests went in, whenever it was possible, without conflicting this data flow, conflicting science, with each other, and so on., these things were run. So there was a tremendous, tremendous work going on in the backroom, and quite a number of people worked very, very hard and they are studying these requests, making sure they were operational feasible, that they would not endanger any systems on board, that they would make no interference among instruments and then they were implemented. I have never felt at pre-mission that this was possible. I think
the civilisations to which we went and to which were quite painful occasionally, where we had to simply sit and just make a dry run of this mission. We went to this mission to several days of this mission before, sitting at the consoles, it was a very painful learning exercise. I think this paid off and enabled the POCC (garble) and the MCC team to show this type of flexibility.

CHAPPELL And this ability to replan of course is essential to respond a result that you get early in the mission, to modify the type, the particulars of the experiments as you go towards the end of the mission and that was achieved.

PAO Mark Kramer

MARK KRAMER For either of you gentlemen, for years there has been a competition between Johnson Space Center and Marshall and each set of vies for the more important role in the Space Program and JSC has the astronauts and Marshall has always had the boosters, etc., and I know that going into this mission there has been some sense of competition and I wonder if the that internecine rivalry ever leaked into the science world and were you people ever hampered by people at JSC resenting the Marshall Team moving in, or was that all in another room and did they stay away from you guys?

CHAPPELL That's one element of the merger that I was talking about. In this case, although Marshall has been dominally man space flight just like JSC, in this case, Marshall is representing the scientific end of things with the Payload, Spacelab, and the Payload. So the merger that I talked about, at least to me, that has been so successful, has been this merger of science as represented by Marshall and the man Space flight elements in this particular case the shuttle, has represented by JSC. There is always, when you bring large systems like that together, there is an interface established, there's a lining code, as each group gets familiar with the other. And that's, and we've had that. We've had tremendous cooperation from, at least from the payload side, my viewpoint, tremendous cooperation from the JSC folks and integration from the payload activities into the shuttle activities which they, which was there main string of activity prior to and will still be, but as we joined it with the Spacelab.

PAO Okay, we'll go to KSC for questions now, please.

STERN (LBVC) - I wonder if you could just summarize the position about crystal growth. How many crystals have been grown and I'm being a bit confused over the days about there sizes and perhaps just a word about the pacific uses these crystals are aimed at on earth.
KNOTT  I can only very briefly summarize this (garble) without boring you with these figures there. Probably the largest crystal which has been growing, and that's already known and has already been seen is the silicon (garble) which has been remelted in space as I explained the other day, the size of this crystal. Another, the other crystals which have been grown, are basically not visible yet, because they are all enclosed in cartridges and inside of facilities and it will be surprise of the investigators when they open these cartridges after the mission and how big they are and how they look like. They have not had a chance to look at them. According to theories and calculations and concentrations which are applied for example the potting crystal should be large enough to do an analysis by x-rays defraction techniques which has so far not been possible. The potting crystal which have been grown on earth, so far, they were not large enough, not uniformity of these crystal were simply not large enough to allow the x-ray defraction technique to be applied under this crystal. It is the expectation that the potting crystals interest are large enough to do so. So I cannot precisely answer a question, the number of crystals growing is in the order of 10 during this mission.

STERN  Thank you. And I believe you mentioned that the film on the metric camera had been used up, which means presumably the crew have taken there 80 pictures for their own use. Is there any indication of the areas they chose for there pictures and how will they be sorted out from the official pictures later.

KNOTT  Rick mentioned already that they basically used them up over North America and Europe according to their original impression of what they saw, and that is probably a very good criteria to select target for one. The scientist tell me that these pictures are more in a strict scientific sense of a (garble) nature (laugh) because the variation from a strict science point of view, the solar elevation angle when these pictures were taken were very, very low. That was during the last few days of the mission. But this does not undermine the success of the men of scientific (garble) cover which estimates it's science success to be 85% (garble). We are happy they got basically pictures of all there targets and there are many pictures, many frames which resulted from targets which they could not photograph because there was cloud covers over these targets.

That's all from KSC.

PAO  All right, well go to Dryden, now please.

JOHN WILFORD (N.Y. Times) - Dr. Knott, in discussing the fluid physics you said that there's been an unexpected spreading of these fluids, much more rapidly across the surfaces, have there
been an speculations as to what is causing this, what are we seeing here?

KNOTT Well yes, basically seeing the (garble) of the liquid which has been used to (garble) onto any surfaces it can find. There is, in these experiments, there is in order.
now what are we seeing here?

KNOTT You are basically seeing the (garble) of the liquid which has been used to cling onto any surface it can find. In these experiments there is an attitude, to carry them out in a defined way, there is a certain amount of anti-spread material used on the discs which are employed. But, I think it became clear during this mission that the investigators have to look again into this area of confining this fluid better of getting this spreading better under control. I think they simply have found that the spreading is much more rapid, and much quicker developing than they ever thought, so this is a valuable lesson to learn during this mission, and will certainly help to improve fluid physics experiments in the future.

PAO Any more questions, Dryden? Okay, we'll take that as a no and come back to Houston, Dave?

DAVE DOOLING (Huntsville Times) Rick, it's nice to see the excitement from you, and the scientists, and you've accomplished more than what I would of considered a successful mission with everything you got crowded on there. How long do you think it's going to take this excitement to bubble up through NASA headquarters and emerge in the form possibly of (garble) funding for space science and application missions in (garble) congress, is there quite off the astronauts give briefing to congress, do you know yet if you and some of the PIs will be called on to do the same thing, and explain to them what you've done?

CHAPPELL I haven't heard anything on that. But, I hope the bubble is already there. I believe several days ago that Mr. Beggs was very interested in how the results were coming, and in fact was I think had a visit over at the White House on the agenda anyway, and was very interested knowing the results as they stood right now. So, I hope it's bubbled, that at least indicates to me that the bubble has gone as high as you can get the bubble to go.

DOOLING I believe that Beggs also asked for a science log of all the data rans and everything comparable to what I had requested a couple three days ago, will be getting one of those post-landing.

CHAPPELL I don't know specifically whether he asked for that or not. Because in this first input was sort of what had happened what were some of the significant things up to that point. I don't know whether he has, but I'm sure if he has and it's available that it would be available to you Dave.

PAO Okay, Schweitzer.
SCHWEITZER    A parallel question for Karl, as to what the bubble effect will be in Europe.

KNOTT    Well, I have had very little contact with Europe over the last few days. And I can only hope that the messages and the information on the results which have been obtained and the way in which this mission was conducted has penetrated to Europe. There is no doubt that before this mission, there was people very critical, and they said okay, well is this the right to go, to put all your eggs into one basket, and put so many expensive experiments onto one huge space ship and operated them all in a fairly complicated manner and a fairly complicated timeline over 10 days, which the rest of the crew gets tired, and other systems let you down, and so on. There was some reservation, but I'm sure that the success in which this was now carried out, and above all the results which will come out of this will certainly convince people who have been so far critical of using the shuttle as a platform for scientific investigations. I think we have proven beyond any doubt that is a useful vehicle and if you can come up with instruments which are made for this type of vehicle than it is useful.

SCHWEITZER    The personal cut level, has it been maybe been like 2 weeks, or maybe more like 2 months of holding your breath and do you feel like you're finally exhaling now?

KNOTT    Sorry, could you ask the question again?

SCHWEITZER    I'm just wondering if you personally don't feel like you've been holding your breath in anticipation and fingers crossed, for the last 2 weeks, or maybe the last 2 months, and now do you feel like you finally are home free?

KNOTT    I came onto this project only when it was already half way through. I did not go with that (garble) to the hardware stage, I can onto the project about 3 years ago. And I think from that moment onward, I've been holding my breath constantly because I was used to taking care of a smaller space project, free flying satellites and so on. Another thing that came onto this project, inside the magnitude and the number of experiments which are on this mission. And the way in which everything was designed, which it was to be carried out, and when I saw the kind of pre-mission guidelines on them. How we had to stick to certain rules. I've been holding my breath, and thought okay, what will get out of this, will it work as designed, or will the smallest littlest difficulty which will arise make it all collapse, so I also was a bit afraid, it may not work, and as it did, and I'm quite happy it worked out this way now.
CHAPPEL

Let me say that my reaction is entirely different from that, there are no fingers crossed, and if you look at what has been done, and the preparation that has been made for this, it is a question of going and doing it. And when the SRBs lit down there last week, I was standing up yelling as loud as I could, and I felt really confident on what we were going to get. Too many people have worked too long to have gone into this as sort of iffy situation, we were ready. And I think what we got was evidence as preparation that was done.

PAO

Go ahead Jackie.

JACKIE JUDD (CBS) Two questions please. One, not to blow the bubble, have there been any disappointments at all? I'm thinking of the equipment failures, temporary as they were, you're putting it in a positive vein, that the breakdowns of the machine only prove the value of the scientist, well why did the machines breakdown? And number, I'm trying to get a handle on the quantity of information that's come in. One of the PIs involved in the space sickness test, for example, said that the amount of information coming back from Spacelab may exceed any research previously done. I want to know, if that's high (garble) or if that is as accurate as you see it.

CHAPPELL

No, Spacelab can deliver data at 32 million bits per second, and that's an awful lot of information. I have an instrument on a free flying satellite that delivers data 16000 bits per second, instead of 32 billion bits per second. And, there is no (garble) in there at all with respect to the magnitude of the information that you can gain. The free flying satellite that my instrument is on, also will never bring my instrument back, and it will never bring back anything at all. Where as all the Spacelab things are going to bring back samples to people who did the experiments, the people who were the experiments, all of these kinds of things, there is no (garble) there. The other thing is, I think certainly we are anxious for you to feel the positive aspects of the mission, but one doesn't have to just paint things in a positive way. There are a lot of pieces of equipment on this shuttle and spacelab, and there are a lot of instruments, and to have in total out of 40 investigations to end up having one only, only one of 40, which was not able to get its primary objective, but indeed is getting it's secondary objective that being the microwave instrument which has been made for an impasive mode, that's just unbelievable, that is very very successful. And as I mentioned earlier in the week, space equipment is very complex, anything you do, building instrumentation for space requires an awful lot of technical (garble). And, to have a 37 or 38 or 69 or 70 whichever you want to count it, is just phenomenal.
KNOTT  Let me come back, what may appear as a slight difference in opinion between Rick and myself here, on the expectation for the mission. There was a pre-mission timeline in which all the activities which investigators had to, which the different instruments had to carried out, was blocked out, and was (garble), and for me it would really be a miracle if we

***
KNOTT  --in the really (garble) if they really had done that, minute by minute and had achieved all the functional objectives, all of them 100%. We had discussed this pre-mission with the investigators and from then we definitely had the statement, that if they would have obtained something in the area of 80, say 90%, that would have been, they would consider this as an extremely mission. And that statement was made pre-mission. This is about where we are, or we are even slightly above this. So it has really gone beyond what was expected even by the investigators before mission. Nobody expected that every FO was finished on time and exactly as it had been planned and that nothing unexpected would happen, I don't think that in such a complicated system that anybody would have expected that.

PAO  More questions please. Okay we'll rap this up, thank you.

END OF TAPE
Okay, good evening and welcome to our change of
shift press conference. Off-going flight director, Chuck Lewis
will tell you what we've been doing on the last shift and
may have a few words for you about the things coming up right
around the corner, Chuck?

LEWIS Well I really don't have much to talk about from a
systems point of view, the spacecraft and orbiter's system are
working fine, no new problems or additional problems there. So
we continue to support the experiment ops that the payload
operations control center has requested. Descartes for about 155
by 126. The attitude timeline, the CAP activities and the payload
CAP activities have been laid out from now through the end of
flight. As well as those during the night shift. About 6 hours
ago, STS-8 broke the duration record for the GAS shuttle
flights. STS-8 was 7 days, 4 minutes, 26 seconds, so we're 3
days, 4 hours at this point. Descartes, the latest calculations
for Descartes would have Descart flight 156 at 9 days, 23 hours and 9
minutes with a landing at 9 days, 23 hours and 56 minutes. And I
couldn't talk Fido into extending for just 2 more minutes to get
a full 10 days. Seventeen runways, 17 and 15 are open, 23 not,
yet, probably will be. Wednesday's weather, cloud coverage, 100
1 scattered 25K overcast. Thursday, 25 broken about 6/10. 85
scattered is the best we've got now. Anticipate no
additional rain. Winds we expect to be light and variable, so
that's a quick summary and like I said there's really not much
going on with regards to systems operations.

PAO Alright, well we'll go ahead and take questions and
if there are some. Well, I don't see very many. Say the weather
again.

LEWIS Wednesday, of course we extended so Wednesday
totally isn't a major consideration but the latest was they
expected 12,000 and scattered and 25, 850 overcast.

PAO Okay, Craig, are you going to save me and ask a
question.

CRAIG COVAVELT (AVIATION NEWS) I'll bail you out.

LEWIS You'll ask me ...

PAO Doesn't even have to be a good question, just a
question.

COVAVELT I was going to say if you went to White Sands, you
would probably squeak in full 10 days.

PAO There you go.
COMM: On thermal conditioning before entry, are you going to chill down the radiators with a cold attitude as previous flights?

LEMIS: Yes.

PAO: Okay, any other questions here in Houston? Do we have any at the other centers? Do questions at other centers? Going over, @:A, I think that's going to be the record for the world's shortest change of shift, thank you very much.

END OF PAGE
All of you remember John Cox, and he's going to tell us all about his flight now and join it's yours.

Thanks John. We again have another pretty quiet shift, we finished up the hot test attitude which had been started on the previous shift and then went down to a cool down attitude and in a few hours now the vehicle will be rolled back over to the inside of solar, which is something like a hot attitude but it's for a science reasons and the attitude is a little bit different. The crew reported again during the hot test and during the cool downs that come more of that moving and banging. They're beginning to think that that's all those related, we even think that's may be seeing some of those vehicle motions may be, there's a theory that may be explainable that way. We had a successful hot fire test today, we terminated call ops, we finished all the activity in that area, the temperature surveys were taken during all those different test attitudes.

The one day mission extension, the timeline worked for that activity looks like it's shaping up pretty good now. If you happen to have a CAP it basically fills in between 2 days and, or 9 days and 10 hours, you just kind of put a discontinuity there and insert 24 hours. There's a few other little adjustments going into and coming out of that that kind of reflects just CAP type changes. There will be a few CAP Spacelab type of tests also worked in there. The crew will be scheduled about 50% of the time during their shifts, so we can give them some free time to get up into the, this is the MS and PS, schedules so they can get up to the front and take some pictures. The attitude maneuvers will be similar to what we've been doing because there will be several unmanned experiments running while they're operating. With that I think I'll just turn it over for questions.

Art Benedict.

I wanted to ask you what experiments are you planning in that 50% of the time? You say 50% of the time will be leisure and 50% of the time would experiments, what experiments will be emphasized, do you know?

I can't. So, you'll have to get the details of what's running unattended and what not from the science folks. The things that are showing up on the timeline are the materials things that had trouble running, we'll make up some ground in those hopefully and seeing some timelines that had some CIIAC MHEI type of things, and there's some life science investigations that are being worked in, but most of that is in large blocks and they in particular or particular experiments, they're all being worked by no POCO and these details will be sent up when the CAP update is normally transmitted for those shifts, just before you start the shift you get this CAP update to work with, and we're not there yet.
ANNOUNCER: Have they, I know the crew tried to be able to take more pictures. Have they picked up all the targets out? And will they try to use up all the metric film that they've got left?

COX: I suspect they'll, the crew has asked for some time to take some pictures of Europe and some along the west coast. I think that Lyon was looking for some shots of the Andes if it is, probably looking for some European shots, so I suspect that we'll work out something in there. There was some work going on, they tried to get some MW altitude time and give them a chance to expose a few frames.

BENEDICT: Anything further on the weather out in Edwards?

COX: No, weather, in fact from the shift I had and from the weather briefing we had still is a little bit close to call. The front that is coming through is scheduled to come in Wednesday, can't tell whether that will be good for landing conditions or not, whether we'll get in before it or not, if you took the Wednesday opportunity. If you don't take the Wednesday opportunity if looks like it'll probably be clearing up Thursday, maybe you can land Thursday, but you don't know whether the lakebeds are wet from what went through on Wednesday. So the folks are trying to evaluate the precipitation that may be in that front, they'll be watching it as a watch right on up. Hopefully I think we're targeting for a decision early tomorrow sometime to tell the crew to go into the extra day timeline or not. And I suspect.

BENEDICT: What time early? 8:00, 9:00 or something like that?

COX: Or 10:00. I think we eyeballed as far as the crew activity plan is concerned, it will be the convenience for the crew to know by 10:00 tomorrow. I think as you are aware of, we can take advantage of daybit times any time and just a matter of how you'd have to adjust the activities to accommodate it, but that would be the most orderly way of doing things, where you can actually insert the new day in and have no impacts, and crew has plenty of time to review everything.

BENEDICT: Do they see any problem landing on the regular runway, on the concrete runway with all that weight coming back?

COX: No. We prefer the lakebeds if they'll be available, but as far as the party table goes we keep going into Edwards and keep on working towards the, even to the concrete before we would pick another landing site, so basically what we're looking at is, can you get into Edwards.

BENEDICT: Is White Sands all right?
COX The last shot I saw was.

BENEDICT Okay, thanks.

PAO Back there.

COX John can you elucidate on that comment you made about the popping, the banging, etc. Was that caused by some of the popping and banging. In the hot test attitudes today the crew called down and said they heard lots of it, they said "you ought to really hear this, there's popping and banging all over". Just a little bit ago now, we've been out of the hot test and we've went to a cool attitude again so there's a large thermo transient going through the vehicle now, and John reported loud popping and banging in the tunnel and some vehicle oscillation that went with it. We're just all scratchings our heads. If you know the way the Orbiter's built the pressurized module actually floats in the front cabin area. You have this pressure vessel up there and then you have the vehicle built around it. We've never had anything directly to that pressure vessel and on this flight we have that tunnel and Spacelab are all hooked to that work to the vehicle and they're also bolted right up to the airflow on the back end or the aft bulkhead of the Orbiter, so you're hooked in with all that structure that runs the whole bay length right up to the pressure vessel. So it may be normal vehicle distortions that go on and we know when we get these vehicle distortions, we found those during the OMS program when we had trouble closing the doors and what not, that was all that resulted to these small vehicle distortions. Well we are now being able to possibly reflect those right into the, some effects of that into the cabin, because we're hooked up that way, that's a guess.

ALABAMAH (UPI radio).

COX Thank you. There's no, I mean what you're listening too is of my pet theory on it, we've just been kicking it around trying to guess. The popping and banging is exacerbated in the thermo test attitudes. Then we went to the cold test attitudes we heard some of the popping and banging. In the hot test attitudes today the crew called down and said they heard lots of it, they said "you ought to really hear this, there's popping and banging all over". Just a little bit ago now, we've been out of the hot test and we've went to a cool attitude again so there's a large thermo transient going through the vehicle now, and John reported loud popping and banging in the tunnel and some vehicle oscillation that went with it. We're just all scratchings our heads. If you know the way the Orbiter's built the pressurized module actually floats in the front cabin area. You have this pressure vessel up there and then you have the vehicle built around it. We've never had anything directly to that pressure vessel and on this flight we have that tunnel and Spacelab are all hooked to that work to the vehicle and they're also bolted right up to the airflow on the back end or the aft bulkhead of the Orbiter, so you're hooked in with all that structure that runs the whole bay length right up to the pressure vessel. So it may be normal vehicle distortions that go on and we know when we get these vehicle distortions, we found those during the OMS program when we had trouble closing the doors and what not, that was all that resulted to these small vehicle distortions. Well we are now being able to possibly reflect those right into the, some effects of that into the cabin, because we're hooked up that way, that's a guess.

ALABAMAH Is it a matter though of structural concern, I mean.

COX No, no.

ALABAMAH Okay, very good.
HILLER: Join can you give us a breakdown once again, what's it looking like tomorrow, Thursday, and Friday, and can you illuminate a little bit on the question of whether weather on Friday would affect a possible Thursday landing, do you need that extra day there at sort of a push?

COX: That's where we're headed for. If we go for the 9-day mission, we make the decision to do that, we'd like to have a good weather prediction, again you can't guarantee it when you get there, but we'd like to have forecast good conditions on a nominal day, plus one day, and so that's why your Friday gets in, if we decide that we would like to go for the extension day, that it, it would say that we'd like the nominal end of mission conditions, the nominal day, plus one day, we'd like to have one extra day. Whether or not that means that you have to have Sunday 17th available or something like that on both days or not, we still have to evaluate that. We still have to evaluate that, we want a good landing opportunity on both days.

HILLER: And so a storm coming through on Friday wouldn't necessarily eliminate the possibility of a Thursday landing, this is just something that you'd like to have, is that correct?

COX: I don't think it would eliminate the possibility but we'd sure look hard at it.

HILLER: That's something else to think about. And once again, when does this storm... I know its a little bit early to tell you on the forecast, but from what you heard, when is this front expected to come through on Wednesday, what would it be, what about 2 hours after landing, the possible landing time or what?

COX: Well that's where all the guess work is going in right now. The last guess work I heard is, we might sneak in before it. And it may come in a few hours later, but then you also have to play the game where you may have some fairly high winds as you're jumping in front of it too, so we'll get another couple sets of data in before we make that decision tomorrow and forecasters will have, we'll have the front a whole lot closer to you and you can get an idea of what you really are dealing with. It's kind of, you know, all the problem we have predicting the one for launch. We chased that thing right on down and this ones showing some trends that it's drying out, it may be a lot dryer and may not have as much moisture in it, you know. If those trends continue you make out alright, but you just have to keep watching them.

PADO: Mike Shea, isn't it from Reuters.
SRH: CHARLIE OF SHOF sedat 12/05/03 12:30 pm PAGE 5

SRH: USA (Eastern): Is there any visible response to the political support or prime political support of President Reagan and Chancellor Kohl of via the program this morning, the fact that they're there and they're saying they're behind you and there may be implications for the future. Is there any reactions to that where you work?

COX: Oh, I think we're all very elated, there was a very happy Central Center today and we all hope we can do a whole lot more good things with the Europeans. There's not making any announcements yet or anything, but we'd sure like to see some good things happen.

PAO: Anyone have anything further? We have nothing from the other Centers, so if there's nothing here from Houston, that ends your day John.

COX: Thank you all very much.
Good afternoon and welcome to a special briefing on Spacelab. On my right is Mr. John Thomas, the NASA Spacelab Program Manager from the Marshall Space Flight Center. On his right Dr. Burkhard Pfeiffer, the European Space Agency Spacelab Project Manager. Gentlemen.

Good afternoon. What I'd like to do is give you a brief overview of the progress we've made in flight so far beginning just before launch and then summarize with the systems that have been observed during the flight and give you an idea of how they have performed so far which has been very, very good. Prior to lift-off, the 24 hours - 2-24 hours - we powered up the Spacelab systems in the ISS environmental control area, electrical power system and the verification flight instrumentation. They were powered up at about 11 a.m. on Sunday morning. They ran throughout the launch count period and through ascent gathering data in the dynamic region of structures environmental control and acoustics during the ascent phase. We then achieved orbit, completed the activation of Spacelab very, very orderly and following that we dumped the tape recorder that recorded the verification flight instrument, instrumentation on the downlink and have retrieved that data and it's in the process of evaluation now. During the activation process, everything came up very nominal. All systems have performed in that general state of adequacy during the conduct of the mission so far. I would, I'd like to point out that we have had a very good what's been called and has been described to you as cold test by the Flight Director and the Mission Manager. That was undertaken for a 24 hour period and completed satisfactorily. Following that sometime later in the mission just 2 days ago and yesterday was the hot test which was a 7 hour test for its full duration exposing the Spacelab to both the extreme cold and extreme hot such that we could verify our modeling techniques on the ground for, for future use. This we believe will allow us to find two of those models and provide the payload community some additional services as more than what we've done now. We have had as I mentioned all systems up and operating and just a recap for you there aboard the Spacelab as an environmental control system. Which is controlling the environment of the inhabitable area provides the mixed gases for the (garble) consumption. Controls the crew cabin temperature with a separate air loop. There is an other air loop that conditions the equipment mounted in the racks. On the pallet is another coolant loop, of cooling system that is, uses freon as it's medium in a closed loop environment. And controlling that of course is the Commander Data Management System, providing power as the distribution system. All of that has worked quite nicely as you are aware with the exception of one problem that we did have with the tape recorder which became jammed and was loosened quite readily by the crew and a very good job of inflight maintenance. That was, that tape recorder was down for approximately 11 hours, however during that period of time we were able to use the Orbiter STS-9
payload recorder to retrieve the data and did not intact lose any. It's operating nominally since that time and shows no indication of any degradation as a function of that particular nominally. The other one you heard about is the RAU, RAU 21, a remote acquisition unit. Mounted on the pallet and it controls as you've been told several nice experiments. It has performed erratically as a function of temperature. It has been running quite warm since the hot test and is expected to continue that way throughout the remainder of the mission. We have been able to work around the impediment associated with that RAU, and have been able to perform the scientific objectives as related by the Mission Manager. The other systems, that we're quite proud of the way they operate, is the scientific airlock which is, which has been operated on 3 occasions. 2 with experiments, and 1 yesterday in the hot test, began additional data on that test, on the scientific airlock. It was preplanned and has performed without a hitch. There was amount of procedure there during the hot test and that was corrected in the deployment continued as planned. You know we have a scientific window in the Spacelab, and that's been used for some very, very good experimentation with the metric camera. It is an (garble) object persay, but there is a cover that is operated to protect the window when it's not in use. All the systems as I mentioned, except for those two (garble) have been performing right, as expected. The predicted temperature during both the hot and cold test were right on as we predicted. And needless to say we're elated with the performance of the vehicle so far. Bob.

BURKHARD PFEIFFER Yes, I think I should add a little bit about the operation since they drew payload during the operations. You know according to the memo of the (garble) The response of NASA is to operate Spacelab. We have a very broad support team, supporting the mission at the time being. And those people are not here to receive that model. We have some certified people who's support (garble), there's a so called (garble), partly from industry and partly from the European Space Agency. The (garble) was planned, we've also a German resident team, who was a KC, who followed all the prelaunch preparation and then the (garble) preparation here at to Cape. And during this time, we have already seen the good performance of Spacelab so far and even before lift off, we had a lot of confident on how the mission would finally be conducted and we now have the proof and we have a lot of pride in the performance of Spacelab and what we have done so far.

PAO I'll take questions here at Johnson Center.
Carlos.

CARLOS BYARS (Houston Chronicle) - Mr. Thomas, on this RAU21, have, this thing seems, everybody refers to this as being temperature related, and could you tell us in more, about, have you found out anymore about what the nature of the fault is, how
it can be avoided next time?

THOMAS I think the erratic behavior of the RAU manifested itself in temperature. We believe that there is a problem, hardware problem inside the RAU itself. Reason we believe that is the qualification program demonstrated that this particular unit or qualification unit would operate at temperatures up to 45 degrees C without any difficulty whatsoever. And there are two more, or two additional RAU's mounted on the pallet, just a short distance displaced from this particular one that has operated normally under identical environmental conditions. So we believe that it is internal to the RAU.

PAO Dave Doeling.

DAVE DOELING (Huntsville Times) - John, I believe you or Barry had mentioned a few days ago, that there was going to be some troubleshooting by the HCSS on a RAU. I was wondering if you got any results back from them yet, and also an RAU failed the same location during preflight integration at the Cape. Could something to do with that location, the (garble) loop, or the coolant, or perhaps it seen a bit more heat than you had expected. Could that have anything to do with it?

THOMAS Okay, let's address the testing we did at Huntsville first. We took an identical RAU, over to the software development facility locally. Intergrated into the facility such that we could reproduce the traffic being introduced into the RAU, as a very similar to what we have now. And also applied temperature, we cooled it down, elevated the temperature and it performed as we expected it to from a qualification standpoint. That is, at about 60 degrees, I'm talking Fahrenheit now, about 60 degrees it would process on the order of 45000 words per second which is exactly what it should do. And as you elevate it to temperature up to 120 degrees, 122 degrees F or thereabouts, it again exhibited good performance before it went into a mode similar to the one we have here. Those of course significantly

***
THOMAS performed as we expected it to, from a qualifications standpoint, that is about 60 degrees, I'm talking Fahrenheit now, at about 60 degrees it would process on the order of 45,000 words per second, which is exactly what it should do, as you elevated the temperature up to 122 degrees Fahrenheit, it again exhibited good performance before it went into a mode similar to the one we have here. Those are of course significantly higher temperatures than we experienced on this current. It seems to behave erratically at about 70 to 72 degrees. That, Dave, did not tell us anything, other than it was confirmed that the RAU is operating properly except the one that is in this particular location.

Might add that the...

Excuse me, Dave. The second port dealt with the nominally we had in this particular location at KSC. We had 2 anomalies, one being that very very early in the process at the cape, we added an RAU in this location that exhibited similar performance, however, in that case, we did have the coolant loop operating at that time. And we attributed it to a very very high traffic rate which we reproduced and that the fact that it was operating at a somewhat elevated temperature. The second anomaly we had with this particular RAU was associated with an on off relay that is completely separate from the data system that is the power service assembly of the RAU. And we removed the on off command harness into that RAU which we believe is totally unrelated to its performance under these circumstances.

PAO I just wanted to make the point that Dave was talking about HOSC for those of you that may not be familiar with the term, HOSC stands for the Huntsville Operation Support Center at NASAs Marshall Spaceflight Center in Huntsville, next question over here.

OLIVE TALLEY (UPI) You mentioned 2 anomalies in the Spacelab, the computer and then the RAU, but as I recall the astronauts were peppered with a number of problems, with malfunctions, the electron gun, beam generator, the isothermal heating unit, things like that, are you not counting them as Spacelab's systems, or are you distinguishing between the systems and the instruments and experiments onboard, and if you are, could you address some of those other things as well.

First, I mentioned that the anomaly was with the recorder and the RAU and not with computer. Secondly the problems that have been experienced with the payload are not within the helm of responsibility, so I discount those.
Might help it, if you could think of it as the shuttle having a payload which is the Spacelab which is what they are talking about. The Spacelab itself has a payload, which is the science, and the experiment apparatus.

PAO

Go ahead.

TALLEY

I just wanted to clarify and make sure that we were comparing apples to apples and oranges to oranges. So that there wouldn't be any conflict in the numbers.

PAO

Sure, Carlos.

BYARS

I've got a couple of more RAU questions. Mr. Thomas, there has been, you are saying there have been no other problems in those two. I have been told by folks involved that at least one other RAU has acted up on this mission, and in since you already had an experience of problems with an RAU while it was on the pad, why did you not go in and split up the load on these things instead of risking four major experiments with one unit where you had already had problems?

THOMAS

Let's back up to the first part of your question, about problems with other RAUs. There has been one skip, as you've heard it called on at least one occurrence of a skip on RAU 19, and one on RAU 28. However, we expected those based on the experiment protocol with those, and that was not a new idea for the experiment at all, we had observed that and agreed that that was the proper thing to do with. Secondly, with respect to understanding the problem at KSC, as you recall, I recounted the resolution that we implemented for the first occurrence of the so-called, skip area and that is, we did the testing, we did extensive testing, and we felt we had attributed, and still feel like we had that attributed to the thermal environment of the RAU at the time, and the traffic which was an unusually high traffic at that time. The other anomaly that occurred on this particular RAU was one totally disassociated with its performance now, and that was the on/off relay problem. And we had at least two ways around that particular anomaly, one is we the latched relay in the on position for launch which was a perfectly acceptable way of getting around the on/off command. And secondly, there was an additional redundant command that could operate the RAU had we needed to. So we had redundancy in that aspect of it.

PAO

Gentlemen in the back.

BRIAN SIZIWAR (Voice of America) Have either of you gentlemen had any feedback from the crew regarding the Spacelab from the human habitability standpoint, have they found it easy to work
in, have they found the layout and design of the laboratory comfortable to work in, and has that matched your expectations from ground simulations?

THOMAS    Well, from my point of view, I haven't heard any adverse comments over the loop, over the downlink so far, regarding the habitability. Secondly, there are normally the types of things we cover in pre-flight dressings in quite amount of detail as opposed to in real-time.

PAO      Dave Dooling.

DAVE DOOLING (Kantersville Times) Briefly back on the RAU, so far it's been 3 initials and 2 digits. About how big is that, and how much does it weigh? And about how many wires does it have going in and out?

THOMAS    Okay, I'm going to do some guessing here for you Dave. The RAU is about this long about this wide and about yay tall. About 3 by 10 by 12.

DOOLING  How do I translate that in the story? Yay tall and this wide?

THOMAS    I just gave you some dimensions. Okay, it's 5 inches wide, about 10 inches high, and about 12 inches long. The weight is about I'd suggest about 20 kilograms. What was the other thing?

DOOLING  Give me that more precisely, I think the...

THOMAS    I've got it outside.

PAO      Was there another part to your questions?

THOMAS    How many wires? Oh yes you asked, there are 10 multipen connectors on the RAU which is the data lines, and the power signal. I don't know exactly how many wires that is, but it's greater than 100. I can get that for you if you like.

PAO      Right over here.

TALLEY     John Young earlier today, was commenting about the shake, rattle, and rolls on Columbia, and it was suggested at one point or another that it might of been the way, there might be just teeny gaps in the way of the connections of the Spacelab into the bay, is that indeed the case or do you feel like that any of this is being caused by any interplay between Spacelab and the tunnel with the orbiter or anything like that?
Thomas The Spacelab is suspended in the orbiter in a way that it is constrained only in one axis at any one particular location. For example, at the trunnions on the (gimbals) in the orbiter where the Spacelab sits down into the payload bay, the Spacelab is free to move in this direction at the (gimbals) at the bottom of the bay is free to move in this direction and...

***
THOMAS: That one axis in any one particular location. For example, at the trimming on the foot on the Orbiter where the Spacelab sits down into their payload bay, the Spacelab in free to move in this direction at the (garble). The bottom of the bay is free to move in this direction and X direction and therefore to get it into a binding condition seems almost an impossibility from that particular viewpoint. And those are very, very high polished (garble) and joined, so I would admit that that might be the problem.


Do you think that it will be done (garble) got some (garble) problem?

THOMAS: No I don't think so. I believe I recall that the flight director this morning said that initially 2 or 3 were thought that this noise may be (garble) at the trimmable little bit later on they said declined that to saying it happened, or that it occurred throughout and they could not isolate.

PAO: Okay, we'll take questions now from the Marshall Space Flight Center in Huntsville.

JIM ADAMSON (3 Eye Witness News): First of all for John Thompson, I would like to get an idea if you've learned anything so far in this mission about the module itself, that it may lead to any modifications or changes in Spacelab 2 or P1?

THOMAS: Not so far. Our final resolution on these 2 anomalies may dictate that we make some adjustments in the design but other than that, I can foresee no change in the design. We couldn't ask for it to operate any better.

ADAMSON: Okay, that kind of leads me to my second question, I want to get a reaction from you and Bob (garble), your feelings about the module and how its performed and whether it's up to your expectations or not?

THOMAS: Well, from my viewpoint, it is fully up to my expectations. We of course, go through prior to any mission, a prediction on the performance parameters like temperatures and power and other functional resource allocations like that and so far we've been right on the predicted values, at least in some occasions on the conservative side so from that viewpoint I am - as I mentioned a little bit earlier completely elated with it's performance.

(garble) I could get here is we have strengthen the module and particular insides of X due to the fact that the load factor of the Shuttle had been increased a couple of years
before. The suspect to original specifications we had agreed upon with NASA. So at this point of time, we have verified really that the conservative figure which finally was in agreement to an ESA-NASA would be set and at the time being, I think we have not yet the results of the flight to compare whether specifications were really on the very conservative side. But, in any case, the specifications we have met all these things we have gained, which is now foreseen for the missions of the future. I don't see any necessity to modify or strengthen anything from the module.

PAO Questions from Marshall.

THOMAS There are no more questions for Marshall.

PAO One more question here from Dave Dooling.

DOOILING John, post-flight, everything except RMU 21 has worked magnificently well. Obviously you would want to replace that, but what kind of stuff between flight maintenance will have to be done before the same hardware can be used again on Spacelab 3. You're going to have to replace gaskets, or seals, or what.

THOMAS The, of course the next flight is SLS, and we will of course remove some of the aft end cone and the experiment segment, so we are going to disturb some seals, however, we don't foresee that they will be replaced or need replacing at this point and time. The only thing we will need to replace are the consumables. That is aluthemonoxide and the nitrogen.

PAO Okay. If there are no further questions, this concludes the special briefing on Spacelab. Thank you for attending.

END OF TAPE
2:00 Welcome back, we're here with a going flight director, Larry Dotson, and to his left, Flight Director Manager, Gary Coates. I'm sorry, to his right Dr. Mullinax, head of Spacelab Investigations Coordination in Europe and we'll let each of these men introduce and go straight to questions, Harry.

MULLINAX: Okay, again we've had an excellent, another excellent shift, everything going nominal. We've had the flight control system check out today, and everything went nominal with that. The weather at Kennedy for tonight, and Thursday is looking excellent, so therefore we've decided to extend a day, so we'll be coming in on Thursday into Edwards. The vehicle systems are looking fine, we're just working on the time line. Everything looks excellent. We've met the mission extension time line for the blue team and the extension time line for the red team will be going on this shift. So we're in excellent shape and pressing on, Harry.

CRAFT: I don't have much to add. Spacelab is performing real well in supporting the experiments as planned. We've had no (garble) there. We've finished the hot test a couple of hours ago and we're going to come on board the hot test. So now we can confidently say that we have science data on all 38 experiments on board, and everything there looks good. We've had no problems, and we're on the beginning the extension day timeline to gather additional science. Thank you.

MULLINAX: I would like to support what Harry said. We were very interested to see how the instruments on the pallet would come through that hot test. There were some fears by the scientists that they might be over exposed. In fact, temperatures have stayed well within the predicted range and they've all run excellent.

PMD: Okay, so we'll take questions in Houston, right here in front. Please give name and affiliations.

CRAFT: That package is a passive, it's passive and the analysis of that data will be done by the PI's. So we will remove those, and they're replaced all over the tunnel, in the module, in various places. We'll look at that data, when we give those samples back to him. There's no live data coming to the ground on that.
Sloan: Perhaps I could add just a pointer in that direction (garble) time. Armstrong has an entry2 which is on the point and he reported that the crew's from earth, very much lower. His background, is very even, lower, because of the excellent protection which the shuttle, and Concorde which is giving him. So it's point in that direction.

KRAMER (EO) - Larry, you said the weather looked very good for Wednesday and Thursday, so you've got it for Thursday landing, but as it has been explained earlier, you have to have good weather for Thursday and Friday to go for Thursday landing. I assume that the weather is also looking good for Friday.

BOURBOIS: The weather is actually looking good for both Thursday and Friday.

KRAMER: And Wednesday as well.

BOURBOIS: Wednesday at Edwards the weather is questionable, looks like the weather would be no go on Wednesday.

KRAMER: Okay so I guess you disprove yourself, before you meant to say Thursday and Friday, earlier.

BOURBOIS: Yes, I thought I did say Thursday and Friday. It is Thursday and Friday.

KRAMER: Thank you.

PAC: Gary

GARY SCHUTZER (SO) - Are the noises from the Orbiter being written off solely to the hot test and is there concern about that at all? Any lingering doubts about the source?

BOURBOIS: No. There's no concern about it, it appears that they are thermal induced, when we went into the hot test attitude we had one or two incidents of loud noises and oscillation in the vehicle. Subsequently coming out of the hot test attitude, we had another incident, it was a couple of hours after coming out of the hot test attitude, it (garble) in the vehicle cooling, is the assumption that we're making. So subsequently went in to the top on attitude and had some noises, so every time it looked like we were stressing it thermically, changes from cold to hot, or vice versa, we were getting these noises. And it appears its thermal, there is nothing wrong with the vehicle, everything looks fine.

CRAFT: I wasn't on then, so they were reported throughout the length of the craft even in the tunnel, is that correct?
BORGEOIS: John reported that one of the incidents, he was at one end of the tunnel, and the noise appeared to both of them to originate in the tunnel. Later John reported that it appeared the noise comes through out the vehicle, so essentially it was multiple sources, with thermal contamination.

PAO: Carlos.

JAMES BROWN (AEC news) - This is for Barry, or Barry I guess. I may have been having an attack with the ingenuity, but I don't recall hearing the, Browse the other day complained about the oscillation and mission control jolted back and forth with him. That it was like they were doing the hop and drop test, and I think somehow Barry Chorle, whoever the GSE) was, said they would have gotten too much, must have taken the full load. Did you every figure what the oscillation was from?

BOURGEOIS: So Browse, the first oscillation came right after Browse out the video and audio pilot tests, and he associated the oscillation with the digital autopilot switching. Basically what we've seen today with the multiple oscillation, we believe it was probably the same thing, the thermal effect. Nothing associated with switching depth. We looked the data, during that time, we could see no indications of any jet firing, or couldn't even see any indications on the (parb) measurements unit that the vehicle was oscillating at all. So we suspect that it was a thermal cause type of problem.

BROWN: And it was strong enough, positive enough to wake up John Young?

BOURGEOIS: Browse, indicated that it did wake up John, that's correct.

PAO: Carlos.

CARLOS BYARS (HOUSTON CHRONICLE) - During this hot test, what was the effect, did you get the effect, what was the effect on our old friend MAU 21?

BOURGEOIS: MAU 21 basically skipped and was nonoperative.

CRAFT: It stayed with us for what we think for about an hour. And we lost it, again point out that the very few experiments were operating then, so it really didn't bother us that much.

BYARS: Was that hot test cut off ahead of schedule?

BOURGEOIS: Negative, no. We terminated the hot test at the normal end of the hot test and all the temperatures looked well.
with limits. Excellent tests.

RAO: Okay, let's go now to the ESA press center at Calipso-Porz, West Germany.

Irish Television - back to things that go bump in the night. I was just wondering, I understand that O11, O11 was to be used to gather some data on those 2 hertz oscillation, that was reported. Can you tell me if that data is already on the ground or are you depending on recorded material, that will reach you later.

BOURGEOIS: Is that the experiment data? Yes during one of the oscillations we did get some experiment data. We looked at it and could not call (garble) data to oscillation in the vehicle or in any indication that the experiment data was probably over saturated because it was too sensitive.

Have you heard that 53 of the 54 were occasional flight tests have been like completed. When will be the last one?

CRAFT: I don't remember about the last one was. We can the nominal time line for all of the verification flight test. I honestly can't tell you what the last one is, but we are going to accomplish it.

BOURGEOIS: I suspect the last one we're, we take WFI data during entry. One of the critical test and I suspect that is the last one.

I was thinking of the last one, the one you lost.

BOURGEOIS: The one we lost?

53 and 54 were down, which was the one left out?

BOURGEOIS: I'm not aware of the (garble) two flight test we lost, I thought we accomplished them all.

Okay thank you that's all from Porz-Wahn.

RAO: Okay, we'll jump from Europe back here, and take more questions in Houston, back there.

JACKIE JUDD (CBS) - Mr. Craft, would you explain the process of the deactivating Spacelab, when it will begin, and how long it will take?

CRAFT: Okay, on the deactivation of Spacelab, the experiment activities will begin deactivating in the neighborhood of 16 hours before re-entry. And Spacelab it's self will 898-9
complete deactivation at about 13 hours before re-entry. Now the process is one that I'm sure you all are familiar with, it's restoring items that we've had out during the mission, and putting the Spacelab back into predesigned configuration for landing. All it's going down closing checklist and making sure that we've done our housekeeping properly. It's really nothing unique.

PAO Greg

SRSS COURIER (Aviation Week) - Larry, how much better is Columbia sitting on her consumable reserves at the present, then you would earlier have plotted? Propellant and fuel cells?

JOHN (CS) - The cryogenic was hydrogen were about 55 lbs. positive, which is equivalent to one powered up day, which is one extension day, plus probably another day powered down for extension day if we need it for re-entry landing. RCS propellant wise we are very close to nominal, we predicted are (quirky). We have positive margins at this time because we launched with positive margins. It may be slightly negative, but it's very close to the nominal.

PAO Any more questions? Back in the back, Tom O'Boyle.

TO: O'BOYLE (Washington Post) - Harry, can you tell us what science you've scheduled for the extra day?

END OF TAPR
predicted preflight, we have positive margins at 
this time, because we launched with positive margins, they may be 
slightly negative, but it's very close to nominal.

PAO Any more questions? Back in the back, Tom O'Toole.

TOM O'TOOLE (Washington Post) Harry, can you tell us what 
science have scheduled for the extra day?

CRAFT Well, we're still cranking out, as Larry reported, 
we have sent up the first 12 hours, and as you suspect we have a 
number of guys who want to things. We're probably going to get, 
the most we'll get in on the micro-gravity areas, and as you well 
know, things like the astronomy and all since we're in the total 
sun orbit, we're not going to be able to offer them that much. 
But we'll put the emphasis on experiments like 23, I think is 
getting some additional runs, Space processing is getting some 
additional samples run, we're going to do some photography with 
some film that we have left, and there are some life sciences 
activities that they have asked for additional runs on. Right 
now, that's probably as much detail as I give you because 
honestly I didn't see that before we walked in, it was being sent 
up. The solar stuff will probably get some additional 
operations, and I'm not sure where that is scheduled, but we're 
going to try to give them some additional operations.

PAO Jules.

JULES BERGMAN (ABC News) Harry, when the final days' flight 
plan for the science crew is finally settled on, can we get a 
copy of it?

CRAFT You sure can.

BERGMAN We've heard like 3 different versions now.

CRAFT You sure can, in fact if the PAO people will get 
them to you, get distribution to all of you, it is no problem at 
all.

We have a pretty fairly extensive package already 
there for the first 12 hours we can give that to you.

CRAFT Yes, we can get you that with no trouble.

PAO Right here, Mark Kramer.

KRAMER Larry, on the business of the landing. If the 
weather were to start looking bad at Edwards for Thursday or 
Friday, started looking better for Wednesday, what would be the 
latest time today, that you could start doing what you have to do 
to land tomorrow? Or have you already passed that point?
BOURGEOIS: For nominal stowage and activities associated with entry, we've essentially passed that point this morning, making the go, we've got some stowage activities which had been planned, for this 12-hour period, which we deleted and replaced with experiment activities. So, we could make a landing on Wednesday if we had to. But, it would not be according to the nominal timeline we had planned.

KRAMER: The 16 hours that Harry mentioned, 16 hours prior to, was that landing or was that retrofire?

CRAFT: No, that was landing, that's when we start our activities, he has a different timeline that they go to.

KRAMER: So, Spacelab needs 16 hours to clean up and close up?

BOURGEOIS: That's the nominal timeline, I suspect you could do it a lot shorter if you had to.

KRAMER: So, then, have you really passed that point? I realize this is really speculative, but I'm just curious.

BOURGEOIS: I would say, if we had to land on Wednesday, we could certainly accommodate at this point in time.

PAO: Any other questions? Okay, we'll conclude, thank you.

END OF TAPE
Good morning, and welcome to the Science Briefing for December 6th. With us again is Dr. Rich Chappell, Spacehab 1 Mission Scientist, and Dr. Karl Knott, European Space Agency Project Scientist. Dr. Knott would you care to begin.

KNOTT: Yesterdays shift was a very hot one, not only because the hot test was started but also because there was a lot of activities up in POCC amongst the Investigators, which created a fairly heated atmosphere for some time. I would start at (garble) acquired, we had a number of activities to do to recover from the Press Conference which had been held earlier on. Then went to some special attitudes, one of the attitude for experiment 19, the particle experiment which was carried to an attitude which aligned this instrument with the magnetic field of the earth. But an interesting attitude for this experiment, and then around mid day, after 12 local time, the (garble) was slowly oriented to, through out the sun. And the hot test started.

When Mission was initially planned, this hot test would have been carried out by just having, during 1 orbit, a period where it was exposed to the sun. And then a certain time when it went into an eclipse, when it went to earths shuttle. But as it turned out after we moved the launch date to November, there was no more shadow time and the hot test really is a hot test because the sun is continuously shining into the bay of Spacehab. Now this is of course, from a science point advantage. The solar experiments get a longer and more continuous view of the sun. However from a temperature viewpoint it is slightly more critical and temperatures of a different pallet experiments had to be monitored very, very carefully during this test. They basically four instruments which operator observing the sun or being pointed throughout the sun during this hot test. The first one is experiment 28, an experiment from the life science area. It is a passive experiment which exposes a number of biological samples, which are arranged on a tray on the pallet, exposes these biological samples. I think it's some 250 different samples, which are exposed to a (garble) and x-ray's from the sun. And then we have 3 experiments which we observe the sun. We mentioned them earlier on, these are 2 active cavity radiometers which set out to measure the solar constants, they just wanted to determine how much energy the earth is receiving from the sun, to a very high precision. Two experiments, experiment 8 and 21. And experiment 8 coming from J35, the Principle Investigator being Dr. Nilson, and experiment 21 coming from Belgium, the Principle Investigator being Dr. Dromolynck. So these two experiments measure the total radiance which is admitted from the sun. And there's a fourth instrument, that experiment 16, and that one looks at the sun and tries to determine the radiance which occurs at different wavelengths. One wavelength looks at the sun in the infrared wavelengths. It looks at the sun in the visible and it looks at the sun in the UV range. So it can get some idea about how much energy is contained in this different wave lengths ranges and of course it
also looks for possible variations in these different wavelengths. This experiment comes from partly from France, Principle Investigator comes from France, Dr. Thuillier. And his co-investigators come from Belgium, and other co-investigators come from Germany, on the Astronomy Institute in Heidelberg, and the Astronomy Institute of Hamburg, and the contribution of these two latter institute is basically a calibration of this instrument, because for solar experiments, it is extremely important for these solar observing experiments, it is extremely important to get a good calibration of the instrument both before the flight, during the flight and after the flight. And this is why they are carried on the shuttle in order to enable investigators to carry out this post-flight calibration, which is extremely important. And the experiment is, in particular is first calibrated by a special black body source, that has been done in Heidelberg last year, just about this time. And then when the instrument was already installed at KSC it was calibrated with other special lens which had been specially carried to KSC. Also the experiment carries its own calibration lens into orbit, and there is also an inflight calibration done. And all this calibration there then are compared with each other and made consistent just in order to achieve with this instrument, the necessary precision. Because the effects people are after are very, very small. The solar constant, that is why it's called constant, it's a fairly constant phenomenon. But investigators are after any possible variation in this what we call a constant, and this is why they have to have a go at it with such enormous precision. This was then processing for about 7 days during yesterday's shift. We saw in our other experiments which at this time were not switched on, the temperatures slowly creeping up and in some cases going very close to these (garble), not at one time I had a number of experimenters, the data which had (garble) my desk, a number of them were quite interested to stay with the sun, because they not such excited measurements. And others came and said please we cannot go on, our experiments are getting too hot, our films are getting too hot, so we're endangering previous results, and they endanger our forthcoming observations, so we had to stick with what we had expected would happen, and after 7 hours we had to turn away Spacelab, the minus (garble) axes of the shuttle, away from the sun, into a cold attitude. To what cold space, and the temperatures rapidly decreased again, and everything was in order, the solar investigators they also saw their colleagues really had a point in interrupting the solar test at this point. While this was going on the pallet, of course the astronauts inside the pallet, enjoyed very comfortable temperatures, because Spacelab, inside Spacelab did not notice anything of the hot test temperatures, remained extremely comfortable. The module experiments went on and these covered a couple of investigations in the life science area, and one very spectacular experiment in the area of material science, and that was the production of a single crystal, of a single lysocyme.
single crystal in the mirror heating facility. You probably recall that this facility had initially some power problems but was repaired by the astronauts and is now working again. And yesterday it was possible to slice in between an ongoing activity, the production of this single lysosome crystal. And this was done, in fact it was achieved with real time TV coverage and that turned out to be extremely important to have this TV coverage because the Investigator from the ground had still to kind of guide the Payload Specialist through this experiment. In particular the very, very first step of this experiment which calls for melting, it's a silicon (garble) about, this kind of dimension. In the mirror heating facility, light is focused on to this (garble) and always a small portion of this (garble). So the light is always going up and down, from one end to the other of the run, and slowly melts certain zones in this (garble). The initial part of this melting in the first beginning, must be achieved by having a very, very mellow, a very, very small diameter of this (garble), and once the first then has been made fluid, it had to be pulled apart, slightly in order to achieve a very thin starting point, because the starting point determines the quality of the remaining crystal. And this is an extremely critical activity which was yesterday successfully carried out with the Investigator following the activity of the crew in real time TV and you may have heard his exciting voice exchange when he said, turn down the heat, turn down the heat, and the Payload Specialist just about made it, and saved his crystal and from then on the critical period was over, and then from then on the crystal was automatically processed. So what we have as a result from this investigation we now have a single silicon crystal which has been processed in 0 gravity and it is expected that this one will be of much better quality, then similar crystals which are ---

***
We have as a result from the investigation, we now have a single silicone crystal which has been processed in zero gravity, and it is expected that this one will be of much better quality than similar crystals that are processed on Earth. This basically covers the activity of yesterday's shift, I don't think we have forgotten anything, that would cost a long duration material science experiments going. I should say that they are doing the cold attitude which was following the hot test, an astronomy experiment, the 23 spectrometer picked up this opportunity and pointed to an X-ray target in the sky. And at this point Rick took over the shift and we'll continue reporting on how things went.

CHAPPELL: The next shift was dominated by life sciences and involved the 201 investigation. The vestibular investigation of Dr. von Baugarten, and I want to come back to that in just a minute, there were 3 different runs of that lasting a total of about 4 hours and a half. We also did a second silicone rod, and in this case, we were not as fortunate in being able to adjust the temperature, and we didn't get a melt zone and the rod melted through, contrary to the first run. And this is an illustration of the stage at which this type of processing is in, as you think about commercialization materials processing is one of the commercialization possibilities. What you have to do earlier on is the background research to learn how to do the processing, and to learn the specific qualities of the crystals once you've grown them. And in this case we are learning how to do this type of crystal growth so that the first good one, we gained a lot of information from that, but the delicate nature of the operation was shown by the second run, where the temperature got a little bit too high, and the rod melted through. However, since that was the second sample of the same sort, we were okay, and learned from that experience. The results is sort of ad hoc fluid physics module experiment which you may have seen on the TV in which Ulf Verrill took a cylinder of oil took a tiny Allen Wrench, took the end off and put some drops of water down in the oil, and then shook it up, so that two formed sort of an emulsion, and then spun it up, so that you could see the bubbles of water within the oil itself, and you could see the motion of the fluid in the cylinder. He then spun it up, and you could get an idea of the way the fluid distributes itself within the cylinder. In this case, an analogy to say propellant in a tank of a spinning rocket, spinning sounding rocket, or a launch vehicle, so it was a very interesting experiment to do that was done with the live video. One experiment that I wanted to mention that has just about finished up operations, has a long sequence of them, that we've talked about, involves the electron accelerator, the SPECS. And they have been able to accomplish a number of things which I wanted to list for you and then professor Ohyashi is
with us and can talk to you later on in regard to the specifics of the SSPAC operation, after the briefing which is to follow the flight directors briefing. But SSPAC has been able to use this particular flight to understand the operation of all the different components and as you've mentioned it involved a very complete diagnostic package of plasma and wave instruments, a neutral gas plane, which is a device which emits neutral gas to neutralize or give return current to shuttle, a monitor TV an electron beam accelerator and a magnetic plasma dynamic arcjet. All of these systems have been tested, all of them worked well through the low power firing on the SSA, the Electron Beam Assembly, the low power firing went very well. And then, in a subsequent stage, there was a problem as we mentioned yesterday, with the heater in the SSA that prevented the high power firing of it. But in being able to carry through what amounted to probably 10 different operations, the SSPAC investigation was able to understand or get a good feeling on the way the shuttle will neutralize or can neutralize itself, drawing back return currents from the ionsphere as a beam is firing. Both a lower energy beam, which they did in conjunction with the SSA 20 experiment, which is also a low power electron accelerator. And then a higher power beam as was emitted by the SSPAC electron beam accelerator, they did a number of studies on the magnetic plasma dynamic arcjet, and how the energized plasma from that interacts with the ionsphere around the shuttle. They have been able to study the particle born plasma phenomena, one of which is called a beam plasma discharge phenomenon which is when you inject a very high energy beam into a surrounding plasma and you get a sort of a shaft of light that builds up around the beam itself. This has been seen in ground based chambers, but could not be studied as thoroughly because of the wall effects within the chamber. Then, they have studied a number of things involving the waves that are generated when the electron beam fires, and when the arcjet fires, as well as the measuring the characteristics of the electrons that are drawn back to the shuttle when the beam fires. So, professor Obiashi feels that the experiment has been quite successful, the SSPAC is scheduled for a following flight in about a year and a half. And he has been able to benefit substantially from the experience of Spacelab One, to look toward the operations in the future Earth observations mission in 85. I've got some video, why don't you, if you could roll the first set of video, which I believe is on the SSPAC experiment. This is when they saw what they believe is a satellite if you look right in the middle of the picture, they'll be a small dot that will flash across, we hope we got the right footage. Did you see it? Okay, that was from the monitor TV which is mounted up on the back of the pallet, and used to look at the beam. The second, shows you, I believe it is the electron beam firing. I guess it is the HPDR arcjet, yes, this
is the M2O2 arcjet firing, this flash is the emission of the electron ion (garble) out of the M2O2 arcjet and then they interact with the surrounding plasma and cause the glow. And the last one, is the electron beam which we saw of now gone past, let's see. It's more subtle to see it, there you go. Okay, that was the electron beam firing. That gives you an idea of the phenomena, okay let's stop the tape till I get to that one. That gives you an idea of the phenomena you have to, when your reading travel guides and going to Mexico, you can't appreciate from the road, you have to be up there and watch the magnitude of those emissions. Both the beam itself, and the plasma plasma dynamic arcjet, in these cases you had nothing to compare it to in size, so it would like just small flashes of light but anyway it is a very significant thing to watch. I wanted to mention a little bit more about Dr. von Baamgarten's experiment which was carried out during this shift. We had a number of different objectives including a coloric stimulation. We talked earlier in the week about an earlier run of this experiment, and that is where you put different temperatures in the 2 oars of the subject which can generate this a feeling of rotation. Which causes the eyes to move with a (garble) to follow what feels like a rotation. That experiment was repeated with some very interesting results, comparable to the ones particularly compared to the ones earlier in the week, and I would encourage you to talk to Dr. von Baamgarten independently about those. A second thing that was done was a measurement of the sensitivity threshold, of the otolith organ, which is measuring the linear acceleration, and in this one, one crewman is in the body restraint system, and the other crewman moves him slowly giving accelerations of various magnitudes. And the crewman in the seat then with a joy stick, gives an indication if he can feel the acceleration, and it gives you then a measure of essentially the threshold of the otolith organ. And the next tape, if you could roll the tape, we show, let me take sure I got the right segment. You can see one crewman in the restraint system. With his legs crossed holding a joy stick, the other crewman is moving him, giving the acceleration. In this case, acceleration along 1 axis. And the subject in the chair then reports, he's blindfolded, and he reports when he feels a motion. So, it's a way of measuring, this is a shot down from the top, can see the joy stick there where he moves the joy sticks when he senses the acceleration. This also has some very interesting...
CHAPPELL: . . . the subject in the chair then reports, when
he's blindfolded, he reports when he feels a motion. And so it's
a way of measuring, this is a shot down from the top you can see
the joystick there, where he moves the joystick when he feels
senses the acceleration. This also has some very interesting
results that Dr. von Braunfest will want to talk about,
regarding the way in which the otolith threshold has changed now
during the adaptation period, in these 7 days in orbit, (garbled)
Ok, we have up to this point completed 37 experiments, and so we
are well on the way. And one notices very significantly the
tailing off of activities in terms of the number of experiments
that are running at the same time. The crew continues to do
extremely well in all the work. Today, with the 261
investigation being lengthy, or they were full up with activities
for the entire shift. I want to show you one other thing which I
think we can give some indication of the significance of some of
the experimentation that is being carried. I guess I don't know
a better to do it than to give you a comparison here between a
spectra of the Earth's spectrum that Nasha Fort has obtained from the imaging
spectroscopic observatory experiment 1. A comparison of that
spectra with the Earth's spectrum that you would normally, that up to now
you would have gotten from an average satellite instrument doing
the same job. Now her instrument looks for emissions that are generated in the upper atmosphere that are natural
emissions called air glow, day glow, night glow, and she can also
do scans of the limb to a certain degree and get altitude
profiles. As we have mentioned earlier, the instrument has 5
different spectroscopes together that covers an entire wave
length range from 300 angstroms up to in this case 1200
angstroms. Typical instruments will give you a coverage of about
500 angstroms and let me just give you an idea of what one of
Nasha's spectra looked like. Why don't we stretch that out as
far as we can. Okay, this is a typical, this would be the width
of a typical spectrum that you would get, this is the width of a
typical spectrum that you would have gotten off of a satellite
instruments today, about that much. Nasha's instrument, you can
see the spectrum is quite a bit, there's quite a bit more
information and this type of thing is done, both in terms of
spectral information of it, both in terms of spectral
information and in terms of special information. The other
dimension of the (garbled) give you - gives you special
information and then as the shuttle moves in orbit, you end up
with a track of air glow or data that looked, each cycle of which
gives you this entire spectrum. Every line in here means
something to Nasha and each set of lines will give you
information on a given atmospheric species. Then you can put the
intensity of the lines together and understand the processes that
the chemical interactions that are going on between the different
atmospheric species. This was as a dramatic way as I could think
of to show you the magnitude of the instrumentation. In this
case, a very substantial survey instrument that will tell us more about the aigrowave in the upper atmostphere than we have ever been able to get before. I think I'll stop at that point and we'll do what we can with answering questions.

PAO Okay, let's start right here with John.

JOHN WILFORD (New York Times) You keep talking about very tantalizing in your remarks about Dr. von Baumbergen and I gather he is not one of the investigators who is going to be here afterwards so either could you elaborate more on him or if he's available, he could elaborate on what he has (garble).

CHAPPELL He can do that. Gary would you like to comment?

PAO Could we get a mike over on Dr. von Baumbergen.

VON BAUMBERGEN That they would like first to see I (garble) on the European vestibular experiment which collection about 10 different experiments that co-investigator responsible for the caloric experiment which excited us so much this morning is Dr. (garble) from the University of Munich. What essentially was done was to blow cold air in one ear of the crewmember and at the same time warm air into the other ear and this caused the eyes to flick. This test is one of the most popular test of ear, nose, and throat doctors and its done in all the other (garble) hospitals to check on the normal activity of the logical activity of the vestibular organ, so the ear is not just for hearing, the ear, the inner ear contains also an apparatus which surfs the normal (garble) when standing and walking, it tells us where it up and where its down and which way we turn and what medically, if we turn brings the eye spec to a fixation point. For such a very popular test we need of course an explanation of hypothesis or see really how it works. The other medicine is (garble) and we want to know why such a single senses. And Dr. (garble) of (garble) found 1906 when doing this test and nice hypothesis and he said the eyes flick because the different temperatures on the ear cause a convection in the fluid of the inner ear. Cold fluid goes down, and hot fluid goes up and these hypothesis is held to present and Dr. (garble) even paid a (fair) price for this hypothesis, reminding I'm not 14. This morning we can see, I want to be careful at least that's not the only mechanism. Maybe it's not a mechanism at all how the temperature works in the ear. Because we got a very strong (garble) eye flicks in space and in space there is no convection in weightlessness so we have to look now to back to the drawing board and look for another explanation for these flicks. These concerns is what excites us this morning, this dramatic effect which increases during submission from the first day to the last one. We did some more test but I don't want to keep talking since it's only 30 hours awake.
This may be due to my own inability to understand this subject. I thought that earlier this week we were told that we had been results which indicated that it was due to convection, but I just misunderstood that. It was no convection in space. I thought we also heard that the (garble) affect was proven the other day and there is some sort of convection in space and can you comment on that?

VON BORKARLEN: I'd like to comment on that, with the test on Monday on Bob Parker, Bob Parker on the ground in the preflight test had already very weak nystagmus, and when we could not looking at the right (garble) than he took some that could not detect any nystagmus without (garble) still. When they moved him in the RSS and the body restraint system, we created convection and then he had nystagmus and this of course brought us to the conclusion (garble) was right. Now two days later, Dr. Verbold who had a much stronger nystagmus on the ground, already in the mission, 2 days into the mission should nystagmus be starting still, standing still. Not so strong as he was with his nystagmus on the ground. So repeating this test to the end of the mission, Dr. Verbold increased his nystagmus threefold to what it was in the beginning so we can conclude from that that probably Bob Parker would have had the stronger nystagmus throughout the end of the mission. He was recorded on a zero. And also we analyzed and carefully analyzed his gain of amplifiers on the running recorders when and by looking very carefully now it was (garble) we can pick up some this (garble) speeds even (garble). So if we have a choice of evaluation (garble) which does not show any nystagmus and behave from the (garble) very, very strong. Goodness nystagmus, of course, that the nystagmus isn't moving (garble) and the other one doesn't say anything.

CHAPPELL: And Mark, your second question is, is there is convection, there is marangonic convection in space but this is thermal convection, this is the convection driven by temperature difference. Marangoni is a surface temperature driven.

Dr., could you tell us has the marangoni effect now been confirmed as we were told originally? Or is it ruled out, and I understand we're being told now that the marangoni effect

CHAPPELL: That's not --

***
PAO: Okay.

BERGIAN: Can I reflect on that please?

PAO: Yes, bring the slide over.

BERGIAN: Assuming this is really true, that and I don't know your data, does your data lead you to a case where there is a nystagmus effect, i.e., where there is?

VON BAUMBACHEN: It doesn't. We also have research in the area...
physiologist and if you do a medical test we want to know and to
learn how it works and I think we learn something this night.
Concerning space sickness, it might be or not be that we find a
real reason for space sickness and the way to prevent it or to
make a better crew selection. At the present time we cannot
predict who is becoming sick and who is not becoming sick. Even
pilots who never get sick doing aerobatic flight are susceptible
to space sickness and the other way around. But our vestibular
research probably if performed often on more missions will give
us some leads which in the future can help to overcome this
handicap.

PAO  Please remember to state your name and affiliation
when I call on you. Dave.

DAVE DOOLING (The Huntsville Times) Dr. von Baumgarten, as I
recall initially for Spacelab 1 you were going to have a
mechanical sled that would have given you very precise linear
acceleration and rotation for those experiments. By having hand
motion does that in any way degrade the data you had originally
hoped to get and what kind of enhancement do you hope to get on
the Spacelab D1 mission?

VON BAUMGARTEN Essentially the experiment we proposed for the
Spacelab 1 mission and the repetition for the D1 mission, our
repetition of the Spacelab 1 experiments in science. Having an
experiment on 1 or 2 subjects does not prove much and it has to
be repeated and more subjects and more runs. That's for one
thing and we have to vary the technique. This time as you have
seen in the video, we moved the VRS body restraint system by hand
which cannot be done in a very predictable way. What we are
doing, we record with accelerometers the acceleration after they
are done but we cannot ask the crew member now move with 0.23
g's, now move with 0.5 g's and so on. That's just not
possible. But in the D1 mission will be the space sled. An
instrument which we, which was originated in Zwick. Germany, and
built then by ESA and they have a beautiful sled vestibular
facility which will be used by our American vestibular friends
and by the European group doing the D1 mission. Among this
instrument we can apply prescribed acceleration pedes.

PAO  Mike.

Dr. to follow up on something you just said. You
mentioned that to do a scientific experiment on 1 subject or 2
subjects does not mean very much and what I'd like to know is you
have said that you are pretty certain that you've disproved this
ages old theorem but I guess the question is have you really? Do
you have enough data now? Is what you've seen irrefutable?
Will there people who say yes you've done this but we need to see
this test performed on 25 other ...
VON BAUMGARTEN We are absolutely convinced from the records and some leading American physiologists like Larry Young and Chuck Oman are convinced too. Dr. Benson from (garble) England one of the leading vestibular physiologists from England was convinced. He was with us this night. So in some special cases single experiment proves but it will never be accepted by science unless you do it several times.

Thank you.

PHO Okay, we'll now go the European Space Agency News Center in Cologne-Porz.

PORZ-WAIN This is Porz-Wain. We have some questions.

LEO (garble) (Irish Television) I have a question for Dr. von Baumgarten as well, excuse me. And I'm not sure, this is a bit of a shot in the dark, but somebody said to me that there was a commercial company already interested in your data sir on the otolith sensitivity and that the proposal was that they would supply, I was told, a floppy disc to hospitals so that they could remove the gravitational effect in any tests they would be doing on patients. Is there any truth in that?

VON BAUMGARTEN I have no idea what is meant by that. Hearing it for the first time. Dr. Scherer shakes his head. But I can say that we already had a little spinoff of our activities. Two other coworkers of us Dr. Dichtens and Dr. Brandt constructed helmet, the vestibular helmet which is also used in our experiment and this helmet is already applied in 3 different hospitals within Germany to work on patients. It gives us a very quick and easy way to check on the otolith system which was very difficult before. A television screen shows (garble) eye movements if the patient moves his head sideways. And this proved to be very good new tool for clinical applications.

PORZ-WAIN (Garble) Germany. What are the chances for the mission that what the connection to the (garble)? What could they, what could he do for you?

KNOTT Well I think this proved to be extremely useful because as you know we have quite a number of investigators in the isothermal heating facility and in mirror heating facility and other facilities which have relatively small experiments which need not too much direct interaction with the crew and therefore they were not present in Houston. However, the difficulties in which we run temporarily with the material science double rack made a certain amount of replanning necessary and decisions on which props, which cartridges to process first and so on. And this was a tremendous replanning effort and I think the support which could be obtained in almost real time
from the center in (garble) turned out to be extremely useful and it had been, it was set up just for this purpose. It turned out extremely useful and supportive for this mission.

SWISS BROADCASTING CORPORATION: Do you know already what experiments are scheduled on the additional day?

CHAPPELL: Let's see. That planning is taking more and more shape. There will be some vestibular experiments. There will be some joint operations that involve the SPAC investigation and the ESA 20, the electron beam and the electron spectrometer 19. There will be a number of fluid physics module experiments. There will be a number of atmospheric observations and some solar observations and we talked about one in particular and that is with the continuous observation of the sun the ability to measure solar oscillations which in the popular science these days is called solar seismology. That's where you look at the variability and different wave lengths from the sun and from that extract information on the wave propagation within the sun of course then tells you something about the way the interior of the sun is put together. So we got a nice, we feel, a nice mixture of experiments in ...
CHANDLER ... these days it's called solar sizerology. That's where you look at the variability in different wave lengths from the sun and from that extract information on the wave propagation within the sun which then tells you something about the way the interior of the sun is put together. So we've got a nice, we feel, a nice mixture of experiments in all the disciplines laid out for the extra day and everybody was most excited about that extra day materializing today.

PORE-SAXTH (Garble) Germany. Once more question to Professor von Baugarten. Was there another crew member involved in this vestibular test outside Horrold and Parker?

VON BAUGARTEN Yes sir. We had the tests with the threshold done with Byron Lichtenberg and Owen Garriott as well. But those particular tests we already have all 4 scientific crew members.

LEO (garble) (Irish Television) I'm still not clear of the exact status of the material science double rack and particularly the mirror heating facility. Can you tell us are we still having problems with it? Can you tell us how, if there have been any troubleshooting since Ulf Horrold went in and retrieved it and whether you still fear that there may be some loss of experimentation aboard that, with that mirror facility.

KNOTT Okay, the mirror heating, the material science double rack is in the following state. There is a short circuit developed in the isothermal heating facility but that happened when already more than half of the samples had been processed and many of the samples which are still onboard are backup samples so the mirror, the isothermal heating facility has basically achieved its goal. But it is at this moment, it cannot be operated any further. That's the only element in the big material science double rack which does not operate anymore at this time. The mirror heating facility has been fully recovered. It had initially after it had been supplied again with power some difficulties with sufficient cooling. But this was overcome and the mirror heating facility is 100% operational and will complete all its scheduled samples. All 4 experiments in this facility are carried out. The gradient heating facility has already finished its program. It has done all its experiments and the same is the case with the fluid physics module. It has done all its planned investigations. However, a number of additional investigations in this facility are planned because they do not take many of the sources apart from crew time. We don not need additional samples for this facility because the experiments are carried out on fluid which is onboard so and the long duration experiments - the crystal grow experiments - in this facility also operated well. Some are still operating and some have been successfully terminated. Overall the state of the material science double rack is very good I would say.
FORBES: Thank you. That's all from Forb-Forb.

PAO: We'll go now to the Kennedy Space Center in Florida.

RCS TURNBULL (RSC): I wonder if you can help a little bit more about the solar constant experiment. Maybe I didn't understand it fully but has this, has this experiment been lost as a result of having to turn Columbia away to do it again?

KNUPP: No, not at all. This experiment was not lost. Basically, if you just want to measure the solar constant one look at the sun is sufficient. That, of course, was done during this time that investigators also are looking at a short term, very, very short term out of minutes variations of very, very small amplitudes. And for this purpose, of course, they would like to observe as long as possible. And also the spectral experiment would like to observe as long as possible in order to get good statistics and also in order to observe small variations at different wave lengths in the spectrum so it has not at all been suffered from this effect but you know how scientists are. They always want to obtain as much as possible in their investigation and we should also not forget that the 10th day is giving another very good chance to this discipline. So I think the solar observations get much more than they ever hoped out of this mission in terms of observational opportunities.

PAO: No further questions from RSC.

PAO: Okay, we'll take any other questions here at Kennedy. Carlos. Here at Johnson Center, I'm sorry.

CARLOS BYARS (Houston Chronicle): On the space adaptation syndrome, space sickness, as I understand it now you may have a little bit better knowledge of the workings of the vestibular system but you still don't have a either a cure or preventive on hand or in sight for SAS. Is that, as I...

CHAPPELL: I was just going to again let Dr. von Baumberg comment. I think we...

VON BAUMGARTEN: Well that's right. We don't have nothing in hand. The only thing we can do is test new vestibular studies and try to pick up stone by stone until we have the first building of the mechanism of the space adaptation syndrome. We are not without any speculations, of course. We have several well supported speculations. How space sickness is created and what to do about it and how to make a better selection but I don't want to go here in for speculations. And I just hope in the course of time we get over this problem and I might repeat that I don't think it is a serious problem for long term space voyages.
CHAPPELL: Carlos, I should also point out that as we know there are 3 experiments in the vestibular area and each of those has quite a broad number of approaches and objectives. And the data from all those they just, many of the data are not even on the ground yet in the form of video and none of the digital so we are a little bit premature also. I think we can't say specifically what all of the findings are going to be until the scientists get a little more time to look at the data.

BYARS: One piece of data that you all might have for us on another subject and that is on the crystal growth. How large a crystal did you grow in the successful, the first run, the successful run? How large was this?

KNIGHT: About, I would say about 10 centimeter lengths and I'll guess 1 centimeter in diameter.

PAO: Jackie.

JACKIE JOED (CBS): Dr. Chappell, how long will it take to begin to shutdown or deactivate Spacelab? That's the process involved and when will it begin?

CHAPPELL: I think it's on the order, for the specifics of this you ought to I think ask Harry Craft, but on the order of 12 hours. The experiments though are tapering off. There's a 12 hour period where they prepare for the final reentry and then there's about 12 hour period where you shut down all of the Spacelab systems and then prior to that the experiments sort of taper down so that really within the last, within a day before the reentry the experiments are pretty much finished.

PAO: Right down here.

GARY SCHNEIZER (CBS): Rick, the cylinder of oil that ULF dropped the droplets of water in, was that one whiz on his part to show the ground or something requested from the ground?

CHAPPELL: It was requested. Dr. Vreeburg, who is one of the fluid physics module experimenters, was doing this as a follow up to the experiments that he had run in the fluid physics module so this was a - having gained some information from the earlier experiments this was something that in talking with ULF, an experiment they sort of invented and got new information from. It's limited because of the apparatus that he used was not thought through beforehand and specifically set up to do this.

SCHNEIZER: Was the motion significant?

CHAPPELL: What happened was you could see the way the fluid distributed within the cylinder as it spun out and then he could just let it go and then you could see gradually that the fluid
motion began to make the cylinder start to come which is something in fact that can happen in sounding rockets when they're not balanced right. It's spinning and then if you have any imbalance in it it starts to, the cylinder starts to come and he was able to watch the fluid motion at the same time as the cylinder went into its coming. And you gain information then on propellant in tanks in spinning spacecrafts and things like that.

SCHWABITZER And do you recall the video right after that. I was just leaving to come over to the briefing and I think you still would have been there and I believe it was still a fluid physics module and I think the investigator was voice enabled but I was leaving. What was going on there?

CHAPPELL Yes, I believe that was Dr. Napolitano who was next and I was not there. We were in our planning meeting at the time that took place.

KNOPT That was Napolitano having another go at the marangoni convection. He was repeating that one, a slightly modified version.

PAO Gentleman in the back. Please state your name.

CHRIS JOYCE (Newsscientist Magazine) Dr. Chappell, are you planning to have the investigators publish all their findings in one big production at some point in something like Science Magazine or in some, all in one place or are they just going to trickle out here and there in different journals?

CHAPPELL We would like to do what you suggest in addition to - each individual scientist generally publishes and because we're multi-disciplinary certainly publish in journals in their particular fields and in this case there are a number of those, but we had certainly looked very favorably toward the idea of say an issue of a magazine like Science Magazine to cover, give at least an overview of the all of the results of the mission.

JOYCE Are you ...
This is in journals and their particular fields. And in this case, there are a number of those. But we had certainly looked very favorably toward the idea of any of issue of a magazine, like Science Magazine to cover, to give at least an overview, of all the results of the mission.

Are you presently talking with Science Magazine, or any other magazine?

We have had discussions with them. We don't have any agreements with anybody at this time.

I'm going to take one last question, I'm afraid we're going to have to cut this off because the flight director and mission manager here for the next briefing, but we will have the investigators Dr. Marsha Torr, (garble) Dr. Lyer, Professor Obiyashi as soon as we complete the change of shift briefing you will be able to talk with them, individually. One other question? Mark?

Dr. Chappell, that tape you showed us with the satellite, the (garble) changes as you watch, does that mean it's rotating and did you ever ask (garble) what satellite that was, and how far away?

I guess we haven't got that far here yet. It was either a tumble, it was a little bit hard to tell, it went by fairly quickly, but we haven't checked. One of the reporters earlier thought, got the specific time and I may of had that in mind to go check. But we haven't.

On that note, I think we'll conclude today's science briefing. Thank you.

END OF TAPE
John

CAPECOR: Thank you, the second step is to perform MSSP set up procedures according to Fox trot, 10-0-5, the steps you'll need are 3.8 through 4.11. The third item to go to the CCD and key in the following 9 stroke, which I will read to you now.

PAO: Alright, good afternoon, were back for another change of shift briefing. On my right is outgoing Flight Director, Chuck Lewis, to his right is Spacelab Mission Manager, Mr. Harry Craft, and down on the end there is Mr. Derek Mullinger, head of Spacelab Integration Coordination in Europe. And we'll go ahead and let each of these men present with some summaries, Chuck?

CHUCK LEWIS: In the last, in my last shift, the last 11, 12 hours, we had scheduled a trim burn 3, it was not required, our flight annex people and the POCC flight annex people, calculate within 5 seconds, a time error with respect to RAN 150 so we're really close. So that was scrubbed, we've started to hot test for the VF verification flight test. The problem you're probably going to see with that is regard to RAN 21, we've got the payload bay pointed to the sun for the hot test and as I left they were already beginning to get some skip messages on RAN 21, that we've probably had before. I think basically, Harry you have to verify this, we've completed most of the experiments that run with RAN 21. Of course, you've seen a variety of TV today, we, the MCC or CAPECOR's was involved in a ham radio phone patch from Australia. Joe (Garble) was there and we worked that through him from here, to our CAPECOR's and they talked to him back through that phone patch. It was loud and clear, clearer than our UHF. Edwards runway 17, I think it was indicated yesterday it was okay, the others will be okay tomorrow, assuming no more rain. Edwards runways okay now, extension day, we got a very basic plan blocked out, the POCC is given to us in conjunction with our FAA or Flight Activities Officers, were now trying to fit in a few other Spacelab and Orbiter system test that people were asked to provide over the last couple of days in anticipation of the possible extension. Whether they are presently in the MCC, obtaining a data with regard to weather and doing an analysis. I didn't have a chance to get a weather brief, up to that point it was still a condition that they couldn't really predict very well so I really can't help you there yet. Perhaps a few hours from now they'll have some information on that. So the decision to extend the final decision to extend, as indicated earlier, will be based on primarily on weather and that has yet to come. Right now the plans are in affect to the extent. And with that, hand it over to Harry.

CRAFT: Thank you Chuck, I don't have that many comments today. We had a very productive last 24 hours, and were gaining
a lot of science and we really don't have any problems to
report. Most of those were cleared up and we were able to
address those with you yesterday. We are beginning now to see
that a number of experiments have completed there activities as
planned, and some of them have for example, taken all there films,
and experiments have been put back in the tank, in the designed
storage container. They have completed the mission and they have
gotten everything they had planned to get. I really don't have
anything to report. Everything is going great, and the
scientist, I think esthetics is probably a good word for most of
them. There really happy with they are getting. I really don't
have any other comments, Derek do you have any?

DEREK MULLINNER I think there is still a little troubleshooting
still going on Harry, on the mirror heating furnace. They've
had a number of successful runs there, which they established
they had got it back in good condition. They've been getting
some error messages and they need to investigate that before
continuing, that's in progress right now.

LENS I might add one thing I had here. I thought Harry
might have mentioned it, I just see my note, experiment 102 gave
10,000 frames of unused 135 millimeter film to the crew along
with the camera for their use as they see fit. So I'm sure John
and Brewster will be busy shooting photos out the window.

PAM Okay, we'll entertain questions here in Houston.
Right here, your name and affiliation please.

HARRY SWTETE (New York Network) - Chuck you mentioned that most of
the experiment requiring the RAU are done. Can you bring us up
on to speed as to what is left there?

LENS I think that there is only one--

PAM Let Harry answer that.

CHAP I let me try, the RAU, all the experiments, there
were 4 experiments as you recall we talked about being on the
RAU. The one that we were waiting for last to get some data was
the active cavity radiometer, which was a solar experiment. That
as I told you yesterday, we went into two special solar attitudes
and got him some data even before today. And he was operating,
he'd been on two hours as we came over here. And I think we plan
to be in that attitude around 7 hours, so he's got 3 or 4 hours
left to go. The other experiments, most of them had completed
most of there runs.

PAM (Garble)

JOHN WILFORD (New York Times) - You said you have a basic plan
blocked out, for this extension day, is this going to be a busy
day, or could you give us some idea of some of the activities of that day.

LEWIS I, the, when I say blocked out, it's basically it's blocked out of the experiment activities. The type things we would do then is just not, were looking at adding some Spacelab systems or orbiter system type test. We're not adding those yet, until we evaluate just how busy the crew day is, because we've tried not to make it a busy day. But since we just gotten that in, and matter of fact, I don't think we'd even had a chance a teleprinter that to the crew, they would like to look at it and provide comments. I can't tell you how busy, maybe Harry can comment on it, I think he is aware of the basic plan, but we've tried not to go with a heavy work schedule for the crew. That was our intent. And as we look at it, we may not add those Spacelab systems or Orbiter systems test because of that, if it appears to much of a work load.

PAO Carlos

CARLOS BYARS (Houston Chronicle) - Chuck, when you talk about adding things on to the tenth day, actually what your doing is not, is inserting something for day nine not to be, in terms of schedule. That's because your last day, your landing day --

LEWIS That's correct.

BYARS --you don't really mess with that very much I don't think, or do you?

LEWIS That's correct, we basically leave the last 24 hours prior to the Orbit TIC, the ease. There is some payload operations up to about TIC minus 12 hours, and then they start deactivating the payload. Also there is a lot of storage, cabinet show time in that same time frame. So your basically correct.

PAO Right here, Dave Dooling.

DAVE DOOLING (Huntsville Time) - Derek, what was the switch that Ulf kicked on material science double rack? And why was it exposed such that it could be kicked? I'm use to seeing these circular metal guards, virtually every switch on a spacecraft. Did he manage to work his tool down there and kick it or was he trying to grab ahold of it or what?

MULLINGER I'm not very sure about exactly how he to do it. Because we were told that if you tried to do it, it is quite difficult, so how he managed to do it, inadvertently we don't know. Indeed they are protected by those U shape guards, and just like all the other switches, and frankly it's a little bit of a mystery to us, but alright he just knocked a switch over,
and that was a little bit unfortunate, but we have got a recovery procedure.

LEWIS I might add that's nothing new, we've done that repeatedly in our vehicles, the same time switch, the same time guards. We'd move around in 0g or something that they're working with in 0g, they can still bump a switch. It doesn't happen frequently, but it happens.

GRAIG COVAULT (Aviation Week) - Check I believe it was your shift that you had about 4 or 5 of the investigators team up for an Orbiter glow test. The PI's tell me that you actually got them in the wrong attitude, accidentally, instead of the Payload bay in the flow, you got one wing in the flow, you might tell me why you got the wrong attitude there.

LEWIS I will pass that one on my right, I don't know.

CRAFT I can't answer that question either, I wasn't on when that happened.

LEWIS (garble) we'll try to get you an answer. We may have made an error. We checked what we had gotten from the Payload Ops people as far as what they wanted to fly to them. We think we may basically got it correct, but we may have made an error, on computing the attitude.

***
LEWIS: No, there was not teletypewriter message sent up to that regard.

PAO: We do have a transcript of the whole morning's activities so if you want to consult that, we've got it available. It's all there for you. Back in the back.

JOHN BERRY (Houston Post): Has there been any repeat of the oscillations that Shaw reported in the Orbiter yesterday and have you made any progress in understanding what they were?

LEWIS: To my knowledge there's been no repeat. The crew hasn't reported anything. We did get some data from experiment 11, I believe. We had some, I guess, accelerometer type data. In was on a graph or plot, analog plot and just before I left we were trying to get the digital data played back through our playback system and they're going to submit that to our engineering people here at JSC for evaluation but that's as far as I can take it with you at this point.

PAO: Any more questions? Tom O'Toole.

-aid runway 17 is okay. Can
LENIS: No, there was not teleprinter message sent up to that regard.

PAM: We do have a transcript of the whole morning's activities so if you want to consult that we've got it available. It's all there for you. Back in the back.

JOHN BETTY (Houston Post): Has there been any repeat of the oscillations that Shaw reported in the Orbiter yesterday and have you made any progress in understanding what they were?

LENIS: To my knowledge there's been no repeat. The crew hasn't reported anything. We did get some data from experiment 11, I believe. He had some, I guess, accelerometer type data. It was on a graph or plot, analog plot and just before I left we were trying to get the digital data played back through our playback system and they're going to submit that to our engineering people here at SSC for evaluation but that's as far as I can take it with you at this point.

PAM: Any more questions? Tom O'Toole.

TOM O'TOOLE (Washington Post): You said runway 17 is okay. Can you go into that a little more. I mean is there any of the latched still wet and if 17 stays the way it is now is that the one you're going to use on landing?

LENIS: 17 was our prime. It's okay as far as the wet conditions are concerned. We got a little bit of rain I think it was day before yesterday and by the other runways, runway 15 is an alternate and of course there's several runways out there. But they expect the others latched runways to be dry tomorrow assuming no additional rain. So we, any runway at Edwards will be available to us.

PAM: Craig I'm told we can get you an answer to your question. Any more questions. Okay, well we'll set a record here for one of the shortest Change-of Shift's on record and go home.

END OF TAPES
Good morning, and welcome to today's science briefing, with Mission Scientist, Rich Chappell, and ESA Project Scientist, Dr. Karl Knott. Gentlemen.

KNOTT Okay, let me report to you on activities of shift 13, the day shift of yesterday, while the crew was presently trying to work back, get back onto a decent scientific working lab, back on Spacelab. After the spectacular press conference that just took place. There was one question asked during this press conference, where the reporters asked for direct replies from the crew, asking well can tell us any definite scientific results which you have seen onboard. It is very difficult for the crew I should say, to answer this question, because just we are aware that many of the experiments in the life science area are carried out in cartridges, inside cartridges, and these are brought back to earth for different analysis so one could not expect any reasonable answer from the crew in this area. And the other results which are coming from instruments, and many results coming from the instruments which are carried down to earth by telemetry. They are displayed by very special displays down here in the POC. Again the crew has not seen the beautiful spectra, and beautiful results which have in the meantime become available here in Houston. So it was a very difficult question for the crew to answer. Now back to the shift of yesterday. It was basically the last shift with a full astronomy program, there were a number of attitude changes made in order to point the astronomy instruments to the desired targets. On average I would say, I went over the last few shifts, which were acquired attitude intensity, intensive, and I counted that an average, about 15 attitude maneuvers for science were carried out during a 12 hour cycle. Now the astronomy experiments, the two which operate, which can only operate in darkness, they have for basically now finished their program. They have exposed all their films, Stu Bowyer the investigator of faust instrument pointed out to earth that he has just one exposure left, and he asked us to change the orbit to get a little bit more of night time to make use of this remaining exposure. However, that was not a feasible way to go. So he will have to come back with that exposure still left in his film.

CHAPPELL You should amplify that Steve was talking about changing the inclination maybe by 30 or 40 degrees which they say maybe they could do with continuous thrusting for 3 years or something like that. It was a tongue in cheek request.

KNOTT He has in the meantime stored his film safely, (garble) in his camera, he has protected it against the hot test, which is coming up and so has experiment 22, the very wide field camera which also carried out all the planned exposures for this mission. So we have already two astronomers who are extremely
happy at work. Plus the happiness last night, our science, our internal science meeting. And I guess our third astronaut, Peter Andersen is even more happy because he is able to continue operations in some light, and he's now the only candidate in the astronaut field and can take care of the upcoming opportunities. Then in the area of the life science, I guess you have all seen the yesterday, the ample TV coverage, of the hop and drop test, and the drop and shock test. Yesterday on day 6 we had the first opportunity to resume these tests because the material scientists are interested in a clean good zero gravity, or micro-gravity environment, they've had since a long time asked for no measure acceleration disturbances inside Spacelab, during the first few days when the crystals were growing. They are now convinced, or they were already since a long time convinced that in the meantime these crystals have grown to a decent size. Such that carrying out hop and drop test, which cause some micro-gravity disturbances, but the crystals are now large enough and the crystals will not be influenced in an adverse way anymore of these types of activities. So this could be carried out. The hop and, the vestibular hop and drop test, I think we went over already during the first day of the mission, when it was done. The drop and shock test consisting of the, of one crewman being dropped inside the module, pulled down by bungee cords and during the fall, while accelerated, while being pulled down by the bungee cord, the subject is shocked by a mild electrical shock, and those's a few who have very, very carefully looked at the TV transmission when Owen Garriott was hanging down from this kind of torture machine, where he was hanging on. You must have seen that his leg was occasionally, making a funny movement at certain stages. Atleast this was the result from the shocks which are injected into his leg. But I'm sure that the Principle Investigator of this experiment Dr. Mal Roschke will be able to tell you much more about this investigation. Another major achievement yesterday, was done in the area of space plasma physics. During these investigations, a number of experiments were running together. Unfortunately the electron beam generator of the SEPAC experiment was in operative and the electron beam generator of the PICPAP took over the whole of this emitter. So the basic functional objectives of studying the interaction of the surrounding plasma was an electron beam could be achieved, simply by shifting, by putting PICPAP into the whole of the SEPAC instrument as far as this aspect is concerned. Exciting results have been obtained in this area, it as for example been seen electrons of a certain energy are injected into the plasma. The particle detectors onboard, detect a population which is coming back to the Spacelab or to the shuttle, which is of much higher energy than the population which has been injected into the plasma. What a interesting acceleration, mechanism must be going on there. But as it has also been found that when the PICPAP, when the SEPAC experiment, blows out its neutral plume, it's neutral gas, that then this effect is not present, very clearly, so this gives a puzzle to the investigators, and certainly space
plasma physicist and theologian then would have to come up with theories explaining all these effects. Then also in this area, yesterday was basically the last day for the atmospheric experiment, the AEPL experiment to make observations, and Dr. Steve Mende has had a few spectacular observations, where he has looked at the, for example magnesium in the upper atmosphere. Magnesium actually being injected into the upper atmosphere as a product from meteoroids coming into the atmosphere and they feed a constant, very constitute a constant source for magnesium in the upper atmosphere. The observation of magnesium for example, helps to determining any motion in the upper atmosphere. So that's why it was a very spectacular observation. Magnesium has been seen and I'm sure Dr. Mende will able to tell you more about what he is going to do with these observations. Furthermore, we were able during the shift yesterday, to schedule an additional solar attitude which was not foreseen for yesterday. This has been done as a precaution for experiment 6, an experiment, solar experiment, an experiment aiming at measuring the solar constant, by Dr. Wilson, from JPL.

END OF TAPE
KNOTT

... for yesterday, this has been done as a precaution for experiment 8 and experiment - solar experiment, experiment aiming at measuring the solar constant by Dr. (garble) from GRL and he would like to - (garble) talk about energy inputs coming from the sun. His experiments is fed by the RAU 21 and we have in the meantime, provides some (garble) two observations of the sun. Yesterday was one of these extra opportunities just as a safety measure against possible difficulties which he may experience during the hot test today when the RAU 21 is going to be heated up and expectations are, that it may not be fully operational during the entire duration of the hot test. So he has already basically achieved his results. In the material science area yesterday shift was characterized by the fact that the mirror heating facility had been (garble) and the investigators then (garble) along to schedule those investigations which we missed earlier on when this facility was not operational when these activities were actually planned in the timeline but had to be omitted because the facility was not working. Investigators were struggling to reschedule these activities and the timeline engineers did a fantastic job in accommodating these investigations in between other activities in order to get the mirror heating facility the opportunity to catch up with lost opportunities before so this is going well. The repair which was done turns out to be a successful and the facility is operational and it will be operated now as long as possible, the mission permits us. In general, I would say that we had an investigators meeting last night. We have it every night at 7:30 up in our P0CC building. I've never before during this mission seen so many investigators expressing happiness, experiment 13, the glow spectrometer has exhausted all its cooling gas. It cannot operate any further. It is not supposed to operate any further because we are entering into continuous sunlight very soon, or heavily entered and the investigator has a whole pile of spector taken from the constituents of the atmosphere, he's extremely happy. I already mentioned the astronomers who have saved their film, their extremely happy, others express their happiness with the way things were going. The PICPAB experiment, the European Plasma Experiment was extremely happy, it gets a number of additional opportunities by taking over the whole of the electron beam accelerator of SEPAC to a certain degree and that Manoe was very happy with the observations which he obtained during the day and a number of special attitudes and also the SEPAC people are happy that the RAU 21 is sufficiently under control that they can operate their experiment, they can operate the (garble) arc jet and all that diagnostic equipment in which to have onboard. So all in all I went home last night, also extremely satisfied with the (garble). I think it is a super mission from a science point of view and there had been a few difficulties in between the (garble) helped us in recovering from these difficulties and this mission is making a lot of experimenters investigators extremely
happy. This is basically a report from shift number 13 so I thought he was an excellent shift and was excellent achievements in very good shape and I understand that shift 14 continues in this way.

CHAPPELL I'm going to give you a follow up on something we talked about yesterday which was the repair on the metric camera which is really - we're now referring to it as the Wubbo Juckel show. It was unbelievable, I wish you all could have been there to watch it. The situation was that the cassette had jammed, the second cassette after taking about 25 pictures out of approximately 500, so they spent a lot of time, Wubbo, Joe Engle here at the center looking at, they found a camera similar to it here. They spent a lot of time working on procedures on how to improvise a dark room in the middeck so that they could guide Bob Parker through this repair and Bob had - none of the crew had seen the inside of that cassette, of any of those cassettes, so Wubbo was acting in his capacity as the alternate payload specialist was acting sort of the Capcom, the CIC as we call it in the payload side and he had a telephone on one car where he was talking to the (garble) people in Germany in German and his head set on the other car where he was talking to Bob Parker in English and he had a screwdriver in the one free hand that he had and a set of procedures all over the desk in front of him and it was just a phenomenal sort of a thing that went on for about, over a period of 50 minutes to an hour with intermittent opportunities for communications. It was just a fantastic thing to watch and all that work done marvelously. Bob took the camera down into the middeck, got into one of the bunks, taped one of the Orbiter curtains over the air duct where there was a light leak. They turned off all the lights on the tunnel and in the middeck. Bob took the camera apart, took some scissors and cut the film, pulled it off of the roll that was jammed, on the takeup reel which was jammed up, took the film out, stored that, brought the camera out, figured out what the problem was with the mechanism through interactions with Wubbo who was coming through Wubbo to Germany and then back up to Bob and figured out what the problem was. Went back in and put the film back into the roll, started up on the takeup reel, put the cassette back on the camera and so we all waited and then during this - then they mounted the camera back on the window. During this shift, it was first operated, it was scheduled to operate during LOS and so everybody sat and waited and then we finally came up with AOS and the CSCs, Bob had the camera worked and he just said it was piece of cake so that Parker continues to do these phenomenal repair jobs and this one was a really great one. As you may have heard just before we started the metric camera people then were able to take about 400 more pictures which completed all of the science that they wanted to do. They were so estatic with how well everything worked out that you may have heard they made a presentation to the crew just before we started here. They gave
the crew the remaining 80 pictures on the film for them to use however they would like to use it. And so we'll probably get some other fantastic pictures depending on the choices made by the crew. As a result, the metric camera which we unfortunately two days ago had to talk in a negative sense came out very, very, successfully. In the shift in addition to the metric camera operations now, which were completed, we finished with the SAL operation of 22 and the SAL was retracted and 22 taken out of the SAL. We did some more vestibular experiment, particularly we had the dome runs which were also - clips from that were shown in real time television. We did a couple of physics module experiments having to do with liquid stabilitics building a liquid column between the two disks and the fluid physics module and looking at the stability that can be achieved by injecting vibration, different vibration mode into the fluid and checking the various lengths in diameter ratios that are possible and then a fluid physics module experiment that looked at capillary action, the motion of liquids through narrow tubes and surfaces. We are - continued running experiment 1 which is measurements of the upper atmosphere, imaging spectrometer and we'll talk more about that tomorrow and those operations draw toward a close. We've got more targets with the astronomy and continued a lot of the just the long cookers as we called them in the material sciences. The one on crystal growth experiments and some of the experiments that are exposing the different biological specimens to the hard radiation and ultraviolet radiation environment that are out on the pallet that are just passive experiments. I wanted to mention a couple of other things: In addition to the data continuing to come in, the analysis, the quick look analysis continues and I wanted to show you a picture, if you could put up that picture, for those of you who have been around astrophysics at all, your imagination is marvelous and they are able to find data to confirm their concepts. This is a concept that Deter Andrasen furnished to me earlier. We were talking about this at 3:00 in the morning. That's a star on the left, an inccretion disk on the right, star on the left is being sucked into the incetration disk on the right, in the center of which is a black hole and the star is being slowly eaten by the black hole. Deter had took an observation of one such binary system. They are rotating rapidly around each other. And in doing that he's found something quite interesting in looking at signas X1 which is the source, the black hole with the star that are mutually rotating, he's found that the spectrum and the flux are very, highly variable by a factor of 2 or more in time scales of milliseconds and in addition to having a continuing type xray spectrum, there is indeed a very strong line at 6 kilovolts which appears to be an iron line. And what that tells you is that in that incetration disk in that picture that was on the right hand side, that tells you that there is iron present in that incetration disk and it's being excited by the xrays that are generated as the other material is drawn or accelerated into
the black hole, and this gives you then a way of remotely sensing actually a composition of this particular binary object. Peter was quite excited about the new findings in this area. In addition he made an observation of the KSA object which is a super nova and what's left of the star that has exploded in the past and there has found a number of discrete lines that have apparently indicate iron silicone sulfur all being in the remnant. So I would encourage you to talk with Peter more, his results get more exciting each day. Karl mentioned, Marsell Acoromans experiment, the grill spectrometer, and we had a very interesting interchange on that in the SO 3g meeting that planning meeting this morning, or it was last night, I guess, where Marsell reported that he had seen methane in the mesosphere which is like the middle atmosphere, the middle to upper atmosphere and one of the other atmosphere physicists who was there, said there is no methane in the mesosphere. It's never been seen and Marsell said well it has now. So the presence of methane is very --

***
CHAPPELL ... when in the mesosphere which is like the middle atmosphere, the middle to upper atmosphere. And one of the other atmospheric physicist who was there said there is no methane in the mesosphere. It's never been seen and Marcel said well it has now. So the presence of methane is very clear in Marcel's data up to very high altitudes, 70 kilometers. Methane comes from the surface of the earth. So for it to diffuse to that altitude is quite significant. Marcel also seeing carbon dioxide to very high altitudes, to 130 kilometers or so, up into the thermosphere and that's also never been seen. And he's seeing water vapor at 100 kilometers in the mesosphere which he feels is extremely significant. Marcel has so many spectra now and so many different phenomena to study, that he's overwhelmed but he also realizes contrary to so many of his instruments in the past, that this one is going to come back again. The Shuttle and Spacelab are going to bring it back. He'll have it back and he'll get to fly it again. So the science of this particular instrument will continue. I think he's scheduled on the flight, the environmental observations mission in mid 1985. Let's see. I wanted to mention just a couple of other. We have completed up to this point about 30 experiments of the 70, keeping in mind that a great number of those still to be done are in the material science's sample area. So we are really getting along and finishing up all the experiments with a very strong success in all of them. I have been reminded, I had the same reaction that Karl did this morning and I wanted to give you an analogy which I hope will be an apt one. The scientists now, I've mentioned in previous days, that the scientists, you're seeing more and more data starting to be pasted up on the walls and the doors and that sort of thing and the exuberance over what is being found has carried to the next level now where there's a phenomena that takes place around Christmas time when all the kids on the block get new toys. And they all go out in the street with their new toys and everybody wants to show the next. One kid wants to show the next one his new toy and I don't want to imply that the scientists are kids, but they are - many of them are as excited as kids with the new toys that they have now and you find them out in the hall sort of collaring each other with the new results and within the MOCR the Mission Control Room that is on the same floor with our experiments, which is not being used right now, you find them quite frequently in there with their data showing it to each other. It's very clear that we are at an exciting stage of the mission. We feel very strongly that we are on the down side in terms of experiment accomplishments. So many of them now are being completed and we are going into operations for those that are to finish up the mission. So things are going really well and I guess we'll stop at this stage. Let me mention, thank you John. I wanted to mention one other that I skipped and Frank Sulsman will be available for you if you would like to answer more questions on this. Frank's experiment, the Circadian Rhythm experiment, was the one that we've mentioned before where Frank uses a fungus that grows on the tube that on
the surface of the earth it displays a new bunching of growth each 24 hours. So it has a very strong circadian rhythm to it. The experiment was to look into whether that phenomena exists in space where there would be no 24 hours cues evident to the fungus and that experiment has been growing since we started the mission and today Frank was able to work with Ulf Merbold as they wound up that experiment and Ulf was able to give Frank some initial results. Of course, he's going to need to analyze the specimens when they come back but generally he found that the fungus had indeed grown about 3 quarters of the way down the tube which is what he had anticipated. And in fact, the bunching or the banding in the growth is present indicating at least in the first order look that the circadian rhythm within this organism persists in space. And there will be a number of other things that Frank will want to look into in second order effects but I'd encourage you to talk with him. So, okay why don't we stop and take questions.

PAO Okay, we'll start with Dave.

DAVE DOOLING (The Huntsville Times) Rick, when I was listening to some of the air-to-ground last night I though I heard the CIC calling up an observation plan to use about 6 different instruments simultaneously to do a day glow observation. Was that correct and was it carried out?

CHAPPELL It was a, I think it was a Shuttle glow Dave as opposed to a day glow. It was a Shuttle glow. That was carried out. We're not sure on the results of that as yet. That's the most, up to date that was the most large coordinated set of measurements that we've made at one time. That had, as you said, 6 or 7 experiments involved in it.

DOOLING Okay, was that an unplanned FO?

CHAPPELL That's right. That's one that we replanned. We had talked about that for about the last 2 years but we had decided because of the way the timeline had evolved at the time that we realized that was a good thing to do, to wait and plan it during the mission and that worked out.

PAO Craig Covault.

CRAIG COVAULT (Aviation Week) Two questions. First, has the weather been cooperative under the metric camera ground tracks?

CHAPPELL Generally so. What they, they realize that weather would be a variable thing for them so when they laid out their investigation program they left the option of taking a target or not. And there were, I guess on the shifts that I have been on I remember 4 or 5 instances in which they said skip this target and we'll take one later. But then they've used up, they've used up
all the film that they wanted to, gotten the major targets that they wanted to. And what they do when they skip one is they just pick another one up later.

KNOTT   It's my understanding that the weather in Europe was extremely favorable during the last few days for the metric camera. However, over here - over the United States I'm not so sure because I've been looking at the weather maps which are always displayed here during the news and it did not look, to me at least, so favorable. But there have been, as Rick said, they have been adjusting to this and they have only exposed those targets which, over those targets which had good ...

CHAPPELL  When they were dominant, their targets were dominant. Europe and I think Africa. Places other than the United States. I think they had 1 pass over the United States.

COVIAULT  Okay and secondly, Dr. Couttes whose wide field camera and I were discussing yesterday. He was here during Skylab and commented that everynight there was a fight on the science tradeoffs. That hasn't been the case this time. Can you describe some of your harder tradeoffs you've had to make, however, in replanning in the evening?

CHAPPELL  You know there really haven't been real hard ones and I think it's because the difference with Skylab, in my experience, was that in Skylab investigators of the different disciplines were brought together very late in the planning so that they had formed fairly closely into groups of interest in solar physics and earth observations, etc. before they were brought together to interact and to share. Consequently, the job was difficult when they all had decided exactly what they needed on individual basis. Contrary to that, in Spacelab we've been together as a group of investigators for almost 7 years and we've grown to know what each other is about scientifically to appreciate each others investigations and to make compromises throughout the desing of the mission to make everything fit and to put the timeline together. And that sort of carried us on in to what we do now. We don't really get into big squabbles because we are familiar and we've been going through the compromise activities for a long time.

KNOTT  Let me add to this that a number of experimenters got actually more data back than there had been baselined in the timeline. There have been additional opportuntics which they were able to grab and the replan has made it possible for them to enhance the science considerably. So I think rather than making half tradeoffs and withholding certain planned activities from investigators the contrary was the case. They got those who could get more than they had planned obtained it basically. Unfortunately astronomers who have a limited amount of film onboard cannot get more.
CHAPPELL  Let me also, Craig, say one other thing. We, as part of the investigator activity leading up to the mission, the investigators themselves decided how they would in fact approach the sharing. And they evolved the approach of discipline balance and balance among experiments and they have given to Karl and me the license to make the decisions if we had to make them ...

***
CHAPPELL ... themselves decided how they would in fact approach the sharing. And they evolved the approach of discipline balance, and balance among experiments. And they have given to Karl and me the license to make the decisions if we had to make them, based on keeping things balanced. And each one of the meetings that we have twice a day, the last thing we talk about is what's the discipline balance like, are there any experiments that need help. And when if it has been the case, then the group agrees to working to help that experiment as much as possible.

PAO Carlos.

CARLOS BYARS (Houston Chronicle) A couple of questions, first on Double Rock Material Sciences, was that, this cause a problem when it got inadvertently knocked off by a misguided foot or whatever?

CHAPPELL In the shift today?

BYARS Yes.

CHAPPELL It will cause a delay, in that they just have to recycle the facility. And it means that you continue with the samples once you got the facility recycled.

KNOTT They had a spare sample onboard for that particular experiment. That particular sample was lost basically, but they have a spare sample onboard, and that one is now inserted into the facility, and is processed now. So, there's basically no loss there.

CHAPPELL That's in the Mirror Heating Facility and the cryostat, that sample continues, so there is no problem with the cryostat.

BYARS On the SEPAC, have they ever gotten the high power to work? And I get the impression that it has not. And I know they have used one of the other experiments there to generate an electron beam, but has there been any attempt to generate a beam from Earth going up that would also be detected?

CHAPPELL Well, it's tough to do the latter because of the atmosphere is so thick at the Earth's surface that an electron beam just can't penetrate through the atmosphere of the space.

BYARS On some of that was involved with microwaves though.
CHAPPELL    Well, microwaves that's another thing, but electron beams, particle beams interact with the neutral gas and essentially scatter and lose energy until it's gone. Let me say, directly on the SEPAC, they were able to complete their troubleshooting. Early in the mission they did operate the electron beam in a low power mode, and they got good data there, they were very pleased with it. Apparently, mid mission they had a heater problem, a filament heater problem in the electron beam accelerator. And that then prohibited the future operation of that part of the SEPAC investigation. So that is why they have then run the electron beam from experiment 20, which has given them good results. In addition, the electron beam assembly is only one part of the SEPAC, the EPD arcjet which we keep talking about or mentioning is a plasma injector and it's working fine and they're running a lot of investigations with it, and they're running a lot of investigations with their diagnostic package, which are the instruments that measure the plasma and the wave environment at the same. So they're having a good set of investigations only they'll be missing some of the electron beam firings.

PAO       John.

JOHN WILFORD       (New York Times) If you're unable to operate the SEPAC at high power, and you're using this alternative, means you must be sacrificing something, as far as the Auroral studies is concerned, could you describe?

CHAPPELL    I guess the two principle things that they would miss would be first of all the general category of the interaction of beams, particle beams with the plasma around the vehicle. They are able to do that in the low power mode, and they have done it. But they will not be able to do that with the higher current beam. Okay, so those wave particle interactions that are generated in plasma with high energy or high current beams will not be done by the SEPAC experiment. And the artificial experiment. And the artificial aurora experiment which is the part of the one that they will do where the beam propagates to the atmosphere and makes a streak and the atmosphere will not be able to be done.

PAO        Do we have any other questions here at KSC, Jules?

BERGMAN       I have two questions. First of all, does the weather still look good, for a Thursday landing? Are you still figuring that you have an extra day?

CHAPPELL       From what we were told not too long ago, it looks very favorable. Now I'm not the weatherman, and..
BERGMAN I know that, but you obviously have still got the extra day (garble) cohorts in crime. Or supervised it. Second question, on the overall mission I ran into a scientist astronaut last night or early this morning, who had just come from the PCOC and he was glowing, he said despite minor failures like with SEPAC (laughter) it was early John, and you should know I don't drink, and he doesn't drink either. He had just come off shift as a matter of fact. He said a very interesting thing, I want your professional judgements on. He said the overall effect of Spacelab One is going to be nothing less than a revolution in space sciences, the mass of data dazzled him. And he said this is a turning point for space scientists. Now is that true, or is that hyperbolic?

CHAPPELL I feel it is Jules. I think I've talked about this before in this briefings. It is a capability, a new capability for space science, which it has never had, and Spacelab One is significant in that it is the one that demonstrates the new capabilities, here it says to the science community. Look what you have available now, look what you can do, use this, think what's possible with this new capability. And do the experiments, build the experiments to match it. It's very significant in that regard.

BERGMAN That is obviously true, but he was contending that this mission, Spacelab One, had already churned up, generated so much data that you would revolutionize the total of what was known about space sciences.

CHAPPELL I think there will be extremely significant advances in all five of the disciplines that are being done. I guess to say revolutionize space science would probably be going out on a limb.

KNAPP That would be exaggerated if would say, revolutionize. Because if you say that, then you would say, you would kind of contradict results which have been obtained earlier on. Because, let's face it, there have been measurements of inside of the atmosphere from balloons, from sounding rockets, there have been space astronomy has also existed before, has been done from other spacecraft, the IUE spacecraft for example, and other, and so on. And it is not that the results which we are now obtaining from Spacelab is kind of (garble) results or contradicting what a revolution would do. It is just complimenting, and complimenting anyway which was previously simply not accessible. Instruments for observing the atmosphere are carried out. The (garble) spectrometer for example is one example is such a heavy and massive instrument it would really be very very difficult to carry this instrument on a free flying Spacecraft, the way it has been designed.
BERGMAN    Of course, revolutionize may have been my word out of fatigue. What he did say was a turning point for the space sciences.

CHAPPELL    Absolutely.

KNOTT    Turning point I agree.

CHAPPELL    Absolutely, Absolutely.

PAO    Dave Dooling.

DOOLING    On the extra day that your getting for this revolution, have you decided what you are going to do yet. Have the timeline people been able to write that out.

CHAPPELL    We've gotten to the stage now, that we've sort of blocked out the day. No details at this stage. But we know that we want to do some vestibular investigations, and they are blocked in some space plasma physics and that's blocked in. Continue the atmospheric measurements. Obviously we are in total sun, so we'll do extensive solar measurement. I think we talked about some of these yesterday. And then the fluid physics module experiments will be continued, and now that the Mirror Heating Facility working well, we'll be able to continue with the samples that we missed there while it was being trouble shot. So, and I've probably forgotten some, but we are sort of at the stage of having it blocked out generally in terms of crew time and attitude, Spacecraft attitude.

PAO    Okay, if we have no other questions here in Houston, we'll go to the Kennedy Space Center in Florida. (garble) discovery of (garble) atmosphere.

CHAPPELL    Say, all I heard was, would you please repeat the question?

...    Yes, I was wondering what the significance is of the discovery of methane in the atmosphere?

CHAPPELL    Well, Methane has been measured in the atmosphere up to I think 30 kilometers. Now Marcel Ackerman is seeing it at 70 kilometers, and that had never been measured that high. The significance of that is that it gives you new information on the ways in which the atmosphere dynamics takes place. The way constituents actually evolve up through the atmosphere, stir into the atmosphere, or defused into the atmosphere. And it will cause th modelers to look again at exactly how they think the
different constituents of the atmosphere interact. Because, as I mentioned, one of the other atmospheric scientists in the room at the time Marcel said this, made the point there is no methane in the (garble) so obviously the overall thought in that regard is quite different from what the measurement tells us.

PAO No further questions from KSC.

PAO Okay, I'm told now that we do have questions from the European Space Agency newscenter in Cologne Porz, so we'll take those questions now.

We have heard that there was an unexpected vibration during yesterday's blue shift, can you tell us more about the (garble)?

***
... in Cologne-Porz so we'll take those questions now.

COLOGNE-PORZ  Hello, (Garble) Germany. We have heard that there was an unexpected vibration during yesterday's blue shift. Can you tell us more about these story. Was it true?

CHAPPELL  I think, let me suggest that you ask that to the. I guess, can they get to the Flight Director Briefing. Are they in that?

Yes.

CHAPPELL  Yes, you should pursue that with the Flight Director in that Briefing but I do remember hearing some of the activity. It was reported by John Young and the process that was taken place was to begin to look at some of the accelerometer data from different accelerometers that are on board to see if it could be verified. And at the time that I went off shift there had been no specific accelerometer data on that.

PAO  I might point out that that Briefing will be a 2:00 central time which is about 3 and a half hours from now if that helps you.

COLOGNE-PORZ  Thank you. That's all from Porz, Bonn.

PAO  Do we have any further questions here in Houston. If not before we close I'd like to identify for you some people who have joined us here in the room in the back and would you please raise your hand when I call on you. Mel Reachiie and David Anderson of the Drop and Shock experiments, Dr. Frank Sulzman of the Circadian Rhythm - of the fungus growth experiment, Dr. Steve Mende of ASPI, Peter Anderson over on the side of X-Ray Spectroscopy and then ...

KNOTT  There's also Professor Napolitano present, investigator in the Fluid Physics Module.

PAO  With that we'll conclude today's science briefing. Thank you for attending.

END OF TAPE
PAO Good evening, welcome back for another change of shift briefing by Flight Director, John Cox.

JOHN COX The shift we just finished was again another very quiet shift, seemed like everything went very well. We did have another little funny where we passed some hydrogen gas through FES A on Orbiter 2, trying to get it back on line again, but as I left it looked like it was working real good. The trim burn which was scheduled for this morning was delayed, didn't need it, and set up a new target time for the next trim burn, trim burn 3 at 7 days, and 20 minutes. Right now, it's projected to be a zero also, but that's out there, anyhow for us to look at. We did send several pages of attitude changes up to the crew. I think the total number of attitude maneuvers stayed about the same, but it's several new tweaks Brewster reported a funny, it turned out a few seconds, or a minute or so after he did DAP change, he noticed about a 2 hertz oscillation in the vehicle that lasted for a few seconds. But we haven't found a cause for that, you could swear that the data shows that there is no oscillation, but it was enough to wake John up, so we're continuing to chase that one. It was nothing that was really abrupt, but it did rock the boat a little bit. Just to show you how well things went for the shift, this is the first one, I think, of all the shifts that nobody put up a failure summary message. We tell the crew about any of the little knits that we may have seen along the way so that they know that it's present in case they stumble on the thing and whether or not they should do anything about it. Well, we didn't even find that today, so they got a nothing in that area. In trying to get at the gas and water tanks and all that, we did a water dump today, and it happened that it turned out right in the sunlight, and Brewster described that as it looked like a fire hose of water crystals, and they sort of spurted as the gas started getting into it towards the end of the dump. Other than that, the day was really right down the middle nominal and did not have any problem to report. With that I'll have take questions.

JULES BERGMAN (ABC NEWS) John, when Brewster reported the oscillation on the air to ground, Mary Cleave, Ronda Fisher, I forget who the capcom was, it was a woman though, reported that it was as they were doing the hop and drop in the rear. And it seemed, that seemed to have been the cause, is that not so?

COX That was more of a joke, she guessed that they had been eating to much food and were doing the hop and drop, which is, you attach the bungee cords when you do all that, and that maybe they were rocking the boat. That hop and drop went on for a long time, and was not something that came up abruptly and went away. So, nobody felt that that had anything to do with it, and it would have shown up in the attitude data, we still feel, and nobody sees that at the moment.
BERGMAN  So it's a funny?

COX    It's a funny, we just have no way to explain it.

BERGMAN  Second question; despite all these little minor problems with the experiments, if you were summarizing the flight briefly at this point, how would you say it's going?

COX    I would characterize this flight as being an outstanding success from both the science and national transportation system capability support science. I think the Spacelab has been a magnificent addition to the Orbiter, so that as a package, those two vehicles really provide a good platform for working in space. And I think the science that we've been gaining has been burrowing that out, it's been very good.

BERGMAN  You think we should do this again, yes?

COX    Well, I think that there will be enough folks that will see the results of this that will want to do this again.

LYDIA VONSOVAGE (UPI)  What are the latest reports about the Pacific storm front heading toward Edwards Air Force Base and is there any chance that the landing date might be changed again?

COX    Well, you just have to pick your favorite weather man. My favorite weather man on my shift says that probably is not going to be a problem. The lake bed report seems to be that Edwards 17 is open now and that they expect in a couple days the other lake bed runways will be dry enough, there's no standing water out there. Fronts coming in right now, does not look like there's anything coming in that has a very high probability of leaving any water in the area. There may be some precip in the mountains from some of the fronts coming, but does not look like there's anything strong enough to leave water at Edwards. That's today's guess, lots of days early.

CHRIS JOYCE (NEWSCIENTIST MAGAZINE)  If you were going to launch Spacelab again, let say, in 6 months, very similar configuration, the full module, similar experiments. What would you do differently working with what you've learned in the past 6-1/2 days?

COX    I think we would try to understand what the RAU 21 situation is and the thermal situation back there. I think of all the things we've worked on that's really been related to the fact that we're flying all this new equipment. That guy has been the one that has kept us active. So, maybe there's a thermal problem out there, maybe there's a RAU peculiar problem, I don't know. We're still hypothesizing the thermal, but it seems to really show up to be a thermal situation. I don't think, if anything else, I think the operation as far as the crew is
concerned has been going well. I think the way we coordinate with the payload operations control center on the ground, has been going well, much better than we had expected. We had some good simulations prior to this that seemed to indicate that things were going to go well. You can't predict today, six months from now, what science you might have onboard that flight. But it seems that the science has been going very well. So, I think it was very planned, the folks have been working on this flight for a long time. We did emphasize the simulations and I think they helped out a bunch.

PAO Any other questions? Well, that was real easy, thank you tonight, and we'll see you tomorrow.

END OF TAPE
Good morning, and welcome back for the Change of Shift Press Conference. To my right is Chuck Lewis, off-going Flight Director, to his right is Harry Craft, Spacelab Mission Manager, and to his right is Derek Mullinger, the head of Spacelab Integration and Control in Europe. We will ask each of these men for a summary of the previous 12 hours activities.

Ok, I guess as of now we have started our 6th day of flight. Our orbit is, we're coming up on rev 98, orbit is about the same as it has been 131 by 128 nautical miles. We continue to try to manage our freon loop in the Spacelab with the RAU 21 problem which we discussed with you many times. We do that basically by, we're now doing it by cycling our verification flight test equipment on the pallet off except for about 10 minutes each rev, that reduces some of the heat load. We've asked the Spacelab crew to minimize lighting and to turn one of the two keyboard and display units off, that's helped. We had several hours last night of good RAU 21 operations, it's my understanding. Later in my shift we began to have a few skip problems, but I think the RAU 21 generally over the last shift or two has been good for the experiment people. Just to give you an idea, we've talked about software patches in the experiment computer to cope with the RAU 21 problems, to date we had developed 9 patches, these are software coding corrections, we currently have 7 of them in the experiment computer, we've got 1, sounds like a very complex patch that we're standing by with to help SEPAC, if we get into a problem with its serial (garble) data coming thru RAU 21. And I say complex in that it requires patching the experiment basic system software as well as the science application software, and I understand even some of the SEPAC microprocessor changes have to be made. Those are on standby just incase they're needed. We scrubbed trim 3 burn which had been scheduled at about 5 days, 23 hours, we were within a minute of the ascending node times that we were planning on preflight. There is the potential of doing that trim 3 later today. This is for Craig, he asked, I have some news for him this time. In regard to maneuvers, preflight at this point in time, we had scheduled 114, we've done 120. Of those 30 were significant maneuver changes, as far as actualy changing attitudes, we've done a lot of tweaking. But the next shift, the blue shift that is on now planned 15 maneuvers. And if you want more detail, I've got a page I'll pass on to you after we've finished here. By the way, we just set a teleprinter message record on STS-3. When I left we had 91 messages onboard, we had 90 on STS-3, and I'm sure we'll set a record with a few more days to go yet, and the planning for the 10th day will require some considerable teleprinter uplink. The Edwards received rain last night, I understand about a fifth of an inch. The lakebed runways are closed at this time. I have no estimates to when they may open up. They'll do some inspections today, and it depends alot on the wind conditions today. They expected some
amount of wind that may help dry them out a little faster than it you normally would dry them out. The extension day planning is in work, we've established a schedule for various organizations to input their requests to our Flight Activities Officer. A bit of trivia, one of our data people calculated on one pass, one TDRS pass that occurred yesterday, if you took off, and this is the (garble) that we get down on the Ku-band that supports the science as well as our Orbiter and Spacelab data. If you took the 1's and 0's and lined them up, and typed them up in a string it would reach from here to the moon, about 227,000 miles. And this is in a 50 minute data period. Or if you want to look at it in the way of volume, if you just typed the 1's and 0's on pages with an average 250 pages per book, you would 18,000 volumes. Just to give you a feel for when we talk about digital data, we're talking about a lot of digital data. Now obviously 1's and 0's by themselves can't relay specific information, it takes a number of them, but I thought that trivia I might just pass on this morning. We had a first I think last night, we established a dark room for photography work onboard the Orbit and I'm going to stop there and pass it on to Harry Craft, and he can tell you more about that.

CRAFT All those bits of data on the science stand point, point to the fact that we're having a very successful mission, things are going very well at this particular point in time. In the last period we've had very few problems, and I guess if you say, when does the period stop, we've got a couple that we're going to talk to you about. The one that Chuck just mentioned, the metric camera did have a film jam in its seconds cassette of film onboard. We had a makeshift dark room, had a great deal of help from the people here at Johnson and the Astronaut Core. We've developed some procedures and practiced them on the ground, then sent them up, and it worked well. We have recovered the camera, it is operating, we're probably going to have to have the crew assist it to get it started a couple of times when we first get it going, but we did advance it, and we do know it will take some pictures now. So we're quite pleased that we're going to be able to do the remaining part of the metric camera's operation. From an overall accomplishment to date, we had another very important thing happen last night and we were real proud of. I'd talked to you about one solar physics experiment, a NASA one that the active cavity radiometer wasn't, we had not any data on it, and didn't play any until day 8, but we wanted to check out and make sure that it operated well. So we turned it on last night, we put it in a solar attitude, and we gave him about 30 or 45 minutes of time to look at the sun, he gathered good data from thru RAU 21, so we're quite pleased. We know that we'll be able to get him some more data later. So right now, every experiment onboard, 36 of the 38 have actually gathered science data, the other 2 have been turned on and calibrated, we know that they are operable, and of course again, they're waiting for that
predominance of solar time toward the end of the mission. On the mirror heating facility and the gradient furnaces, I would like to let Derek Mullinger talk to you a little bit about the status MNSDR.

MULLINGER Thank you Harry. You'll remember yesterday we had problems in the MNSDR. Although the gradient heating furnace was working fine and the fluid physics module was very good, and the other subsidiary facilities like cryostat, and UHB and HTC are all working fine. It appeared that there was a failure in the power supply which fed both the isothermal heating furnace and the mirror heating furnace. And that looked very serious. We though we'd lost both of them. We continued however with troubleshooting and after the crew had been able to get at the internal part of the rack, it turned out that it was not the power supply, what one did was to disconnect the IHF, the isol thermal heating furnace. At that point it was possible to send power to the mirror heating furnace. Its normaly either or, you switch to one or the other. There was something in the IHF circuits that was fouling up the pass (garble). We started a run on the mirror heating furnace and everything began fine, the temperature began rising, and there came a stop from the computer which is built in. And the reason for that was because the temperature of the cooling water was too high. Now there are 2 redundant pumps, so that normaly if a pump fails in anyway, it switches over automatically to another pump. Its not clear why this fault has arisen, and we're going on with the troubleshooting. It is suspected that either the power from the pumps is not quite sufficient to dry the water out, or it could be a bubble in the loop, we're going to try diverting all the water into this one facility, instead of circulating around the various facilities I've alread mentioned. And if necessary to switch both pumps on, to urge the water thru. And we hope to recover something there, that recovery action is in progress and we'll hope to have information for you at a later opportunity. So we haven't recovered as successfly or spectaculaely as the metric camera, but the crew is working on it. And here I would like to say that the behavior of the crew and the folks on the ground has been excellant. We have a tremedous support from the astronaut people involving this metric camera problem.

PAO Ok, question, Carlos.

CARLOS BYER (Houston Chronicle) Ok, Chuck, here comes the biggy . . .

***
BYARS Alright Chuck here comes the biggy. What size of type were you calculating those ones in (garble)?

LEWIS I don't really see, I may not have the size of type, but I've got all the calculations here, on how many lines we've assumed per character per lines, and lines per page, but that's the one, you've got the one thing, I don't have an answer to.

BYARS Derek, could you tell us a little bit more about how the metric camera fix was done?

MULLINGER Yeah, it was first subjected to troubleshooting onboard to see if it was a fault in the internal drive of the camera, or is it in the magazine. The magazine is just an overgrown cassette. And it was able to be shown, it was definitely in the magazine, and not in the drive, not in the commands, it was this one particular magazine. I recall here there is one magazine which had been almost fully utilized with infrared film in it. This one I'm talking about has black and white film. So then we had an action here on the ground, first of all the manufacturers of the camera were consulted by telephone, the (garble) company, in Germany, to get their advice, the science team got together, and considered what was considered what was the best possible way of getting into the magazine and looking what the problem was, I should perhaps say that we've had a similar but not identical problem during testing, at JSC. So it's was not absolutely unknown. It turned out very fortunately that there was a magazine of almost identical type here in Houston, that was brought in by some of the JSC people, they use it for aerophotography. And we had a lot of advise from a couple of the photographers on the staff of JSC who were helping us figure out what could be done. At the same time in parallel we were trying to locate the spare cassette, which is left behind at Kennedy, that turned out not to be necessary because of the full support we got here. The science team got together, tried to work out a procedure, which would not risk the films in anyway or at least minimize the risk. So the first thing was don't touch the infrared film which is already exposed, now how to get into the magazine, in a place where there is not too much light, and perhaps screen it or put the film temporarily in black bags when it is removed and so on. This action then was strengthened by bringing in Mr. Joe Angle, and the whole group then went off to the Spacelab simulator, checked out that the best place for working on the film as far as darkness is concerned, was in the sleeping area, and that, of the crew. From that they worked out a procedure which very simply meant, getting the magazine taking it into the sleep area, and closing that off in, with the built in screening, making sure there was no light leaking in, and then opening up the magazine, cutting the film to free it, so the spools could be removed, taking out the piece of film that was removed, and generally rethreading the film through the spools again, and putting it in order. All that was done, very STS-9
successfully, they were of course being assisted by the people on the ground, who had the spare magazine there in order to answer any questions. The whole procedure was walk through as they say here, by the APS on the ground explaining what was intended before the actual work was done. Magazine was brought back, fitted to the camera, and then hopes were dashed, because it didn't work immediately, and after some consultation, we arrived at this situation, which Harry discribed to you, where it will work if you just help it a little bit around. And if we can get the film wound on sufficiently, we're fairly optimistic, that we can continue to get very meaningful pictures in the way that was planned in, but the times that were planned. Thank you.

PAO  
Names and affiliation please, Greg Covault.

COVAULT With the lakebed damp, continuing to be damp, and that possible reducing your flexibility as it relates to winds at Edwards, going into the Edwards Concrete, adding to that the perpensity of some Pacific storms coming across, are you doing anything, even the most preliminary way to get a leg up on a White Sands recovery, should that become necessary?

LEWIS Not to my knowledge, we really feel like that even if the lakebeds are wet, the runway 22, the concrete runway would be acceptable. The winds I mentioned, I was talking specifically today.

(garble) ESA - I got a question from a journalist, who phoned in from a German journalist, who wanted to know when are the wives coming here to talk to there fellows up there?

LEWIS I think we'll have to get an answer for you and let you phone it back.

PAO Here please.

JOHN WILFORD (New York Times) - Which crewman got into the sleeping are and did all these things?

CRAFT This was Mr. Parker.

PETE SOTTO (Christian Science Monitor) - I guess we love these make shift darkrooms. Did they, I guess one trick photographers as they use, as they crawl into the sleeping bag, for extra (garble) is that what he did?

LEWIS Yes, he got into the sleeping bag, closed it up and they taped up other of the screens to minimize any light into the compartment, they turned the lights off the middeck, they turned the lights in the tunnel, they did everything they could to minimize any light exposure.
successfully, they were of course being assisted by the people on
the ground, who had the spare magazine there in order to answer
any questions. The whole procedure was walk through as they say
here, by the APS on the ground explaining what was intended
before the actual work was done. Magazine was brought back,
fitting to the camera, and then hopes were dashed, because it
didn't work immediately, and after some consultation, we arrived
at this situation, which Harry discribed to you, where it will
work if you just help it a little bit around. And if we can get
the film wound on sufficiently, we're fairly optimismistic, that we
can continue to get very meaningful pictures in the way that was
planned in, the times that were planned. Thank you.

PAO

Names and affiliation please, Greg Covault.

COVAULT With the lakebed damp, continuing to be damp, and that
possible reducing your flexibility as it relates to winds at
Edwards, going into the Edwards Concrete, adding to that the
perpenst of some Pacific storms coming across, are you doing
anything, even the most preliminary way to get a leg up on a
White Sands recovery, should that become necessary?

LEWIS Not to my knowledge, we really feel like that even if the
lakebeds are wet, the runway 22, the concrete runway would be
acceptable. The winds I mentioned, I was talking specifically
today.

(garble) ESA - I got a question from a journalist, who phoned
in from a German journalist, who wanted to know when are the
wives coming here to talk to there fellows up there?

LEWIS I think we'll have to get an answer for you and let you
phone it back.

PAO Here please.

JOHN WILFORD (New York Times) - Which crewman got into the
sleeping are and did all these things?

CRAFT This was Mr. Parker.

PETE SPOTT (Christian Science Monitor) - I guess we love these
make shift darkrooms. Did they, I guess one trick photographers
as they use, as they crawl into the sleeping bag, for extra
(garble) is that what he did?

LEWIS Yes, he got into the sleeping bag, closed it up and they
taped up other of the screens to minimize any light into the
compartment, they turned the lights off the middeck, they turned
the lights in the tunnel, they did everything they could to
minimize any light exposure.
Okay, we'll go to KSC now for questions.

(garble) (LVDC) - I wonder if Chuck's maneuvering shock, couldn't give us any guidance on whether the Orbiter will be in a suitable attitude later today over UK and Europe and again tomorrow for Owen Garriott's ham radio transmission?

LEWIS I don't have the data I would need to answer the question in front of me. I think PAO could get that out of our CAP and ground track data, which would be available to him. I jsut don't have that right now, perhaps pass that back to the ----

PAO We can do that later.

(LVDC) Okay, thank you, I would appreciate it.


CARLOS BYARS (Chronicle) - Chuck, how do you feel about the ham radio operations? From your position Flight Director. Do you feel like everythings gone nicely, that, or do you feel there has been some interference or what?

LEWIS I don't think that the ham radio operations is really much of a schedule till later on the flight, so I don't really exactly what Owen's plans were and when. It was to be done on a non-interference basis with out experiment operations and that was well understood. I think, like yesterday, and perhaps the next few days, you'll see the crew time freed up more than it has been as Harry indicated yesterday. So I really can't give you any specific answer, but that was the general plan as I understood it.

BYARS Some of these are already going on, as a matter of fact. But obviously, since your not that aware of ---

LEWIS I'm not getting any feed back.

BYARS ---it hasn't been a big problem or any problem at all.

LEWIS No sir, not that I'm know of, and I don't have any feed back as what results, or what kind of results they make.

BYARS I understand that, I was just thinking about it's impact as you might see it on the ---

LEWIS No impact, no impact at all.

JACKIE JUDD (CBS) - A quick question, how many exposures are there on each magazine?
LEWIS  There's about 500 exposures on each magazine. We've got one good magazine with 500 and now we're going to start on the second one.

(garble) (USA) - Is there any more words on the Reagan, Kuehl, hookup tomorrow morning, is that still as far as you know still as far as you

LEWIS  I would ---

KRAFT  That's another PAO question.

(USA) - Is that a yes.

PAO  The answer is yes, but (garble) it would come to us.

PAO  Anymore? Okay, thank you very much.

END OF TAPE
Okay. Good morning. Welcome to today's Science Briefing. To my right is Dr. Rick Chappell, a Mission Scientist for Spacelab. To his right is Dr. Karl Knott, an ESA Project Scientist and we'll let them go ahead and summarize the latest activities.

Thank you. Karl, why don't you start.

I would like to report on the achievement of shift 11, yesterday's day shift. The shift started off with exchanging experiment 20 which had been sitting in the airlock. In fact only part of experiment 20 which had been sitting in the airlock for several days doing plasma, passive plasma measurements in this location. This experiment was exchanged against experiment 22, the very wide field camera of Professor Courtes. And you probably all have seen on partly even on live TV how this exchange was successfully effected. Then the next part of the shift saw an exchange of observation of opportunities. We had the SEPAC experiment planned to operate in 2 subsequent periods. However during these periods, the RAU 21 was unable to support SEPAC and a change was made to the attitudes which had been booked for SEPAC we had taken by the FAUST telescope and the FAUST telescope got two good observations in these 2 slots. However, a trade was made. SEPAC did not give these opportunities away. A trade was made because it is expected that the RAU and indeed it turned out to be like this, it was expected that the RAU would become functional again when the temperature would be lowered down slightly. And indeed when the temperature of the RAU was reduced by the cold, it was a so called cold attitude viewing cold space into which FAUST was pointing. This gave an opportunity to the RAU to cool down and in fact to become operational again later during the shift. So this was a very wise move and was perfectly achieved and I think both the SEPAC and FAUST benefitted from this trade. Then the next period in the shift saw 2 life science experiments - 28, the Ballistocardiographic was carried out successfully and it had been planned premission that it only was carried out on one crewman. It turned out that the time set aside for this activity was sufficient to carry it out on both crewmen and that was in fact achieved yesterday. So it was a strong enhancement of the science for this investigation. Then the next activity was also in the life science area. It was a dome run for experiment 102. I would like to mention here that the principal investigator of this experiment, Professor Larry Young, is with us this morning and you will be able to talk to him after the briefing. He will be glad to answer any questions you have concerning his experiment. Just to refresh your memory, he is the PI who's experiment in carrying out several levels in the area of life science. Apart from the dome experiment, he has the hop and drop experiment, he another FO which is called Awareness of Position. He does several investigations in space motion sickness and another FO covers eye movement test. So Larry's
here. I don't have to go into any of these FOs. So he would be pleased to answer any questions you have after this briefing. Then the remainder of the shift was dominated as far as crew activity is concerned and as far as orbiter pointings are concerned by experiment 22, the Very Wide Field Camera operating. This experiment as far as we understand from the principal investigator, who of course also has not yet seen the exposed films that will be brought back to us and only then analyzed. But as far as we can tell from the engineering data which are constantly monitored while the experiment is running, everything looks perfect and this experiment obtained quite a number of excellent exposures. We have also heard that the PI, Professor Courtes, of this experiment will be joining us this morning and he has already been I think on a live TV interview yesterday afternoon and he will be here again to answer the questions from you. And there was another remarkable event yesterday. The, as I told you earlier, the RAU 21 did not support the initial runs of SEPAC but it was the expectation that with some (garble) and a cooling down of the RAU it would work later. However unfortunately, SEPAC did not have any allocated time slots at this later time and of course the investigators who wanted to troubleshoot the experiment wanted to get a look at the experiment and we had to approach the life scientists who had a major part of the crew time booked in the later afternoon and, indeed, the material scientists agreed to give some of their allocated time to SEPAC for troubleshooting. A move which was very much appreciated by the SEPAC investigators. And this enabled SEPAC to take another look at the experiment. Indeed, the RAU had recovered at this time and SEPAC could successfully troubleshoot the experiment. And then the rest of the afternoon as far as crew time was concerned, was again taken over by material science. So this was a very, very clever move and I think both parties benefitted from this exchange. As far as the unattended experiments are concerned, they've been physically running along as planned in our timeline and the electron spectrometer of Dr. Wilhelm made one observation. When Spacelab was flying over a ground station which is emitting VLF waves, the expectation of the investigator, that's for the time being only the expectation. The expectation is that these VLF waves propagate up to the atmosphere into the ionosphere and into the magnetosphere and interact with the energetic particles which are inside of the (garble) belt can be trapped into wave particle interaction. These particles get scattered and then precipitate down into the atmosphere. This is what the experiment expects. He had previous runs where he was overflying these type of stations and did not see any signature in his particles. However, yesterday for the first time he got alarmed. He saw some signature in his particles. He's still not sure whether he can definitely associate this with the real life caused scattering. He is working on it but at least he got very exited about it and perhaps he has achieved this particular aim of his experiment. Then offline yesterday there was a lot of activity.
over amongst the principal investigators. Particularly the investigators of experiment 300, the material science double rack and the metric camera experiment 33. They were deliberating in real time conferences over with Europe what to do about their facilities. That got good advise from their sponsors from the technicians which were not all present in Houston and they developed troubleshooting plans for the instruments which they wanted then to carry out later in the mission. And I guess Rick when he reports now on the next shift he will tell you how some of this, some of this troubleshooting went. So there was tremendous activity there in preparation of the troubleshooting for the metric camera and for the double rack. All in all, I think yesterday's shift was a good shift. The experimenters behaved extremely flexible and traded a couple of observation opportunities which was a very good achievement. It appears also that the data quality keeps increasing. TDRS, that is my opinion, but perhaps Mission Manager later on wants to comment more about this, TDRS seems to be in reasonable shape and the Data Managers they have managed to control it right. So we are really succeeding in getting the data down which we want and the data of good quality. The RAU 21 is being (garble) and I think it is also known when it will work and when it will not work. So it can be adjusted in such a way that it can support the SEFAC experiment whenever necessary. It is a very sensitive creature. It is sensitive to temperature. It is sensitive to the load it has to handle and a balance is made there in order to keep it going. All in all yesterday's shift, I think, extremely successful and having said this I would like to turn it over to Rick for shift number 12.

CHAPPELL  Okay, let me go through very quickly the types of things that happened in shift number 12 and then give you some specific, talk about 2 or 3 of them specifically. We had more runs of the wide field camera. There were another 5 runs that went, I think they were described as perfectly, acquiring I think 10 more targets. So they were good, or 10 more exposures. So they were good, there was very good data in the astronomy area ***
CHAPPELL . . . the wide field camera, there were another 5 runs that went, I think they were described as perfectly, acquiring I think 10 more targets, or 10 more exposures. So there was very good data in the astronomy area, and when the wide field camera runs, the Faust camera also runs, so you get dual pictures, or dual capability on a given target. With the wide field camera looking at the larger field of view and the Faust camera with a more narrow 5 degree view, concentrating on 1 particular source within this broader field. We did some of the 201 experiment which is the vestibular experiment of Dr. von Baumgarten. These are the midmission runs. We did the ballistocardiography, and you may have seen that, we had marvelous television coverage, I think they played it back just a while ago. Just about a half an hour of both Ulf Merbold and Bob Parker doing the passive measurements with the accelerometer pack floating as the accelerometer measures the flow of the blood in the body and then doing exercise inorder to increase the heart rate to measure the changes in the flow. Its facinating to watch that. We had a good run with the SEPAC which ran the MPD arc jet at the same time as the low light level television was running or the AEPI experiment 3. We were very successful in having the RAU cool down because we were in mostly a pointing the bay of the Shuttle to deep space. When the RAU cooled down, the data quality was quite good on it, it was restored to its full operations which then was used to support the SEPAC investigation. They have one more troubleshooting run that they plan to do in the next few hours on their electron beam, and then we'll do a number of operations after that using the arc jet, MPD arc jet. We did a plant selection. There was some problem with the cinc in the television, in the plant selection, but that was minor. Ulf Merbold was able to do the selection onboard, and that experiment is proceeding. We did a very exciting run of the fluid physics module. John Padday did his follow up experiment, and here we saw demonstrated the learning as you go type mode. John had done an experiment a day and half ago which was the first run of this one, where he got information on how to inject the fluid, how rapidly to separate the discs, on the fluid mechanics module, and he had in that experiment, he learned that in the separation he had to be more careful because the fluid was beginning to actually spread up one of the discs. So this time having learned from that, he was able to modify his approach. Ulf Merbold ran the experiment again and did a marvelous job, and he thinks he got exactly what he would have hoped, and feels that from the description at least of it, that the results are confirming some theories that he had what should happen in this interaction between fluids and solids. And in fact, John said in the SOPG, our planning meeting today, that he was thinking maybe we could shorten the mission instead of lengthening it so he could get his film back early and work on this investigation. But he is quite excited about how that went. He had predicted, its the fluid between two discs, and the discs are moved apart and the fluid,
shape of the fluid is studied. He had predicted when the fluid should break, the flooding zone should break, and it did that at exactly the time he had anticipated. So that went really well. Let's see, we ran, we continued to run some of the atmospheric experiments. We completed the Grille spectrometer runs, Marcel Ackermans instrument that measures, in the infrared spectrum, does altitude profiles of the upper atmosphere using the absorption of the solar light and then does measurements of the natural emissions in the atmosphere. Marcel is quite pleased with the data that he has, I think he got over 30 runs, and I've hear Marcel comment many times in the past that the return from this experiment will be so significant because in comparison, it has been flown in the past on balloons and you get only limited data on the balloon use of this technique. And now he has been able to expand a great deal on the technique and infact expand a great deal on the global coverage with the data. I think Marcel is quite pleased and he's also here with us and will be able talk with you if you would like after we get thru here. So the 13 operations were completed successfully and we were all very pleased about that. Probably the most exciting thing in this shift, and maybe it was associated, yesterday it rained pretty much outside, and we had to talk about experiments that had had problems, today the clouds are parting and at the same time we are repairing experiments that had problems that we talked about yesterday. Its with a great deal of pleasure that we can actually talk about repairing the experiments and infact this is obviously something that you can do when you've got a trained science crew onboard. The red shift is certainly building a strong reputation on their ability to repair things. They're Repair Men Extraordinaire. Bob Parker started with the high data rate recorder a couple of days ago. We had problems with the mirror heating facility that we talked about yesterday to you, and Ulf Merbold disassembled the front panel on that and rerouted some wires and did some testing and the mirror heating facility came back up again into operation. And so the materials science people anticipate on getting several runs in the mirror heating facility. That was quite exciting to see, and now I believe at this time they are going thru a procedure to troubleshoot and hopefully repair the metric camera. You may have been listening to some of that on the air-to-ground, but Bob Parker has the camera down, he's going to take it up into the middeck, build sort of a makeshift dark room, open up the back of the camera, take the film out, bring the camera back up (the cassette mechanism) back up, hold it infront of the video camera so that the experts on the ground can watch and work with him in seeing what's jammed up. And hopefully get a fix there. That will be quite exciting if it works out, and we hope it will. Those are 3 repairs that have been done, 2 repairs that have been done and 1 that we hope will work out by the red crew. One thing that has been done by the blue crew that I wanted to mention following up on what Karl talked about, is a very neat thing that happened with the rotating dome experiment, Larry Young's experiment, that
Karl mentioned awhile ago. We had a problem there, this is an experiment in which the crew looks in to a dome, the dome rotates, this gives you a visual cue in which you begin to then follow. There are photographs then made of the eye and the eye counter-rolls as it follows the dome. The degree of counterrolling is coupled into the interaction between the eye and the vestibular system. So its a way of probing the workings of the vestibular system. The flash on the camera, the 35 mm camera, earlier on in the mission didn't work, and so as a result of some advance planning that infact Byron Lichtenburg had suggested, they had made arrangements to carry a lens and an adapter that would allow them to use the Spacelab video camera to do the same measurement, and because of Byron's forethought and then his ability on orbit to put the camera on to the dome and infact test out to make sure that the focus was adequate and that it would do the experiment. And in interacting with Larry, they were able to run, use the video camera to run this experiment. It has been run several times, I think 4 or 5 times now, quite successfully, and I wanted to show you a brief clip of what we have gotten back from that, as a result of using the video camera instead of the film, we infact can get a preview of what happened. Not having to wait on the film to come back later in the week, we get to see a little bit of it now. You can see the film rolling here, this is from the video camera, in fact if you look in the eye, you can see the reflection of the spots on the dome that's rotating, that the subject is looking into. I believe this is Owen's eye, and this experiment is very interesting. In addition to the counter rolling the subject as a joy stick that he indicates the degree to which he is rotating. So as you, if you look into a rotating dome like that, after a while you begin to feel that you are rotating and that it is still. And of course in 0-g where you don't have the strong cues from the otolith system, that rotation will be, you'll be even more susceptible to that. And Larry does this experiment both with bungee cords holding the subject, which gives them tactile cues that maybe they're not rotating and then takes the bungees off and this is a run to look at the difference in that. And he has found some very interesting differences and I would encourage you to talk with Larry about this. This is of course, part of the basic study of the vestibular system and how the brain integrates the visual cues and the tactile cues and the vestibular system cues, the otolith cues. Could we roll the other tape, I think there was a second one which is I believe Byron with the, yes. Now here is Byron, and Byron has on a contact lens, and you can see the nice (garble) marks across the eye there, and this is to, and you can see the eye, can see it rotating, slightly. And also there you can see the reflection of the dome as Byron is watching. This is a very interesting experiment and again I would encourage you to talk with Larry about the results on that. Ok, and thanks for the tape. Another very interesting thing we were able to do today, which is very exciting to me, we have had some apprehension about the hot test,
CHAPPELL --- (garble) will work in the hot test, as far as supporting the 4 experiments that are on it. Two of them use it at in a minimum way, in fact one of the will not be operating in the hot test. A second one will not be either, and probably the third and the one experiment we have been concerned about is the active cavity radiometer, which is experiment 8, because it requires the full service of the RAU. We have been concerned in the hot test, the temperature, if the temperature on the RAU goes up, which it certainly will, that there may be some problem in acquiring data for experiment 8. With that in mind then, we knew that we had a cold period during this shift, if which the temperature of the RAU would be lower. And we decided to make some observation for Dick Wilson, in his experiment while we knew the RAU was normally cooled down. And that worked out very well. What we were able to do, is to set his experiment up completely and then go into a solar attitude, solar pointing, we were in the solar pointing for about 30 minutes, and his instrument worked fine, and he got good data and then we rolled back out of that to keep the RAU temperature below the point of which it begins to at least in the past, in which it would begins to glitch. So we've got some good data for Dick Wilson, so that in the future if we have a problem in the high test, we will have had already done some good things. One might say, this 30 minutes of data worth all that trouble, and I will remind you that active cavity radiometer is a very high, highly active measurement of the total solar output. And if you can, in fact that has been done many times from sounding rockets for 5 minutes or 3 minutes. If you get this, the instrument turned on, set up, and make the highly accurate measurement for a few minutes even, you got the data point that you need on total solar output, or solar constant as we have called it at this point and time. And Dick will then be able to compare that with a similar instrument, not as sophisticated but similar in its basic nature that's on the solar maximum satellite, that's is in a slow spin. You'd be able to do an intercalibration on that. (garble) calibrating the instrument on the ground, take it to Orbit, shoot, take a picture of the sun or measure the output of the sun, compare that with SMN, bring the instrument back down, and recalibrate it. So he's got, he will have it at the end of that a very careful calibration of the SMN instrument, which has been on Orbit for several years. I wanted to mention also, we talked a couple days ago about some of Deter Andresen's measurements, x-rays spectros. Deter has gotten a third target, which was signus X-3, and he's found a very definite line in the x-ray spectrum that appears in the iron line, which tells you something then about the composition or the surface nature of the neutron stored in this case it's a bionary neutron and (garble) that he was observing. (garble) was excited about that, it's the resolution that's every been used on this particular source. They're been previous hints that there was a line there but they were using
portional (garble) that had more course energy resolution and it couldn't be proven beyond a shadow of a doubt, and now Deters instrument is showing excellent things there. Deter is also here with us, and I would encourage you to talk with him more about that if you would like. Let see. I guess that's all. We had a good MPDR jet firing. We've got good video on that, that was recorded onboard. Things went really well, this was suddenly a sunny day shift, and it's been exciting to go through it. I guess will stop and let you ask questions at this time.

PAO	Okay, please wait for the mike, and give your name, and affiliation. Dave Dooling please.

DAVE DOCLING - (Huntsville Times) Rick, a request and a question. At the end of mission, I think we would all appreciate, having some kind of log on when the various science experiments were run and how long they were run and if each sequence was run to completion. This would help us in doing post mission stories. Secondly, with all the problems with RAU21, what impact will that have on various atmospheric and other instruments that maybe were hoping to have data from the horizon sensors. Are they going to be able to do everything they want just using Orbiter attitude data, will they (garble)

CHAPPEL (garble) there was a couple of them that needed that, and so far they have been operating okay. They're been a couple of times when the operation were inhibited by the, I don't want confused data, but the incomplete data from the horizon sensor. But there have been work around used on that so that the two instruments that have needed it, have been able to acquire the data that they needed. So it hasn't been, although it has been in affect, it was a small one for that time. In the future I think, the horizon sensor information, I think one of those experiments is completed of its operations and the other one has only a few more. So I don't anticipate there being anything between now and then. The other experiment on there have been doing fine, they have been using different patches, if the RAU has gotten to hot in this head, drop out on some of the lines, then they've used soft ware patches to ignore some of that. The other experiments on there, the data come down and the way they are either film or on the high rate marks and so they don't come back through the RAU and they have been getting the data. So it's been, all though it's something that we've had to work with all along, it hasn't been a dominantly negative impact on the experiments on it.

KNOTT I would like to add to this, that the horizon sensor is basically there to give you a reference, comparison between the attitude which is taking up by the Orbiter and the attitude in which the pallet has. The horizon sensor is there just in order to make sure that the pallet pointing is consistant with the
Orbiter pointing. If there would be a slight offset which is apparently in the Orbiter. Then the good pointing of the Orbiter would really not give us the targets which we are looking for. However, the vary directional astromony measurements which have been carried out, so far, they confirm that the Orbiter pointing is good and that the pallet is well aligned with the Orbiter, and that the pallet is really looking into the direction where the Orbiter thinks it is pointing in the pallet too. So the duty of the purpose for which we have built in horizon sensor, which was some kind of a safe guarding measure against this. This possible miss alignment, this reason does not exist. The pallet is perfectly aligned to reach the Orbiter and we get good point off the pallet mounted experiments.

PAO       Greg Covault

CRAIG COVAULT (Aviation Week) - Two questions, first one for Rick, on your shift. Do you have some additional details on how Ulf was able to repair the mirror furnace and the actual problem he did correct and for both of you it's kind of a overall question on your shifts, with the guiding rule being always to return to the time line if possible, put some perspective on how your change requests has changed the basic time line from a percentage standpoint. 20% different then what you would have flown, something like that. So the mirror facility and then the time line question.

CHAPPEL  The mirror heating facility, the approach there was, when we talked yesterday, the feeling was, there was a power supply problem. A short in the power supply that worked both the mirror heating facility and Isothermal heating facility. Both of them, the Isothermal heating facility just about completed all of its operation, but they both were out. Through the night, or through the day and night yesterday, the thought came on that they should verify that the short was not in the Isothermal heating facility. There was a single supply that carried both of those facilities. So what Ulf did was to essentially disconnect the wire from the power supply Isothermal heating facility which was a load where in apparently the short was and that allowed then, and the supply worked again and was, and is supplying power to the mirror heating facility. So it was disconnected a wire there. In terms of the, let's see, the variability or the effect of replanning, the way we have done, we've have always this stay on the base line time line, phylosopy to the degree that you can, and we've always talked about there being spaces in that time line. And what we've done I guess is to, in our replanning and in our operations change request, and replanning request, is to utilize the time that's inbetween the scheduled runs. Now there are times when the crew gets behind, or in fact many times they
get ahead, it varies, and things will not run exactly on the same
time line. But in general the runs are done, or the experiments
are run as they are previously time lined and then with our
replanning things, we work in this, I don't know, this 30% range,
where there's just sort of blank, crew time available, or
resources of various sorts available, pointing or power or
whatever.

COVAULT Dr. Knott, did you have anything to add to that?

KNOTT We had developed this rule, of always going back to the
basic time line, basically as some kind of safeguard rule, in
order not to upset things by too many replanning requests and
this emission progressing, and people getting experienced in the
various fields, mentioned the data transmission question earlier
on, there's no real sensitivity of the TDRS with respect to
attitude maneuvers, that has been found out, so people aren't
getting less reluctant to allow us to do this, changes, they do
not impact the normal operations. If there is a good reason, as
existed during the shift 11, to exchange SEPAC activities against
faust activities, I think it would be very -----

***
KNOTT  so, does not impact the normal operations and if there is a good reason existed for example doing the shift 11 to exchange SEPAC activities against faust activities, I think it would be very stupid not to do it and to just very rigidly apply the little bit we have made earlier on just as a safe guard. So things are working out fine and you develop alot of flexibility and it's to the benefit of the investigations.

CHAPPELL  I might add that we've had excellent support from the Orbiter, as you know even the discussion about the added day says the Orbiter resources are just excellent. They have been under cooperation there is excellent and it makes the replanning activities where we do them, quite straightforward to do and a very good interaction there.

PAO  Okay, we're going to try and stay on our timeline and go now to West Germany, the East suppress center there. Do you have any questions in Cologn-Porz, please.

Yes, we have some questions here.

(Irish Television)  A couple of questions here about the material science double rack but first my congratulations on the pictures of overnight. They really were superb. On the six Merbold did on the material science rack, weren't their any risk involved on thinking of those little notices on back for television fans? And secondly, can you tell us what - if any impact there would be on the experiments by this delay. Was it just simply a matter of (garble) day late.

CHAPPELL  The answer to the second question is yes. They would just run later in the mission and that's no problem because that's dominantly a sample loading and then let the furnace, let the heating facility do it's job. Those are easy to continue at a day later. Certainly the aspect of the troubleshooting and the repair was looked at extremely thoroughly before Ulf was allowed or encouraged to go in and take the panel off and change the wire. There was no danger in that and it was thoroughly considered before it was done.

KNOTT  The one thing that I would to add to this. This wasn't an activity which the crew had not trained on the (garble) before. They have been trained in all types of activities of running their experiments but this time a basic troubleshooting was not trained on the ground and needed something for which he was not actually trained but it turned out to be feasible and it was done and faust coming activities on the metric camera are also activities which the crew did not train on the ground. However, we have the backup crew standing by in the (garble).
They have been training on an engineering module of the metric camera. This model is available there, the magazine filaments are on and they have trained and they give advice on whether we should ask the crew in orbit to do it or not so these things are very carefully thought out and trained before the inflight crew is doing it.

Something about Mike (garble) from the (garble) experiment. What can you do to start it once more and second, is there any plans for a retry in the next mission?

CHAPPELL In terms of starting it, they periodically command the high voltage to the tube on and do some troubleshooting on the data that they get back. They've had no successes on that, making the tube come up. They are operating the instrument though, continuously in the passive mode, which is the radiometer mode which is to use the antenna to receive microwave radiation that's generated naturally in the atmosphere or around the Earth and so any time the pointing of the Shuttle is with the bay down toward the Earth, the microwave instrument is gathering data there.

Two more again with two more questions, frankly very brief. Can you tell us is it was true that there was an engineering module of the metric camera cartridge flown from Germany overnight for the backup crew to work on? And secondly, the whole question of 3 experiments, all 3 I think, in some ways designed to answer the question of their solar constant and can put an exact value on it. I'm wondering if you can explain how it is 25 years into the space age that such a basic question still requires 3 experiments aboard a spacecraft? (Garble).

CHAPPELL I'm not sure whether the cartridge was flown in or not. I just know it was in the (garble) behind my desk and there was a lot of people huddled around it about 6 hours ago. Why do you need 3 experiments to measure something simple like the solar constant, well they're trying to measure it to about 100th of a percent and that's pretty tough to do. Two of the experiments measure the total solar energy output and they are the two that will verify carefully compare there results. The third experiment measures the solar energy output in specific wavelengths regions of the solar spectrum so it's a complimentary experiment that different from the other two. One, if you build instrumentation you find that 1 has to get down to pretty sophisticated techniques to get down into the one part intended the fourth type measurements of a total energy output like an object like the sun. This activity has been going on for quite
some years, on sounding rock and the results are beginning to
come together now. But not to the extent that a dual measurement
is not warranted.

KNOTT I would like to add to this that Spacelab offers the
first time in the measurement series for a solar constant. The
possibility to calibrate these experiments these 3 experiments
after they have been flown. So far you could calibrate your
solar experiments before they were installed on the satellite on
the ground and then flew them and you never saw them again and
you did not know what happened to the experiment characteristics
inflight was a very great decision. But here now we have for the
first time the opportunity to get these experiments back that
will go back to the institutes involved and they will take them
to very, very powerful calibration, solar simulation facilities
in order to calibrate them and only this, this post flight
calibration will help them achieve this very high decision in the
solar constant (garble) down there they are aiming for. So it is
a unique first for Spacelab because this is possible.

Thank you, that's all from Porz, Bob.

PAO Okay, we'll go to KSC now.

REG TURNEILL (BBC) Two or three questions on different
subjects. First of all, you seem to have done so well with your
life sciences experiment, do you feel - are you able now to judge
whether by the end of this mission, you'll have sufficient data
on human adaptation to the space environment to feel that in
future missions you can write down on these very time consuming
experiments and give both future spacetlab missions much more to
productive exercises, like material processing and astronomy?

CHAPPELL Well, I think - I'm sure Dr. Young would like to
answer this question.

KNOTT I saw him shaking his head when the question was asked,
so that's perhaps the --

CHAPPELL I think as we point out many times that these
experiments are in addition to being applying results to the
space adaptation, they are basic physiological studies of the
vestibular system and that's important to a lot of things, for
lots of people on earth. I'm sure that out of the menu of
vestibular experiments that are being done on this particular
flight, that there will be some areas that are very promising
that the results from which will be used to guide experiments on
future flights. I think we won't answer all the questions on
this one but I'm sure i'm sure we're going to find some
encouraging lines of study to follow. I don't think one should be the results from this as a way to sort of get this out of the way and go on to more important things. I think this is an extremely important line of investigation and I'm sure it will continue, particularly on the future Spacelab where they will be able to use the spacesled which will give a nice way to give very carefully controlled linear accelerations and things of that sort. As a follow up to the body restraint system type of accelerations used here. We're doing a variety of things in the Spacelab 1 investigations that will I think, point out for us some promising past to pursue on future missions.

TURNELL It's been very noticeable in the last day or two, I think, the improved atmosphere between the crew and ground. What do you attribute this to, is this because the crew has adapted better or because the scientist on the ground have adapted more to talking to the crew?

CHAPPELL There's one element of it is certainly the crew's adaptation, but as, I think, we talk and maybe a couple of days ago about this particular point, a great deal of that adaptation takes place in the first couple of days. So if you are interested in understanding that adaptation, that's when you need to do your experiments and so in the early days of the mission when the crew is adapting to the microgravity environment, there going through that adaptation which is a change for them, but at the same time, that's when need to run the experiments. So the timeline of experiments during those early days has a great deal to be done there. And I think it's that confluence of the crews adapting with the experiments that you want to do while there adapting, that may be earlier days be possibly more or trying on the crew in these later days. Now there more adapted, but in addition we are not doing as many of the adaptation experiments although we're continuing, were not doing nearly as many of them as we did on those first couple of days.

KNOTT I think there's also a psychological moment in this because the crew, just as well as we down here see that things are going well with this mission.

***
CAPPELL: They're not doing as many of the adaptation experiments although we're continuing. We're not doing nearly as many of them as we did on those first couple of days.

KNOTT: I think there's also a psychological moment in this because the crew does just as well as we down here see that things are going well. That this mission is a great success and I think this also must inspire them and put them into a place them into a good working spirit and I think they see that things are getting accomplished and they feel, now that they are considered extremely useful. That they have done major activities. Their activities which they have not trained before and so this puts them into this spirit and this may also contribute to this more efficient type of working and a more relaxed atmosphere during the first days because during the first days there were still at least 9, at least 8 days ahead of us and that put a major burden on them and they did not know what was coming, how the different instruments would behave, how they would be feeling on the second, third and fourth day and all this. So this also contributes certainly.

TURNELL: And finally, I'm wondering whether or not you can help a little bit on Owen Garriott's ham radio operation. Was his conversation with King Hussain completely unplanned and unexpected? Did he just find King Hussain at the other end of his transmission?

LAUGHTER

CAPPELL: You know I'm not sure. I imagine King Hussain has a fairly large receiver.

LAUGHTER

CAPPELL: That may be why he got through, I don't know. But I really don't know the specifics because we don't, you know during the science crew operation we're not as much aware. Owen is doing his transmissions largely on his own time. On his presleep time and that sort of thing.

PAO: I think really that's a question for the Change-of-Shift Briefing. Any more questions at KSC?

PAO (KSC): Do you have any more questions?

PAO: Okay. Back here in Houston, we are running short of time so please try to keep answers and questions as brief as possible. Right here up front.
PETE SPOTTS (Christian Science Monitor)  Looking ahead a bit, one of the objectives at least on the press release for a 10th day is an examination or studies geared toward solarsizemology. And I wonder if you could explain what that's about a little bit and perhaps some of the instruments that would be used to pursue that?

CHAPPELL  Solarsizemology is the study of the oscillation of the sun. The different wave modes with which the sun oscillates and if you are able to measure these waves very carefully then you are able to understand sort of the makeup of the solar interior because the wave modes themselves tell you about the way the solar interior is made. And experiment 16 is used to do that. It will measure the solar output in different wave or bands, different bands of the spectrum and use that information over an extended period of time of several hours to look for oscillations or variations. That's the approach it takes.

KNOTT  The advantage which Spacelab gives for this investigation is that during the last few days of the mission we see the sun continuously. If you want to detect these very faint oscillations in the sun, you have to observe it for a continuous period, a continuous - they are now proposing 3 hours continuously in time in order to then later on cross-correlate this period and just bring out by just superimposing them basically the measurements and bring out these oscillations because they are extremely weak. You cannot measure them in just one single shot. It could be done on the earth but there you can do it only with the absorbing influence of the atmosphere. If you would go, for example, to the South Pole during the northern winter when the South Pole is continuously exposed to the sun and you can do this long duration observation. But you can only do it by looking toward the atmosphere. But now Spacelab, and Spacelab being launched in November where we have continuous sun for a long period, this is just unique that you have this opportunity now. The phenomenon of this solar oscillation was not known when the experiments were first proposed several years ago. So if it would have been known perhaps they would have proposed a launch in November in order to have continuous view at the sun. So it's a very, very fortunate series of coincidences here which brings us in a situation where we have continuous sun and where we fly over the atmosphere and can look at this. So this is an extremely important investigation which is done on the 10th day which we are hopeful will come about.

PAO  More questions please. On the end.

GARY SCHWEITZER (CNN)  Was there any discomfort reported at all by the subjects of any of the life sciences experiments like the ballistocardiography?
CHAPPELL: In the ballistocardiography there were none. There was, we had I guess it was the second day. The times are beginning to run together a little bit. But in that adaptive period there was I think one of the experiments where the crewman opted to terminate the experiment, one of the vestibular experiments in sort of midstream. No not recently, no. In the recent ones there's no, they're a happy bunch up there right now and they're roaming around running lots of things and fixing lots of things and we're seeing more and more television. It's quite exciting to watch and participate in.

PAO: Mike.

MIKE MECHAM (Gannett News Service): Can you tell us what the 10th day will be used for besides this solar stuff which you've already done. Like in material science and the vestibular stuff. Is this new things that you haven't, that are just being added or more of the same or can you go into that.

CHAPPELL: We really haven't done detailed planning on it. We've looked, we've asked for inputs from the investigators. We've taken a fresh look at what the 10th day might embody and I think in the press releases we indicated that we feel very confident there'll be good things, new things in all of the disciplines. Certainly there'll be some more vestibular work because you get to continue to see the adaptation. There'll be solar observations. There'll be more atmospheric observations with a number of the instruments. There'll be some joint activities that will involve the electron accelerator of experiment 20 as well as the receiving, wave receiving equipment of experiment 20 and SEPAC and electron measurements of 19. More material sciences follow on experiments just like John Padday was able to learn from his first to his seconds experiment. He would benefit substantially in being able to go from his second to his third and follow up on what he's learned in the second. So there'll be things like that.

PAO: More questions. Okay, well we have got in under the wire. Thank you very much.

END OF TAPE
PAO Good evening again, let me repeat a couple of announcements that we made on Mission Audio that you may have missed while you were Christmas shopping. First the White House announced this morning that President Reagan's schedule for Monday Decemember 5 includes a conversation with West German Chancellor Helmut Kuehl and the Spacelab I crew and it will occur at 8:40 am Eastern Time. And secondly, NASA and ESA Managers have decided to extend the STS-9 Mission by one day contingent on satisfactory weather conditions for landing at Edwards Air Force Base, California and that landing will occur nominally now at 10:01 am Central Standard Time, Thrusday December 8. And now on to the Change of Shift Briefing with Flight Director John Cox.

COX You just stole my thunder. We had a very quiet shift today. We had several attitude maneuvers, some minor changes to the attitude maneuver profiles, we did get a message up to the crew about the extention day, and there is one about ready to be uplinked addressing this conference with the President and Chancellor. Just before the shift was over, we did have an anomaly in the COMM system. It appears that we may have lost S-band power amplifier 2. That guy right there, when you take a look at him, he comes up for a while and then goes off, he just won't stay up. We only need him for downlink data from the TDRS on S-band, and while Ku-band is still working fine and all that it does not appear to have any impact on what we have to deal with. But it is an anomaly that did occur in this shift. The lakebeds are wet out at Edwards, got a bunch of rain today and didn't expect to get nearly that much, so that was quite a surprise. And as far as items that we worked on today, we did have one case where we put a patch up, well we put a couple of patches up today, but one of them was to re-enable that 1 Hz triplets so the Faust experiment can get data snaps from time to time, even though the RAU will skip afterwards, we put another patch to free up the timeline that was locked up in the experiment computer. And that all worked well, and the data is flowing well and everything is being acquired properly. With that we're open for questions.

PAO Craig Covault please, Aviation Week.

COVAULT John, I'm curious if the Flight Directors have had any discussions amongst themselves on something I understand was a flight safety issue that was raised and by now I think has been resolved. But as I understand it, when the solid motors sep'd yesterday off the external tank, you've got some evidence that that was a less than clean separation. That it was a bit dirty on at least one motor and that there was a question that arose whether you might have thrown some debris up against the belly tiles and done some damage, and that was thought about. Is that a correct discussion?
COX    That is pretty close to what we understand about it. They determined that when they examined the SRB's once they tugged them back on in and there was some off-line analyses, nothing the console teams have been working on, but we have had some periodic reports come in about what they have found, and I don't know that the whole team has reached any final conclusions, but the assessment we have seen so far indicate that the energy that these bolts would have had and the angle of incidence that they would have hit the Orbiter and probably wouldn't have caused any significant damage. So we don't feel there is an Orbiter concern.

COVAULT So it was the bolts that hold the brackets that hold the motor to the tank that your concerned about?

COX    No, but close. There is a cover on the back of those little separation motors, on the back side of the NOSL and it normally has a weakened area around the ring and when the motor actually fires for separation, it blows this portion out. Now in the mean time, this little portion keeps the NOSL separation motor nice and clean. Apparently that little weakened area around that, that is supposed to allow that to pop out easily was not as weak as it should have been and the bolts that bolts that plate on were the thing that had to break. And so little fragments of bolts went out in different directions.

COVAULT And when the recovered the forward (garble) at the Cape, they found pieces missing that should have otherwise been there?

COX    But no, there is that, and they also noticed that some of these bolts had managed to find themselves on the outside of the casing upstream of where they should have gone. And so it appeared that it may have been either thrown forward or that the SRB ran back into them when they fell off or something like that. So they tried to Worst Case and try and say, if this did go in the Orbiter direction, what would have happened, how much energy would they have had and what kind of damage could they have done. At least I think that is pretty much over now, and I think that they feel there is no problem now.

COVAULT Ok, thanks.

PAO     Yes, sir right here please.

HOMER ELMER (USA) The Reagan-Kuehl-Spacelab conference tomorrow, do you have any idea how long it will be, will the two leaders make a statement before they engage in conversation, and could you also reconfirm the time, because the printed release you had out said, I don't think it said 8:40 EST, I think it gave some later time.
STS-9 CHANGE-OF-SHIFT BRIEFING  p21ja  12/03/83  06:00 pm  PAGE 3

COX Did I say EST? Its 8:40 Central Time, 9:40 Eastern.

PAO And it Monday, not tomorrow.

ELMER Right, I'm sorry.

COX And questions are suppose to go to the White House, not NASA.

ELMER Will Reagan and Kuehl make statements, do you know how long this is going to last?

COX That is all open right now, but we will have protocol.

PAO And those determinations aren't going to be made by us and they won't be announced by us, that will come from the White House. And let me get Barbara (garble).

BARBARA (GARBLE) (Houston Chronicle) I understand it this is the first time you've extended a mission because things are going right, and I wondered if you would comment on that.

COX Well, I did comment the other day, and I think the comment is still true. This has been a flight that has an awful lot of science onboard and as each one of those experimentors got onboard, they have a lot more to do than we were able to find time to accomodate. So they have all along wished, wished and tried to make the flight last longer, tried to be able to do more things, and this is probably the only flight we have ever tried to plan the consumables down to the last pound of hydrogen and last pound of propulsion consummables. So I guess I see as people begin to see a margin build, they begin to look at how big is the margin, and does it get me a day, and they start looking it up and as soon as it equaled one day, everybody got in line and said I'd sure like some of that. We have haven't really had that mind set on any previous flights. We had certain tasks to do and we got those tasks finished, it was time to come home.

PAO Jules Bergman, ABC.

BERGMAN John, I understand by simply calling Edwards weather myself, that the forecast for Thursday, first of all it's too far ahead to project, but the forecast for Thursday looks much worse than for Wenseday, and I understand they are already talking about a 2 day extension, is that possible?

COX Well, I think there is some confusion in all that. It is true it is too far away to really forcast that, but we agreed that some of the criteria, the weather criteria that we're going to use is that when we do do the extention that the nominal day and one other day be predicted to be good weather. So we'll have a one day back up when we decide to try for the landing. That's
generally the way we'd like to see the flights end. Anyhow that's why we carry the extra flight days, as part of the guarantee that we are going to do the extension day, we would like to have guarantee that we're going to have 2 good days in a row at least predicted.

BERGMAN  But in this case your faced with the nominal day being less than certain at this point, in fact if the forecast at this point, if you can call it a forecast i: dismal, there is a front moving in, so you haven't got the nominal plus the next day good.

COX    Well, if you want to believe forecasts out that far, I try to believe one the other day, yesterday, that predicted what your saying, the forecast that I had when we came on shift today was that that front was going to really clear thru the area on Tuesday and probably be dry for 3 or 4 days, but again, that's still too far out to call, so that weather out there right now is still anybody's guess, as far as I'm concerned.

BERGMAN  That is the second front your talking about by the way, it's not the front that was originally predicted for Tuesday, but your main point is in essence correct. It's too far ahead. A more likely time would be Monday morning.

COX    Its too far ahead to get concerned about. Sometime Monday would probably be a good time because that is when we begin to go thru the process of implementing the extra day paper work and all that.

BERGMAN  And that's when NASA must make the acid decision.

COX    No we can put all the paper onboard, and when the time finally comes to implement that last day, we can just call it off and go back to the nominal paper that's onboard.

BERGMAN  When must stowage begin though, for a Wednesday or Thursday . . .

COX    Pieces of that can be done, Jules, I think quite a bit ahead of time, as a matter of fact a normal CAP does have you put away all the experiment hardware that your no longer going to be using, so your really left with the critical items, get the Spacelab deactivated and closed out.

***
COX: That's about a 2 or 3 hour process, there's about an hour or so process of shutting off the final experiments just prior to deactivating the Spacelab. And then there is some additional stowage, but it's not anything that you couldn't get done in advance as you saw it coming.

PETE SPONSE (CHRISTIAN SCIENCE MONITOR): Two questions. 1) What is the deadline for the primary investigators to submit the kinds of things that they would like to accomplish on this, or have they already basically, so you can set the timeline up on it.

COX: We set up a template, but it's merely something to get the ball rolling type of thing. It's nothing hardened and crisp. About 24 hours from now, we'd like to have the inputs, and we're also going to include crew inputs. We've solicited some comments from the crew, they've indicated an interest in wanting to give us some comments. So we will then have a sentiment. We have a template right now that says where we add the days just slip an extra flight day in if you go to the attitude time limit, we currently use the last attitude that was flown for a payload reason, I don't remember the exact MET that that occurs at, we just insert 24 hours at that point in time, and then just pick up the normal end of mission after that. So what we've done is we've given them a block and said, days are going to look like this, you'll have these crews available at these times, and but now they're just supposed to start filling in the broad picture of types of attitudes they'd like to fly. Once they get the attitudes worked out, we expect that will be about a 24 hours process, then they'll start filling in all the supporting experiments that will fit into that.

SPONSE: Okay, I understand also, that one of the objectives of at least one of the investigators if things look good for the extra day is to look at the Shuttle Glow phenomenon and really analyze it with some of the equipment onboard. For any of the rookies in the audience like me, could you sort of, briefly, recap the history of that Shuttle Glow, what they suspect causes it at this point.

COX: As far as what they'll particularly being doing, I think you ought to talk to the science conference on that. But we've observed that phenomenon over all the Shuttle flights. I don't know which was the first flight to report it, but it could be an oxygen interaction going on. With any material that you expose in space and fly it at those velocities through that atmosphere. We have run several experiments on previous flights, looking at what types of materials are more subject to this oxygen interaction, and you actually have some material lost with certain materials. Some materials don't seem to be effected by it at all. What we're able to observe easily is just this glow off the tails, since you look out the back window and you can see
it and you're flying into the velocity back there. But it's been observed and there's been several experiments run already, and there's probably a lot of good instrumentation onboard that could probably gather some additional data for us here.

CHRISTOPHER JOYCE (NEWSSCIENTIST MAGAZINE) For the 10th day then, are the scientists, the investigators who lost some data, the AEPI, for one reason or the other, the SEPAC, are they going to get first crack at a slot on that 10th day.

COX You'll just have to go to the mission manager, I have no idea. If I did, it will be there pick.

JOYCE NASA has no set of criteria for using that.

COX The science community for this flight is working on that as a separate item.

PAUL RECER Do you expect the lake beds at Edwards to be dry by Wednesday, or by Thursday, and if they aren't, given that we don't have any more weather, and if they aren't dry, what are your landing plans.

COX Well, I can't say whether we expect one thing or another. The last predict was they were supposed to dry out in a week after the last rain, and it took a little bit longer. I don't know how much rain they actually got this time. So it's tough to say whether they'll be ready, we'd sure like to have them. As far as landing choices go, we work Edwards through its runways, including the concrete, before we move off of Edwards. So, we would still be go for the concrete even though the lakebeds were unusable.

MIKE WILLIAMS (KJOJ) Two questions, number 1, going back to the SRB separation. Did you say that was the forward separation motors?

COX No, I believe that was the aft.

WILLIAMS Also, is there any chance with the wet lakebed and a wet concrete runway, that you would go for White Sands or maybe even a Kennedy landing on this flight?

COX Those are in the tables as far as fault downs of where you go next, next, next, next, you don't have to do that on wet, you can have dense cloud cover that we can't get through or that type of thing, we'd go to those other sites. Yes, there are cases that you can usually get to either White Sands or Northrup or the Cape.

RECER Is Northrup currently open? I understood that...
COX: They took water, but I understand that the runways are okay there.

PAO: They had high winds today, I think.

COX: Right, we weren't using it as, we go up and down as each front goes through, as far as winds and cloud cover and what not, as far as if you had to have an emergency landing now, where would you go. But as far as we know the runways are okay there.

STROK: This is probably a science question, but I wondered if you could quickly tell me three things, the metric camera, SEFAC, and furnaces. Those furnaces they were concerned about, are they still broken, all three of them?

COX: I know there was some troubleshooting going on in that. Our copies are down there. But I think you would have to again talk to those people.

PAO: We have a query desk out here, Barbara, it can run that down for you, I think, we shouldn't have to wait until the science briefing to get that. Does anybody else have any questions now? We have not questions from the other centers.

RECER: I'm going to try one more time. Have you got any reports as to the satisfaction, dissatisfaction, comfort, or discomfort of the bunks that they're supposedly using this time out?

COX: The only, you can draw whatever conclusion you could from this comment, is that the teleprinter is kind of a noisy little thing and it's down on the middeck and we use it a lot, and Brewster commented, we thought that preflight that we may have to move that up to the flight deck to get it out of the sleeping area. They commented it has been no problem, they'll be able to sleep fine with it there. So that's as close as we've come.

JOHN PETTY (POST): How long after the additional day and the contingency date could you go, if it came right down to it?

COX: Well, the normal package that we build the flight around is 9 days plus 2 extension days. And so what we've done is added another day so that's 10 days plus 2 now. That's without doing anything heroic, it's just going and get the power levels. If you found some reason you had to stay up there a little longer, you might squeeze another day or so out of it. But right now, that looks like it's 10 plus 2 with a little extra pad.

JOYCE: Any chance that the pilot and the commander, with the extra day, participate in some of the experiments?
COX I have no idea.

JOYCE Were they ever asked to participate in the experiments?

COX I don't even know that. It was originally set up, the MS's for this flight were named long before the pilot and commander were. And they work with the experimenters for quite a long time developing all this. So they've been intimately related to all the activity for several years.

JOYCE But I don't mean...

COX Well, wait a second. They do do at least one of the experiments, they do that...

JOYCE 25, but other than that.

COX I don't know, I don't know if they were ever asked.

PAO Anyone have anything further. Okay that ends this one. Thank y'all very much.

END OF TAPE
PAO  Okay good morning. Welcome back to the change of shift briefing. We're here with off going Flight Director Chuck Lewis, Spacelab Mission Manager Harry Craft to his right, and Mr. Derrick Mullinger head of Spacelab payload integration coordination in Europe. We'll let them give some reports and then we'll open up for questions.

LEWIS  I really don't have much to discuss from the orbiter point of view, it's not much change of status there. Before midnight last night, about the time I came on we had past our half way point in the flight assuming nominal nine day flight. It was a very very quiet orbiter from the Spacelab systems point of view. The high rate recorder, I'm sure you know now, appears to be functioning well, after the fix yesterday. The possibility of an extension day is still in discussion stage, decision has not been made on that. And I'm sure that you are well aware that that will be based on primarily the key would be Edwards weather, we've got to ensure that we got good weather for the nominally planned end of mission, whether that be the 9 or 10 day, plus a back up deal capability. And with that I really can't add much more, it was very quiet shift. Harry?

CRAFT  Okay, Chuck mentioned here, we have past the half way point and we think we've got a very very successful mission going. The VFI is obtaining the results they wanted, and we think that we have done just a tremendous job within the (garble) science capabilities of Spacelab. Chuck mentioned the high data rate recorder, and yesterday, 2 or 3 of you asked and we promised that we would address that. The high data rate recorder was out about 11 hours yesterday. This is going to be an update to what I think maybe Karl mentioned to you a few minutes ago. We did lose data on 3 experiments, the reason we did is they were not compatible with the one megabit format that we went to immediately upon losing that recorder, we went to the orbiter recorder which has a one megabit (garble), but those 3 experiments lost less than 5 percent of their planned activities. All the other experiments were on what we refer to as a (garble) data was recorded on the orbiter recorder and subsequently captured. We're still continuing to work with the RAU 21, and it hasn't changed from what we said in the last couple of days. As far as our problems we got a couple of experiments that are demonstrating anomalies, the material sciences double rack, right now, two of the furnaces are down and we're looking in to how bring those back up. Looks like there is a power supply problem. Metric camera has a film jam problem in we are looking at how to clear that, and we think we can probably do that. I might point out on that, that is a second magazine, they have already taken over 500 exposures so we're real comfortable with that, but we'd like to clear that problem up, and let them continue to take photographs. On the positive side,
there are 38 experiments onboard and to date, we've got science data on 34 of those. One of them is in the process in the next hour or so of its first time to operate and that is the astronomy wide field camera will be placed in the scientific airlock in the next couple of hours, and that will be their first opportunity, so with that we'll be up to the 35 of the 38, and the other 3 are the solar experiments which I've mentioned 2 or 3 times, we don't get until about day 8 into the mission. So overall, we're quite pleased with where we are, and as Chuck said, it was reasonably quiet.

PAO  Okay, we'll open up for questions here. Craig Covault.

CRAIG COVAULT (Aviation Week) For Chuck Lewis. About how many maneuvers did you have over night? And--

LEWIS  I haven't counted. I didn't count them.

COVAULT  Okay.

LEWIS  But both the maneuvers, I just don't have a number for you.

COVAULT  Did you have to read up many changes for the maneuvers that you do have in the CAP?

LEWIS  We read up, we sent up several changes up on the teleprinter, for the last 12 hours and on the last shift that I had we sent up another teleprinter message with a significant number of changes. Some attitudes that modify the maneuvers by a few minutes. Nothing of significant change. Mostly tweaking.

COVAULT  And was the tweaking designed to help out the camera which is locked down unfortunately?

LEWIS  I don't think any of the maneuvers that we plan in the next 12 are for AEPI, I don't believe so.

PAO  Wayne Dolcefino back there.

WAYNE DOLCEFINO  Harry, you said the other day you needed 48 hours or so to plan science wise, for mission extension, if we go to Thursday, would it mean Wednesday would be a stow day, wouldn't we need to know by tomorrow night from your standpoint?

CRAFT  We need about 48 hours to do the job, that is the right number. We'll start watching as Chuck said, we'll watch the weather and the conditions --
DOLCEFINO  So, the next 36 hours, you expect a decision. The second question, could be my imagination, but it would seem that from a hardware standpoint we've had a lot more problems on the maiden voyage of Spacelab, then we did hardware wise on the first voyage of the Space Shuttle. I'm wondering whether either of you gentlemen have any comments as to whether or not there have been more problems than you would of expected, and second of all, are any of the problems things that will prompt you to do any kind of design changes either in redundancy or the type of equipment you got onboard?

LEWIS  Well, let me respond to that first. From the Spacelab systems point of view, I think it's been an exceptional mission. We've had the RAU 21 problem, has been the biggest headache for the experiment ops people. But other than that, and high rate recorder, was down for a period of time. But it's got a life support system. It's got basically the same system as the Orbiter's got with the exception of propulsion system and the guidance navigation system. It's got the avionics, so I personally think it's suprisingly clean for the first flight of a vehicle like the Spacelab module. Harry?

CRAFT  I don't really have anything to add to that, I think Chuck summed it up real well. I don't foresee that many problems with the system.

LEWIS  And I might add something about the 48 hour. I think we'll probably end up doing a little bit, like I said discussions are going on in (garble) planning. I might point out though that we could wait as late as Monday night before we actually have to make a decision before it begins stowage onboard the vehicle. So, whether it's Monday night or Tuesday morning, it could be as late as that before we actually decide to try it. It may well be, based upon the weather, we got to get close enough to Wednesday, Thursday, weather to understand it.

COVAULT  But, what's the weather situation Chuck, and Harry, do you have a timeline that you've written up yet, for the extra 24, and could you tell us what it is?

CRAFT  Again, like I said yesterday it's too far away from Wednesday to really get good forecast, the weather conditions right now are, we violate our cloud flight rules and that's expected to continue in the next day or two.

On the science, we are asking, and as you are well aware, we are asking the investigators to begin thinking of the kinds of things they want to do that will augment the data that they have already gathered, and they are coming up with a couple of unique things, and I'm sure we're going to get them things given to us soon.
PAO Okay, we're going to go Cologn Porz now for questions. Is Cologn Porz ready?

LEO ENWRIGHT (Irish Television) Were they mentioning things, or did I hear a report earlier this morning European time that the computer on the material sciences double rack crashed, and if so, since it would of been the second computer crashed, how did it happen, and I've got a little (garble) that crashes all the time, but why does yours?

I'm not aware that there has been any (garble) crash on the material science double rack. That has got dedicated processes in it, but it's been running fine. I think the easiest way to deal with a computer crash is to say it just occurs when you overload the computer, you just try to do too much traffic with it. You reach the limits of it's capability.

PAO That's all from Porz Bonn.

PAO Okay, we'll go now to KSC, KSC do you have questions?

REG TURNELL (BBC) A couple of short ones. I'm told there is even discussion going on of a possible 11th day, is that correct?

LEWIS I've not done heard any discussion about an 11th day.

TURNELL It won't happen?

LEWIS The only way I know of that it might happen is if for some reason we do extend it a 10th day, and we do not make (garble) orbit for reason, go to vehicle status and the crew just doesn't get the (garble) on time, or we wave off a day. But, that is a contingency case.

TURNELL We are half way through the mission, have you had any reports on the living accommodations and how well that is working? Do we know yet where the crew is sleeping? How well the new galley is working providing food for six people, and is the toilet actually working properly this time?

***
LEWIS  About 2 days ago, we asked Brewster Shaw to give us a little information in that area and he commented at that point in time that our teleprinter system which we uplink our traffic goings were confined and apparently been left up in the middeck area. There was some concern about that bothering the crew, sleeping crew, but I guess that wasn't the case. The galley was working fine and the waste management system was working fine, that's been a couple of days ago, we've heard no reports since. And no reports on whether sleeping or how well they sleep.

KSC  KSC has no further questions.

PAO  Okay, back here, Dave Dooling up front.

DOOLING  Harry, housekeeping problem question rather. As the crew goes through the various experiments when they wrap up each one or a portion of one, do they stow everything immediately or is a lot of the stuff going to be left hanging out to be stowed on the last day and considering some of the problems, we've heard voice by orbiter crews, especially early in the mission, the stowage was more (garble) that they had anticipated. Did you allow for extra time?

CRAFT  What we had done, Dave, is the timeline, we look ahead. If there's an activity that happens on a given day and we know the activity will happen two days and then again, then that item most of the time is left in that operating position so that we don't have to do a reset up. If the experiment is a 1 time operation, in other words, when you take it out, we perform the experiment and a lot of times we'll go ahead and stow it. The only other constraint is, if it obviously gets in the way of another - two experiments begin to conflict for the same resource and we obviously have to restow. We're keeping a pretty clean spacecraft from that standpoint.

PAO  Right here, Mike Meecham.

MIKE MEECHAM (Gannett News Service)  Do you have any optimism that the two furnaces or the metric cameras - yeah, the camera can be brought up?

CRAFT  I'm always optimistic, reason for optimistic. We're going to go through some - they're looking at some troubleshooting procedures now. We should let the investigators provide those to us and we'll provide those to the crew and see how it comes out. They are still working the problem, they have not given up by an stretch of imagination. So I'm confident from that standpoint they'll come up with something else for us to try.

(Garble).
Question for Harry Craft. Chuck Lewis said that the driving force the mission extension now seems to be the weather at Edwards. What sound as if you've already made up your mind that the mission should be extended and can be justified extension for the science. Can you go into that a little bit?

CRAFT The scientist are quite enthusiastic about the opportunity to gather more data on another day and to come up with you know, some - lets say deviation to the experiment based on what they've seen earlier in the mission. And there going to come up with some good things i'm sure and there already thinking about it. The investigators amoung themselves and we hope to get an input from them later today and begin saying how we would structure that day if the opportunity was provided to us.

You'll give us a couple of examples of what you could do if you extended the mission day?

CRAFT You really ought to wait and let the investigators come forward. The disciplines are all there and knowing the investigators we have on mission 1 and I've worked with them for a number of years now, I think everyone of them will probably come up with something that they can do so, we ought to wait and see what they come up with.

PAO (Garble) right here.

HARRY SCHWIEZER (C&N) Any personnel medical consultations and anymore of Ulf's headaches? Did he clear it up?

LEWIS There's been no private medical communications and I don't know - I heard the same thing you did last night about Ulf's headaches. I don't know if Harry has any more information about that or not.

CRAFT I don't have any at all.

PAO Anyone else? Craig.

COVALT One quicky that borders on science more than overall mission structure, would be in the metric camera. If you know what areas you have missed by the film jam and secondly, how has the weather been running under the targets that you have been able to get?

LEWIS Derrrick, you want to (garble) to that?

MULLINGER I don't know the targets but I'm told that they had very good opportunities over Europe and of course that's a strong link to the European Scientific community there for - there's no restriction to European targets. They have achieved a large number of exposures in the infrared which I'm told is the most
interesting scientifically. And the cloud cover over most of Europe seemed to be acceptably low. By low, I mean low in quantity, not low in altitude.

PAO Anyone else have questions? Okay, thank you very much.

END OF TAPE
PAO

Good morning and welcome today's Spacelab Science Briefing, with Dr. Rick Chappell, Mission Scientist for Spacelab, and Dr. Karl Knott, European Space Agency Project Scientist, on the Mission. For information I thought I might add that Dr. Chappell is a Space Plasma Physicist, at the Space Science's Laboratory of NASA Marshall Space Flight Center in Huntsville, Alabama. And he is also a co-investigator on the SEPAC experiment. Dr. Knott, is also a Space Plasma Physicist, at ESTEC which is an 'garble' center. Excuse me, the ESA the European Space Agency Technical Center, at Noordwijk in Netherlands, that's the European Space Agencies largest center, I understand. Dr. Knott.

KARL KNOTT

I would like to briefly tell you about the Science activities during the shift #9. That was the day shift, there of course, Houston time. Day shift of yesterday. As you probably all witnessed over the TV, transitions which took place, the shift started with activities in the fluid physics module of the material science (garble). These activities are, I think went very well. There was ample time for a wise exchange between the crew, carrying out the investigations and the fluid physics module, and the investigator on the ground, in fact the possibility of complicating with the crew during these activities enabled the physics investigators to recover from one difficulty in the physic fluid module, which they indeed had not anticipated. Later on in the shift, one run which earlier on did not work, just as they had expected, worked very nicely after they had deliberated on the ground and had thought about an appropriate solution, how to get experiment 31 actually going. Following this activities in the fluid physics module, there were several, in fact three periods dedicated to investigations or crew support for investigation showing plasma investigations using SEPAC, using API, using the electron spectrometer experiment 19, and the other plasma experiment, experiment 20 to jointly carry out plasma investigations. These activities suffered from the fact that the (garble) 21 was not able to support the SEPAC experiment, in these activities, and indeed experiment 20, PICPAB kind of took over the whole of SEPAC in generating the electron beams for this investigation. And to my understanding, with the PICPAB playing this role, some useful science has been obtained, during these periods. The second part of the shift, activities drifted more into the area of life science and astromony, and also some atmospheric physics observation. There were dedicated attitudes by the Orbiter in support of experiment 2. The atmospheric was imaging spectrometer. There were dedicated pointings of the Orbiter to support two additional runs of the faust telescope, and as far as crew time was concerned during that second part of the shift, the crew worked on experiment 25, and the experiment from 25, Dr. H. Ross obtained results and you probably heard over the loop her comments on these results and several questions which she passed up to the crew, and which the crew answered. Then there was a
dome run carried out, for experiment 102, the Vestibular ISTS-9 Investigation, by Professor Larry Young from, for MIT. During the very end of this shift, an additional activity had been rescheduled, an activity which was not in the original time line and that was an additional run for experiment 201, the life science experiment where Professor Baumgarten, who is the Principal Investigator. The crew on attendant, experiments also proceeded, were during this shift. The Material Science double rack processed a number of samples and during that shift they concentrated on samples which generating a so called what is on earth admissible alloys, on earth due to gravity and (garble), it is very difficult to mix alloys of very much weight. For example, fluid aluminum and fluid lead, is very difficult to mix on earth, they simply demix there (garble) so called misability gap, however, it is the expectation that this is not the case in space, and this is the type of investigation which were carried out in Material Science double rack during the shaft yesterday. The power load, so called (garble) crystal ball experiments. The long (garble) which Rick called them yesterday, were also performing normally. I think this basically covered what was done in terms of scientific activities during that last shift. One very positive aspect during this shift, was of course, that we recovered already from earlier shift, from the problem which had arisen is the high data recorder, and this one is fully reinstated and is fully supporting the investigations since. I think I stop here, and turn over to Rick for the next ----

RICK CHAPPELL  Okay, the next shift, shift 10 was dominally material science this time. There was some life sciences done, there was some plant selections done for the, sunflower experiment 101, which you may have heard over the loops. There were a number of material science experiments done. The most dominant one, was on experiment called tribology is which is the study of liquids lubricants in particular, both in a dynamic type of study and a static type. One of the studies uses liquid in which is called a journal barring, which is a rotate type. Which is a rotating type of barring with a sleeve, and the barring casing can be seen through, it's transparent and the motion of the fluid around the barring as it is spun up in 0g is actually filmed and the Payload Specialist watches it as he does the experiment. The idea here is that the actual physics of the way a barring works, is different in 0g. One is concerned with many of the Spacecraft that we'll look to in the future with having effective barring type surfaces. And this is a way of studying a particular type of barring, the journal barring, which will find in future applications, in Spacecraft and to understand the way the fluid moves around the barring in 0g. Then that's the dynamic part, where the barring is spun up and the shaft is watched as the fluid redistributes as the barring spins. The static part of it involves the spreading of the fluid over, and it's called the wetting or spreading of a lubricant over
different surfaces. This also has general applications to understand the forces that control spreading of fluids and then again the application of using lubricants in space, in the future activities. This is a experiment that Ray Gause, from Marshall and Koda Pan, have that Ann Wittiker is also involved in. That experiment was done, in fact two very long runs, taking almost 4 hours, were done for that experiment, in which Ulf Merbold was able to run the experiment, give reports continuously, had good interaction with Ray off and on during the experiment. Ray had a run earlier in the mission, about 2 days ago, where he got, he had some data loss in the initial part of the first run, this was a couple days ago, so because some of the flexibility in the time run, we were able to rerun the complete first functional objective as they are called, and then do the second one that he had scheduled today. So we had two tribology, back to back. We had a number of material science experiments planned, about half way through the shift there was a problem with the material science double rack, where the facilities shut down, the computers shut the facilities down, and Ulf Merbold then went through a process of reinitializing it. This resulted in no problem with the sample which was in, however when the facility came back up, there appears to be a problem with the high voltage, one of the power supplies, which operate the Isothermal Heating Facility, and the Mirror heating facility so

***
CHAPPELL ... no problem with the sample that was in, however when the facility came back up, there appears to be a problem with the high voltage, one of the power supplies, which operates the isolothermal heating facility and the mirror heating, 2 of the 4 facilities. Now the isol thermal facility had been running for some days, infact they had processed about 10 of the 13 samples that they had set out to do, so there are 3 samples there that will not be able to be processed because of the problem with the isolothermal heating facility. The mirror heating facility had not begun its operation, and there is some discussion at this point as to whether to do some troubleshooting on the facility as far as the power supply is concerned to see what the possibilities are of recouping some of the mirror heating facility experiments. and that's in discussion at this point. It's not obvious at this point exactly how the troubleshooting might be done. The feel its a short in the power supply, but they're not sure. So those 2 portions of the material science double rack then are for the time being shut down, with the isol thermal heat facility not to be started over, because of the problems that it has had prior to this. The other 2, the fluid physics module is not impacted, in fact all the experiments that are planned in the future for the fluid physics module are still in the works. We missed a fluid physics module run today because of doing the troubleshooting on the aurora facility that houses the fluid physics module. And the gradient heating facility is operating fine and has samples in it and the samples in the gradient heating facility are to run for about another day and a half. So we had the crew, in particular Ulf Merbold spent quite a bit of time with the material science double rack doing some troubleshooting, and then bringing the entire facility back up after it shutdown. So those are the material science experiments that we did. I wanted to mention a couple of experiments that have been run, one of them that continued to run today, that involves, we have mentioned but we haven't gone into much detail and that's the experiment of Klaus Wilhelm from the Max Planck Institute in Germany. Klaus has an electron spectrometer that measures natural electrons of energy's from the order of 100 EV up thru 10's of keV that are natural in the environment. Both natural and artificially induced electrons, and let me give you the 2 catagories of studies. One is to measure those electrons that are present in the auroral zones, this is regions of latitude above, roughly, 60 degrees where you see what space plasma physists call soft electron fluxes of the order of 100 ev and the low latitude side of the auroral zone, and then as the spacecraft goes farther north, then you see harder fluxes, this is up in the kilogor range, that actually cause the light of the aurora. The energetic electrons are thought to be excellerated in the magnitusphere and then shot down into the top of the atmosphere where they interact with the neutral gases, cause them to emit light, and the light that you see is the aurora. So the patterns of the aurora that you see are caused by the patterns of
the electrons that are coming into the top of the atmosphere with the light emissions taking place where the electrons hit the atmosphere. This has been an active magnetic period which is to say, the sun, the solar wind, the plasma that blows out of the sun, has been probably blowing at higher speeds, which probably says that their coronal hold is present on the surface of the sun. When your in this kind of condition, the magnetosphere is shaken, essentially by higher speed solar wind. The delivery of solar magnetic flux to Earth's magnetic field is higher, this causes the magnetosphere to go into a higher energy state, accelerate particle that are present in it and cause more active auroras and it also causes the auroras to move farther south to lower latitudes around either pole. So this is particularly gratifying at this stage, because the Spacelab 1 orbit right now is not in polar orbit, but rather a 57 degree inclination. And so the farther south the aurora goes, the more that you see at this stage, so its a good thing that its an active time. Klaus has found some very interesting results in the pitch angles of particles that are associated with the aurora. He's seen some columnated beams of electrons that are probably related to this great auroral arcs below, and he has also seen the softer electrons associated with the diffused aurora. His instrument is nice in that it is hemispherical in nature and can measure all the pitch angles at a give energy of electron at one time, where pitch angle is the electron with respect to the magnetic field. So you can see sort of the entire hemisphere of possible electron angles as they come into the instrument, and then he can sample different energy ranges at all these angles. Now the other use of that experiment is with the active experiments, and it has been run, I think Klaus has had something like 90 to 100 operations at this point in the mission. And a number of those have been both when the experiment 20 is firing the ion gun, and its electron gun, and when the SEPAC experiment 2 has been firing its electron gun. In these cases, the beams that are injected by these accelerators interact with the ambient gas around the Shuttle and generate apparently generate instabilities that can then accelerate the ambient electrons that are around the Shuttle, and you coming back to the Shuttle then, or to the pallet where Klaus's instrument is mounted, both low energy accelerated electrons that are pulled right out of the ionspheric plasma and at the same time, other populations of more energetic electrons that are apparently accelerated by the interaction of this original beam that is injected from the Shuttle with the surrounding plasma. There is a very interesting phenomena that he has see there, that I would encourage you to talk with him about and get more information on. A number of different populations of electrons that are present with very different characteristics when they're firing the low energy electron beam of the experiment 20 versus the higher energy under (garble) beam of the SEPAC experiment. One other experiment I
that I wanted to mention and here only in brief, is a very interesting experiment that was done just a little bit before this shift, and I wanted to mention it because it will be done again toward the end of the mission, and I wanted to call you attention to it. That is a very unique experiment of Karl Kirsch who is from Germany, who is a physiologist looking at the measurement of the venous pressure, upper-body venous pressure in 0-g. And this address the affect that is found when you go into space that the blood which normally pools in the lower part of the body because of gravity, they hydrostatic force on the surface of the Earth. When you go into space, it redistributes itself into the upper part of the body. As a result of that, those sensors in the upper part of the body realize that there is more fluid there than is normal and start of series of reactions to reduce the fluid level on the body. And that result is that over a long period of time the body can lose a fair amount of fluid, I guess I think Karl said estimates of 2 to 3 kilograms of fluid can be lost over long periods of time, like in the Skylab Mission. What he is studying with this very unique instrument, you actually pierce the vein in the arm which is in the upper body portion of the cardiovascular system and then measure the pressure in the vein at that point, which gives you an idea of the upper body pressure inside the veins. And at the same time he takes a blood sample, once he's measured the pressure, then he takes a blood samples then are frozen, and then are ultimately analyzed for the presence of different hormones that are thought to be varied in the blood in order to change the fluid level. The feed back mechanism within the upper body which senses a change in the fluid injects, has the brain inject hormones into the blood stream which then modify the fluid loss from the body. This is a most interesting in that as Karl pointed out, it is very interesting in the fact that originally way back in the evolution of man, we started more in a prone state as crawlers and as we developed into the upright state, these mechanisms to adjust the relative pooling of blood in the body developed in an evolutionary sense. As you go into space then, your back into the equivalent of a prone position in which you don't have the pooling anymore, so your able to certain extent to have the body go back to its evolutionary state, and look at its response more to the way it would have been when man spend more of his time crawling rather than walking. Its very interesting to biologists this is a very first cut, its the first opportunity for them to use space to do this. Karl feels that they are very much in a descriptive phase of things, but with the idea of learning both how the body is evolved in handling its fluids, particularly in the cardiovascular system. And then what mechanisms exist specifically physiologically to adjust the fluid balance. I wanted to mention one other thing, which I think you may have heard on the loops, and that is the discussion of Shuttle glow. That has
been mentioned at least twice now. Owen Garriott mentioned it on the first day, when at the end of his shift, I think he was enjoying the view out of the aft flight deck and commented on the glow around the Shuttle, around the engine pods. I think he was looking thru an instrument that Steve Mende had, that Steve Mende and Owen Garriott had carried on the Shuttle this time which is a regular camera that had has an image intensifier on the front of it.

***
It's not audioing the view out of the aft flight deck and comment around the glow around the shuttle, around the engine pods, I think he was looking through an instrument that Steve Mende and Owen Garriott had carried on the shuttle this time which is a regular camera that has an image intensifier on the front of it, so you can open the shutter and look through the camera and through the image intensifier and get a magnification of the light that is out there, and I think Owen was using that and reported the glow around the pods. Later, I guess this must of been yesterday or a day and half ago, John Young reported being able to see the shuttle glow with the shuttle flying tail into the land direction, almost in daylight without using an intensifier at all, so this is an extremely high shuttle glow. And this is of interest, for a number of reasons, the principle one of which is to understand well enough what the shuttle glow is and how one deals with it to be able to treat very sensitive instruments that may look in wave lengths that may be contaminated by the shuttle glow. So for the future, for telescopes that will look in a variety of wave lengths and it seems to be particularly strong in the infrared. The mechanisms causing the shuttle glow will be important. And the relative intensity of it will be most important, because it may be in some instances a background contributor to this future measurements.

One other thing, I mentioned experiment 20, which the electron spectrometer runs with. Experiment 20 completed it's operations today, it has two parts an on accelerator an on electron accelerator that is on the pallet and the wave measurements that have been deployed through the scientific airlock, out of the top of the module. And today, they reached the end of their sequence of operations, and the scientific airlock has been retracted, closed up, I know the temperature has stabilized and I guess the crew next up will pull this set of antennas and plasma propes that are extended out of the airlock. Take those out, stow them away, and then put in the very wide view camera, which will be an astromony experiment. Ultra violet very wide field of view astronomy experiment that will now run for the next few days. And those activities will go on over the next, I guess the removal and re-installation will go over the next day. We've had in the way of instrument problems, we have had within the metric camera, they have gotten a lot of good pictures, and there appears to be currently a jamming in the film in the second cassette, and they are looking into some troubleshooting procedures there. The team which is here is discussing it with some of the other team members back in Europe, and looking at some workarounds there, some ways to approach unjamming the film. That will take place probably over the next day or so. And also, the microwave instrument which we talked about yesterday has had some problems they have not been able to
get successful high voltage to their traveling wave tube, which is the active part of the module wave system. And they are considering troubleshooting mechanisms right now. They have tried about 4 times to get the traveling wave tube activated, and those have been unsuccessful. The experiment also operates in a passive mode, which is to say it just senses microwave radiation that comes from the surface of the Earth, or from space. And it will be operated in a passive mode for the rest of the mission, they will continue to try various troubleshooting modes in trying to activate the traveling wave tube.

I think that's about it. This last shift was an interesting one to the degree that it had a great deal of troubleshooting activities going on. Most of the investigations that were planned during the shift were carried out, with the exception of the material science ones that were missed in about the last 3 or 4 hours of the shift. But, the crew did a great deal of troubleshooting which in the past has been very successful for them, particularly with the material sciences double rack where Isothermal heating facilities had been repaired. And worked just about to completion on all of these experiments. So we've seen the zero-g environment used again, both for life sciences and for material sciences and then we continued our observations both in astronomy space plasma physics and atmospheric physics and Earth observations. I'll stop there and we'll take questions.

Jackie, back in the third row. Please identify yourself --

JACKIE JUDD (CBS) Two questions for Dr. Chappell. Number one, how would you describe the loss of increment to the material sciences category, because of the shutdown of the two furnaces? And number two, would you describe your concern about the time that is being taken away from these experiments because the scientists do have to become repairman?

CHAPPELL Well let's say in terms of the loss in the material science double rack, the Isothermal heating facility was able to do 10 of the 13 experiments as I mentioned, so there are 3 that will definitely not be done. The (garble) heating facility at this stage, I forget the exact number of experiments in it, they are now in question, because there is still as I said discussion on troubleshooting, if they were not to be done for some reason, I think, Karl, do you remember the specific number of experiments, it is of the order of probably 5.

KNOTT I think there are 4 experiments in this facility and they cannot carry it out anymore if this power supply problem is not recovered.
JUDD --beyond the numbers--

KNOTT The types of things?

JUDD No, the loss that it means to these scientists who have spent 5 7 9 years developing these experiments and kaput, it's not going to happen.

CHAPPELL I think probably all of us can sense the concern that they would have. It is an exciting opportunity for them, and to not get it will be disappointing. There are a number of experiments in the (garble) heating facility that will be very exciting if and when they are done. That's the facility in which you can suspend, for example, silicone crystal rods, melt them using light radiation as opposed to direct heat, direct contact heat, and reglow in the melted rod a more perfect crystal of silicone, it is a very interesting facility, and has a lot of potential. I hope some of the repair activities are possible. Certainly they will be disappointed, no doubt about that.

KNOTT I should also mention that this facility is scheduled for re-flight on a nearby shuttle mission. That will be the so called D1 mission, which is a mission, basically supported by Germany, and the material science double rack, as a whole is a definite experiment which will be included in that Spacelab. It is a prime experiment of this mission.

JUDD All the experiments lost on this mission will be done then? Can that be guaranteed?

KNOTT That is not yet guaranteed, but I could very well imagine that the results, the kind of negative results in particular for the MIR heating facility will be taken into account when the candidates for processing during the D1 mission are highly decided upon.

JUDD Concern about the time away from the experiments.

CHAPPELL So far, the timeline has been setup such that the troubleshooting is possible. And there is always emphasy among scientists in different disciplines or your colleagues when this happens, the investigators have displayed flexibility where there have been delays in their runs because of troubleshooting. But in general, if you look at the timeline, there are relatively evenly spaced opportunities to do this sort of thing, that is why the timeline was setup the way it is. With like 60 percent type of load on the crew to realize that they are going to be exciting new discoveries that you want to spent more time on, and that there are going to problems that you are going to want to
troubleshoot. It's certainly not a source of concern among the investigators that the troubleshooting goes on, we're happy that we have the science crew there to do it.

PAO

Dave Dooling.

DAVE DOOLING (Huntsville Times) Rick, I recall during integration at the Cape that a pump had to be replaced in the material science double rack, and the reason I was given at the time was simply the thing had been through so many tests and so many training runs that it simply wore out, and a new one had to be put in. Is it possible that some of the failures we've seen on the double rack and some of the other instruments are due to the fact that this equipment has been through extensive testing and retesting in training preflight?

CHAPPELL I think there is no evidence of that, the vacuum facility, the cooling system, all of that part from a wearing out point of view. That part of things in the material sciences double rack is operating fine. This appears to be a short, this is the kind of thing that will rise up and bite you in the (garble) of electronics every once in a while, and it's a short, from what they are able to determine so far, it is a short not a wearing out type of short, but a short that can occur from a wire shaking loose, or just a couple of contacts being grounded out for some reason.

DOOLING Okay, I wasn't trying to pin that down as the cause the on the IHP and that MIR facility, but in general with the number of Minor or modest failures that we've seen on several of the instruments is it possible that this is accountable for some of them.

CHAPPELL I guess it's really not possible to Say Dave, I
on the IHF and the mirror facility but in general with the number of minor failures, modest failures that we’ve seen on several of the instruments is it possible that this is accountable for some of it?

COX I guess it’s really not possible, sorry Dave. I think it wouldn’t be reasonable for me to speculate that that was it. My experience in flying things in space is that you do everything as carefully as you can. You test everything as much as you can you build your confidence as strongly as you can and then you cross your fingers and launch it and you hope it works. You’ve done everything you possibly can to make it work and you hope it does and sometimes they don’t. It’s a complicated business.

PAO Right here.

CRAIG COLVALT (Aviation Week) You’ve had some significant hits on materials, microwave, SEPAC and possibly the metric camera as well, as mission scientist from an overall standpoint, can you put those science losses into perspective? Are you at a point where you are somewhat dissapointed with some of the more active instruments on the flight. No you don’t want to see, you want to see everything work. You want a mission to be 100 percent. One cannot be disappointed with this mission in the least bit at this stage. We have just a flood of truly exciting scientific results that are still coming everyday as I mentioned the other day, more graphs up here on the walls and the doors. And one is disappointed always to see an experiment have a problem but in the context of the overall mission, we’re are sitting tremendous scientific return at this stage.

COVALT (Garble) go ahead, Karl.

KNOTT As far as the (garble) is concerned I think there is just an intermediate indication of difficulties. This experiment has already exposed 1 complete cassette. It has two cassettes onboard, film cassettes onboard, it already has exposed one complete cassette of infrared film, they’ve now started the film which is more sensitive in the visual wavelengths and they’ve already 23 frames exposed for that film and now they are stuck. This instrument is inside the module so the payload specialist, mission specialists have access to it and there’s very good hope that that will recover from this problem of the film just being jammed.

COX Its taken already what, 500 pictures?

KNOTT It has already taken several hundred of pictures.

Seven?

KNOTT Several hundred.
Right here.

Aren't those cassettes designed to be changed out? (Garble) on that question specifically?

The whole cassette is being changed out.

Have they done that?

They have done it, they've changed from the first to the second and have used the second already 23 times to have 23 exposures on the second cassette already and then the problem occurred.

Okay, can they again go on to the third cassette?

There is no third cassette.

There's not a third one, I thought there -- Okay,

They only have 2 of them.

Okay, they had 1 infrared and 1 black and white. Is that right?

One infrared yes, and one black and white, yes.

Okay. How is the high speed data recorder doing and what kind of feedback have you received from people on the ground about data that was lost during the period it was down yesterday?

The lets say the recorder operated marvelously today. We had I think 2 or 3 dumps, maybe more during the course of the 12 hours. Dumps went fine. There was no data losses today. For that period of time that it was out and again for the specifics of the recorder, let me refer you to Harry (garble) when he comes. For the period of time that they were out there was fairly minor impact on those experiments. It's in the probably in the 5 to 10 percent category for that time period. Because as I mentioned yesterday, we switched over and used the payload recorder and there was only a couple of instances in the 1 megabit format for the payload recorder that we couldn't capture all the data.

I have the figures for this event today. The high data recorder was down for 11 hours in total. And of these 11 hours about 3-1/2 hours of data were lost. This loss affected only 7 out of the 17 experiments and the impact onto these 7 experiments is estimated to be about 5 percent of the mission. They are going to collect during the total mission.
How much?

KNOTT  About 5 percent and should we ever get to a tense date and I think that could easily be made up.

PAO  Let's go to the back of room, we're concentrating up front here. This gentlemen with (garble).

(Garble) (USA)  Could you clarify for me the SEPAC problem. Did that involve it's not being able to shoot off the electron gun at high power and was that failure, if that was the failure, due to the equipment itself or was it due to something in RAU unit that didn't work?

COX  They had successful operations at low power and then of there first operation at high power, the instrument commanded itself off which said that it detected something about its character that it wasn't comfortable with so it commanded itself off. They then had 2 more runs at the lower power in which the instrument apparently operated but during which the mission specialist, Owen Garriott who was operating it then was not able to see a thing, not able to see the heater working on the pallet so they have some concern that the beam was not emitted, although the instrument itself from the data they had, say it was operating. Since then, because of intermittent problem with the RAU, they have had difficulty in getting a good operation to go through the troubleshooting to see what shape the beam is in. They suspect - they are concerned and they suspect that they may have a problem with the electron beam accelerator. As of yet they can't confirm that through troubleshooting operation. What they have done are - is to use the MPDR jet which also gives rather than an emission of just electrons, gives them an emission of electrons and ion pares in which - through which they can also do plasma and beam plasma type studies, so there using it at this point. They are working to set up some operations where they can troubleshoot the beam, the low energy and high energy electron beam.

PAO  Gentleman in the hat.

WAYNE DOLCEFINO (RTRH)  With these recurring but so called minor problems, I'm wondering from a science standpoint, if a mission extension is becoming more or perhaps less attractive now?

COX  I think the mission extension is independent of these things that we're going through now. The mission extension is attractive because of an additional science point of view. Scientific objectives that we didn't have planned that we think we can do that will be very exciting to us. It remains
attractive and it remain attractive independently of what's happening in these particular instruments that we we have STS-9 mentioned.

PAO Gentleman from Salt Lake City.

(Garble) KEPP (KUTV) Dr. Knott, you mentioned that during shift 9 experiment 1, the ISO project was used. Can you explain any further what exactly what was done during that time?

KNOTT Experiment 1 the ISO? Well, experiment 1 was used during (garble) shift and they in a particular altitude and attitude dedicated to this experiment and this altitude enabled this experiment to observe so called day glow of the atmosphere. This is a particular radiation from the atmosphere which is triggered by the UV radiation of the atmosphere by the sun and also by a lesser degree triggered by electrons bombarding the atmosphere. Electrons leaking out of the radiation belt of the Earth. And in this particular attitude the experiment was really looking straight down into the atmosphere and able to analyze these phenomena, measure these phenomena.

Let me amplify that. It has a number of spectrometers that's able to see the spectrum all the way from the ultraviolet through the infrared at the same time and it uses imaging detectors behind the telescope so that you get a one dimensional along within the detector itself, two dimensions, one of those dimensions is in special area, the other dimension is in spectrum and then when you fly that and look down, you get a ground track where you're measuring the detector gives you one dimension and the motion of space drift gives you another. And what you end up with is an entire image along the top of the atmosphere, below the spacecraft of all the emissions all the way from ultraviolet to infrared. So that tells you over that entire space around the glow, the different constituents chemical constituents that are present there and what the temperatures are and what there dynamics are, that sort of thing. It's a very comprehensive instrument.

Is the ISO project have anything to do at all with looking at the shuttle glow? Are you aware --

COX It does. In fact Marsha Torr plans to do a specific study because the spectrometer is so comprehensive. And she has mirror on the top of the instrument so that she can aim slightly the way that it looks. She'll be able to aim the instrument, - I think what we're going to do is aim the shuttle bay into the ram direction and then have the instrument look through there apigee's at the glow that's caused maybe on the front of the instrument itself and the spectrometer --
on top of the instrument so that you can aim slightly the way that it looked. But you'll be able to aim the instrument. I think what we're going to do is aim the Shuttle bay into the ram direction and then have the instruments look thru their appatures at the glow that's caused at maybe the front of the instrument itself. And the spectrometers will be able to give you the specific characteristics of the emission which then tells you something about the chemistry that's going on that causes the Shuttle glow. That will be a most interesting experiment. One in fact which we hope to do in about 2 days from now and then we would, it would be an excellent candidate to do in the additional day, if we did the additional day of the mission.

PAO

This gentleman over here on the far side

PAUL FRENCH (VOA) To follow up on Wayne's question about going a 10th day, have you finished drafting your priority list of projects? Should you go a 10th day, and if so can you tell us what sort of things you would like to do on a 10th day?

CHAPPELL What we did was to, I think I mentioned yesterday, polling the investigators about interest in that. And their interest was fairly unanimous in doing that, as I mentioned. I think nobody didn't want to do, most people wanted to, a few were neutral. So that gave a first indication. Then we looked into, the next thing we did was to look sort of in a general way, the types of things that could be done. In fact one finds that you can do excellent scientific work in all the disciplines that we currently have. We will not go into a specific layout of those particular days until later on. I think we need to know for one thing if the opportunity is going to materialize from a weather point of view, because one is doing replanning continuously for the mission we're now flying, and you hesitate to dilute your replanning resources too much to look toward a last day which may or may not materialize. So we will continue to look at it in a limited way, as we build toward the day when we'll know for sure that we'll have it or not.

PAO We'll take one more question, and then we're going to go to the other centers. The lady in blue right here.

PAT JONES (NSI) If you go to a tenth day, can you give us some indication of what sort of briefing the crew have had ahead of time, as to what they might do with extra time? Will they be going into this cold? And will we therefore be hearing a lot of nuts and bolts of how they are going to undertake the experiments, or are will we get a clear perspective of the aims and objectives.
CHAPPELL I think you will have a clear perspective of the aims and objectives and what really we're talking about is, we've still got the same instruments, they're very familiar with the operational modes of all the instruments, and what your talking about is setting up the instrument in a slightly different way, which they do in many instances just thru the keyboard itself. You type in a new set of commands for the instrument, have it do its measurement sequence in a slightly different way. In the astronomy experiment for example, you have different stellar objects you would want to point at. Same operation of the instrument in the vestibular experiments, you would do continued runs measuring the adaptation that you had done all the way thru the mission. The crew will be very well prepared for it and many of the objectives will be new, but they'll be done instruments that the crews very familiar with.

PAO We'll go now to the European Space Agency News Center in Cologne, Portz West Germany.

PAO This is Porz Bonn Germany, we were just watching Spacelab fly over here, we're very excited. We have some questions.

A. JOHANSEN (Voice of Germany) We just saw the Spacelab flying over the Mission Control, the Mission Control as our information center. My question is, we heard something this morning, this morning our time, of some sensational things in (garble) astronomy. Could you elaborate a little bit on that please.

CHAPPELL I talked about that yesterday, let me just mention a couple of things, and not go into it too much. There have been observations of 3 sources, so far, in x-ray astronomy by Dr. Andresen's experiment in x-ray spectroscopy, I would encourage you to talk with him when he returns home, after the mission. I'm sure he can give you a lot more information than I can. But he has looked at what's called a burster source, and a binary source. The binary source being a neutron star, and a regular white dwarf star in rotation about each other. And he's looked at the characteristics of the x-rays, he's looking for particular x-ray lines in the general continuum spectrum that one sees. And there are indications in the measurement of lines. Dr. Andresen, I know is going to spend a great deal of time in the analysis before he gets too far with the specifics of the lines that he sees, but there are indications there, these particular lines if present, will give then direct information on the physical process that are occuring in each one of those objects. Because the line tells you something about the energy of the electron, the energy of the x-ray, the energy of the x-ray tells you something about the physical process that generated it. Hence it tells you something about the environment of the stellar object that your looking at.
KNOTT  I would like to ask you this, that ESA is flying an almost identical instrument on the ESA-(garble) which is presently operational and the observations done by (garble) for example are influencing his present observational program to the degree that, for example, he had, some time ago he was planning to observe a particular x-ray source, and (garble) had told him that this source is not emitting any more, that this source has switched off and he has changed his observational program accordingly, and in this sense the observations on (garble) and on the Spacelab is now almost an identical instrument, kind of coordinated observations. And I think both investigations benefit from the fact that this is kind of carried out at the same time.

JOHANSEN  Thank you.

LEO ENWRIGHT  (Irish Television)  Just a number of questions about the 2 major instruments that have failed. The microwave and the mirror heating. Can you tell us, do you think these are software problems or hardware problems. What are the chances of fixing them, I heard Dr. Knott say that he thought it would be very good for the metric camera, but what about the other 2, is there a good chance of fixing them? And if you do have to just stick with the passive operation of the microwave system, what sort of science would you expect to get out of that? Would it be very disappointing?

KNOTT  The shorts which have developed in the power supply of the material science double rack according to the experts, will be very, very difficult to fix, and there is not too much hope that this short can be repaired. The similiar situation, unfortunately, is also true for the microwave travelling wave tube. A short is suspected inside this tube and the investigators will continue at the times when they are scheduled in the timeline to activate these experiments, but it will be simply a kind of a passive try, they will simply try to switch on, see whether it works or not, and if it does not work, they will then pass on the resources which are free to other investigations. But this is only true for the isothermal facility and the mirror heating facility power supply and for the microwave experiment. The results which can still be obtained with the microwave experiment I would call, as compares to the prime objectives of this experiment, fairly not very significant. They can basically only test the receiving part of the radar instrument and can measure the microwave radiation originating from the Earth in a passive mode.

We've heard about so many troubles with the Spacelab Experiments, what are the rates of successfully running experiments?
CHAPPELL What is the rate of success, was that the question? I would say the rate of success is greater than 90 percent.

I hope ESA hosts won't be offended, but I was wondering what was happening with the NASA experiments, have you had any trouble with them?

CHAPPELL Very honestly, we consider this one scientific payload, and not NASA and ESA experiments. But just in terms of who funds them, the NASA experiments, the one that we that we have talked about was the SEAPAC experiment which is having difficulty with the electron beam at this stage. And the low-light level television, or AEPI experiment is operating well, but its operating from within its cradle, within the locks, and the operations of the pointing of the instrument is being done by the Shuttle as apposed to being done by the pointer of the instrument. So he's getting good data, although his operational mode is different form that originaly conceived. I have to say, we tend to always focus on the ones that aren't working, we all feel a great empathy for those experimentors who are struck by an instrument problem. But one has to look at the overall mission from the viewpoint of all the things that are going well. As I said, that is the very dominant image of the mission at this stage is the success that it is having with all the investigations. I think one would be mislead to characterize the science as having been impacted to an extent that this image of success has been the least bit tarnished.

GERMAN TV Bob Parker had a special training at the high data recorder, did this knowledge help to bring it in order?

CHAPPELL It certainly did. One thing that we had looked at prior to . . .

***
on the tape--

(garble) (German, TV) - Bob Parker had a special training high data recorder. Did his knowledge help to bring it in order?

CHAPELLE It certainly did. He, one thing we had looked at prior to the mission, was the possibility of changing out tapes on the high data recorder. Bob had trained on that quite a bit, and so he was most familiar with the recorder.

Alright that's it from Porz Bonn.

PAO We'll now turn to the Kennedy Center in Florida. And Kennedy I've got to tell you we only have about 5 minutes remaining, so please try to be brief, thank you.

LASIZO DOSA (Voice of America) - For Dr. Chappell, earlier you had eluded to, when the pressure experiment in connection with experiment that to the affect (garble) something like a backward step in evolution. Could you imply on that a little bit.

CHAPELLE Well the space, yeah, let me restate that, if that's the way they (garble). The Spacelab environment, the 0g environment allows one to view the operation of the human body in the way in which may be nearly more related to the way it was earlier in its evolution. Certainly it's not a backward step in evolution, but as Dr. Kerr says, it is a way of half turning the evolutionary clock back somewhat and seeing how we were, how our body must have functioned, at an earlier stage in this development.

GREG STONE (LPVC) - A couple of questions, first could I back to the shuttle glow. Is there any reason to think that this glow is peculiar to the shuttle or is it likely a large body like these space telescope will also suffer from a similar glow with possibly disastrous effects on its efficiency.

CHAPELLE In fact, the shuttle glow is not a function of the size of the vehicle at all, it's the function of the altitude that it acquires, we think. Because of the particular dominant atmospheric species, that are present, are function of altitude and the particular altitude of some of the early shuttle flights were in, was in a dominant atomic oxygen atmosphere, and that is thought then to influence the chemical processes that take place. But it has been seen, what we now call shuttle glow, the glow of Spacecraft, has been seen, for example on the atmospheric explorer satellite, which is about a meter in diameter. So it's a phenomenal that occurs, that varies in its characteristics, depending on the altitude of the Spacecraft.
STONE Does that mean then since, the telescope will be higher, there might still be a glow, but with luck it will be less?

CHAPPELL One could speculate as to that fact, but what you want to do, in fact why we are wanting to do this experiment, is to understand the specifics of what causes the shuttle glow and how much of that is the atmosphere, how much of it is the surface material of the Spacecraft, all of those kind of things you want to understand, so that you can best design around it. And there's a lot of interest in it, and attention being given to it on each one of the shuttle flights that we fly, because the shuttle is nice enough in size that one can ride in it and look out and still see part of it, and study different part of it, and study different parts of it. And that gives you the opportunity to make better investigation of glow phenomenal.

STONE On quite a different subject, I wonder if it is possible to have a little help about the sunflower seedling. I'm asked to explain it possible, how this experiment differs from the experiments carried out on seedlings, and plants growth many times before in Skylab and by the Russians, sees dozens of times.

CHAPPELL I guess I can't, I'm not the right one to answer that, I think Dr. Allen Brown should. He has been involved in some of the earlier experiments, this one has a great deal of uniqueness to it. I believe in it's capability, considering the (garble) mechanism being used, the different sampling times, that are being used, the ability to watch the plants grow in the infrared light with the video cameras, the ability to have the crew make a selection. A lot of things like that make this one special. But the particulars of it, I think, I would defer the question, your questions to him. I think he can do a much better job than I can in answering.

AUTO (Countdown Magazine) - Was wondering if the shuttle glow contains any contamination problem for any of the instruments flying on this flight?

CHAPPELL It may. We don't know, and that's one of the things we are looking into. It's entirely possible that it may offer some increase in the background of some of the instrument. But in fact we don't know that, and that's one of the things we are investigating on this flight.

KNOTT Indeed, it has not been possible on previous shuttle flights to determine this phenomenon on more detail, because this is the first shuttle flight that we have exposed to optical devices outside on the pallet, where the infrared part of the spectrum can be investigated and also (garble) part of the spectrum can be investigated. Previous investigations or
previous photographs taken of the shuttle glow, were all done through the rear cabin window of the shuttle and this has cut off significant part of the spectrum of the shuttle glow, therefore we are now for the first time in a situation to explore this phenomenon and discussions are on the way, of going into sum more details observation of this type, during the forthcoming days of the mission.

PAO  Ladies and Gentlemen

And the third question from KSC.

PAO  Timed that just right, we have a Change of Shift Press Conference starting in 5 minutes so this will conclude todays Science Briefing. Thank you for attending.

END OF TAPE
GOOD evening again. Here's the outgoing Flight Director John Cox with a summary of his shift.

JOHN COX Thank you John. Today was another outstanding day for the Orbiter Spacelab crews. They had a few problems to work with and by the time the last couple of shifts have been finished I think we've got all the problems back under control again and the science data collection is going on as planned. We managed to repair the high data rate recorders. Bob Parker did that. We found a relationship in the RAU 21 thing with the freon loop tems and I think we have that one figured out. At least we think we understand when we're going to have problems with it. We've earned the warmer attitudes now and we're operating with the (garble) deployed and that's helping our water situation a little bit see we had the gas in it now we're not having to put as much of it into the tanks and worry about dumping it as often. And preliminary inputs seem to indicate the TRM burn 3 scheduled almost 2 days still from now, looks like we're almost on the money. We may not need that burn or if we do it'll be a minimal size burn. With that I'll, questions.

PAO Anyone here in Houston have any questions? Craig Covault, Aviation Week.

CRAIG COVAULT (Aviation Week) To continue our discussion on the maneuvers, about how many changes did you read up to them today to make the maneuvers.

COX Probably about 7 or 8. Most of the changes were due to the fact that the AEPI is having to operate in stowed and so we're putting a little roll bias in so they can get some pointing data. Some of it is squeezing down the times that we need to be in the very tight deadbands so we can cut down the number of vernier jet firings when we're in those tight deadbands. There weren't any major changes for brand new things or not very much of that.

COVAULT Okay, and changing the subject. Consummables on both the RCS propellant and fuel cells and how that equates to the days extension. By the way we had a nasty rumor that it might even go more than 1 day.

COX Oh, I don't think anybody's intended anything more than 1 day. At least I'm not aware of any even thought processes going on that way. Consummables that we do have might support a little bit more than that at the moment. I think the hydrogen budget is running in excess of 50 pounds extra and the rule of thumb is somewhere between 25 and 30 is needed for a powered up experiment type of day. Maybe a little bit more than that. Prop, I think we're on the order of about 800 pounds above the red line. We seem to be running almost exactly as predicted or maybe within a few pounds per day on that. It seems like we've
done a very good job of predicting the prop consumption. It needs about 2 to 300 pounds a day when we're in this experiment activity.

JULES BERGMAN (ABC News) John the people up there seem to be getting along better with the scientist on the ground today. Are they more rested?

COX That's great.

(Laughter)

COX I never thought they were really getting along that poorly really. They've been running almost like all the sims did. It's just a lot being asked, whatnot. But I think today I didn't listen to the science report that much air-to-ground but what I did hear did sound like it was running along pretty smoothly. It may be the different experiments its running or maybe the timeline's easier, I don't know.

BERGMAN How would you characterize the flight so far?

COX I think, I don't have any catchy phrase or something like that that describes it, but I think that we're finally seeing the Orbiter being used as a real science lab base and it's working. The Orbiter and the Spacelab combination I think is outstanding. I think we're showing that very good space science can be conducted from this Space Transportation System that we've developed. I think it's proved without a shadow of doubts it's doing an excellent job.

PAO John Bisney from RKO radio over here. Is it RKO? Is that right John?

PAUL FRANCUCH (VOA) No I'm Paul Franchuk with VOA. That's okay Terry. Can you give us a little bit more information on why the recorder went down and how it was fixed.

COX I think you had to characterize the recorder situation as not too different from all the other types of recorder failures that we've had. It seems that those who use it a lot there's a lot of mechanical devices in them and a lot of little gears and motor and whatnot. It appears that something probably got wedged in one of the roller sets in there. There's a delta roller set that when we sent up an inspection procedure for the crew they went through everything that they could get their hands on easily just by removing the cover. It is supposed to rotate that is related to the tape transport mechanisms. They checked all those rotating devices and found that they had 3 rollers in the capstan area which would rotate as a set where it jammed and they could move them only about a quarter of a turn so they just rocked them back and forth and back and forth until
they finally cleaned. Then they spun nicely after that. There was nothing obvious that the crew could see on the top side of the roller so some of the drive mechanism below it must have picked up a particle of something and it got wedged in there and they managed to work it loose. You know in the past we've had washers and paper clips and other types of things get caught in these, in recorders. This is a completely different type of a recorder but the problem is probably similar.

PAO Carlos Byars.

CARLOS BYARS (Houston Chronicle) John on the RAU and its relationship to the freon loop. Can you discuss that and also, since this seems to be thermally related the fact that you're now operating in warmer temperatures, what impact that will have on this flaky little piece of machinery.

COX Okay. I don't know whether you're aware but as we ran cooler during that cold test that's what put everybody on to the fact that hey we weren't having any of these RAU skip messages. Once we got out of the attitude and went back up to warmer attitudes began picking up skip messages again. The folks went back and compared the freon loop temps. They picked a temperature very close to that RAU in the loop and they noticed that when this temperature was below 72 degrees fahrenheit in that loop the RAU seemed to behave itself and we didn't pick up any skips. When it exceeded that temperature we were kind of open for skips. It didn't always happen at 73. Maybe it happened at 75 or something. That seems to be the case again. Now the way we're trying to manage that is not going to colder attitudes but we're shutting off all the messages and all the read cycles, the data read cycles that seem to be susceptible to this and allowing only the serial data stream to pass through it. It has not exhibited this phenomena and it seems to be passing fine. So we've gone ahead and reinstall the patches that we had before, actually a new version of them, and the serial data is flowing even though the RAU temp is up now. But without those patches which we installed towards the middle or the end of my shift we were getting skip messages everytime we tried to use the RAU since it was actually above that 72 degrees.

BYARS The skip messages were coming during what we might call in rudimentary terms testing modes or self tests sort of thing in the run?

COX Well, that self test is just one of the things that we actually ended up inhibiting. The self test is performed on the data or on the machine itself and that, that was just causing a lot of clutter on the crew displays and whatnot. We went ahead and inhibited that function. The skip process is actually related to a bunch of read cycles where they go out, where the experiment computer goes out and reads a bunch of data in and
they read the data in with different data rates. Turns out that all the serial and bilevel type data, not the serial but the analog and the bilevel type data reads seem to be subjected to skip phenomena and we're guessing it's thermally related. It probably gets out of sync and maybe reads a little too fast or too slow in there so we just blanked all that out. We're not even doing those jobs any more and we're only looking for data down the serial port and it seems to be holding its own that way. The reason the patches were out is we did have an experiment computer crash oh probably about 20 hours ago or something like that and probably part of that was due to these patches that we have in and some funny timeline things that were going in with the experiment computers and just added up to get us a problem inside that computer. But we were reluctant to put all those patches back in again until we understood it and then we have a good of (garble) time to look at how this RAU responds with thermal data. It seemed like everytime we got up by that 72 degree number you could expect to get those skips.

BYARS So you're concentrating on the RAU data first time through type stuff rather than recycled sorts of messages.
COX We're using the serial ports which seems to be the prime science data port thru that RAU. Most of the other analoging digitals represented are your housekeeping type of data for different experiments and the payload people don't seem to be that concerned about that data as they do the serial data. I couldn't break down that by experiment and tell you, but that seems to be their emphasis, so we've worked up a way to get that data to them.

TOM (GARBLE) (CNN) Given the amount of storms that are moving off the California Coast with great frequency this time of year, how much risk is there weather wise considering an extension of 1 day?

COX I hope none, because that's part of the formula of how we'll do the extension day, we've been looking at long range forecasts and whatnot, and I don't think there is anything concrete this far in the mission right now. But that will be part of the ingredients, right now it looks like the lake beds are just about useable, as a matter of fact we had a call today that the lake beds are usable, the runways out there at Edwards. From here on to the end of the nominal end of mission it looks like there are no wet fronts headed that way. There is a front out further than that, and you can't forecast when that is going to arrive just yet. But it may play in with the decision process and whether we do the extra day or not.

With that extra day, how many of the portions of experiments can be picked up that have been passed over?

COX There is still a big assessment going on, I saw just some preliminary that maybe half, somewhere in that ballpark. I don't work that part of it, the POCC is working at what they would like to do and what they wouldn't like to do, and they've got some preliminary cuts of people who could take advantage of those days, that they would actually try to schedule them, people that couldn't take advantage, it wouldn't be of any help of their science, and other additional things that they might look at doing. And that is just an integral process that is going on right now, to see if they can build that extra day. We have not seen a template of what that day might look like yet.

PAO More from Carlos Byers here.

BRYERS John, when do you, what's the schedule on making the decision for the go for the extra day?

COX I'd like to know soon, but I think it's all going to be a function of weather, and we'll probably delay that decision, probably as long as we can. We'll probably build the day, sometime soon, so that we know what it looks like, and maybe have
Something to iterate from, but because weather hangs in the balance, you won't commit to doing that extra day, unless you know you have a couple of more days of weather behind it, and you won't know that until those fronts are actually right up ontop of you so your looking at them to get any idea if there is participation.

FAO Craig Covault

Craig COVAULT (Aviation Week)  John, did you hear any interesting comments on visual observations out the windows today?

COX Gosh, it seems like there were some, but I don't remember, I can't recall right now. Not allot, but there was some out the window discussion today, a little bit.

COVAULT I noticed you sent up a far amount of volcano oriented type Earth-observation reminders.

COX That is what the comment was, Brewster had his Atlas out trying to find one of the volcanos we knew he'd be over, he could photograph it if he had an opportunity for us. That is what the discussion was over.

CHRIS JOYCE (New Scientist Magazine)  Maybe I missed something along the way, but I have yet to hear officialy of why you want another day, is it because its there or is it because there are experiments that have been missed and there is a lot pressure to

COX Nobody, from the STS Orbiter-Spacelab side of the house, we're happy with whenever it ends. Basically we're up here to accomplish a lot of science, and this flight has been a difficult problem to package, and perform all the objectives that all the objectives that all the different investigators would like to have performed. It has been a compromise over the many years of cutting down more, and more, and more and packaging it in so we have always known that has been their desire, and when we saw the margins growing, it became obvious that you could do a little bit more, well if it obvious that you could do, people will ask for a little more and there is kind of a interim thing going on. I don't think anybody is running around campaigning, "Say lets go do an extra day," but I think the payload people would like to take an advantage of it. As I said the other night, if there is something really productive, and good high priority type things that you can get done, that we just can't get finished in the packaging that we have, I think it would then be concluded that it would be a worthwhile thing to try to get. And we still don't have what that template looks like, but it looks like there are enough experiments with probably important FO's that either have been missed already in the flight or they just never could
package in the flight that they would like to go for that we will probably end up with a decent descriptive day by the time we're finished.

PAO

Sue Butler

BUTLER One more question concerning the extended day, if the decision is made forth, will you go exactly 24 hours in chart, on which rev would you land, at what time at Edwards, weather permitting?

COX I hope somebody will call in and tell you what the rev, all that rev, landing rev stuff is already worked out. That is one of the evaluation process that has been going on. It's almost an exact 24 addition, because those landing opportunities appear almost the same time of day, when your working with just a couple days difference. So it's almost an exact 24 hour extention, half an hour. Its in the ballpark.

PAO Bill Collins in the back.

(garble)

COX That's already quoted. 7:59, that's almost 10 and we land almost 10 Central. So that's within a minute. Okay.

DOUG MILLER (KTRH) This whole idea of extending the mission a day, came up as a result of, or came up as weather became a factor, it sounds that weather wouldn't be a worry landing on the scheduled day, it sounds as though its just a matter of taking advantage of it now. Is that a fair assessment of what the state of mind is right now?

COX I don't know when or how to characterize it since there's still so many opened areas in it right now weather is a factor and it's looking good for nominal end of mission right now, we'll have to see whether extension days are in the cards. Until all those other factors come together, how important are the DTOs, and what does the templet look like and what you can do, I don't think that you can really characterize that extra day yet.

MILLER And if by some chance the dry lakebed were not dry and you had to land on concrete, then if you got into a situation where you cross winds, wouldn't that put you into a situation where you might have to go onto White Sands?

COX Oh you can play all the normal intermission problems we get into though, the different weather constricts we have. If those lakebeds are all dried out and in good shape, and we're going to get a lot of water the next day, we'll probably come in on normal end of mission. I don't think that'll be to
hard a decision to come up with. That's just my own observation from here.

Coming up, Paul Recer from Associated Press thrown in a question, you said they could pick up 50% of experiments missed if we extend it a day and he wants to know what experiments have been missed and why. Is that a good question for you.

COX I couldn't even tell ya what experiments have been missed. They just made tables of things, it wasn't experiments so much, as the FO's, things that they would have liked to put in the timeline, but didn't get them all set.

It might give me something to spring on Harry Craft...

COX Yeah, go ahead and give that one to Harry, he'd like that one. And Jules Bergman. You have another one Jules?

BERGMAN I've forgotten what it was John.

COX That's an easy one.

BERGMAN I was thinking...

COX Anybody have anything else?

BERGMAN Oh, I know what it was.

COX Ah.

BERGMAN If the weather stays good for end of mission the next day, what is your projections, will the mission be extended?

COX I still can't tell, I really can't tell til it's all put together. I know we'll be looking at not just end of mission, but it would be the new end of mission day and then the following days on that, based on weather, so.

BERGMAN Lets assume all those are good.

COX Well, also assume that good high priority things come up, I would guess we probably would extend it.

PAO Okay, anything further, okay thank you all, very very much. Thank you John.

***
PAO Okay. Good morning. Good morning everyone. Welcome to the 10 am Change-of-Shift Briefing. We're going to go ahead and start now. To my right is Flight Director Chuck Lewis. Just got off shift. To his right is Spacelab Mission Manager Harry Craft and on the far end is Mr. Derrick Mullinger, head of the Spacelab Payload Integration Coordination in Europe will be here to answer questions on the ESA side of the house. We'll start with a summary from Mr. Lewis and have a summary from Mr. Craft and then we'll go to questions. Chuck.

CHUCK LEWIS Okay, I'll try to cover the orbiter activities primarily over the last 2 shifts. I don't think there was a press debrief after Larry Bourgeois's shift last night. As we discussed earlier, we had a primary RCS oxidizer leak in one of our jets, R3D. We've repressed that manifold and over a period of about 8 to 11 hours the leak stopped. So we have that basically under control. We have run into some difficulty in managing our water. I stated yesterday that we were trying to manage our water using tank B only. Tank A is the one that supplies galley water for the crew. Tank C and D we normally hold in reserve anyway for entry. We're picking up a little more hydrogen gas in the water than we anticipated based primarily on the fact that the fuel cells are producing a lot of power force this flight. We're running something like almost 17 kw on orbit as an average. The crew has picked up gas in the galley water. We have redeployed the radiators just a little while ago to allow more heat rejection and less water boiling. We've got that I think under control but I thought I'd pass that on to you. We went ahead also we suspected we might be picking up gas in tank A and loaded about 16 water bottles that we for our entry predeorbit prep period for the crew so that's been taken care of. Also last night we had an experiment computer crash. That was at about 3 days, 14 hours and 25 minutes mission elapsed time. The crew has onboard procedures to recover from that. They went through that and got the computer back up. At the present time, though, we did not load any of the patches that we had in early because of that that we had loaded for the RAU 21 problem. The HOSC in Huntsville is analyzing the dump data that we took from the computer and I suspect in a matter of an hour or 2 they'll complete that and then we'll have a recommendation of whether or not we load the patches back to the RAU 21 problem. It's back with us by the way. We're getting the skip message and a number of other messages that we were getting earlier in the flight. Now the payload operations control center pressed ahead even though we were getting these error messages with their experiment activity during this last 12 hours or so. The high data rate recorder -- we've had a problem with it. We've run into a high motor current and INCO commanded it off. We have worked up and just finished a new flight maintenance procedure that was uplinked to the crew the last half hour so basically that procedure is to do a very detail inspection of the rollers, tape reels and so forth looking for any kind of possible jam or
mechanical interference type problem. And we've given that some priority so I suspect within the next hour or so one of the Mission Specialists will have gone back and performed that IPM and reported back any findings. As you know, that was the recorder we used primarily for covering the LOS bridge. We didn't have our Ku-band TDRS in acquisition. We've downmoded as I think we've indicated in previous briefings to the order of payload recorder. In doing so that means basically that we've restricted the band of data down to about 1 megabit. That's all it can record. It's played back through TDKL but at a one-to-one rate as opposed to a fast rate like the high data rate recorder could have dumped it. We've resimulated, in our simulations we had errors of this type during the simulations so although it's a disappointment they're working the problem and will use the payload recorder if we can't get the high rate recorder fixed. Now, the Payload Operations Control Center had a number of flight plan changes for the next 12 hours but really none of those were associated with the high data rate recorder. Just turned out till we had enough Ku-band coverage basically to cover us for the next 12 hours and they'll treat that on a shift-by-shift basis if we can't recover the high data rate recorder. We're also looking at the feasibility and another inflight maintenance procedure to see if we can access one of the two ops recorders onboard the orbiter to augment the payload recorder we got just to give us a little more recorder time. And I don't know what the feasibility is. That was in work and I didn't have a chance last shift to look at the details of that. We've had, as you probably know, multiple maneuvers over the last 24 hours and got a lot more planned. The prop margin's looking real good. Just a couple of other comments. John Young reported or suggested that he could record us about 30 minutes of video tape tomorrow if we would like. He was commenting on how beautiful his view was of Africa, across Turkey and the Himalayas so our FAO, our Flight Activities Officer, is looking at scheduling that in sometime perhaps tomorrow. And he also had some comments about the glow that some of the other crews have seen around the OMS POD. He was commenting that basically he could see the glow. It appeared that the glow was more so on the right side and it looked like it was perhaps oscillating a little bit and he was trying to relate that perhaps to the oxidizers which we had on the jet that I talked about earlier. Although our data show that it had stopped leaking so we really can't relate that to anything except it was a nice description on the part of the Commander. And with that, I think that summarizes the orbiter activities. Harry.

HARRY CRAFT  Okay, just a couple of brief comments. Chuck has elaborated on the 2 problems. We still have very successful science mission in progress and at this particular point in time we have about 70 investigations if you look at all the various samples and all that we're going to process during the mission. At this particular point in time we've accomplished about 50 of those and fully intend to get the others in the next few days.
I'm not going to go into the science. Rick Chappell and Karl Knott I'm sure gave you a very good run down on that. Just a couple of things. We did have a cartridge stick in the material science double rack and that's been cleared. And the life sciences is continuing on on schedule. On the SEPAC, we are having some difficulties with the electron beam. We're looking at data on the ground and that particular investigator team from Japan is looking at their data and we'll be able to talk more about that later when they get that all looked at. The other disciplines—Atmospheric Physics Earth Obs and the Astronomy—are all gathering data according to the timeline. That's really all I have to see. I know Rick talked a great deal about the science and we'll get to your questions.

PAO Okay. Questions here in Houston. Please wait for the mike. Give your name and affiliation. Roy Neal, NBC.

ROY NEAL (NBC) Recorder can't be brought back up. How will that impact the mission and most particularly, also, how will that impact the video schedule that you have. We noticed this morning, for example, that mass discrimination experiment was dropped from the TV schedule because, presumably, of the problem with the recorder. So what can you tell us about those facets.

LEWIS Well first, I don't know why the mass discrimination TV activity was dropped. It may have been a timeline problem. I don't know. That was a POCO call but obviously the loss of that recorder if we can't recover is a disappointment for us and it's going to impact our operations to some great degree. And as I said earlier, I don't think our payload people have had an opportunity to look over the remaining days of our flight to determine exactly what impact it might be. However, I suspect and Harry will have to verify this, we could change our maneuver or attitude timeline to some extent to give us a little more ku-band coverage. It just depends on what particular experiment. It's a tradeoff between your experiment activity and ku-band coverage. And like we have indicated earlier, we have the contingency formats for our data, the low bit rate formats that we already had in our file and we'll use those to get what data we can.

NEAL A follow up on just that thought. Would this be another reason for extending the flight an extra day to gain some extra time or would this negate that thought? Is it pro or con from that point of view?

LEWIS I don't think we can ...

Is it premature.

LEWIS I think that's premature.
It is really premature.

CRAFT  Okay. Let me mention, make sure that everyone understands. The high data rate recorder is only used during the LOS periods so we're talking only when we don't have a capability to send that data to the ground in realtime. I want to point out very clearly the data in realtime, all the high data rate stuff is still going to come down. There's no question about that. It does not impact our analog video. We've got 2 very good well operating analog video recorders and all the science from those are operating nominal. Right now the problem is not causing us any significant concern but if we don't get the procedure implemented and clear the problem then we're going to have to read timelines some and goes along with what Chuck said. We'll be operating, utilizing the orbiter recorder during those LOS periods.

PAO  Jules Bergman down here in front.

***
BERGMAN  Dr. Knott after the briefing, Chuck, the earlier briefing explained to me the loss of the high data rate recorder, he thought justified the extension because on the 10th day, as Roy was implying you could do with the TDRSS live, what you can't do with HDRR. Both for experiments and for TV.

CHUCK LEWIS  Well, I think it is premature to comment on it, because I think the justification for the 10th day would depend upon what specific science might have been lost, and it turns out that your attitude profile to support that science is not compatible with the Ku-Band then, it's not it's conflicts. So, I think until we get to the weekend, and know really how we stand on, and Harry and his people know how they stand on their science work, I don't think we know what they would want to do on the 10th day.

BERGMAN  But, speaking for the Orbiter, it can fly the 10th day safely?

LEWIS  At this point in time, we still have our margin in our cryos and our prop to do that. And we probably haven't done much thinking about that because I'm sure Harry's people have been very busy looking at the backup plan with regard to the payload recorder and so forth.

PAO  Wayne Dolcefino, in back.

DOLCEFINO  Chuck, from a weather standpoint, how does Edwards look? In terms of extending the mission?

LEWIS  I think that is premature too, really need to get within 2 or 3 days toward the end of the mission before you have a good forecast, we haven't looked that far ahead. The lakebed conditions as we talked about before, looks like now Sunday before the lakebed would dry out enough that we would use it as a nominal landing strip, we can go in there now if we had a contingency. So I really can't comment on how the specific weather will be at the end of mission and I think it is too early to "

DOLCEFINO  From a crew standpoint, did they seem to be in a slightly better mood this morning. And I'm wondering whether or not anyone told the science guys to sort of keep quiet a little while, cause I have noticed near as many transmissions even though we're having problems. Any comments on either one of those.

LEWIS  Maybe to the timeline, I think Harry indicated yesterday that the timeline, Harry should probably answer this. But I think they are getting more into the some of the automated
control sequences for some of the experiments and so forth, and I think maybe the crew workload is lightened up a bit, but I guess we should --

That's very true, I pointed out to you yesterday both crewmembers today have significant gaps where we can allow them to catch up, and I think it will go much smoother today.

PAO  John Wolford.

WOLFORD  In a 90 minute orbit, how much LOS do you have? And could you give us a comparison from the payload recorder to data rate there with the data rate from your high data rate recorder?

LEWIS  TDRSS coverage is approximately 55 percent of an orbit,--

WOLFORD  But you also have tracking stations don't you? Tracking stations --

LEWIS  Yes we do--

WOLFORD  But they don't handle this?

LEWIS  They can't handle the high data rate, the Ku-Band telemetry system that we've got. That is compatible only with the tracking and data relay satellite. The payload recorder can record up to 1 megabit, the Ku-Band recorder can record and operate up to 48 megabits. And, that is an obvious difference.

PAO  Down here in front.

BARTBARA  (Houston Chronicle) Are there any experiments onboard that need this high data rate recorder to actually operate or be successful?

CRAFT  There are none that need the full capability of it, if we have to drop and be saddled with the one megabit only, we don't get the recorder recovered, then some of them will have certain modes that we will not be able to operate in. But they all still have significant functional objectives left that are compatible with the capability we'll have during LOS. Remember, during LOS we can still get their high bit rates down, we may juggle the timeline a little bit for those high rate users to make sure they get it during an AOS.

PAO  --gray sweater--

TOM O'TOOL  (Washington Post) Harry, which scientific discipline will it be impact to follow up that question? Will be impacted the most by the loss, will it be material science?
CRAFT No, they won't know, the material science don't need the high rate, what you'll see it will be in the Earth observations, and some of the atmospheric experiments. Material sciences will never know the difference. They are in fine shape.

SUE (Time and Space World) Yesterday we were told that hydrogen leak did not, had no real consequence. To the crew's drinking water now I believe you said that it is true to taste if the gas in the portable water. Can you elaborate on that? And how is the possibility that the leakage from the fuel cells will increase to effect the water make it, and that in turn could effect the length of the mission, could it not?

CRAFT First, it's not a leak, the fuel cell generates water, and the water has hydrogen gas in it. We have separators that's designed to separate the hydrogen gas from the water before it passes on into the water tanks. I think basically if the power loads were running, the separators aren't just not keeping up. With removing all the hydrogen, so we are getting more hydrogen through the system than we anticipated. With regard to the crew, us of water, the only concerned there is it's just, if you have hydrogen gas in the water it could create some intestinal discomfort. As you intake it through liquid or if they use it in you know their -- food. So, we provided another inflight procedure, we uplinked, at the same time we uplinked the high data rate recorder IPM, such as with (garble) if it becomes a nuisance, to them, they can separate the manually, basically, the hydrogen from the water. It's basically a discomfort kind of feature, nothing dangerous or anything like that.

PAO Right there please.

CHRIS JOYCE (News Scientists Magazine) Who's the vendor on the high data rate recorder. And was it specially built for Spacelab or is this a piece of technology that has been used before on other STS flights.

CRAFT It's built by (garble) I believe, and I don't know if, they have, this recorder's used in other applications or not. I can't answer that.

PAO This gentlemen right here.

GARY SCHWIEZTER (San Ann) Harry, I still don't think we are clear on whether or science on this last shift was compromised by the recorder problem.

CRAFT Not yet.

SCHWIEZTER That's clear, thank you.
PAAO Back in the back.

WAYNE DOLCEFINO (KTRH) Tell us the flexibility of Spacelab. Not to play Monday morning quarterback, but, was it a mistake not to have a redundant system for high data speed recorder, or is that even feasible?

CRAFT Onboard Spacelab?

Hind sight is always great.

DOLCEFINO But, from a practical standpoint, if everytime we send Spacelab up there, let's say hypothetically, we would have a problem with data speed recorder, would it make sense to now review that and see whether or not we are messing ourselves up by not having an extra one up there?

CRAFT I'm sure would probably be reviewed.

PAAO Green sweater --

CHUCK LEWIS Follow up, the hydrogen question. Isn't this what happened to Joe Engle on flight two? The Hydrogen got in the water, he didn't want to drink it, so he got somewhat dehydrated?

CRAFT I don't remember. That could of been, we've had gas in the water before. And as a matter of fact, the procedure they used then to separate it is basically the same one we are going to use this time. I don't recall the specifics of flight two.

BERGMAN Chuck, if you say it's not dangerous, if you say the hydrogen in the water is not dangerous, then why this morning were they telling Brewster Shaw to drink the lemonade only, or that is one thing I seemed to of heard on the radio.

LEWIS What Bill Fisher was trying to tell him is that, is as they mix water with their drink, they obviously going to get a stronger drink if it has gas in it, you are going to have a higher concentrated lemonade for example than you would have if you hadn't had the gas. Because as your proportional for the mix you are going to have gas in it, so you have less water, I think that was all he was trying to say.

BERGMAN Is there any way, is there some way of removing the hydrogen from the water up there?
LEWIS That's what I was trying to indicate, they have a procedure that we just sent up to them. Basically using one of our urine collection device bags, the procedure modifies it, and they put the water into the bag, they basically tie a rubber band around it to let some water through and they just sling it, and you are slinging the water past the constricted area that the rubber bands around and separating the gas. It is a nuisance but that's the procedure.

PAO Next row please, Mr. Schweitzer.

SCHWEITZER Harry, are you disappointed with what the public has been able to see of the science of this mission?

CRAFT I'm not disappointed at all, I think you guys are doing a fantastic job, I've seen it on CNN and I've seen it on ABC, NBC, CBS, and all the other radio networks and all I think it is fantastic.

SCHWEITZER The check is not in the mail Harry, but (laughter), but, that's not quite what I was after. With losing the, you can start at the beginning or start most recently and go back losing the mass discrimination which could of been interesting for people to see, seeing preparation for hop and drop, preparation for drop and shock, but not the real tests. I have to

***
That's not quite what I was after, with loosing, you can start at the beginning or you can start with the most recent and go back, loosing the mass discrimination which could have been interesting for people to see, seeing preparation for hop and drop, preparation for drop and shock, but not the real test, I have to assume there was a great deal of interest going in and explaining and really bringing home some basic research to people with this mission, and am I wrong that has not come across?

Well, what we going to have to do for you, unfortunately, because of the TDOS situation and what's happened to us in some of our acquisitions, that data is going to be available post mission, and hopefully the press will pick up with it post mission. That data is on the analog video recorders and yes, I would have liked to have seen more of it on the ground, but we haven't lost it. Its just going to be toward the end of the mission before you're going to get to take a look at it. And I hope some of you will go back and put it into the press and show what we did get.

PAO Any more questions?

JACKIE JUDD (CBS) Mr. Craft, in trying to get a handle on the signifigance of the loss of the data recorder. Can you put a percent on the amount of information that may be held up or lost and before when you were asked about the experiments that would be affected, did some of the steps of experiments have to be dropped but not entire experiments, is that what you were saying?

CRAFT Well, let me say first, it's hard to speculate now, I'd like to check the recorder out and see if we get it back. There is not much sense in speculating in percentages. The second thing that will obviously affect that is how well we're able to replan our timeline around the AOS periods for those folks how have data rates of excess of what we put on the payload recorder. The third part of your question, what we'll probably try to do is adjust the timeline again to get the science that requires something in access of the 2-megabit we're talking about, get that during an AOS period. And we won't really know till we get to close to the end of the mission how successful we've been, but I know I've got a great team of guys working it and I'm confident that they're going to come thru and make the scientists happy.

PAO Back there please.

HOMER ELMER (USA) So my understanding of what you will do if indeed the high speed recorder failure continues, is you that will wait until its over an Earth station and then you'll perform the experiment at that time so you can get the data down right away or you'll record the high speed data and then dump it all at once while your in range of the Earth station's dish. Is that a correct conception of what your planning?
We're going to do a little of both. We'll be able to dump the recorder and still get some stuff down in real-time as well. The payload recorder we're talking about.

PAO Do you have a question?

JUDD Just one more time, is anything going to be actually lost, in other words, the stuff you don't get to send back down, will it be recorded in up in the Shuttle and brought back later, or is that complete loss?

We have the 1-megabit capability onboard the Orbiter and we will utilize that during the LOS periods. If we are successful in replanning the timeline . . .

JUDD But if your not?

The timeline is being replanned on the ground, and we have done that a great deal, I am confident that we will be able to do that. I do not now have a way to tell you if we're going to lose anything. I just don't have an answer today.

SUE BUTLER Would you please go over this once more about the RAU 21 problem. It is back, and what exactly are doing about getting that crash computer recorded?

The computer's been recovered. It went down, but it was reloaded from the Mass Memory Unit and its functioning. The RAU 21 problem, well there are a couple of problems basically. One is that we're getting, from one area from one experiment I believe, the horizon sensor, they were getting a data rate into the computer that is too high and it basicaly gives a message that says were going to skip this data. And that data, had it been in the computer goes into data tables that some of the other experiments use. While on the other experiment computer looks for it and sees its not there, it gives another error message. And what happens is its flooding the fault summary page, what we refer to as the fault summary page, with these message, masking basically inside into the general health of the experiment computer. I can't answer answer you with regard to specific data that is not being recielved by some of the experiments as a result of this. Now, early we put patches in to correct some of that problem. And we'll probably go back and put some software patches in again, after we complete analyzing the dump data from the experiment computer problem. We just want to make sure that the patches were not a source or a possible cause of the experiment computer crash we had earlier.

PAO We'll go to Cologne-Portz now for questions, then to KSC and then back here.

PAO This is Cologne-Portz here, we have a question.
LEO ENWRIGHT (Irish Television) I have a couple of questions. You mentioned a character called John Young. I wonder what he's been doing all this time. Does he just sit around watching his OMS pod glow?

I would imagine he does when he can, but on the other hand, he's maneuvering the Orbiter, many maneuvers every day to support our experiment operations and also he basically does troubleshooting for the Spacelab systems from the aft flight deck of the Orbiter. So I would imagine he watches the glow when he can, but I'm just not sure how much free time he's got. He is I think very busy.

ENWRIGHT So there is no part of him getting bored.

I don't believe so.

ENWRIGHT Ok, just one other question if I may. The microwave experiment, there was some talk during the science briefing that it was giving trouble during checkout. I was wondering if you had any more up-to-date information.

The microwave experiment is being checked out right now, when I came away from the POCC tables was still busy. They were having initial troubles in activating fully and therefore it is too early to say, exactly the status. So I think we will just have to be patient and come back to that a little later, at the next briefing.

PAO Thank you, that is all from Portz-Cologne.

PAO Ok, now we'll go to KSC.

REG TURNELL (BBC) I remember hearing John Young using some very colorful language about gas in the water during Apollo 16 and since I get the impression that he is doing most of the cooking, I wonder whether he has had any observations to make on this occasion about this.

He implied earlier that he was doing some meal prep, I'm not sure that he is, but he sort of implied that. When we told him we had a procedure to separate the gas from the water, we'd send it if he'd wanted to, or we could hold it and let them ask for it later. He said no it was no problem for him. So I guess he wasn't worried about. It was a little bit later that Brewster indicated that they had more gas in the water from the galley then John had seen up to that, so Brewster asked for the procedure. I guess I better not comment on the other comment he made, it was on the air-to-ground.
DICK DINADO (Count Down Magazine)  Looking towards extending this mission and perhaps longer Spacelab Missions in the future, what point do you reach the limit of crew endurance for these long 12 hour shifts?

I can comment with regard to Skylab, the crew operate the same basic shift and perhaps more so for months, 2 or 3, 4 months, so I don't think there is a limit as long as you give the crew a rest time, which we try and do in their pre- and post-sleep activities, exercise periods and as you may recall in Skylab, we had I think a day off, when they could take a shower and had some leisure time. So I think the Skylab experience indicates that as far as the crew is concerned, considering the conditions I just stated, they could stay up for months.

PAO Thats all from KSC.

PAO Ok, back here in Houston, Jules Bergman again.

JULES BERGMAN (ABC)  This is for Chuck and Harry. And it concerns that very point, crew shifts. Several times during this mission, the edge of irritation has crept into the onboard conversations on the Earth, or very clearly the scientists in the POCC have revealed their lack of what it is, how difficult it is to work in space where you can't take down notes and float around in 0-g. And I'm told there was a lack of simulation preflight. My question is this. In view of all those things, might not, I left out one thing, also you don't sleep for 8 hours I'm told, you sleep more like 4 or 5 hours at most. In view of all those things, might not a new crew cycle be established. 8 hours on, 4 hours off, 8 hour . . .

***
BERGMAN  I left out one thing, also you don't sleep for 8 hours I'm told, when your up there, you sleep more like 4 or 5 hours at most. In view of all those things, might not a crew cycle be established, 8 hours on, 4 hours off, 8 hours on or something like that? Or if not that instead of 12 hours straight through, breaks in those 12 hours straight through. In other words are these men being overworked to the point of flagging out?

LEWIS  Well you know you indicated that we had simulation, but you can't simulate 0g. So you estimate the best you can, what the time requirements are for the crew to do the task. And as we stated yesterday, I think Harry agreed that, in particularly some of the life science TDO's it took a little bit longer than we anticipated. The experimentation that were running on this flight is whether or not we can operate the 24 hour cycle. The basic work shift that we see in this flight is no different then we done in Apollo, Skylab, throughout the history of our flight programs, so I don't see this indicates a need for a change in our work cycle. The question were going to have for the crew is just how well could the off duty crewman sleep with the other activities in the vehicle. With regard to only sleeping 4 or 5 hours, I think that is true the first night or two but as they work and get tired, the day from our other flights, indicate they got their 7 or 8 hour sleep. Usually a little later in the flight, but it wasn't always a short sleep cycle.

BERGMAN  Chuck I think that 7 or 8 hour sleep point is arguable. I'm not challenging the 24 hour work cycle, but I might point out to you that in Skylab, and Apollo and all the previous NASA flight, there was no attempt of interaction, with scientists on the ground. The crew operated and did experiments, yes, but from a flight plan at their own pace.

LEWIS  We'll there was no PI's talking to them, they were in the Control Center passing their request in the R, in the MCC, and we (garble) in the CAPCOM. As you may remember in Skylab on the last man flight, we had the ground, had been operating for months with previous crews and expected the crew, to respond in a manner that the crew had in a earlier Skylab flights. And we over tasked that crew in the beginning, in the first few days, because, as in any flight it takes a bit of time for the crewman to adapt to the 0g. He may have some of the space syndrome symptoms, slows him down. I don't think this, there is any different in what were seeing now then we did in the previous flights and I think the lessons learned made on Harry's part is maybe we need a little more time if your going to have a PI interaction, to allow that to happen, without you know, such a demand on the crew. I think maybe that is a lesson to learned perhaps Harry might want to comment on that.
CRAFT  I think maybe you know that was one of the major goals of the mission is to look and we took a major step forward and beginning to let the investigators interact with the crew. I think it is going to work out fine. I think we are going to learn some lessons, I think the investigators are going to teach themselves some lessons, because they are there. These are the same guys and a number of them are on subsequent both within Europe and here in the States and I think that they are going to be much better schooled and understand that.

BERGMAN  The feeling I've had a number of times, listening to the intercom or the air-to-ground is that the PI in the POCC, is trying to treat Byron, or Ulf, or anybody up there as if they are standing right next to them in their lab. And that's just not so. You can't simulate lab conditions in Orbit, while your weightless.

LEWIS  And that's less than accurate, is what were saying. It takes a little longer for them to respond.

PAO  Comment (garble) right here.

Chuck maybe you could tell us just how well the crew is sleeping?

LEWIS  They've not commented and I hope that would have been the first question asked yesterday, since we didn't get to ask very many, that the press might have asked. You ask us here everyday, everytime I come over, how they are sleeping and they've not commented on it, and I haven't heard any comments.

Are you getting any indications that they're are up. Normally you can tell a little bit from. you know, if somebody has turned the a piece of equipment on or off or what.

LEWIS  Sometimes you can.

This one I know, kind of lost in the noise of the other operations.

LEWIS  Sometimes you can, and sometimes you really can't. Brewster sounded fresh this morning, when he came on. I think Byron sounded fresh when he came on, and that's about, you know you sort of listen to the crew and how they are responding, and I think that's about all we have to go on. And you can tell when they are getting tired, you know, I think Bob was getting tired towards the end of his shift today.

PAO  John Petty.
PETTY  If you are able to use one of the operations recorder, what kind of additional capability would that give you.

LEWIS  It's basically the same type of recorder, Payload recorder. It just gives us more time.

PETTY  So it would give you an additional 1 (garble)

LEWIS  It gives us, yes we could record simultaneously with the Payload recorder and the Ops recorder. Or you could just look it up from a time point of view, and if you fill up the Payload Recorder, you have another recorder that you can alternate that with.

PETTY  Thank you.

PAO   Any more questions? All right, thank you very much for coming by.

END OF TAPE
PAO  Good morning and welcome to today's Science Briefing with Dr. Rick Chappell from the Marshall Space Flight Center, the Spacelab 1 Mission Scientist, and with Dr. Karl Knott, the European Space Agency's Project Scientist. Dr. Knott.

KNOTT  Well, I would like to start to talk to you today about our achievements in the area of material science, because since we last talked to you, discipline came into business and carried out a number of successful investigations. The discipline started off with some difficulties indeed, when they first tried to activate what we call the isol thermal heating facility, they discovered that a small leak in the vacuum system of this facility had developed and they could not achieve the desired vacuum in the facility, however the versatility and flexibility which exists on the Spacelab due to the presence of the Payload Specialists and the training they had before, enabled us to exchange a vacuum seal in a fairly short time and after just a few hours, get this facility running with just good vacuum. I should like to point out the reason why for example we need vacuum in this facility, its basically a furnace which is heating up a sample and then carries it to a predefined profile in temperature and while it is liquid it will be processed, and it will be processed in the microgravity. Now the fact that the vacuum is required in this facility is the following one of the reasons. All these cartridges have been calibrated on the ground, the profile to which they are carried thru has been verified on the ground and the heat input into the furnace has been determined exactly on the ground. Now if we would not have had vacuum in the facility and would have had two mechanisms of heat transferred to the sample, on mechanism would have been radiation and the other mechanism would have been convection in the residual air inside the facility. Now by simply having vacuum in the facility the convected heat transfer inside the facility is cut off and therefore only the radiative transfer of energy to the sample is remaining, and this is the only way how these samples could be calibrated, earlier on the ground and the same, very same temperature profile could then be applied in zero-gravity in space. That much about the isol thermal heating facility. With some delay these investigations then started. And again due to the flexibility of our replanning mechanism, it was possible to keep the, to maintain the planned program for this facility. Here, a very interesting investigation which was carried out in another furnace, and that's the so called gradient heating furnace was the following one. In this furnace we started melting a mixture of aluminum and zinc, and these two mixtures have quite a different melting temperatures. In deed the zinc melts at much lower temperatures than the aluminum and we operated this facility at a temperature when the aluminum was already kink of solidified and when zinc was still in liquid state. And in this situation we started, this combination was mixed very, very evenly into a mixture which can not be achieved so easily in a 1-g environment because of sedimentation. So in
0-g, we achieved a very, very even mixture and we then started very slowly to cool this sample down and when finally the zinc also went from its vapor state into the liquid and solid state, we obtained a material which was extremely porous aluminum and thats a material, a metal of quite considerable strength, but very low weight. And thats a very, very interesting component to work with, and we're looking forward to receive these samples and to analyze them. There was a very interesting investigation carried out in the fluid physics module of the material science facility and that investigation was investigations 330, and in investigation 330 which looks at the motion of the liquid in the 0-g. This problem was quite interesting for applications for a spacecraft which carry liquid fuel onboard or also for example for infrared telescopes which carry liquid cooling agents onboard, and it very difficult to predict how these liquids behaving inside a fuel tank or inside a reservoir when they're not subjected to a vacuum, when they're only subjected to say a centrifugal forces, when the absence of a spinning motion of a spacecraft, when they're only subjected to surface tension and surface adhesion. And this experiment in the fluid physics module now set out to verify certain existing modules on the fluid behaviour in the 0-g environment. The experiment physically exists out of small containers of different shape which contain a fluid, and these containers are either spun a low revolution rate or they are vibrated at a certain frequency and the investigator then looks at the shape the fluid takes up and during the vibration of this (garble) he looks at setting up of certain (garble) modes, oscillating frequency of the liquid under these circumstances and from this we can learn quite a lot from the problems which I pointed out earlier on fluid behavior or fuel behavior inside a spacecraft, and fluid behavior in cryogenic tanks. Because the problem, for example, spacecraft controllers are faced with, is that they'll never know exactly where the fuel is located at any particular point in time, the center of gravity of the spacecraft is upset by an uneven distribution of fluid in the tank and if a certain attitude change to the vehicle is to be initiated, they are not quite sure what type of momentum they have to give to the spacecraft, because they don't know what the movement of inertia of the spacecraft in this fairly undefined state is. So after after having carried out the experiment 330 and having analyzed the results that are coming down in the form of photographs taken by a very high speed photographic camera, we are quite optimistic of the experiment, he is quite optimistic that he can shed some light on to these problems. The investigator is Dr. J. Vreeburg, he comes from the Netherlands, he is here and anybody who wants to get in touch with him, we can arrange that, this contact can be made. We have already carried out several of these experiments in the fluid physics module, other experiments are carried out where the fluid is not contained in vessels, but it is kind of free floating in the facility, and I understand that Rick is going to give you one example of such an investigation in
just a minute, so all in all the material science investigations are progressing quite well. I should perhaps, at the end of the story about material sciences, tell you about another small problem from which we also recovered. It turned out that in the course of the investigations of the isol thermal heating facility, one cartridge which had been inserted into the isol thermal got stuck, due to some thermal deformation and it was only after the Payload Specialist had kind of demounted the entry part into the facility, he was able to . . .

***
KNOTT  ---entry part into the facility, he was able to remove
the facility and free the place again for other samples to be
processed, because if he would not have been able to remove this
sample, the program of that facility which was still calling this
stage were processing at least another 15 samples would have got
stuck and we would have lost quite a bit. This again was a
marvelous example of the flexibility, we exist on board, a
marvelous example of how useful it is to have a very well trained
crewmember on board to help us to recover from this type of
horror. So they was basically, shift 5 which was carried out
yesterday, in fact not yesterday, but the day before, yesterday
it was shift 7 which I covered and shift 7 was our second shift
which was a very attitude intensive shift I would say. So far
we've been mainly to attitude, which have been dictated by the
technical identification program of Spacelab. And now were
coming into the phase of the Mission, where the attitude of the
Orbiter is more made available for scientific investigations. So
the scientist become a say, where do you want to point the
shuttle at any one time. This then enables the discipline like
astronomy to point their telescopes at certain targets, we are
still operating in a stage where all the telescopes are firmly
mount onto Spacelab, and where the whole Orbiter has to turn and
point the telescope at their targets. Later on in the shuttle
program it's planned to fly facilities, which we call IPS, where
the shuttle can maintain a certain attitude, and to have more
flexibility to point you individual instrumentation at a certain
instrument. For the time being we have to just carry the whole
shuttle to these attitudes. And thereby enable the astrometers
to point instruments at particular targets. And also enable the
plasma physics investigators to point the shuttle in certain
point instruments in certain directions. With respect to the
g geomagnetic field of the earth. They would like for example to
fire a electrons among the magnetic field, shooting them up along
the magnetic field, into the magnetosphere, and see whether there
are any electric fields, among the magnetosphere, which would
bring these electrons back to the shuttle. Indeed this has, over
the last few days been observed. Electron beams have been fired
from the electron gun of SEPAC for example. Along the magnetic
field they've been traveling along the magnetic field up into the
magnetosphere, and they seem to exist electric fields, which turn
this part of which first deaccelerated particle, bring them to a
hold, and then they travel back, and then come back to Spacelab,
and they are sufficient particles, particle detectors on board to
measure these returning particles to measure there energy in
which they are returning, they measure their angles we suspect to
the magnetic field under which they are returning. This angle
and the energy distribution of the returning particles gives them
information on existing electric fields, inside the
magnetosphere. This is a very, very interesting measurement,
basically a remote sensing of an electric fields in space. That
has been carried out. I deliberately did not say much about the
astromony investigations, which were carried out yesterday. To
my understanding successfully, because the two principle
investigators are joining us this morning. It's Dr. Stu Bowyer,
from University of California at Berkeley, is with us this
morning and perhaps you can talk to him later, and it's Dr. D.
Andresen, from Space Science Department from ESA who has built
the x-ray spectrometer on board of the Spacelab, and Stu Bowyer
is the Principle Investigator of the l.aust (garble) telescope.
And these two gentlemen are here this morning, and we would like
to encourage you talk to them, and learn something about exciting
results. Unfortunately Stu will not be able to tell you so much
because his experiment is taking pictures and will only see the
pictures when the shuttle has returned to earth. However, Deiter
is getting its data from a detector which can transmit it's data
while the shuttle is still in Orbit. He will have something to
tell you later on. So this is basically a survey over the last
two day shifts, which I covered, many more things than the ones
that I could mention very briefly to you in these few minutes.
Went on, we had good measurements in the fields of atmospheric
physics. We had life science experiments, we were not very
intensive anymore in life science, but we have a few long
duration experiments on board and these are still operating. I
should say that one life science experiment has been successfully
terminated. That's the first successful termination experiment
on board. It's experiment 31, the one which looks at the
lymphocyte proliferation. This experiment had radio active
thymidine injected during yesterday's shift. This radio active
material interacts more heavily with the activated cells, and
therefore gives the investigator after return to the ground a
quantitative measurement on how many cells have been activated, and
shortly after this injection of this radio active material, the
sample was fixed by a chemical injection and then stowed in the
freezer onboard Spacelab and will be returned and compared to a
sample which has at the same when this sample in process onboard
of Spacelab, to be compared with the result of an identical
different sample which was processed on the ground. I think this
is all I wanted to say about the last two day shifts, now I'll
turn it over to Rick.

CHAPPELL Well let me cover just shift 8 which is the one that
just ended. Let me amplify on Karl's use of the work terminated,
that sounds a little more like getting a pink slip, and it wasn't
that sort of thing, this is termination that goes with graduation
from school, or what ever. The experiment was run quite
successful, and the investigator, I think he was described as
ecstatic, with the way things had gone and is looking forward to
analysing the samples when they come back. I wanted to mention
just a couple of the experiments that have been done on this
shift. In general, the shift involved both life scientist in
these vestibular experiments principally. Which we've talked
about in the previous couple of news briefing. I won't spend
much time on those. And then material sciences investigations,
and I wanted to do the best I could on describing in a
preliminary way the results of one of those, and then I would
encourage you to talk to Dr. John Petta, who is also in the room
here with us in the back for more details of the operation of the
experiment. This particular one looks at the essentially the
study of the interaction between liquids and solids. It's in the
fluid physical module and it involves two disk types of surfaces
between which of fluid is injected and the disks are moved in
distances between each other and the shape actually, the shape of
the fluid structure, the liquid structure that forms between the
two disks is studied. And then as the disks are moved, the shape
of the liquid structure is observed, and photographed using a
camera. I'm sure many of you have may have heard the experiment
when it was

***
CHAPPELL ... because that liquid structure is observed and photographed using a camera. I'm sure many of you may have heard the experiment when it was run. Maybe not, come to think of it, it was kind of late. But we had this marvelous interaction between John and Ulf Merbold as the experiment was being run. Recently I know there's been, I remember a couple of questions and I've heard some commentary regarding the amount of communication that exists between the payload operations control center and the crew. This has caused comment and question I guess because it's different from the way we've done things in the past. Some of the comments have been at least implying that that difference means that something is, that people are not as regimented in their ability to talk to each other or whatever. In fact what it really reflects is the unique new approach that we're taking in Spacelab in which the investigators on the ground interact quite extensively with the onboard crew. And I think if you followed, if you were fortunate enough to follow John's discourse today with Ulf Merbold as the experiment was performed you would have been given the impression of 2 scientific colleagues conducting an experiment together. One of them happened to be 5,000 miles away from the other one. But there was quite a close interaction and, in fact, John tells me that as they went through the experiment because the results were very surprising to him that the 2 of the together were able to actually modify the latter part of the experiment and learn some things about the new phenomenon that he observed which had to do with essentially the wetting and the motion of the liquid over the solid surface. And I would encourage you to talk with John sometime about this after the briefing is over. This is the first of a series of experiments in this particular area and they are most exciting to listen to as they take place and certainly they're exciting to the investigator as the results unfold. In the astronomy area, I wanted to mention some of the initial results that Dr. Andresen has gotten and I won't spend much time on this other than to encourage you to talk with him in addition separately. But he has made 2 successful observations so far. You may have recalled that early on I talked about his early measurements in the mission in which he was determining the background. Both the background within the instrument itself and the cosmic background and I mentioned the fact that he had observed x-rays from the earth itself. That the earth is certainly a strong x-ray source in the orbit that we're in. And Detter has been able then to view 2 particular sources, signus X2 which is a neutron star orbiting about a white (garble, and he's got some very interesting spectra there. His idea in using the spectrometer is to be able to separate the x-rays by energy to look at the particular characteristics of the energy of the x-rays and if you find particular lines or particular enhancements at a given energy to use that information to then reflect on the physical processes at the star, in this case the binary system itself, the physical processes that must be going on there that would cause an emission of x-rays at a certain energy. He has
received a number of excellent spectra from this particular source and is in the process of analyzing that now. The second source that he observed is called a burster and this has to do with an object which generates x-rays impulsively. In this case, not a regular periodic generation of x-rays but rather a sort of a random generation of very high fluxes of x-rays. And this measurement also showed the possibility of lines being present. This has never been seen before. Deter is still, as I said, involved very much in the analysis of the data and results are only preliminary at this time. He recorded on the order of 100,000 events in the 10 minutes that this particular source was being observed so it certainly a prolific x-ray source.

Coming up today which you may want to tune in later to find out about Deter plans to observe the herculeous X1 source which is an x-ray source that mysteriously stopped emitting x-rays earlier this year. It had been observed earlier. Deter's instrument on XOSAT made observations of it in the June time frame and it found then that it had stopped emitting x-rays for reasons that nobody understands. The earlier measurements of that particular source showed that it had a magnetic field of the order of 10 to the twelfth gas which is a tremendous magnetic field. And the electrons that were being caught up in this particular magnetic field had such energies as to generate x-rays at 60 kev. It's very difficult to understand how an object with that sort of a magnetic field that involves the physical processes that it has going on to generate that, it's very difficult to understand how all of a sudden it stops. So Deter will make an observation of that later today and we'll see if it is still stopped. I'd encourage you to talk with Deter as I've said and as Karl said after we get through. I wanted to give you an update on the SEPAFAC activities - the electron accelerator. They have had a series of runs and as you'll remember we've talked about from the beginning that there are a number of steps that you go through that they are going through with this compliment of instruments. SEPAFAC involves an electron accelerator as well as 2 devices, one which can inject a neutral gas as the accelerator fires that's used then to neutralize, electrically neutralize the shuttle as the beam fires. They also can generate a plasma or a set of ionized electron ion pairs that come out of a thing called a magnetoplasma dynamic arcjet. These can also be used to neutralize the shuttle as the electron beam is firing. In addition, this MPD arcjet as it's called can be used to generate artificial air glow. That is to say to generate emissions, light emissions from the plasma surrounding the vehicle that then give an indication of the composition of the plasma around the vehicle. They have gone through a number of steps, I guess on the order of nine different runs, in which they have checked - I think you saw the checkout of the monitor television early on which showed the star fields - and they think when they were scanning that particular television that they saw another satellite go by. If you look at the picture, the video picture it is entirely possible that that's what it was. It was at such
a range that all you see is a very rapid motion. A light spot
that moves through the star field so it was obviously something
moving with respect to the background. Whether or not it was a
satellite can't be established but it was quite interesting for
the group to see. They followed that up by firings of the
arcjet, the MPD arcjet, and you probably have seen some of the
film of that. That gives a very bright cloud of light when it's
emitted. And then they followed that then having done the MPD
arcjet with firings of the electron gun. This gives an electron
beam and at the lower energies they were able to see the electron
beam. At the higher energies the resultant beam appeared more as
a flash if you were watching, if you've seen any of the
Television on that. They have since then followed up with other
beam firings and in addition, beam firings with the emission of
the neutral gas and emission of the ionized gas and they
currently are analyzing the data to try to understand specifically
how the beam is operating. They have not yet generated an
artificial aurora other than the flash, the glows that they've
generated around the vehicle. They are still studying the
particular characteristics of the electron beam. They have
another run today and then another several runs in the shift, in
the next shift. Okay, let's see. I guess in summary, I was
going to mention one other. And that is the fact that we are
currently, and Karl and I refer to these as the long cookers, but
there is a - we are growing a crystal, a protein crystal. It
takes about 60 hours to grow. And this is an interesting
experiment. It's still in progress. It's been going, I guess,
30 or 40 hours at this point. The idea is to make, to grow a
protein crystal which is large enough and a perfect enough
structure that it can be returned to earth and used in X-ray and
neutron crystallography where you actually bombard the crystal and
measure the scattering patterns of either the X-rays or the
neutrons and use those patterns to determine the crystalline
structure or in this case the molecular structure of the
protein. And if you can grow a crystal that's large enough to do
this then you can get a better really image of what the protein
itself looks like in its molecular state. So this is a very
interesting experiment that has been ongoing and continues, will
continue for another, probably another day. So let's see. In
summary we've, as Karl said, we've seen the value of the
scientists tremendously as, in this case, as a test subject for
the life sciences experiment; as an experiment operator in the
case of the life sciences experiment and in the case of the
material sciences experiments as we talked about with John's
experiment; and even as a repairman, now in this case where Ulf
actually got out the tool and took the front off ...
CHAPPELL  In the case of the material sciences experiment as we talked about with John's experiment. And even as a repairman, now this case where Ulf actually got out of the tool kit and took the front off of the Isothermal heating facility and fixed it, got the sample out, put in the next sample, put it back together. The sort of thing that is very difficult to do with free flying Spacecraft and easily possible when you got trained crewman onboard. We've seen the use of Spacelab free from the influence of gravity in both the fluid physics module experiments, and the life science experiments. We've seen the ability implied use of the Shuttle then to return these samples to ground, and specimens, once the analysis are finished and we've seen once again the Spacelab used as an observing platform for the astronomy experiments, and for the active experiments in the SEPAC. So, I'll stop there. John?

PAO    Alright, let's take Jules in the back.

JULES BERGMAN  (ABC News) I was wondering since Ulf has already repaired the Isothermal jobby, do his skills extend to repairing the high data rate recorder that's failed? Or does anyone else onboard do that kind of skill?

CHAPPELL  Jules, I believe, I would like to delay the details of the HDRR thing to Harry, I think Harry Craft and the Flight Director will be up after we are, and I would like to defer the specifics of that. I believe there are repair procedures being talked about at this point, and I shouldn't go into anymore detail I guess.

PAO    This gentlemen right here.

    Yes, this is Dr. Knott, physicists --

PAO    Identify yourself--

PETE SPOTS  (Christian Science Monitor) Your description of the aluminum zinc mixture experiment was rather intriguing, this may be somewhat speculative, but do you foresee the possibility of using these kinds of techniques on a larger scale to come up with let's say alloys, that were made out of more common metals that would reduce our need for some of the rarer metals that were currently using in structures. You said it was a very lightweight and strong, seemed to be a light weight and strong sample and seems to me like airframes or something like that, at some point would have use for this. Do you see this as perhaps eventually leading to the point where we will reduce our dependence on the more rare metals that we are currently using for some technologies and allow us to use some of the more common metals.
KNOTT  Well it depends very much on the application you have in mind. This particular experiment is looking for a very strong kind of metallic material which is of low weight. And you already pointed out possible applications. The other investigations onboard, for example, later on we have come to investigations which will into processing steps which will do so called composite materials. And these again show other very beneficial effects. These composite materials cannot be made again with the same type of purity and (garble) distubtion as their can be in Space, these experiments basically utilize the absence of sedimentation of heavy material in the liquid phase. And one application of a composite material for example is the fact that one can make excellent material for so-called slide in contacts, out of these materials. Later on, when the time comes I will tell you more about it, and there is a material being processed that will generate a composite material, and that will then be a basic material for sliding contacts. There is another investigation which I report on later about, in more detail, and they are looking for some so called synthetic, they are, generating so called synthetic materials, these are non-metallic alloys and principle which show metallic, electrical conductivity which usually, which so far only metals show, high conductivity which only metals show. And the theory so far is that if these generated as very very pure crystals, the purer crystal will be the better the conductivity will be, so if you generate a very very clean and pure crystal in space, the more offers a material which shows some sort of direction of super conductivity. Without having to cool these materials through these very low temperatures, these are the kind of expectations we are the kind of expectations we are after. There is no guarantee of course at this stage that these expectations will be fullfilled, and this is only the first step in the very long investigation. There are kinds of applications which finally could come out of these investigations.

PAO  Dave Dooling.

DAVE DOOLING (Huntsville Times)  Rick, assuming that the HDRR can't be recovered, what is the potential impact for the onboard science, and how big a job would it be for you and your people in the POCC -- in trying to shuffle the timeline to make do of the resources and still be available?

CHAPPELL  Again, I think I shouldn't speculate too much on the recorder, because I think there are alot of things being considered for it right now, and I believe we don't want to generate a picture that may end up not panning out. In general, what we are doing right now is to record the data on the orbiter payload recorder, which can record at megabit rate. And we're essentially using that, filling it during the LOS periods and dumping it during the AOS periods, that is the situation right now.
DOOLING But if you have to continue operating that way, you would have to eventually start reshuffling the timelines wouldn't you? And wouldn't this be a larger effort than had been, then what you normally go through in the 12 hour --

CHAPPELL Again, just from a first look, the high rate in to first order, the High data rate experiments are operating during the AOS periods, in which then, the recorder is not needed. And by and large, the lower rate experiments can be handled by the orbiter payload recorder which is being done right now.

PAO Gentlemen with the hat.

WAYNE DOLCEFINO (KTRH) Without getting into the repair part of this high data speed recorder. I'm curious whether or not from the stand point of quality, when we're talking about extending the mission one day, for instance we don't have this recorder for the rest of the mission. From the science stand point, would it take away the attractiveness from another day of science?

CHAPPELL I don't think it would, but let's as I mentioned earlier, Harry I think want to address the high data rate recorder when he's here and --

DOLCEFINO One other question from the experimenters point of view, if we don't have TV coming down because of that recorder, what will that mean to the experimenters not being able to visualize some of their experiments. For instance, the experiments with the eyes and something like that, any impact from their (garble) stand point of what---

CHAPPELL They have the onboard recorders for video functioning fine, and that is the way they are doing things right now. For example, we did a dome run just at the end of this last shift in which Bob Parker was the subject and Larry Young who is the PI they used the video camera for that, things went fine, they recorded the data onboard, and the payload specialist and the mission specialist described the sensations that they were having, and that of course comes down to the investigator and things worked out fine.

DOLCEFINO One other question about the AEPI on 003, is it my understanding that it is stuck out now, or are they talking about if what if it does get stuck out?

CHAPPELL It is currently a position called being in the locks, it has gimbals and so, then it has a cradle that comes down in that it holds it, it has lock pins that holds it for launch and landing. And it is currently in the locked position with the pins. And, they are looking at essentially the locking procedure
and the stowing procedure. The instrument, however, was set up so that it can operate in the locks, and it looks out over the wing when it is down in the locks, and so what is being done now is that the investigator puts in what we call replanning requests, where he asks for a new attitude, and the shuttle does the point for him. That's essentially the ---

DOLCEFINO This is for us non-technical radio guys. This compound of zinc and aluminum, could you perhaps maybe give us some idea of what it's applications would be, because I don't have the faintest idea. Just in practical Earth wise, what applications might it have, where?

KNOTT Earth wise it may not have all that many applications, because they are only looking for light and strong materials, if you want to go away from the answer, if you may have it's application in Spacecraft construction and Space station, things like this.

PAO Okay, right here.

LEE DEMBART (Los Angelos Times) Dr. Knott, two days ago, you told us that the drop and shock experiments had been completed, despite the indisposition of one of the crew members. Mel Reschke one of the investigators on that project says, and I quote 'that that statement is inaccurate, and that Byron Lichtenberg was not able to complete the drop and shock experiments and that he's been trying to get them rescheduled, so far unsuccessfully' so I want to inquire whether you want to revise that statement and whether there are any plans to schedule the conclusion of that experiment.

KNOTT Well, I can just tell you what I said at the time. I said at the time the experiment was carried out, and we developed some problems at the very end of it. That's what I said.

DEMBART Well, if I may quote from the transcript, you said 'this task was successfully completed except for some minor difficulties which developed during the end of it, but this was overcome by workaround' and when I read that to Dr. Reschke he said that statement is inaccurate.

KNOTT That was the situation as I understood it, immediately going off shift. The complication was of course limited as you know, sometimes you only get the information once you come into another acquisition period.

DEMBART Well, what is your understanding now?
KNOTT  My understanding is that he lost the hop and drop on one of the subjects and that he is continuously feeding in the plan of requests in order to recover it. The difficulties in which we are in this investigation is the following one. The hop and drop test is a

***
KNOTT  My understanding is that he lost the hop and drop on one of the subjects and that he is continuously feeding in the payload requests inorder to recover it. The difficulties in which we are, in this investigation is the following one. The hop and drop test is a disturbance to the micro-gravity science, and this is why we had scheduled all the life science experiments, this type of life science experiments for the beginning of the mission and we shall repeat the major of them again at a time when these long duration material science experiments are beyond the stage of the crystal recreation. Once the crystal is grown to a certain stage, then a smaller micro-gravity disturbance is caused by the hop and drop and that will disturb it any more. So we are trying to find a suitable opportunity to repeat this investigation.

PAO  (garble)

OLIVE TALLEY  (UPI)  We understood earlier today that a portion of the electron gun on SEPARK was not working. Is it working now, and was there a problem. If so could you describe it?

CHAPPELL  The status is, they are looking at the data right now. The status of it as they see it, they had a series of 3 or 4 different runs. On one of those runs the beam itself shut down. On the following 2 runs, the data that the onboard crew had as it was operating said that the runs went to completion. What they need then is the particulars of all the data taken during that period back to analyze it, and they've gotten the early parts of that thru the playback data that came down. And they are analyzing that now. As of right now, I don't think they have a prognosis of whether there was a problem or not.

PAO  This gentleman right here.

GARY SCHWEITZER  (CNN)  Rick, do you have a ballpark on when possible other satellite viewing was made during SEPARK?

CHAPPELL  Well, let me see. As you may expect some of the hours are beginning to run together for us, but let me get that time for you Gary. I can look it up and find it, but I can't tell you now specifically when it was. It was about 36 hours ago.

SCHWEITZER  Was there a comment on that viewing at the time?

CHAPPELL  Yes, they saw it and they said, first of all "I wonder what that is," and then since they're all scientist they hypotheses started developing, and at this stage I think the one that has the most votes right now is that it was a satellite, although there are other possibilities, certainly.

PAO  This lady right here on the isle.
JACKIE JUDD (CBS)  If the mission is extended by one day, what would be on your wish lists for the sort of work to be done with that extra 24 hours.

CHAPPELL  There are just lots of things Jackie, what we have done, let me give you a little bit of background. When we've gone thru simulations, one of things that we always simulate is if you had to cut the mission short for some reason. In doing that, we have always protected the idea that we would have about half a day, a 12 hour period that we would replan to do the best that we could for the over-all science disciplines. So we have an approach in replanning that allows us to look at how things have gone, and then to use that time period for both doing the best we can toward each of the disciplines and in fact enhancing things where possible. Now that approach that we developed for shortening mission, but it applied very nicely to length mission. What we would do is later on in the mission, we'd look at how things are going, we look at our balance between experiments and disciplines and then we plan the optimum use of that last day, which I think would be a great bonus for the experiments if we get to do.

PAO  Wait for the mike.

Is it a technical impossibility for new experiments to be initiated or is it just better to plan on some redundant . . .

CHAPPELL  It is entirely possible for new experiments to be initiated, depending on how you define new. For example an instrument already onboard could be operated in a new mode or observe a new stellar source for example, and in that sense you can do new experiments, yes indeed.

KNOTT  There are a few things already known which we can not do on the last day, because as you probably know from the 7th day of this mission we will not have any more night time in orbit. We will go to a continuous sun. And experiments which can only be carried in darkness, we definitely know already that these experiments can not be done. There are certain global experiments which even though they are not opposing the extension of the mission, they just have a very neutral attitude, they will not gain anything.

PAO  We will take one more question here and then we'll go to the other centers, and then return to Houston. Sue Butler.

SUE BUTLER (Time and Space World)  I'd like to ask about the question concerning SEPAK, wasn't that one of the experiments targetted for reflying after the mission slipped by a month?

CHAPPELL  Yes it is.
BUTLER And what, would you have gotten enough good results on this flight, is it still definitely on for reflight.

CHAPPELL Yes it is.

BUTLER And the second question is, and perhaps I'm totally out of line, but in reading about it it suggests that it might have its application also in, and I'm no physisist, particle beam studies, particle beam as in the nature of defense of the countr. Is this correct?

CHAPPELL Not in the defense area. Its particle beam studies as related to the general topic of the interaction of energetic particles with plasma, which takes place in this case, there using it to study to auroal, the natur auroal, but that takes place in stellar environments and planetary environments throughout the universe. So its a study of beam particle, beam plasma interactions as applied to the general physics of the universe. I think not, because this is a very modest power beam. I'm not an authority on the military weaponry use of beam at all, but I'd imagine that they are more high power than this is. This is quite a different thing.

PAO Ok, we'll now turn to the European Space Agency News Center in Cologne-Portz, West Germany.

PAO This is Cologne-Portz, we have some questions.

PAO Go ahead.

This - - of Germany and Frankfurt - -. We heard much of Ulf Merbold as a troubleshooter with the different scientific and technological experiments, but we didn't hear anything of the blue shift. Did they not have similar problems, or is that we just didn't get the message over here in Europe?

KNOTT Well, let me answer that question, because I was on duty while the blue shift on board was on. It just happened that the red shift was the unlucky one who had to troubleshoot. It occurred during the red shift. During the blue shift, I don't recall any incidents of the nature of the two nature which you described here which would have called for crew interventions. So blue shift is standing by for similar type of repair jobs, and they certainly equally trained to do it, but it just, the opportunity did not occur for them, and I hope that it does not because, this is the kind of troubleshooting which you would if at all possible, would like to avoid.

LEO ENWRIGHT (Irish Television) I wanted to ask a little bit about the microwave remote sensing experiment, according to my little handout here, that experiment should have started an hour ago. I wonder if you could tell us how it operates, broadly
speaking, if it is in constant operation, and also for the
benefit of my own viewers, whether or not it will be looking at
Ireland, or can you say.

KNOTT  Well, this experiment has so far not been operated, it
had its first scheduled operation during the last shift, it was
initiated and the experimenter was an extremely busy (garble) at
this stage, in order to check it out. It is also my
understanding that there have been a few initial difficulties
with that checkout, however, I'm not informed at this stage, and
I don't thin" the experimenter is to make a very definite
statement on how he is getting on because he only was in the
very, very, initial stage of the activation of his experiment.

I understand that you activated the metric . . .

***
---then you activated the metric camera during this last shift, the question is did you get reasonable pictures of Europe and how was the cloud cover?

CHAPPEL I believe, I did not talk to the investigator immediately after the pass, but I know shortly before I did talk with one of the metric camera investigators and he said things looked very good for the pass over Europe. I assume that meant the weather was favorable at the time, and I know that they carried out that particular set of observations. But of course we won't know the results until the film comes back, but I believe that sequence of pictures were actually taken.

KNOTT That sequence was definitely taken, and I guess the European know better then we do over here how the weather is in Europe.

(garble) can I get you to go back the microwave again, could you tell me just how it operates. Is it continuous experiment and also to repeat that question, if you know whether or not we're looking at the island?

KNOTT These experiments operate in a number of different modes, one is a 2 frequency mode, where it is looking at the sea, we are starting to determining the spectrum of the ocean waves. And then it is operating in the soundmode, where it is imaging the earth, and doing this independent of cloud cover. It has a number of predefined targets. I'm not sure that you are asking if the island is one of the targets, is that your question? I'm not sure that island is on the target, but I will check it for you.

Thank you and that's call from (garble)

JOHN Okay, we'll now turn to the Kennedy's Space Center from Florida for questions?

(garble) from LBVC, two or three very quick ones. Going back to Merbold, the repair Istothermical Heating Facility, was there any danger involved in this? Presumably it was very hot?

KNOTT I don't think there was any danger involved, it has an automatic mechanism in the Isothermal Heating Facility, which only allows you to open the door of that facility, if the sample has cooled below a certain temperature threshold, there is not, so there was no danger.

CHAPPEL And it had been cooled down at the time.

And how big do you expect your crystal to be at the end of the 60 hour growth process.
CHAPPELL Are you talking about the protein crystal.

The crystal that your spending 60 hours growing.

KNOTT The expectation of the investigator is that it will be about several millimeters, several millimeters big. Sufficiently large to be investigated in the, under the microscope. In this, by this very special technique which Rick had discussed earlier on.

And my last point, we were promised but didn't get I think some TV of the mass discrimination experiment, I presumably because of the high data recorder failure. Can you tell me if this did take place and whose turned it was to play the ballgame this time.

CHAPPELL Let's see, I think it was done on this last shift, and I cannot remember now which crewman did it. I can get you that information, I will have to go back and look at my time line. It was done.

Okay, thank you.

That's all from KSC -

JOHN Okay, we have about 7 minutes left, if you have any questions here at the Johnson Center. Jules in the back.

JULES BERGMAN (ABC News) - To Dr. Knott, Jules Bergman, ABC news, I want to be sure I understood you precisely, before in answer to the earlier question up front about the alloys experiment. Where you implied where I was saying, I think sir, that yes indeed it would be useful in future, high structural strength aircraft members. Did you really mean that and would the shuttle or future space stations be able to carry enough such materials for practical use?

KNOTT - Basically if the material is of suitable quality of that particular application. I would say lines of the material is, the more of the material can be carried. This application which I described which is definitely an application which the investigators had in mind when they sent out to do this particular type of experiment.

BERGMAN - Maybe I'm asking the wrong question to the wrong person, or the right question to the wrong person, or something. What I'm getting at is that a practical use to make such high strength material, will shuttles be able to carry enough volumetrically in weight that is? To make practical use, for example, if we are building a new transport, or Germany is and you want a lighter weight longer one or rib, rather than go the composite route, which the aircraft industries seem now to be
headed, would you go this route and would it pay off? Could you sent materials, the raw materials of the alloy up to orbit, manufacture it there and back down at an economic rate?

KNOTT Okay, I got you now. This is an experiment which is basically looking at the fundamental of the experiment. It's just looking, it's an easier way now on (garble) gravity to make this type of material. A very easy way to make it, make it in a very nice form. And if it can be shown now on the shuttle that it can be done, that this is a viable route to go, I'm sure that more sophisticated type of techniques of (garble) of mixing techniques and so on will be pursued on the ground at this time of low weight, high strength materials can then also be later on produced on the ground.

JOHN Gentlemen right here in the blue.

GEOFF LEAVENWORTH - Time Magazine) - Are there any experiments that will be, or could be adversely affected by a mission extension, if so are you any investigators that are lobbying against such an extension?

CHAPPELL To first order, there are not any that would be affected. There are some particular details that need to be looked into. We did a very first order polling of the investigators and I think over 70% were in favor of doing such a thing, and 30% were neutral. Nobody, there was nothing so obvious in being detrimental to an investigation that anybody said "no" we shouldn't do it. So I think it's a fairly uniform vote of confidence for doing such a thing if it is possible.

JOHN Mike?

MIKE MECHAM - (Gannett News Service) - Not (garble) to much here, but can you just explain why, I'm not quite sure I understand, why the aluminum wouldn't be liquid at the same time that the zinc is liquid. Why is one not quite liquid there?

***
STS-9  SCIENCE BRIEFING  pl6jg  12/02/83  08:45 am  PAGE 1

KNOTT  These 2 materials have different melting points.

MECHAM  I understand that they have, but why wouldn't you just raise the temperature to the point where the aluminum also melted...

KNOTT  Just in order to get an even distribution of the already solid zinc and the still liquid aluminum.

CHAPPELL  If they melt at different temperatures, if you heat high enough to melt both of them and if they have different densities they'll begin to settle out. That's one thing that happens. But even if that doesn't happen for some reason and you resolidify, one begins to solidify before the other. So then you've got a solid and a liquid again and then you've got a problem with uniform mixing. Does that make sense.

KNOTT  If you have a liquid with solid particles in it. What happens when the rest of the particulars if they are heavier then the liquid sediment...

MECHAM  Not up there.

KNOTT  Not up there. That's exactly the thing we just (garble).

MECHAM  Okay, my question was why are we not, why wouldn't you mix both of them in a liquid state up there?

KNOTT  Well, initially you do that. And then you start cooling down and then the one solidifies first and then the other one. But you go to a stage where one is already solidified, the other one is still liquid and that's the way you obtain this product.

PAO  Right here.

OLIVE TALLEY (UPI)  One more clarification point please on the high speed data recorder. You said that you were conducting high data rate experiments during the TDRS passes and that you were conducting the low data rate experiments during LOS and that that was, you were functioning in that manner. Is that first of all a change in the plan? Had you always done it that way? Was that an adjustment because of the problem? And secondly, are you or are you not losing data and if you continue at this rate how long can you go before you might lose data?

CHAPPELL  I think my first answer to the high data rate recorder question was you should ask Harry Craft and I think I should encourage you to do that. I believe he is quite anxious to be the one to deal with the question and not me and I should really defer it to him.
TALLEY  But can you even explain whether or not this has this change in recording high data rate experiments during the TDRS and the low data rate during the LOS. Is that a change in the plan?

CHAPPELL  That hasn't been a change.

PAO  Do we have any other questions. If not, we'll conclude today's science briefing. Thank you all for attending. We appreciate it.

CHAPPELL  Thank you.

END OF TAPE
PAO  Well, good evening everyone. Welcome back. Here to brief on his shift is the off-going Flight Director John Cox.

COX  Thank you John. The crew continues to be in excellent spirits. Brewster I think had a really good day. Things are pretty quiet as far as the conversations went with the control center to the crew. As a matter of fact I think Bob at the beginning of the shift, (garble) maybe was a little too quiet. But as the day went on, we found out that the business was pretty routine. We did not have any major problems come up during the day and they were pretty much nominal. Some of the things that we did - the sluths in the system were working pretty hard and worked on a few more of the little goodies. We put a patch into the SM computer. The naval the Spacelab comes to run - the only problem that we had all along turned out to be that just the flag wasn't set to enable them so they went ahead and fixed that. We suspected we had a little gas getting into the water system and we've pretty much concluded that we think that's hydrogen from the fuel cells and what we have is a hydrogen rate that is about 2 or 3 times the spec number. It's no great concern but that's a little frustration of the way we have to manage the water tanks - dumping them to keep that under control. During the previous shift we had had an indication of a leaking primary jet R3D. During the last shift we went ahead and enabled that jet and uses history from previous flights we have found that those jets basically seal themselves off after a little while and looks like this one maybe on it's way to doing that, taking a little bit longer than some of them though. Other than that, things went fairly well today. We had a very good shift.

PAO  Questions. Craig Covalt.

CRAIG COVALT  (Aviation Week)  (Garble) starting to get into the busy maneuvering schedule today. Can you tell me how many you've - maneuvers you did perform and what we might see tomorrow?

COX  I don't have the numbers. I can get them for you afterwards. It was a pretty heavy day as far as lot of maneuvers, boosters starting to do quite a few of them. We into the tight deadbands. As a matter of fact I think we added a little bit to that. There was a concern in the tight deadbands about the many thousands of vernier jet firings we were going to get while we're holding .033 degree attitude and we're going ahead and relaxed the amount of time that we need to stay in that attitude to test the data date time so those are a little bit of extra. It is a little bit extra callouts for them so maybe - we added three or four maneuvers today but they're really just DAP changes.

PAO  Anything else, Craig?

COVALT  He kept up with then all 100 percent.
COX Couldn't find any problem with them today. No.

PAO Lynn Sherr.

LYNN SHERR (ABC News) Just to set the record straight, John. Do you know what went wrong with the communications system during the press conference?

COX Well, so glad you asked. I won't answer the last par' cause I don't know and the first part is all I did was go to a nice tour of the building to find out what has to be hooked together to what, find out how things worked. If you can picture a telephone operator about 25 years ago plugging in all the - there's a patch panel that this comm had to go through and just to simplify it, voice circuit came in at one place and there were nine panels later it had to come out and along that panel, if you stand back to look at it for this Spacelab configuration, the POCK and all the voice loop modifications that we have to accommodate this flight, it just looks like a bowl of spaghetti all up on this wall. It may be 15 or 20 feet long, full of holes and wires and it just so happened the way the rules work on that you pick up one of these main lines you put it in one side you... only allowed to take it out once at the other side. That had been checked somewhere - checked 3 or 4 hours before the conference was suppose to take place. That brings you up to the air-to-ground system. What they did do just prior to the pass, was did check the fact that from the air-to-ground system up, in other words, while you would take the output of that big patch panel, they inserted a tone there and said, ah ha, the system works. They didn't go back all the way to the source and so happened that somebody else set the little cable in there in the meantime sure making or breaking another patch and it just missed pulling one out and that turned out to be the culprit. That just didn't stand out in that whole field of spaghetti. They found it afterwards. I think they are probably going to go ahead and do a check just to make sure that was the problem. Probably sometime the next shift or so, I'd suggest that to them. It's a very simple little thing (garble) day of automation we had just a big manual patch panel and one of those little connectors didn't get in right.

SHERR Let me just follow up if I could. Is it because of Spacelab and the two air-to-ground systems that it was more difficult that it was a problem this time as opposed to last time or is it just - was it the exact same system and it just didn't work this time?

COX I think if you have that much of a manual system you have that great of a change to make a mistake but it was aggravated by the fact that there were more wires over there. They estimated somewhere as 3 times as many hookups on that panel as you would normally would have so it just adds to the confusion of trying to
see things. The troubleshooting just didn't get finished before loss of satellite.

PAO And the plug was in. It just wasn't feeded.

Cox Right. Well that plug was the guy that was causing the trouble. He shouldn't have been in at all.

PAO (ga. le).

AL MARSH (Aviation Week) Are you going an extra day? And what will the leaking thruster effect those plans at all?

COX Okay. Two questions. The extra day thing is still up in the air. I guess what we're doing right now is collecting inputs. Anybody that would like to do something if we had an extra day is trying to fill the bag up. The Orbiter people are all proposing tests and what not and that's all going into the bag and the POCC people are taking whatever inputs they get from different investigators and we haven't checked it out to see what's going to turn out to be the things were doing. When we get down towards the end of the flight again, weather will be probably the big driver of what we'll really will do. The extra day if we have it. Would be added just prior to closing up the shop. You just come up to the last place that you were making payload attitude maneuvers and from that point on the other day so we'll still be watching the weather. Now as far as the leaking jet - the leaking jet will probably save itself if it behaves like all the others. So nobody is anticipating that to be a problem. The amount that was leaking was very low rate so nobody - that's not going to be a margin problem on quantity or anything so no I don't think the leaking jet going to be a problem. And as a matter of fact as far as the rules are concerned, that jet is perfectly available for reentry it's just a little funny right now, we're working with, keeps the prop as busy.

PAO (Garble) name and affiliation, John, you need to adjust the trim on your mike.

DOUG MILLER (KTRH) How might the leak of hydrogen effect your possibility of extending the mission? Would that have any impact whatsoever?

COX No, as far as duration goes, Brewster asked that question during the flight and the guys went around and figured out the numbers. It's .0005 pounds an hour which you can't even see in hydrogen budget that we're using so as far as the amount that we're consuming that's no problem as far as it contaminating the water or making it a drinking problem, the tank that the crew drinks out of is basically filled preflight which just about would be enough to be for the whole flight. We haven't had any
significant amount of hydrogen to that tank so that doesn't appear to be any problem. And even if we did add it, it's not a serious amount to get concerned about.

MILLER And what's the possibility of an extension? Could the timeline be slid back in such a way - I don't know if this is exactly up your alley, but could the timeline of some of the experiments be slid back in such way so that their not having to fit so many potatoes in that small "ack."

COX I think you have to ask those folks. I expect based upon all the training we did with these folks, part of this flight they'll probably stay pretty much on the timeline up until that point in time. And what we do after that is you're guess is as good as mine at that moment.

MILLER And what else would you have to address before you make the decision to extend the mission. Could you give us a rundown of things you're going to have to take and do --

COX Well, we're looking at consummables. It looks today like we're going to have good shape in the consummables. You look at the weather and the landing site opportunities, state of the lakebeds at Edwards and whether or not there is rain forecast or not forecast for the upcoming days. Also, when you get the pilot things all put together is it worth doing. Some of the experiments will have consumed all the consummables will have lost their opportunities or it may be very low priority things that there asking for doing and don't really care about it so if it doesn't buy you much to stay in orbit you know the decision might be made not to stay up an extra day. It may seem kind of strange but on all other flight, we don't try to squeeze all the consummables down to the last little margin. It has been that sort of attitude with the Spacelab flight though that - because we've tried to go for a fairly long flight and get a lot done. All the discussions have always tried to squeeze the consummables. So we found that we had a little extra so naturally the tendency is hey, we'll see if we can get a little more. It's not necessarily in bias a whole lot to do that so we're all looking at that. There's a lot of different considerations.

***
When you get the power of things all put together is it worth doing. Some of the experiments would of consumed all the consumables or have lost their opportunities or it may be very low priority things that they are asking for doing and don't really care about it so if it doesn't bother them much to stay in orbit the decision might be made to stay up another day. It may seem kinda strange, but on all other flights we don't try to squeeze all the consumables down to the last single margin, it has been the that sort of attitude with the Spacelab flight though, because we have tried to go fulfilling onflight and get a lot done. All of the discussions have always tried to squeeze all of the consumables, so, we found we had a little extra so naturally the tendency is we'll see if we can get a little bit more. It's not necessarily going to buy us a whole lot to do that. So, we'll all look at that, there is alot different considerations.

GARY SCHWEITZER  SAN ANN It occurs to me that among the things getting the extra workout with the largest crew and round the clock, around the world mission, is the waste management system and yet we've heard no problems, is it cured?

COX    Well, let's hope so. I sure don't want to talk about that one.

SCHWEITZER    You haven't heard anything?

COX    There was a (garble) but there was a comment that (garble) Brewster came down with several different statuses of different things, and that was one of the things they were having problems with.

SUE    (Time Magazine and Space World) I have two questions. One of the crew members reported earlier on a horrendous smell, I believe this was in one of the lockers, was it ever established? What this odor was?

COX    That went right by me, I don't know.

I think that was on Chuck Lewis' shift, and I'm not sure what it was, it was something in the middeck, I guess. Around one of the food storage lockers, and I don't think it was anything serious.

SUE    You don't know what item produced the odor?

To my knowledge, they never followed up on that. And it wouldn't be anything that happened during John's shift, I'm afraid it was something like 4:00 this morning, I guess that it occurred, and it was on Chuck Lewis' shift. We can leave a note for Chuck and see if he can respond to that.
COX Most things like that get scrubbed out pretty quick, if it all this other package got opened and it had an odor in it, it would be scrubbed out on the system anyhow, it wouldn't stay around.

SUE Another question is, apparently there has been a problem with the RAU 21, it was a problem and it now seems to be working. Can you confirm that this RAU is working correctly?

COX Keep your fingers crossed, it's working like a top.

SUE And one short question, then I get off the Mike. Is there a power outage at White Sands and what exactly is causing it?

COX I don't know exactly what caused it, they have just finished the troubleshooting that, and was back up as I left. The (garble) was they lost a computer facility there. And they did get the computer system back up and reverted, we ended up losing one TDRSS pass as a result of it. I think just on the whole the White Sands support has been outstanding. I don't know what caused it, I'm sure we'll learn here but I tried to stay out their hair as they tried to get their problem fixed and up and running again, and try not to bug them a whole lot. And afterwards you ask them how did that happen?

PAO Jules Bergman please, and the folks in the MOCR turned out to watch the press conference and the surgeon says that was probably fresh fruit stored in one of the lockers that was something less than fresh.

JULES BERGMAN (ABC NEWS) John, can you comment in general on the, is the quality of communications so far and has TDRRSS lived up to your expectations or been below them?

COX Well, I think it's been very good, in fact even better than expected. We expected outages kinda like today to happen a little bit more frequently. I don't understand that whole White Sands facility, but they're not built with quite the redundancy they we have, at least they don't have it all on line yet. And when they have a little hiccup somewhere along the line then you generally expect them to be down, but we haven't had any problems like that, they've been up supporting very well. As far as the satellite coverage has been and the data that we've been receiving, believe that it has been better than we expected knowing that we had this forward link problem with them. Couldn't use the tags, that's also the problem in the fact that you can't talk satellite dish to orbiter dish to keep them pointed actively. And we've had real (garble) in order of plenty. We expected a lot more drop outs then we are actually getting so I think just on the whole, we've been pleasantly pleased.
BERGMAN   Can you give us your version in 20 seconds or less of why there has been so little TV?

COX       I think there has been quite a bit. My shift has not had a whole lot of television. If you look through the PAO scheduled releases, there are quite a few. We don't do a lot of television on this flight where we had in the past where a lot of show and tell work and looking out in the bay, and this type of thing. Most of the television is science oriented, and is coming down in support of different experiments and there a few of those other things in there, but I think on the whole they are using the TV system pretty much as a science data collector. And that doesn't make a whole lot of interesting things for just the general person on the street.

BERGMAN   You also miss a lot of interesting things, when your not in the right position to get them live. Like the rotating chair experiment, like the dome, things like that.

COX       Yes, I do think remember seeing the dome one of those times.

BERGMAN   Well you stay awake more 24 hours better than I do then.

COX       Well sometimes we get them to play some of that back for us, during a along LOS.

PAO       Craig Covault again.

COVAULT   John, what have you sent up on the teleprinter today, that might be worth discussing? Any visual ops type messages or otherwise?

COX       I think there was one vis ops thing, but it was just standard type things. There was one vis ops that called up as (garble) erupting and I think rev 58 they're supposed to give camera settings and whatnot to get that. Plus, I think pretty much looking at flood plans here of (garble) things that are always there, any time you fly over you can always see them.

PAO       --(garble)

DOUG MILLER (KTRH) Could you review for us why the reluctance to land on the concrete runway this time?
COX I don't think we have very strong objectives, we have a pretty good (garble) and I think just in general, with that heavy a landing to have a lot of runway to land on. They could land on the concrete if that need be.

PAO And no questions from the other centers, nothing else here, thank you all very much.

END OF TAPE
At this point the chair dominated the room.

Craig: The landlord can only be held responsible if conditions are such that you cannot possibly live in the house. Of course, we have the council records of rent, so...

Fleming: A question for Mr. Craig. In the last house, the premises were not properly prepared, since we were only in the building. It has been a rather testing experience for the council. And I don't understand what a phrase such as 'you haven't been sleeping' means. I wonder if they have been cut off to your effect this is a sign of...

Craig: Craig may want to address it as not as well. They are on the time line so I thought that before I could ask, and we've within minutes literally of where we can listen to do. I don't know the case to this detail, and your particular case, but I knew were on the time line and it's quite a great deal of time or part of the case on this to maintain.
If we go to the Bradleys and the Warner place, will you be able to help us out? We think they may have some idea of what's going on.

Gary Hall, it's not a good idea, you're looking to the Government and not getting anywhere. You're a dead end and no one is going to help you. I think for the moment we should not go outside of the area. We aren't going to be causing any trouble, we're just our usual thing.

PD: OK, Gary.

Gary, you're acting like a child. There are no easy solutions to this. We have to work through this situation. That is not easy, Gary. You're not thinking about putting yourself in the middle of things. That's not going to work unless you take a hard look at what you're doing. The consequences just are not talking at all.
Chart, we had an interview with Mr. X. He told us about the problem with the system. He said that if we don't fix it, it could take five minutes, and in that amount of time we do not have any information that he has. And then he explained his plan to come up. It is possible that this old

...
OK, I think we should like to take a moment and ask now, and we'll come back for any time on additional now.

But continuing... I mentioned it was not yet enough to explain what exactly is going on that was it going to protect and what time to get their aid...

I was in the control center, but I couldn't follow anything.
PAO

Okay. Thanks for coming so late in the evening. Change-of-shift briefing from off-going Flight Director, Larry Bourgeois. Larry, why don't you charge down through the day's activities and we'll go to questions.

L. BOURgeois

Okay. Well the day's activities were basically nominal. All the Orbiter activities went off as planned. The Orbiter systems are doing excellent, and speaking to Harry Craft on the way over here, I asked him if he had any message for me to convey to you, and he said "the only word I can say is fantastic. Extremely happy with what's going on. The Spacelab, the VFT data is looking excellent. The thermal characteristics of Spacelab during this cold test are looking super. All the temperatures are well within the expected range in basin bid isol, it looks like most of them went on the warm side, so thermal in Spacelab, as well as systems wise, Spacelab is performing superbly. Again, consumable status, we still are running very good on the cryos as well as the propulsion consumables. Cryos, as was stated yesterday, we still have enough PROP for another extension day if we needed it. In PROP's, the same. We've got about a 1000 lb positive margin in the propellant budget. As far as key activities we had today, we did discover there was a basic generic problem in the SPA computer in programming that the program running in the SPA computer will now require that we cycle the computer off once every 24 hr. Apparently there is a design problem that after the computer runs for a period of time, it gradually writes into areas of memory that could eventually wipe out the program if you don't reset it by turning power off and then on every 24 hr, and from now on we'll be doing that, cycling power on that computer. Ku-band tests this morning, we did have a event this morning with Ku-band system where we went to command the Ku-band transmitter on the traveling wave tube and it wouldn't come on for one pass. We subsequently went into troubleshooting procedure where we cycled power to the entire Ku-band system and were able to reset the system and were able to turn on the power to the Ku-band system. Subsequent to the event, we've learned from the engineering people that this is a problem you could expect if the temperatures in the Ku-band system got down to -- in the teens, 12 to 15, 12 deg and the temperatures were approaching that at that time this morning. And as you know, we're in the cold case attitude. In that attitude the OMS pod appears to shadow the Ku-band system so, essentially we're seeing no Sun for this long period of time, so what we've done is, we've chosen to keep the traveling wave tube powered up continuously. Normally, we would turn it off during periods of LOS to save power, but we've decided to leave it on continuously and since we've done that, the temperatures have warmed up to a comfortable 60 deg and the Ku-band system is working properly, working nominally, so everything is looking real good there. We'll probably discontinue the continuous transmitter power on after we terminate the Ku-band, I mean the Spacelab cold test. Another
point of interest is, this upcoming shift, we had planned to switch from the Spacelab pressure control system 1 to pressure control system 2. We have two pressure control systems in the Spacelab and this switch we were going to do was where we wanted to operate on 1 for part of the flight and then 2 on the other portion of the flight just to verify both systems are working properly, but the spacecraft Orbiter configuration is so tight in that we have such little leakage from the vehicles, we haven't see enough cycles from nitrogen to oxygen in the pressure control system, so we decided to leave the pressure control system 1 on longer just so we'd have time to see more pressure cycles in that system. Another thing is, with the lower power usage, and again, we're about 1-1/2 Kw's lower, kilowatts lower than we expected. We're not boiling as much water from the flash evaporator as we had expected and this has given us some difficulty because with the Spacelab science going on, we have to schedule our water dumps in particular periods of time where we don't interfere with the science activities. This is becoming more and more difficult because we have more water to dump, we're having a harder and harder time trying to find a place to dump the water, so we've decided to go ahead and stow the radiators. We'll be doing that on this next upcoming shift. We'll stow the radiators in hopes that stowing the radiators will cause us to boil more water and reduce the requirement for our water dumps, and hopefully that will solve this scheduling problem we're getting into. And basically, that's all I had to say and I'm willing to take questions now.

PAO

Okay. Craig Covault, Aviation Week.

C. COVAULT (Aviation Week) Larry, it's a science question, but since it's Orbiter attitude dependent, you may be able to help. It looks here like they did get a metric camera path in. Do you recall the area of the Earth over which they made it?

L. BOURGEOIS I don't know when they got the metric camera pass in to be honest with you, Craig.

PAO Carlos Byars, Houston Chronicle.

C. BYARS (Houston Chronicle) Kind of a housekeeping question. The temperatures, are they centigrade or farenheit?

L. BOURGEOIS They're farenheit.

C. BYARS Farenheit, okay. 12 to 15 deg you said.

L. BOURGEOIS Yes.
C. BYARS  Would you mind doing this thing on the buildup of water again, what the cause is and the basic cause for having more water that's not boiling off, and what it is that you're going to do about it, Larry.

L. BOURGEOIS  Okay. Sure. The electrical power load on the Orbiter and Spacelab is running about 17 Kw and we had expected somewhat less -- somewhat more, excuse me, about an extra 1-1/2 Kw. That's the reason we've got such a good margin in our cryo, because the power load is lower on the vehicle than we had expected. Now the water -- to cool the vehicle, we've got the radiators and we've got the flash evaporators. The radiators would normally cool -- take out a specific quantity of heat out of the Orbiter freon loop, and the amount of heat being put into that freon loop is a function of the amount of power we're using in the Orbiter. Okay, so we're using less power, there's less heat going into the freon loop. With the radiators deployed, there's very little supplemental cooling required from the flash evaporator because the radiators are so efficient at cooling the vehicle. When we stow the radiators, this makes the radiators less efficient at radiating heat, therefore, it will require more water boiling from the flash evaporator. Therefore, we use more water.

C. BYARS  I think I'm correct here. You're using less power so you've got less heat going to the flash evaporators. Right?

L. BOURGEOIS  Going to the freon loop.

C. BYARS  Okay now, the freon loop (garble)

L. BOURGEOIS  Flows through radiators and through the flash evaporator. The flash evaporator only comes on if the radiators do not reject enough heat.

C. BYARS  Okay. So you're going to just, by stow, you mean fold one of them in, or what.

L. BOURGEOIS  Fold both radiators in. Right now, they're deployed up so that we're radiating from both sides of the radiators. By stowing them, we (garble).

C. BYARS  Lay them down. Okay.

PAO  Have one side working. Any more Carlos? Back here. Yes.

TOM MENTER (C&N)  The problem with the SPA, how close did you come to dumping your computer program?
L. BOURGEOIS I'm really not sure. We did have an error message some time yesterday. We got an error message which we did not understand at the time and we cycled power to clear it. That was probably an early indication that we were having some problems.

TOM MENTER Did you actually lose anything?

L. BOURGEOIS No. We did not. We cycled power and then full function came back.

WYAT ANDREWS (CBS) Was not SEPAC fired on your shift, and if it was, can you tell us about what was involved there and what the basic reaction of the investigators was.

L. BOURGEOIS I know the SEPAC was scheduled on this shift and it was activated, but I couldn't tell you what the investigator's responses were. Harry Craft would have to answer that.

PAO Doug Miller, KTRH. Way in the corner over there.

DOUG MILLER (KTRH) This particular flight, it seems like the show's fairly well been stolen by the payload. We've talked so much about, we've been talking so much about what happened aboard Spacelab, and so on. How would you compare the performance of the Orbiter on this flight to past flights?

L. BOURGEOIS I would say this is, the Orbiter's probably doing better than we've seen it before. We essentially have no significant system anomalies.

D. MILLER We're hearing less and less about problems aboard the Orbiter. Is that because we're just not picking up as much of the transmissions since it's coming down on UHF and not really going over air-to-ground and we're not hearing it, or is it, in fact?

L. BOURGEOIS I think it is in fact. It is a very clean Orbiter and we're having very few problems. In fact, you know, they'll be one or two. The last time we flew it was on flight 5, so performing quite well considering how long it's been on the ground.

D. MILLER Did you have some concern that perhaps it were left on the ground too long and pick up some bugs on the ground?

L. BOURGEOIS Not really because, you know, it goes through a very thorough checkout before a launch and we had all the confidence in the world in it.

PAO Any other questions here? Any other centers up? All gone to bed? Carlos.
C. BYARS  Try one more, Larry. Anything from the crew at all that you're aware of as far as where they're sleeping, how they're sleeping, this sort of thing. Meals, any little housekeeping details aboard at all that you could share with us?

L. BOURGEOIS  No. The only thing I could say was that early this afternoon, Brewster said he had heard a thump down in the middeck and he went down to investigate and there was no problem down there, and so we said, well, maybe it was one of the guys down there sleeping kicked his bunk. He said "no, if it had been that, I thought they would have woken up". So from that, I assumed they were sleeping pretty good because apparently they were not awake when he went down there.

PAO  Any further questions? Thank you very much.

END OF TAPE
JOHN  Let me start all over by saying Good Morning again. Next
to me John Cox, Flight Director, Orbiter 2 team, next to John,
Harry Craft, Mission Manager, Spacelab 1, and we'll begin with
their remarks and then invite your questions, John.

Cox  (garble) last couple of shifts from the Orbiter side. The
activities have been pretty much by the time line and we can't
a few things that we could fix them and get running into
operational state again, and was very pleased by that. The RAU
21 problem seems to work itself to a nonproblem now. The RAUs
been on for several hours and looks like its in super shape and
hopefully it will stay that way. We had a little funny on a jet
that acted up on us, did a little troubleshooting, and fixed that
one, there was a recorder problem in the Spacelab, Super Sluth
worked on that one and had that one up and running and that one
looks like its in good shape, and just before we came in here
today, we're in the middle of this cold test attitude that we've
been in now for several hours, and we had a funny with the KU-
band atenna, had everybody looking at each other wondering what
happens nexts, and looks like the guys have that KU-Band atenna
up and running and that looks good. As far as the activities
been going, the crew has been performing excellently. The
consummables in exceptionally good shape, much better than we had
predicted. We accomplished trim burn 2 with a 3 foot per second
retrograde burn today. Everything else just looks super. It's
been a very good last couple of shifts, thank you.

JOHN  Harry?

CRAFT  Well a couple of notes I echo everything John said, we're
up and operating fine we have 27 experiments that either are
continuing taking data or have taken data and subsequently turned
off because of there particular point in the overall time line.
The major problem that we had over the last shift, he's
addressed, and that's was RAU21 and that thing is operating
fantastic now, and those experiments are up and operating and all
of them have checked out and we're ready to continue. The crew
is on time line, I checked before coming over here, and I really
believe Byron is now beginning to catch up and get a little bit
ahead and were gave him a few tasks to let him try to build up
some margins so it is looking really good. On the science stand
point I know you had a briefing earlier this morning, and I think
Rick Chappell and Karl Knott gave you a good understanding of the
results, so with that we'll take some questions.

JOHN  Okay, questions, Craig Covault, Aviation Week.

COVAULT  Harry or John, explain in detail what you did to solve
the RAU problem.
COX Wish we had the complete story of the one thing that did the fix. There is a patch in there that inhibits the 100 hertz triplet, that is there at present, we did turn the horizon sensor off for a while, but it's back up and running. We thought that maybe that was related to it, we're in the cold attitude, and there is a thermal theory that says well maybe that's helping the problem. The other thing we've done is several times we've gone in and done the knob and op function giving it a cool off time in between of several minutes. Those tasks have all been performed and we must be up now running for 20 some hours on that RAU with no problems since then, so it's hard to contribute what one thing seems to be doing the job, but all those happened in a relative short period of time. I don't think there are any best guess, maybe when we get rid of each of theories as the flight progresses, but it's working.

COVAULT Follow for Harry, had you not been able to restore it, how many hours were you away from really loosing some significance science?

CRAFT Well we had two experiments that were going to be adversely affected. One of them were 7 days away from loosing any significant science. The other, SEPAC, we would have been, we were within 8 to 10 hours, primarily you have to understand even to this point, under our nominal time line SEPAC is only going through checkout procedures. It has one more checkout procedure to go through and the actual science data will begin. So it's like day 3 before they really get science data, so we'd miss those checkouts.

JOHN We were asked yesterday, who the vendor for the RAUs were, it' Standard Electric Lorents, of Stitzgart, Germany. (garble)

I've got a few questions for you all, one, John on this 3 per foot per second retroray burn, I've been told this has been made necessary because you don't have the solar flux that you were expecting, so your getting ahead of the line on the nodes, acrossing nodes, and your running continually faster, so you had to do this to slow things down. Is that thing correct or incorrect, or why did you do the retroray burn.

COX It's the drag that is the reason, you get different drag affects and what they are really trying to do is keep the Orbiter in sync with the preplan time line, keep it running together, so whatever drag affects you get if they are more or less than what you preflighted plan, your going to have to accommodate them with the trim. As far as whether you are head or behind, the retroray burn actually speeds you up, and you get there quicker, the (garble) slows you up and takes you longer to go around each
Orbit. So (garble) we had to go retroray, to speed up. To get
the 3 foot per second is selected, what we do is look down
several days down the road and figure a time in the equator
crossing and use that as an acrat time and compute back to where we
are now and find out what the differences of times will be if we
use the same vector, and then we go ahead and make an adjustment
so that time is 0, we cross it at exactly the right time, it
turned out to be a 3 foot per second adjustment.

Keeps you in sync with the time line and the computer.

COX  Right.

Okay

COX  And the POCC is running to.

CRAIG  We were 30 seconds late, they said at the Handover, for
the

Harry, on the RAU, and I'm hearing stories, and one of the
theories is there is a intermittance wire connection there, that
when it gets warm, it opens up, and when it cools off it closes
and everything works normal, is that what you mean by thermal
theory?

CRAIG  I don't think there is anyway to speculate the problem
is, John described it, and said we really don't have an answer.
I might point out that we do have a RAU under going test at
Marshall, trying to assmulate the kind of failure that we had
there where it continued to go aut. and do the skip, we're
looking at that and possibly later in the week and we'll have an
answer, better understand exactly possibly happened.

Okay, how much was lost, how much science data was lost as a
result of this problem and from what?

COX  That's difficult, it's probably more question you want to
run past Rick Chappell. As I pointed out the RAU has four
experiments that were attached to it, to this point, we've lost
no data, we had work arounds in progress, we operated two of the
experiments and had them ready operate in the mode that they we
had not planned. But as far as loosing, we did not loose any.

JOHN  Your name and affiliation please.
JOHN O'TOOLE (Washington Post) I'd like to ask a mundane question, about sleep, who slept where, when, last night, and are they playing musical bunks up there. Other words there are two shifts on, I'd just like to know where they are sleeping.

CRAFT They're still report of where the crew sleeps, but there are 3 bunks, and it's a hard bunk system. There's 3 bunks that are set up on the middeck, and when that crew leaves, gets up in the morning, the next crew then enters those bunks, if they so choose, they could sleep hanging on the wall someplace if they think they can do that.

Somebody is sleeping upside down right? On top of the middeck?

COX We've had no reports, or no idea of that.

There is one other question I have, and that is how many attitude trimming controlman have you made so far.

CRAFT We made one on day one, which basically adjusts the semi-major axis of the Orbiter. It fixes the Orbiter period, at known value, and this second one lets that adjust so that as we repeat these periods, you get to a point in time, this was a correction to that. And there is one more nominal one playing, you could do as many as you needed, there is another nominal one playing on RAV 97.

I guess I didn't make myself clear, I meant the manuevers to point Spacelab in the right way. Aren't there 192 plans for the whole mission? I wonder how many of those attitude manuevers.

COX There is something in that order of attitude.

CRAFT That's about the total, I don't know how many we have made yet do you.

COX On the last couple of shifts, there weren't much at all, we've been sitting in a thermal attitude.

CRAFT You have to understand the experiments that we have operated so far have been microgravity, or (garble) primarily.

They start tomorrow, more or less, these manuevers?

CRAFT They'll start later in the shift today.

JOHN Jeff (garble) (Time) Is there a generic name for the RAU? That piece of equipment.
STS-9 CHANGE OF SHIFT BRIEFING p12ja 11/30/83 11:30 a.m. PAGE 5

COX  RAU is what we all have come down to    RAU is Remote Acquisition Unit and it is professionally

Located on the pallet? Is the patch a software modification?

CRAFT  The patch is a software modification to the experiment computer that reads the data coming in from the RAU and communicates with it.

JOHN  Dave Dooling (Huntsville Times)

DOOLING  Harry, what kind of VF5 data have you been getting back and in the cold case test has there been any reports of condensation of the laboratory or any spots that the crew has encountered where they might feel the temperatures are lower than normal then they expected.

COX  To this point of the cold test, I have not heard any reports of anything like that.
To this point in the cold test, I have not heard any reports of anything like that.

PAO: Ok

BRIAN SIZLAK (VOA): Does Owen Garriott still plan to try some amateur radio broadcasts anytime today? And if so, is there any idea when he might begin?

COX: We've published, The Amateur Radio Organization has published a list of opportunities that tells when he is over the states and when he's off duty and awake and has all the right ingredients and he proposes to do those, unless he tells us differently, and he hasn't said anything yet about telling us differently, and Roy Neal has got his hand up, and maybe he can embellish that a little Roy.

NEAL: Yes, the first opportunity would be tonight over Central US, that's rather a bad pass, and there is another fairly decent pass over the West Coast of US at about 8:30 Pacific Time. Those will probably be the first opportunities, when he will have had time off long enough to operate, so I'm told. I have a question of totally different context.

COX: Well, before you do that, let me say, we've got that transcribed and those opportunities are available in the newcenter if you don't have it you can get it. We plan to go by that unless Owen for some reason waves us off. We'll have that word over there air-to-ground and the commentary will be sure and repeat it as well.

NEAL: That sign over there that says A R R L for the American Radio Relay League, that's the group that would have the data and information on it. Harry never have a group of astronauts been so carefully studied up through and including their eyeball. Which we have been seeing so much. I wonder if in the throws of all this, you have detected anything out of the ordinary or if you can discuss a little bit there adaptation to weightlessness as observed under those conditions.

KRAFT: Our observation is the TV that you see, and it's the voice that we have with them all the time, and it's the time line we try to keep up with. I would say in the early day, probably the first day of the mission that the adaptation is about what we expected, it looked like from time to time I'm sure on the loop, it sounded like we were behind, but most of the time we were within 15 to 30 minutes of a planned pre-mission timeline. We'd like to point out again, that we plan those early days to off load their capabilities, we plan them from anywhere to 50 to 70% duty cycle for the crew. We knew from past experience that it
would probably take that. As of this morning it looks like they all have adapted quite well, we don’t see any problems at all.

NEAL I’ve seen or heard a lot of copy to the effect that they were tired, they were frustrated, they were nervous, I haven’t detected this, have you?

COX No, I don’t think so. I think the first night, maybe some of them didn’t get as much sleep as we had planned. As we said yesterday, we put them to bed. I’m not sure that the excitement of the first days didn’t probably limit the amount of sleep that they got to some extent.

PAO Yes sir, right here please.

LEE DEMBARTEN (Los Angeles Times) How ill was Byron Lichtenberg?

COX This morning his comment was, he felt great and he said give me something to do.

DEMBARTEN How about yesterday? That was presumably in response to how he felt yesterday.

COX Well, yesterday he was embarking on some life science experiments and I think those are well displayed in the press kits, as you know. They are built to be provocative and the crew member, when he reaches a threshold that brings him to any kind of discomfort, he’s supposed to stop. Byron stopped, and that was what he was supposed to do.

DEMBARTEN Did he vomit.

COX I don’t have any idea.

PAO Craig Covault, again.

COVAULT John, did the cockpit crew describe any vis-ops that were especially interesting?

COX I haven’t been on when they’ve, no John did make a comment during the night that he was, what was the volcano in Sicily that he was coming up on?, that he thought he’d try to get to take some pictures of it. So that’s about the only comment. He didn’t come back and say I have had and seen some interesting things. He just commented that he was going to take the picture shortly.
COVAULT At the risk of being brash, would it be possible, perhaps to get a note up on the teleprinter that asks, elicits some comment on vis-ops in the high inclination orbit? Perhaps during a lunch or dinner hour they could hold some discussions. Its quite unusual to flight that high an inclination for . . .

COX You know, you talk about the, this is just a funny little anectode, we noticed that John is ver, quiet during his shifts, but he's especialy quiet during the either the north and for the south latitudes that he hits. In other words, if we want to talk to him, we've learned that if we talk to him in the latitudes that we normaly flight in, he's always available to talk.

COVAULT What does that tell you?

COX That he's looking out the window.

PAO Any other questions here? Lets try the ESA Press Center at (garble) Germany, and see if there are any questions there.

PAO Okay ESA Press Center, do you have any questions there from Germany? Okay, I'm going to mark that down as a no and thank you all very much.

END OF TAPE
Gentlemen. At the conclusion of day 2, the Orbiter will begin its rendezvous procedures over from 260 nautical miles over to approximately 259 nautical miles, circular orbit to rendezvous with the solar mass. The Orbiter will park approximately 300 feet from spacecraft, the spacecraft has been placed in a 1 degree per second rotation, roughly 1/6 of an RPM in order to maintain stability. The astronauts, James Van Hofton, and Dr. George Nelson, will then egress from the Orbiter's cabin wearing their extravehicular suits, pressure suits. Dr. Nelson will board the man maneuvering unit while James Van Hofton will prepare the tools for the repair activity. Once aboard the man maneuvering unit, Dr. Van Hofton will check it out and approach enclose the 300 feet distance between the Orbiter and the spacecraft using the man maneuvering unit. He will then close with the spacecraft, he'll put the man maneuvering unit in a same rotation rate of 1/6 of an RPM, and he'll affect to capture with the spacecraft. The man maneuvering unit and Dr. Nelson will then break the rotation rate and stabilize the spacecraft so that it is in fact fixed in an inertial space. The Orbiter will then come over and Terry Hart, using the remote manipulator will, controlled from the cabin, will reach up and grapple the solar max spacecraft. At that point in time the man maneuvering unit is released and Nelson and the MMU will fly back into the Orbiter cargo area. The remote manipulator system will park, position the spacecraft down on a piece of hardware called the flight support system, which is used to, electrically safe and mechanically support the spacecraft during all of the repair activities. You'll be seeing that hardware, that flight hardware here today inside the STS simulator. Again on day 3, once the spacecraft is berth to that life support system, Ox Van Hofton will come forward, use the special tools developed for module removal, he'll repet, remove the malfunctioning subsystem, which is a 500 pound, 4 foot by 4 foot by 1-1/2 thick module, he'll store that temporarily and then he'll place a new subsystem, a new module of the same weight on the spacecraft. On the fourth day the astronauts will rest, two of the astronauts will rest, while the Goddard remote satellite control center will undergo a complete checkout of the spacecraft, will take some 18 hours to accomplish. During that period, Crippen and Skolby will reboost the spacecraft from the 259 nautical miles pickup point on up to the 290 nautical mile altitude at which we want to begin the new era of experimentation. So we will do this reboost mode on the fourth day. On the fifth day we'll attempt perhaps the most ambitious aspect of the repair. We will remove the malfunctioning main electronics box of the pronography polarimeter instrument, which is one of our major science instruments onboard, and we will attempt to replace that entire electronics box with a brand new electronics box we'll be bringing up. That box has never, was never designed for in orbit repair and replacement. We will have something in the order of 11 individual separate subminiature type connectors, and you'll see some on the tables around in the area,
to remove and replace. Once that activity takes place, and we're estimating about 3 to 4 hours to do that activity, we will do a very brief checkout of the spacecraft while still attached to the Orbiter. Then using the 50 foot arm, Terry Hart will left the spacecraft off and hold it up while an antenna stored underneath the spacecraft is deployed. At that point in time the EVA activities will be terminated, the astronauts will go back inside, another 4 hour, or 5 hour checkout period of the spacecraft will occur during the sleep period of the astronauts, and on the 6th day, the astronauts will release the spacecraft back into free flight. Preps will be made for the spacecraft for the Orbiter to come back and on the 7th day will return the entire system to the ground with these solar max observatory left in orbit in free flight. We'll be bringing back all of the hardware, the malfunctioning hardware that we removed on the spacecraft and bring it back for intensive investigation as to the effects of 4 years of free flight in orbit so that our next series in spacecrafts can in fact be built with more knowledge of the effects of space exposure. Thank you. I'd like to take an opportunity to introduce our program scientist from NASA headquarters, Dr. Dave Bolin, and our program manager at NASA headquarters, Ron McCullen. Thank you Gene.

Thank you Frank.

We'll proceed with the questions and answers at this time, taking the questions here at Goddard which will be relayed to via satellite to Houston. Questions from the media here. Would you please identify yourself and your affiliation before your question.

SALESTAFF  Al Salestaff, Baltimore Sun  Can you hear me?

No, that didn't come through. That was Al Salestaff the Baltimore Sun.

SALESTAFF  Will Dr. Nelson explain precisely how he's going to stabilize the rotating spacecraft.

George will you repeat the question so (garble).

NELSON  The question was asking for an explanation of how we're going to stabilize the satellite once we docked with it on orbit. The manuevering unit, the backpack which I'll be flying over to the satellite with, has the capability and enough thrust or power to stop the rotation of the satellite fairly easily. It has a gyro system in it which will both myself, the backpack and the satellite, what's called inertially stable, in other words it'll stop all of our motions and the maneuvering unit has the capability of doing that automatically, evidently at the press of a button. If that system fails we have the capability of also flying out the motion by hand with the
maneuvering unit itself. So we will just use the same thrusters they use for flying that backpack to stop the satellite's rotation.

Other questions?

CORBUTT Warren Corbett, American Business Network. Again for Dr. Nelson. The cause of the various protrusions, sharp corners, sharp edges, and so forth on that satellite, how much danger do you see as involved in such things as getting a tear in your suit or nic or a bump in the MMU itself. How do you approach this thing physically, I presume very carefully, but.

NELSON That's exactly right, very carefully. If the satellite does have a lot of things sticking out of it, the larger of which is the two big solar arrays, and we approach the satellite very slowly, by the time we're in close enough to be in contact with any of the solar arrays we're moving at rates of inches per second, so very slowly. And we practice backing with the satellite many, many times before we do it so that you build up the confidence and the skill to fly in and attach yourself without hitting, but it is simply a manual flying task.

MILLER Anthony Miller Prince George's Journal, for Dr. Nelson. Are you the first astronaut to use this seat, is this the first time such a device has been used in extravehicular space?

NELSON No the man maneuvering unit will be test flown on the flight prior to this solar array repair flight, which is called 41 bravo now, I think. And they will be taking up two of the man maneuvering units on that mission and doing extensive test flights on both of them. The crew that will be doing that are Bruce Mckanlis, who was instrumental of the development of the maneuvering unit and Bob Stewart, who was another mission specialist on the mission.

All before we get into the questions that came up from Houston, do you have another question? Any other questions here? We have had relay upped to us from Johnson at Houston following questions, from Dave Dowling of the Huntsville Times, now this question is for Frank Zeppelin or any other person who would care to field it. Has the MMS, multi mission module spacecraft quality control been tightened as a result of SMM and Landsat 4 failures? Frank.

ZEPPELINA Dave I stopped beating my wife, and you don't have to worry anymore, the quality control of the spacecrafts have been tightened. But the problems, let us remember that this was a designed generic problem, and the important aspect here is that anytime we recognize since the late 60's, that anytime you build complicated systems with over a million individual piece parts,
and you attempt to place those systems in orbit for operational periods from anywhere from 2 to 5 to 10 years, things will happen, errors will occur, design error will occur, and in fact individual piece parts will fail causing, degradations such as we had on solar max. Recognizing that reality, years ago we designed the first of a whole family of spacecraft such that we could handle that reality with the advent of this new transportation system, and so what you see here Dave is the result of at least 10 years of prior thinking, of prior concern and of a desire on our part not to depreciate our assets, because we have destroyed, because we have a flat tire or a broken rotor cap, but rather to take advantage of this new transportation system to preserve our assets to keep them up in orbit and to have them operate for prolonged periods of time and thereby get more data for the investment. Thank you Dave.

***
PAO Good morning, and welcome to the Solarmaximum Repair Mission briefing. We will kick off the briefing here from JSC, then we will go to Goddard where we have the 41C crew and other members of the team that are working on this mission. I'd like to remind you that we have no 2 way cuo and a from Goddard, and if you have any questions that you would like to ask of the Goddard participants, just give them to Jim Elliot. Jim, would you raise your hand, right here, and he'll take care of getting your questions back to Goddard. We'll start off to my immediate right as Dr. Birton I. Edelson, Associate Administrator Office of Spaceflight, I'm sorry, office of Space Science and Applications, NASA Headquarters. To his right is Lt. General James A. Abrahamson, Associate Administrator for Spaceflight, NASA Headquarters, and we'll start off with General Abrahamson.

ABRAHAMSON I'd first like to comment that in the middle of one mission is perhaps not the time to be talking about the next mission, because, of course, all of our attention is usually directed at the mission that is in the air. However, I think that's an indication of things to come in rather where we are indeed going on the Space Shuttle in the space transportation system in terms of the number of flights that we'll have. And, the excitement that each of the flights will have as we go ahead and of course, as we look ahead here to flight 41C, and I'll emphasize that, 41C, so that everybody knows it, both the NASA people that work with it as well as the media, that this will be another challenging flight, quite a different challenge certainly than the one we have and that's going so successfully at this point and time, but one that has again an extreme importance both to the space transportation system as part as of our on going effort and important from a science viewpoint. Now, I'd like to just summarize very briefly my view of what this means to the space transportation system, and then Dr. Edelson would like to comment from a science viewpoint. If we think of it in terms of the Shuttle itself, and how the Shuttle will play this very vital role in bringing man up and combining them will the man maneuvering unit as an important element of the Shuttle infra-structure, it's capability, and putting the crew outside where the action is and being able to repair this particular satellite. This is a demonstration of the capability. Now this demonstrated capability will certainly be worthwhile in just what it will do for this particular satellite in terms of restoring it to service for the science community and again, that will be Dr. Edelson that will comment on that. But, I think of equal importance, it will layout what we can do, show it positively and as a result of that, it is my hope that designers around the world who are working on payload systems will come to gain confidence in repair and servicing as a concept and that they will begin to think about that for future systems. And, in the end, we will all benefit if as a result of that we can bring down the cost of building payloads and operating payloads. As systems for long term applications for the future. So, I think that's at
least the kind of importance that in a sense transcends the specific mission. And, we can see that this is already happening by the way. Just the fact that we made a commitment some time ago to go ahead and repair this mission and infact galvanized people's thinking already, and we do have committies within NASA who have been evaluating satellite servicing and repair, they've been looking at not only the possibilities of how we should do it on specific missions, but what policies we should undertake as we go forward in the acquisition part of any system. There is a similar kind of little slightly different trend but there is the similar investigations that are going on within the Department of Defense. As they look at some of their systems, and we hope that the commercial community will do the same thing. So, we hope that it has great significance for the future in addition to being a dramatic mission in it's own right. And, with that, I'd like to turn it over to you Bert.

EDELSON  Oh, Thank you Abe. The point that I want to make, which Abe referred to is what valuable science the solarmax mission has done already and will continue to do so that this repair capability will give us an opportunity to gain new science. This is a valuable mission in itself, although it will teach us how to repair objects in orbit. This one is well worth repairing. We've made calculations which are being born out, incidentally. It will cost us about a quarter the cost to actually build a new space, build a new replacement spacecraft. The solarmax satellite was launched in February of 1980, and it worked for less than a year, failed in December 1980. This is a spacecraft in 28 1/2 degree orbit up at 265 nautical miles. It's a large spacecraft, weighs about 21,000 lbs and it's equipped with 7 scientific instruments to study the solar dynamics. The internal structure of the Sun, and the activities on the solar surface. Why do we study the Sun? Well, simply because the sun is the nearest star, and it's a great labatory for astrophysics. It's the one star that we can examine closeup with detailed instruments to get image and a very high resolution and we can study the internal dynamics, and we can study on a close scale what activities are underway. We can study the internal structure, we can study the explosive inverts, the enormous solar flares and we can study and understand what's happening with the solar sunspot activity. Solarmax mission in the 10 months that it was operating made a number of very useful discoveries I mentioned 2. One, it indicated that the so called solar constant, the total flux coming from the Sun of energy was not quite constant, and varies considerably. The energy decreases a little bit with large sunspot activity. And, how this energy is stored in the Sun during the large sunspot activity and later released is a very basic question in solar dynamics. And, we are very much interested in that. This is a first indication that we've had at all that solar constant was not in fact steady. And the second thing that is quite exciting, is that the solar flare energy is as much a hundred times greater than we ever suspected
before. Highly energetic reactions such that we feel that nuclear reactions are taking place right at the flare sights. Now, what I've mentioned then is that the solarmax mission has been successful and that we've got an indication in 2 very important areas that are valuable to astrophysises. Why should we repair it? In particularly, that it's not going down on the peak. The reason for launching in 1980 was that it was at a peak of its activity by the sunspot count. Now we are 4 years down from that peak, and one might well ask the question is it still worth while to do so. And the answer of course is yes it is for a couple of reasons. One is, the sunspot activity is really quite high. It turns out that the 1980 peak was the second highest in the history of sunspot activity. The second is that 3 of the instruments on board will continue to provide very valuable information even on the quite sun. They are the ultraviolet spectromator and the luminosity monitor so that we're repairing for 2 very important reasons. One is that there is still a large activity, it's about the half of the average that we've measured over the past 150 years, and two, it's going to make very valuable measurements on the quite Sun as it cools off. Now, I should add that this repair capability which we're developing, the idea of going out and capturing the satellite which you are going to hear about in a minute, bringing it back on board and repairing it, is extremely important to us in all of the scientific projects we're proposing in the future. The Hubble space telescope for example, over a billion dollar project, in the centerpiece of our space science program is designed to be serviced in orbit. Not only repaired, but serviced in orbit. So that instruments can be removed from the focal plane of the space telescope and new instruments put in. The whole value of the space telescope program as well as the gamma ray observatory, the x-ray facility which we're planning in the next few years is going to be greatly enhanced and we're counting on the fact that we can service and if necessary repair these spacecrafts in orbit.

***
EDELSON  On the space telescope program as well as the gamma ray exibitory, the x-ray facility which we're planning for the next few years is going to be greatly enhanced and worked probably on the fact that we can service and if necessary repair the spacecraft in orbit. So let me conclude with the thought that while we're in the middle of the Spacelab-1 activity, we're are demonstrating really for the first time, I hope Abe won't harp me when I say this but really for the first time, we're really demonstrating our capability of the space shuttle that couldn't possibly have been done by unmanned expendable launched vehicle. And the opportunity, the second capability will be demonstrated in April with the 41-C flight in which we will do something which absolutely couldn't be done in an expendable launched vehicle nor any other way and that is repair of a spacecraft in orbit. Thanks.

PAO  Thank you gentlemen. We're now switched to the Goddard Space Flight Center.

PAO  It's a pleasure to welcome you here today to join in on this press conference with JSC and Goddard. I believe that what you are seeing is the first of what will become many. To me what it represents is a slowly evolving and now with a step function chain in the way we, ourselves view NASA. Ten years ago, twenty years ago, you had a division. There was the manned spaceflight world and the automated spaceflight world. I think with the capability now to repair our satellites with more and more involvement of humans in space. We're seeing those distinctions just wipe out, disappear the mutual benefit of the whole space program and the people involved in it, the scientific community. This all started about 10 years ago really here at Goddard when some of forward looking people, with the shuttle coming along there must be an opportunity there to get more science for the buck and that's where the whole concept of the multi-mission modular spacecraft started, a decade ago. We're looking forward now to doing new and intimated times a decade from this time period. Many of you may not be aware that there are 5 satellites now which are either in orbit or in the works which are going to be fit for the repair and maintenance function. First the SolarMax you know about and you just heard Bert tell you about the space telescope. The LANDSAT also has that capability and we're looking now at the potential for retrieving or servicing, repairing the LANDSAT possibly as our first mission out of Vandenberg in late 85 or early 86. The Gamma Ray Observatory just recently started is going to have the potential for being fixed, repaired, modified on orbit. The upper Atmospheric Research Satellite which we hope will get started this year in earnest will have that capability. So we see it now not just as a one time thing but a whole new way of doing business which Goddard will participate with the rest of NASA to giving us a much more efficient space program. Gene--
GENE Thank you Noel. May I present next William Keithley, Director of Flight Projects here at Goddard.

KEITHLEY I'd like to pick up on one note that Noel just referred to and make sure you recognize one point that often gets lost in this process, that we have a lot of other spacecrafts in the works right now that utilize this same capability, this designed in capability. There is one aspect of this mission as I say sometimes get lost. The crew here will make some attempts at repairing equipment that was not designed for repair and with a successful completion of that activity, we're going to find that that capability will effect a lot of our future designs in a very subsidive way. So we're looking forward to seeing that particular aspect of the repair mission pulled off. I have the pleasure of introducing the crew. I haven't worked with them as closely as my people have but all of the effort that they've put into this activity up there has been a very refreshing thing to Goddard and we're looking forward to continuing these kinds of relationships. I'm sure all of you recognize Bob Crippen, Bob was the pilot on the first STS-1 flight, he was the commander of STS-7, I don't know what they're calling that one these days but I guess the nomenclature still holds up there. The, and now he'll be the commander of this flight, Bob Crippen. Jim Van Hoften will be the pilot on this mission. Jim is better known as "Ox" and I guess that's public. Jim joined NASA in the late 70's after serving as a pilot in the Navy and receiving his PHD from Colorado State University, Jim. George Nelson will be one of the Mission Specialist on the crew, he will participate in the EVA activity. George joined NASA in 1978 after receiving his PHD from the University of Washington and serving as Opposed Doctoral Research Associate at the Joint Institution for Laboratory and Master Physics in Colorado. The third Mission Specialist, I'm sorry, I missed Dick Scobey, I'm sorry.

(garble)

KEITHLEY That's right. Sorry, sorry I had him wrong. I got one out of sequence. Dick Scobey will be the pilot and he came to NASA in 1978 following a distinguished 20 year term in the Airforce. So Dick, I'm sorry. Now I got it right, Jim or "Ox" will be one of the three Mission Specialist and George Nelson will also be a Mission Specialist and those two will participate in the EVA activity or the repair activity. Now Terry Hart will be the third Mission Specialist. Terry came to NASA in 1978 after serving as pilot in the Airforce and he also was an employee at Bell Telephone Laboratory. He's got a Master's degree in mechanical engineer from MIT and a Master's from electrical engineer from Rutledge University. Terry will handle the RMS activities onboard. And I think I got it straightened out here, Bob. Okay, there's the crew and I'll turn it back over to Gene now.
Gene May I introduce next the SMRM Project Manager here at Goddard, Frank Zeppelina.

Zeppelina Okay Gene, I'd like to just run through the scenario for the mission trying to depict the in a descriptive fashion, the roles and the activities of each of the astronauts as we attempt this first time endeavor. Starting back with the beginning of the scenario which began on February 14, 1980 when we launched a three ton, very complicated, very sophisticated solar observatory with the principle objective of doing solar flare research on the surfaces and on the corona of the sun. That observatory worked very well for the first ten months. After the first ten months, we began to experience pointy degradations as a result of a generic design problem within one of the modular subsystems. In addition, we also encountered one of the critical instruments, difficulties with it and some minor difficulties with several of the other instruments. The next aspect of the scenario begins with a decision, some 14, 15 months ago for the agency to repair this very valuable satellite and bring it back to full operational capability and so on April 4 of 1984, we're going to launch the repair mission aboard STS-13, also referred to as 41-C, along with that particular flight will be a 17,000 pound, 30 foot length satellite called the long duration exposure facility. So that will go along with this mission and basically share the flight. That satellite will be launched with us. It will be deployed on the second day in orbit. Terry Hart will operate the RMS arm and he'll elevate the spacecraft from its tied down points in the Orbiter, prepare it for the correct attitude and then release the LDEF spacecraft into free flight. Some year to two years later, that spacecraft will be recovered and returned to the earth.

End of tape
And Dave Dooling has a question for Bill Keithly, how much of UARS, upper atmospheric research satellite (garble) gamma ray observatory and other MMS, multimission modulist spacecraft design of the three depend on Nelson making the repairs?

Let me distinguish two, two aspects of the repair now, there are modules that will be replaced during this repair activity. Two of those modules will be also used on the gamma ray observatory so therefore, therefore there is that linkage with the gamma ray observatory. The, in the case of the UARS, all of the modules that are designed for repair will be used on the spacecraft, the (garble) spacecraft that will be utilized on the UARS. So therefore this is a demonstration of our ability to implement that module repair on those particular missions. I have to answer the question completely by saying that we are also again looking very closely and at the attempt to repair the main electronics box. Because with the successful completion of that, then it will allow us to start thinking about replacing or repairing in orbit the wide band system on the landsat, which also uses the (garble) spacecraft but the wideband system is not a part of that spacecraft. So we are looking at that very closely just to extrapolate it a bit further, there is a refueling demonstration going, planned for subsequent shuttle flights and in the case of landsat a refueling would be required to repair that in orbit so we are also looking at those subsequent demonstrations on STS to tie that into a landsat program too.

The next question from Johnson is from Mike Toner, the Miami Herald, for Frank Sepallina. What is the cost of the repair mission including the training but exclusive of the MMU development, MMU being manned maneuvering unit?

Mike, the cost of that to do all of those activities exclusive of the transportation flight which we share with another 17 thousand pound, 30 foot long, payload is 19 million dollars and that includes refurbishment or the hardware that is brought back such that we can put it on the shelf as flight and we fly it again on some other mission.

And we have a question for Bob Crippen from Mike Mecham of USA Today and Gannett News Service. What was the development cost of the MMU?

CRIPPLEN (garble) I'm afraid that none of here are qualified to give an answer to that, there's somebody back in Houston and (garble) there.

Mike, we'll get you an answer back in Houston from one of the individuals who are working that particular area. Just before coming up here I received a note, it appears to be a
question from Johnson, and it looks like it's from Time Life, which would be Jerry Hannifan, the bureau chief at Washington. And Bob this is the question again for you. The question is, if you repair the SMM satellite and don't have to bring it back, what are the pieces that you will be bringing back, known or unknown?

CRIPPEN Okay, I think that was (garble) in the previous discussions, the main thing that we will be bringing back is the attitude control system that Ox is going to be removing from the vehicle and in addition to that the main electronics box that was going to be removed will also be brought back. Those are the two main components. (garble) you got any other significant parts other than that?

Hope not.

CRIPPEN Hope not. That's all we attempt to bring back.

Last, we have a moment here for an opportunity if there's any last minute questions here at Goddard. And the last part of this press conference will be the STS-13 astronauts will be moving into the bay and if we can move that lift up for the television crews to get a shot down in of them in the bay that will conclude the program and the astronauts, the crew will be departing for lunch with the media in building 21, cafeteria. There is a special section set aside in the south west part of that building between 12:30 and 1:15. Thank you very much. For Houston, we will be giving you a scan of the astronauts in the open bay but without any narrative. Thank you.

END OF TAPE
Good morning, and welcome to the science briefing covering the second day of Spacelab 1. On my right is Dr. Rick Chappell of Marshall Flight Center, Mission Scientist for Spacelab 1, and on his right Dr. Karl Knott who is the European Space Agency project scientist. Dr. Knott would you care to begin this morning.

KNOTT Yes, I took care of the third shift during the Spacelab 1 flight of the scientific activities, and as far as co-activities are concerned, this shift was full life science investigations. It started off right at the beginning of the shift, immediately after change of crew with about one hour after blood, we call it blood work, it was activity where the crew took blood samples from each other, and stored them away in the freezers which are available on board. And they also measured the Venus pressure on the different crewmembers. This was the first time this happened onboard. It will be repeated several times before the end of the mission. That was the first activity during yesterday's shift. We done then a fairly lengthy experiment which has several hours allocated to it in the timeline, and that's experiment 104, it's called the drop and shock test. It's a fairly involved experiment, basically consists in dropping a crewmember inside it bungee strings. And while the crewmember is dropped, while he is undergoing the acceleration by the bungee cords, the crewmember at the same time is shocked electrically, a mild electric shock is introduced into his leg and the interplay between the two reflexes is studied. It's the interplay between the reflex which comes from ultralist, which is in the brain, and the shock reflex which come from the electrical shock. Interplayed between these two reflexes is studied and what is varied, is the acceleration during the drop and the time delay between the reflex from the dropping and the electrical shock and the results recorded and can also be seen real time on oscilloscope on board. This task was successfully completed except for some minor difficulties which developed during the end of it, but this was overcome by workaround. The crew then immediately continued with the hop and drop test, for experiment 102. That's the same activity which had already taken place on the first shift and this has been reported on our briefing yesterday, so I do not have to report on this one again. The next investigation on the life science area was then what we call the dome experiment. It's an experiment where a crewmember views into a rotating dome, which has a particular color pattern inside of it, and it is tested, how the eye is trying to following this color pattern, when they are rotating in front of the eye. And from the so called counter rolling of the eye, the roll of the eye in the vestibular system, the support vestibular system is studied in this investigation. The crew then went into a checkout of a atmospheric experiment. Experiment 3 was then checked out, the gimbal mechanism for
experiment 3, which can be gimbled, it's a very faint camera, low line level TV camera. This one is gimbled, and can be pointed in several directions and the mechanism was tested how well the because this is a very important activity which has to be done before the re-entry. On experiments these are fairly heavy experiments and they must be firmly locked before the shuttle can go towards the re-entry acceleration. If this is not done, this would be extremely critical for re-entry. So this was very carefully clicked, in between two life scientist investigations. And then the last life science investigation which then followed and completed this shift, was an easy one, a fairly easy one, it's called position awareness. During this FO the one crewmember is just laying quiet in the module and he cannot see, his eyes are covered and he must then point several predefined directions and the other crewmember and TV record how well the crewmember can remember of where certain mark points in the module, how well he can point to exactly to the right, or whatever predefined direction had been agreed upon before. So it is basically an orientation test, how well can you orientate yourself in 0 gravity when your eyes are covered. These were the investigation in the life science area during yesterday's shift. Then we had quite a number of non attendant, non crew attendant experiments running, these experiments are basically run by telecommanding from the POCC, they are more or less result a major crew interaction to record only, has to deal with them when they run into to any difficulties and then this was not the case yesterday. So they could stay with the life science investigations and these experiments were conducted fully automatically and supervised from the ground. The attitude of the shuttle during most of the shift yesterday, was with the bay of the shuttle, pointing down to the earth and that enabled the atmospheric physics experiments to carry out their observations. The experiments which were running was the ISO experiment. A atmospheric imaging spectrometer, which took a number of measurements on the day glow of the atmosphere, then the glow spectrometer, which had undergone a successful calibration on the blue shift before had it's first real measurement of the atmosphere yesterday. It had 6 runs scheduled, however, due to a onboard problem, which consisted of the date not correctly stored in the Orbiter computer which was transferred to the Spacelab computer then was in error by one day, caused that the experiment did not get the right coordinate to orient itself. And therefore, the first three observations were lost, due to this problem, however, the investigators in the POCC reacted very quickly and developed a new problem which was uplinked and this enabled the experiment during the, to the later runs to orient itself to a lock on to the sun and do the atmospheric measurements as they were planned. This morning they reported after they had evaluated the data that they have
excellent data obtained with this spectometer. They are reporting that they still saw among the atmospheric constituent quite a number of constituent which they think at this time are outgassing or contamination particles from the vehicle. Which are easily to separate from the natural STS-9 SCIENCE BRIEFING p10ja 11/30/83 9:30 am PAGE 3

constituants. And expect these will be going down the further we go in the mission. Another experiment, a Spectrometric photometer also from France, one of the major aims of this experiment was to detect the terrarium in the upper atmosphere. Terrarium being the heavy isotope of hydrogen and hydrogen being of mass 1, terrarium being of mass 2, these two atoms was prospectively this molecule. These two Adams discuss very easily due to their low mass in the atmosphere, and if I know the concentration of hydrogen in atmosphere and the concentration of terrarium in the upper atmosphere, then it is possible to determine what the atmospheric physics said called, so called Eddy Defusion Coefficient. And this Eddy Defusion Coefficient gives you knowledge on mixing and transport phenomenon which are occurring inside of the atmosphere and they have a major influence on the basic what is happening inside, basic mechanism inside the atmosphere. So the measurement of terrarium is really a first, that's a real discovery and a real first in this mission, and the investigator must really be congratulated to this very fine result. Then in the Plasma physics area, the SEPAC, the huge beam experiment, which is on board, was not scheduled for any major operations yesterday, all they did, they started charging there batteries. When they fire these very intense electric beams later on the mission, they are drawing a numerous power but for only a very short time. And this power is not take from the Orbiter energy supplies, but it is taken from a separate battery which is part of this experiment and these batteries have been charging continuously yesterday and they will be the new energy starting battery, then will be used when SEPAC becomes active later in the mission. But another beam experiment onboard of Spacelab, and that's a french experiment, called pic-pop experiment 20 and that has been operating extremely successfully yesterday. In fact, this experiment was able to generate both in the electron beam and high beam, into the Ioniisphere and they studied the reaction of the Ioniisphere to the injection of these beams. So pic-pop had a very very successful, they also yesterday.

***
KNOTT...beam, so pic-pac had a very successful day also, yesterday. Then in the area of astronomy, still not much is going on because the Shuttle is not, the mission is not yet in the phase were, in terms of attitude maneuvers are being done, attitude maneuvers toward scientific targets, and therefore astronomy experiment is one experiment inactive at this time and this experiment is basically doing background measurements and it has in fact established that it has a very, very low background which will allow him to later on make its astronomy measurements with extremely high sensitivity. This low background is partly caused by the fact that the Shuttle orbit is very low, its very deep inside the minutesphere, and the energetic particles which are coming from outspace, cosmic-ray particles, they're all deflected by the magnetic field of the Earth, so they are not causing any noise inside of this experiment. So this is one advantage of the (garble) Shuttle orbit that it gives for this type of x-ray spectrometry and excellent low background and this has been verified physically yesterday. Apart from this a number of experiments have been running which run over several day. Among those are biological samples in the life science area that are exposed to space to enetical and solar (garble) over several days. These were exposed and are running fine, and there was one material science experiment, in fact the first material science experiment started earlier on. And this is experiment 332. It is an experiment where a crystal is grown out of a solution. This has been started, and the second one has been started, experiment 338, that's one where a crystal is grown out of vapor. And these two experiments are now on, and they will be growing for several days now in order to generate a sufficiently large crystal during this time. This basically was the content of yesterday's shift. All in all, it has been an extremely successful one. We were not sure quite, last night when we left, how successful it was because many investigators overnight only studied the data, and they did it and we had excellent reports for the shift this morning, so we are quite happy with what we obtained during the shift number 3.

CHAPPELL Ok, let me pick up with shift number 4. And we began to see a transition in shift number 4 from the life sciences type of experiments, particular of the adaptation experiments which we talked about a little bit yesterday, into the material sciences investigation. In addition to having some check out in space plasma physics and in a number of experiments in the atmospheric physics and astronomy beginning to run, and Karl has just mentioned a number of those. Of the primary crew activities involved completeing the 201 investigation, the vestibular investigation, the early mission runs, and they did and experiment they call a caloric experiment, which is a stimulation of the ear with a difference in temperature between the two ears. And on the surface of the Earth, if you do that, you get a strange reaction out of the vestibular system. The difference in temperature causes the vestibular organ, the gradient in
temperature across the vestibular organ, causes it to think you are turning and it does so because the temperature difference causes a density difference which in the 1-g environment causes a circulation of the fluid in the semi-circular canal. And that circulation normally happens when you move your head, and the brain interprets that as a motion, even though it is caused just by a temperature difference. The hypothesis was, in 1914, that the effect was caused by this flow of the fluid within the semi-circular canal. In evidence, indirect evidence, at least, between the time that was suggested and the present, is lead to that interpretation, although it has never been proven conclusively, the way you prove it conclusively of course, is you eliminate the gravity, so that there is no convection when you apply a temperature gradient and see if the effect goes away. The effect manifests itself in the eyes beginning to twitch, which is called a nystagmus because the brain interprets the signal as saying that your rotating, and so the eyes start to try to move to try to compensate for the rotation that it thinks your doing. So the proposal was, that in space when the gravity goes away, there is no fluid motion, hence the brain won't think your rotating, hence the eyes won't move, in fact when that was done today, with Bob Parker as the subject, and Bob in fact, on the surface of the Earth, his eyes moved substantially during the caloric test, today they didn't move very much at all, and instead of a nystagmus, they called it a micro-nystagmus or a milinystagmus. A very small movement of the eyes, indicating that what had been postulated in the early part of the century as being the cause of that was indeed the cause. So that was a very nice verification of that theoretically predicted affect. That also then is a further study of the vestibular system itself, which has been the subject, as we mentioned yesterday, of a number of the experiments. We did another one with the experiment 28 which is the very interesting one I mentioned yesterday about using accelerometers to measure the passing of blood thru the cardiovascular system. That was done again to follow, day after day, to follow the adaptation of the cardiovascular system to the weightless environment. Then we got into the, I'm sure you saw on the live TV, watching Ulf Merbold doing some plant selection for the sunflower experiment, and you saw there very dramatically the importance of the onboard crew and the ability of the Spacelab to support the onboard crew as he went around and looked at the different flowers, or not flowers, plants to be flowers later on, if they grew long enough. Several of them didn't exist, I think you may have noticed that about half of the ones they had planted, nothing came up. And that of course was planned, it was planned for him to be able to select the best specimens, which he then was able to do. And in fact they used the real-time TV then for the PI, on the ground or here in the Operations area, to interact with Ulf and concur in the selection of plants. So the laboratory ability, the capabilities of the laboratory were used quite a bit there, and we all got a chance to see the crew in action on this particular shift. Then
they went into a fairly extensive set up and check out of the material sciences double rack, and that is a very sophisticated facility, it has a number of different furnaces as well as a fluid physics module. And so for several hours then, Ulf was actually setting things up, beginning to initialize the facility, having interaction with the investigators, the material sciences investigators on the ground. We did also have a checkout of the SEPAC experiments, which is the electron beam experiment that we've mentioned several times already. Today they actually turned on their monitor TV, that sits on a little pedestal up in the back part of the payload bay and look forward toward the module, so it looks out across the instruments on the pallet. It can see the diagnostic package which measures the plasma and the waves around the Shuttle. And then it can, it is set up focus wise, and field of view wise, to be able to follow the electron beam, once that beam is initiated. So today, they turned on all the diagnostics, turned on the television, scanned it around, we got some nice star fields, in black and white, checking out the TV and everything worked well there. The SEPAC investigators are quite encouraged about the status of things. The instrument is fairly well set up now, they'd do I think one more sequence of initialize type testing, and then I think they'll go into the beam firing in another day. So I think that activity went well. And then we did, as Karl mentioned, we continued a number of the unattended experiments in astronomy and astrophysics, and atmospheric physics. And I remember, in particular, what your starting to see now, which is exciting to watch, as your starting to see the results come out. The science is starting to manifest itself in various drawings and strip charts and graphs, and your starting to see graphs go up on the wall of different spectral that they're measuring. Which is a nice stage of things to be in. In particular, the growth spectrometer experiment 13 got its first couple of runs in the absorption spectral. That's were they look at the sun and as the spacecraft goes behind the Earth, the instrument tracks the Sun and then as the sunlight penetrates the atmosphere, as the spacecraft moves behind the Earth, then the instrument of field of view, and so it does a scan, an altitude from they type of the atmosphere down, and you look at the absorption of the solar radiation by the atmosphere. Those absorption lines then tell you what constituents are present in the atmosphere. So you end up with an altitude profile of the different constituents. In this case the instrument measures in about the 2 to 10 micron range, which then gives it a survey of on the order of 10 or so different species in the upper-atmosphere, but they had they're first absorption that was immediately copied many times and passed around for everybody to see, and the spectral, the resolution in the instrument is excellent, the investigators are most pleased with it. We have now started, about 33 of the 38 investigation. So as you can see already, at this early point in the mission, a number of, the
...bulk of the instruments have been started and in fact once the materials science double rack is in complete operation, then there will be a number of samples and experiments cycled through that facility, almost 40 different experiments will be done using that single facility which is being activated now. So, we're very far along in terms of having the payload set up and running. And by in large things look extremely positive from the standpoint of all the investigations. Let's see, I wanted to mention a couple of things that came up yesterday, one yesterday and one today, we've talked about the RAU problem, the RAU 21 problem yesterday, that was solved at the beginning of this shift, so we had a big lift at the very beginning, particularly those 4 investigations that are on that particular RAU who had not been affected to date because a couple of them had not been in operation yet. The solving of that problem was quite a lift in the beginning of that shift, in fact that enabled SEPA to do all of it's checkout, which it was scheduled for, so it was a very timely solution to the problem. I think Harry Craft could probably talk more about that and the specifics of that activity in his briefing later on this morning. Then the timing problem that Carl mentioned that was essentially a mismatch between the way the bookkeeping, the day bookkeeping was done in the orbiter computer versus the in the space lab computer. That was worked out also very early in the shift which then enabled the absorption measurements to be continued, and eliminated that little glitz that we had at the end of the day yesterday. We've seen very clearly in these activities today with the space lab the value of the scientists at the test subject having a scientist onboard, having the man in the loop to carry out the experiments to a payload equipment when needed to select (garble) in this case for the planned growth experiment we've continued with the study of the human physiology and in fact the example I mentioned with the 201 is an excellent example of how you use the micro-gravity environment to prove out elements of physiology which are not easily proven on the ground, in this case, being able to show through this experiment done in space in 1983 to be able to verify a theory of how the vestibular system works. It was put forth in 1914 when they didn't have this type of marvelous laboratory available to them to do the research. So, we see that the application of this space results to just the man on the street in this case the understanding of the human physiology. And we began to see the use of the materials processing facility MDSR, to begin the study of materials properties and the making of new materials. And we continue today with a very steady dialogue between the investigators on the ground and the science crew in orbit maximizing the iterations, maximizing the science return by exchanging information on a continuous basis. The shift was a very good one. Very comfortable one in the sense that things went very smoothly, the crew is becoming oriented, they're becoming adapted and I think we are off to a real good start.
Alright, we'll start with questions here in Houston, and when I call on you please wait for the microphone, and state your name and affiliation.

Start right down here.

Huntsville Times Rick, yesterday you mentioned that Anderson with his X-ray instrument in seeing some X-ray back scatter from the upper atmosphere, did he notice anything during the pick pap operations, or is just still the low level activity?

You say was there any enhancement in X-ray diagram during the pick pap operations?

Right.

Not that he has mentioned, and I'm not sure why necessarily there should be. I would imagine what he is seeing is the burn straying from the drizzle of the radiation belts which is a normal phenomena that takes place that gives you a very diffused X-ray source at mid latitudes all the way around the Earth.

Here on the aisle, in the middle.

CBS Dr. Chappell, it seems unusual, I can't recall ever hearing about a scientific experiment flying on a Spacecraft which produced such instantaneous results as you have described, regarding the (garble) it seems we always hear about elaborate experiments and you have to analyze the data and reduce it and six months later you might see it in the Journal. I appreciate your excitement about the fact that you've got this laboratory that can prove a 70 year theory, is there anything though that you can say about what it might really mean to the man on the street, rather than basic understanding of physiology, is there some application to motion sickness or even SAS or anything like that?

Well, I'm not the expert on this. And I think probably you should talk with Dr. .... about the result, but in a general sense, you're dealing with a better understanding of the vestibular system. Which seems to be (garble) system in influencing both motion sickness and of course the space adaptation syndrome. So in that regard, it is direct application back to the man in the street in that area. To be more specific then that, I think I should refer you to the PI.

So you can know if the results are instantaneous, and it seems gratifying in that way. One shouldn't get too excited because you can't really say, you now have an answer to this specific problem.
CHAPPELL That's right, if you're question is, is the key result which opens up the understanding of motion sickness, I can't say that it is, no. It terms of an application to that specific thing, is it a key result in understanding or verifying our understanding of the vestibular system, yes it is.

PAO Okay, on the end.

Can you tell us more about the importance of the detection and (garble)?

As I said, the (garble) upper atmosphere, because it's concentration is extremely low. It takes a very very sensitive experiment to measure it. I should also say, that it is not possible to measure (garble) which basically is looked for in an altitude between 80 and 100 kilometers. It is impossible to do any (garble) at these altitudes which is too high for balloon experiments, and it is too low for a solid rocket experiments, rocket experiments are still going too fast to this altitude range. So the only way to solve this (garble) is to do it by the (garble). But you have to do it from Space and not from the Earth, because if you were to do it from the Earth you would have to look to the (garble) atmosphere, so in fact Spacelab opened us up a very nice way of attempting to do this, to bring this (garble) and do this observation, and the experiment of (garble) he knew that the concentration was very very low, he was very doubtful whether he would be able to measure it, and he was extremely excited, in fact yesterday when he finally identified it, (garble) he can now use the (garble) of the measure of (garble) concentration and to well known concentration of hydrogen at this attitude, in order to determine the so called (garble) which will give him very (garble) information about on going (garble) inside of the atmosphere, which has influence on other species and constituents and on the general atmospheric chemistry. So from this point of view, simply because (garble) because it is so light, next to hydrogen, the next (garble) just because of this you can get a handle to this very very important (garble) which atmospheric physicists have been looking for for a quite some time now, and have never been able to determine it.

Let me mention also, in that regard, you should talk with Dr. ... about this, there are relationships between the measurements, that's measured in the Earth's atmosphere and interpretations of measurements have been made in the (garble) atmosphere. The early measurements that he has just made look to him as if the ratio of (garble) hydrogen is about the same as it is in the oceans. This then enables you to go to measurements of this ratio, that have been made in the atmosphere of Venus. And
make at least speculation as to how that ratio relates to the
content of water on the surface of Venus as it evolved. And
measurements from the Pioneer Venus mission several years ago gave
that ratio on the order of 100 instead of 10 to the 4th, that has
led to speculation that if indeed you can relate the atmospheric
ratio to that ratio of water found on the planet. That then adds
to the speculation of how much water was originally on the
surface of Venus. A paper written by Tom Doahue, I think within
the past few years, so it's using the measurements of the Earth's
environment to understand what we have here in addition to being
able to tie into planetary speculations on planetary atmospheric
evolution.

PAO...right here. Please remember to give your name
and affiliation.

JACKIE JUDD CBS A question not exactly about the experiments.
The crew seems to have had very little to say so far about the
comforts of working in Spacelab and the comforts of actually
living in the Orbiter. What is your sense of how they are making
out up there?

CHAPPELL They have had very little to say, and one can only
speculate. I think as they have adapted to the Space environment
in general, they are beginning to catch up on their sleep a
little bit, they are just getting used to it, and getting
adjusted. I heard just as we came in and Byron Litchenberg came
on shift, just as we started here, I heard him say good day I'm
feeling great, let's get started, and that's I think is an
indication that they are getting used to the environment and
getting more and more comfortable. Other than that, I haven't
heard specific comments one way or the other, so there is no way
to tell.

***
CHAPPELL  good day, I'm feeling great, let's get started and that - I think that's an indication that there getting used to the environment and getting more and more comfortable. Other than that, I haven't heard specific comments one way or another so there's no way to tell.

PAO  Down here.

JULES BERGMANN  (ABC News)  This is for Dr. Knott or is it Knott.

KNOTT  You pick your choice.

BERGMANN  We pick up - I pick - we're picking up reports from Europe that the German community is very disturbed and upset by one, percent of money they spent on Spacelab, and two, the way Spacelab is locked to the Shuttle. In other words, it cannot fly without the Shuttle. Two, their locked to the Shuttle's launch centers. Would you care to comment on that?

KNOTT  Well, you're second remark first. The fact that that's Spacelab being locked to the Shuttle. The Europeans built it that way so they shouldn't complain if it cannot be unlocked from the Shuttle. Do you understand your question, right? You said why should it be unlocked from the Shuttle. They built it this way, it cannot be unlocked from the Shuttle. It is not a free flyer space, it has to remain with the Shuttle. Was that your question?

BERGMANN  Well, yes, but the implied criticism, there was a wire service during yesterday in AP. Is that - this was agreed to 10 years ago but were it done now, it might be very different. In other words instead of building lab locked to the Shuttle, the European community might go for their own vehicle.

KNOTT  Well now, the pursuing way of designing more independent carriers and in fact they have started doing something like this but this has just been started and will be pursued in the future. For the time being they should be quite happy that Spacelab is a means locked to the Shuttle because it would be unlocked from the Shuttle. It would be without any energy and it would certainly not be able to combex, so I don't think where this criticism came from, I'm most certainly convinced that it is not justified.

PAO  John.

BERGMANN  What about my first question? The criticism of Spacelabs excessive costs?

KNOTT  Okay, well you all know how much it has cost to build Spacelab and what the European's obtain to in turn of course this
first free flight and also the selling of the second Spacelab (garble) including several Pettifolds and thrust barrier units and so on which was a major number of parts and equipment. They used to be delivered to us and paid for. Now if you make up exactly the sums in terms of dollars you have to balance a shot of fly against what it has cost to build Spacelab and in this calculation you must remember that this money did not all go to United States. A lot of this money has flown into European industry. European industry I think has obtained a lot of know how in the cause of this project and I agree if you make up the bill in terms of dollars then it is perhaps not a very good deal but if you add other advantage into it like obtaining know how like the corporation to which we have gone or things we have been picking up during this process. I think we should be reasonably happy with this deal.

PAO Right down here in front.

JOHN WILL (New York Times) Back to science. In the Eddy defusion coefficient, is that another way of saying the dynamics of circulation of the atmosphere currents in the atmosphere?

KNOTTS That's basically the (garble) exchange of constituents inside of the atmosphere.

WILL And why is terrarium such a key to that? Are there no other species of molecules that could be traced to find the same thing out?

KNOTT The fusion is dependent of mast. The light of the constituents, the faster the fuses. So the best of fusion is obtained for hydrogen and the next best of fusion is obtained for deterior. So these two species are extremely sensistive to the fusion and the fusion process are best studied using these two constituents.

WILL Now is this region of the AD to 100 kilometers, is that the region that you knew least about as far as the upper atmosphere dynamics are concerned?

KNOTTS It is a very critical layer form (garble) physics because it is a layer which is still filled up with constituents which had the fusing up from the earth and it is a layover extremely strong courses in terms of atmospheric photochemistry, are going on because you realize this still source taking this attitude.

WILL Thank you.

PAO Right here on second row.
PAT JONES (National Space Institute) I get the impression in respect to the scientific communications dominating the communications between Spacelab and the ground. Does that mean that we probably won't get any feedback on the new galley arrangements and new sleeping arrangements until debriefings on the ground and flying home from that I know this time there is someone in mission control to advise on photographic possibilities during the course of the mission. Will there also be communicating time for this to go ahead, for example, I think we have 3 typhoons around at the moment, two active volcanoes. Will they be able to follow up on this?

CHAPPELL I think - I believe you should really address the questions - those are Orbiter related questions and I think you should address those to the I guess flight director in his debriefing as opposed to the science.

JONES I think what I'm concerned with is the occupation of time on the air. Is science really going to predominant to the exclusions of other things?

CHAPPELL Certainly not the exclusion but we - science will dominate in the S-band communications and that has been very effective in allowing the interaction between the investigators and the onboard crew. I think not to the exclusion of these other things certainly. We're not familiar with the because our preoccupation is with the scientific communication and we have been sharing the S-band and that's gone quite well. But certainly that information is available and I think you just need to go to another source to get a reasonable answer.

PAO Well take two more questions here in Houston from Wyatt and Mike Meecham and then we're going to go to Kennedy and Portfar and we do have to hurry a little bit because we've got to clear out of here in about 15 minutes in order to make room for another briefing.

WYATT A series of quick one here for Dr. Knott. Dr. Knott, is it possible that SEPAK, I can't tell from the schedule, might begin it's bombardment into the atmosphere tonight. The second question is, whenever it does, will we be able to see it from the camera that we saw the starfield last night. And thirdly will results of the data be as significant immediately as the detection you think of deterior. In other words, in the same vane will you be able to see things out there immediately in the similar vane that you were able to detect deterior last night?

KNOTT Well, it will not start doing this present shift as a test scheduled so there will be nothing going on in this shift. SEPAK will become active only under 3. That means in two shifts from today. And the beam (garble) if you know exactly where this - you should look to see if the sky is clear you should be able
to see a (garble) of the beam under certain conditions. If it's fire down, it's not always firing down but if it's firing down, it should in principal be possible to see it but I'm doubtful by the opportunity of (garble) because the orbit covers such a large part of the world and then the weather is so uncertain that maybe that difficult, but we could try to get you an idea on when this happens and where the Shuttle is and so on, where to look for.

WYATT I think I ment from the camera that's mounted on ...

KNOTT From the camera - this is one of the major aimes of this investigations to it to study it yes, that's definitely being done, yes.

PAO Mike.

WYATT The third part being whether or not there will be data. You'll be able to tell what's out there instantly and if it will be significant.

KNOTT Well you will not be able to see what is out there. The SEPAC experiment is more made to study basic action phenomena between a beam generated by it and the surrounding plasma so it is not, we are not going to investigate what's there but we are going to in this experiment to investigate a basic physics a process, a particle plasma in action. Perhaps the generation of (garble) the generation of instabilities and things like this. So SEPAC is not looking for something which is there but SEPAC is generating a disturbing signal into the ionosphere and other expeirments are trying to detect this disturbance.

PAO Mike.

MIKE MEECHAM (Connect News Service) Do I understand that you have the module for determing the ratio between deuterium and hydrogen or you hope to establish from this data a new model?

KNOTT There are a number of models which has a very critical input, there is a very, very critical input, this so called eddy diffusion coefficient and if that eddy diffusion coefficient is not detemined (garble) as good as (garble) and fed into these module, this will make these modules so much more accurate. So if the diffusion coefficient is so ...

***
on this...

This so called added fusion, co-effecient, if that (garble) is not determined with good accuracy and fed into these models this will make these models so much more accurate. So far they said, if the diffusion co-effecient is so large my (garble) exists, this co-effecient so far then is a parameter, and generated similiar atmospheres.

So, this helps verify the model that you have.

No, this helps bring in the model closer to reality.

Okay, I guess I'd call that verification. By seeing more (garble) up there then you previously thought would be there --

This is what not has been accounted. What has been accounted so far is that what has been seen is very close to what was to be expected.

I see, okay.

PAO We will now go to the European Space Agency newscenter, in Cologn Porz, West Germany.

(garble) this is Cologn Porz, West Germany, and we have some questions.

PAO Okay, go ahead.

This is (garble) voice of Germany and Frankfort to (garble). This is a more basic question. Do you see that the spacelab is really a step forward in space, in other words, do you see that the spacelab is, for instance, the metric camera better than what you had on (garble) optical skeptical scanner or is it in other areas better than what you had up to now in spite of other (garble) or maybe even what the Soviets had on the (garble) stations, do you think it's really a step forward?

Let me say that there is no doubt, that it is a step forward and one can comment specifically on the metric camera because that hasn't been turned on yet, and we don't have results for comparisons, one can anticipate a great deal of excellent observations out of the metric camera. In comparing with Skylab, it's not a straight forward comparision because
Skylab was a long duration mission, and any of the experiments were of a different nature than those done on Spacelab. However the flexibility of Spacelab is so far superior to that of Skylab that one is able to cater the Spacelab capability to whatever scientific discipline you want to pursue, and use it again and again. As well as the instruments that are built to make with it. So I think there is no doubt that Spacelab is a significant step forward and a significant capability for the science community.

Let me add one point to this as far as the metric camera is concerned, the fact that the metric camera will return or will be in a position to return films to the ground is a very significant step. I do not believe that the electrical optical systems which exist at this time will be able to give you back pictures of similar resolution as the metric camera is able to do with it's film size of about 30 by 30 centimeter per frame. This is a major achievement to get this film back into obtaining pictures with this type of resolution.

LEO ENWIRGH (garble) report that the crew being fatigued in the early days, was it a mistake to have them working 12 hours shifts, and has that had any impact on the science results of the life science experiments, do you expect that it might degrade some of the results, the fact they were so stressed.

KNOTT The (garble) as far as the first day is concerned. First of all, the first day's a very important from the point of Life science, life scientists have always insisted of getting access to the crew, as soon as they are on orbit in order to get their first point in terms of adaptation of the crew in zero gravity. And therefore, the first day ran very very full of this life science activities which can abstrain the crew quite a bit because the crew has to test subject, later on their own experiment, but during the first days, experiments are on (garble) and it is simply the first few days when the crew has to get used to the new environment, and this is a load on the crew during the first days of the mission. And, I think we have overcome this period now, quite successfully without losing too many of what he wanted to achieve. And, I think it was simply to expect that these first days on orbit, our first shift would be very very hard. (garble) hard but the crew managed extremely well to deal with all the things that they are supposed to deal with.

I should add that a great deal of the tiredness that you had felt that the crew displayed is partially a result of the adaptation to the zero g. One aspect of the adaptation is a state of mind that causes you to work a little bit more
deliberately and more carefully as you adjust, it's a new environment, both in terms of the way the vestibular system responds, as well as just getting around, positioning yourself to do experiments all of these sorts of things.

Do the astronauts report on the (garble) in Space, and if it's a subject to be studied apart from the (garble)?

CHAPPELL Was that dreams in space? They have not reported such as yet.

PAO Any more questions from ESA newscenter?

That’s all from ..

PAO Okay, we’ll take 2 questions or 3 possibly 3 questions from the Kennedy Center, then we are going to have to conclude the briefing.

LARRY BERNARD (Fort Lauderdale News) Very quickly Dr. Chappell, I suppose it’s too early, but concerning the (garble) have we learned anything yet about how plants grow in space?

CHAPPELL We have just selected the samples, and we’re beginning that part of the observation now. So we can't say anything as yet.

If the (garble) advised to take (garble) what is the result of the successful efforts to provoke space sickness or was he just plain tired?

KNOTT My impression was that he was exhausted at this time.

Excuse me, I didn’t hear you.

PAO Are there any other questions from Kennedy?

(garble) to this British (garble) discriminaton, can you tell me please whether we are going to get any TV with this experiment?

CHAPPELL I don't know, I don't believe so, but I am not hundred percent sure, that that's not the case. We can find that out for you, if you would like.

Thank you.

PAO One more.
Mr. Knott, I have not heard your answer earlier, would you please repeat it about Litchenberg?

CHAPPELL Paul's voice is leaving him, let me say, that I think Byron's situation was a combination of getting toward the end of what was a busy shift for him, and the adaptation in general, which as I mentioned earlier causes the a slowing down in performance to a certain degree. I think that's what we saw at that stage, he did have one could say a rally toward the end of the shift and in fact was able to carry out two or three of the experiment 102 functional objectives, very efficiently and came up to a couple of workarounds that got some of the activities back on schedule, so it went ending the shift he was in, I think exceptionally good shape, and as I mentioned earlier when he got up today and started his shift he was quite well and ready to go.

PAO Ladies and gentlemen, I do know you have a couple other questions and I apologize but we have another briefing starting in precisely five minutes, so we are going to have to conclude this, if one or two of you do have a question, this gentlemen might be able to address that outside, thank you, this concludes today's science briefing.

END OF TAPE
PAO  We have once announcement. There will be a Solar Max Repair Mission News Conference tomorrow from 10:30 to 11:30 am central standard with the 41C Flight Crew at NASA Goddard Spaceflight Center. General Abrahamson and Dr. Burton Edelson, NASA Associate Administrator for Space Science and Applications, will lead off the Press Conference from JSC here before the switch to Goddard. There's no two way audio on this for realtime questions from JSC so you need to submit your questions in advance for relay to Goddard before the Press Conference starts. Okay, the Flight Director Larry Bourgeois covering the last 8 hours of STS-9. Larry.

LARRY BURGEOIS  Thank you. I'll start off. The last shift both the orbiter activities and payload activities. I spoke to Harry Craft on my way over here. He is very happy with the activities accomplished during the last shift. Basically all of the objectives were accomplished from the orbiter standpoint. The same holds true. It's going pretty well. We did have a couple of activities during the day that I would like to tell you about. The first one was RAU 21 which I'm sure most of you are aware of. We had some difficulties with it yesterday. We made a couple of attempts today to try to recover that RAU. We did a memory write update to the experiment computer with the hopes of recovering that RAU. The theory was that the problem we had, the concern we had with the RAU was that too much data was coming from the RAU to the experiment computer and essentially overflowing and causing the computer to bypass on the new op, that RAU. So the software patch we implemented essentially took part of that data and removed it from the, and caused the computer to ignore part of that data in hopes that the lower data rate the computer would see would solve the problem. Well, we implemented that patch this afternoon and for about an hour the RAU performed nominally and then it bypassed again. So, we've since tried to op the RAU to reestablish communications with the experiment computer and the same condition existed as existed last night. So we're back to reevaluating where we are and what we need to do for that RAU. So the status is basically the same it was earlier this morning the last press conference. The other thing is the SM computer during Spacelab operations shifts an orbiter state vector over to the Spacelab computer. The SM is the systems computer in the orbiter. Shifts state vector to the Spacelab computers. This vector we found has a time (garble) in that the vector we're shifting out of the SM computer has an additional day added onto the GMT time which has had some affect on the experiments requiring that state vector information. We understand the problem here. It's apparently a coding problem in the SM and there's a patch in work to fix that and I would expect by during this next shift that problem will probably be fixed. Consummables wise we're running very well in consummables. The cryos margins are significantly higher than we expected preflight. The pile loading is about a one and a half kw less kilowatts less than we had expected therefore cryo budgets are
very good. Prop consummables are looking good also. They're running basically along the nominal plan so we're looking real good for a complete mission and total success. And that's basically all I had. Ready for questions now.

PAO Please wait for the mike. Craig Covault, Aviation Week. First row.

CRAIG COVAULT (Aviation Week) Larry on the state vector transferring from the Orbiter to the Spacelab, was this a software programming error preflight that wasn't caught and secondly, has that bias resulted in perhaps a cycling on or off of some Spacelab instruments that was done in incorrect times.

BOURGEOIS Okay. That was a preflight programming error. The effect on the Spacelab experiments I can't say. Mission Manager Harry Craft should be able to answer that in the morning for you.

PAO Carlos Byars, Houston Chronicle.

CARLOS BYARS (Houston Chronicle) Well Craig got my first question. You say other things are going very smoothly Larry. How about the communication system through TDRS both Ku and S-band.

BOURGEOIS Both Ku-band and S-band are performing about as we expected preflight. We are experiencing some problems as we expected with low circuit margins in both the nose of the vehicle and the aft end of the vehicle where the gain from the omni antennas is less than it is for the other portions of the vehicle so we are experiencing some difficulties there. But that was expected preflight and we were not surprised there. The Ku-band system is handled, is performing I would say somewhat better than we expected because there are areas where we had some concerns that due to some lookup tables in the pointing system that we may have lost some Ku-band data because of inaccuracies in the pointing, and today we've only seen one occasion and that was a very short dropoff.

PAO Follow up with Carlos over here.

BYARS Have the lookup tables in TDRS been updated?

BOURGEOIS No, Lookup tables have not been updated. They're in a (garble) which cannot be updated.

PAO Jules Bergman, ABC.

JULES BERGMAN (ABC) Larry, the 150 odd attitude changes the orbiter has to make to support Spacelab - how many have been made so far?
BOURGEOIS I hate to hazard a guess Jules but we have not gone into the high maneuvering part of the flight. These first few days we don't do as many maneuvers as we do later but I would hate to guess how many we've done. I really would not like to guess, speculate. I can get that number for you if you would like.

PAO Craig.

COVAULT We have not heard that much from John and Brewster due to the configurations on the comm. Have they had many comments of visual ops out of the 57 degree orbit?

BOURGEOIS The comment I recall was a pass over Hawaii today when he said Hawaii - he enjoyed the pass and he was looking good but that's the only comment I've heard on visual ops.

PAO Carlos.

BYARS Follow to that one, was that from John?

BOURGEOIS No, that was from Brewster.

BYARS Brewster?

BOURGEOIS Yes.

BYARS Okay. How about state of the health, the crew?

BOURGEOIS There's been no PMC. The crew has made no comment on their health and I cannot make any comment and would not like to speculate on their health. I know they're keeping up the timeline and doing a fine job so looking good.

PAO And back over here, 5th row.

JERRY SCHWEITZER (CNN) Is it just that the timeline is off coincidentally by this much that the hop and drop last night and the drop and shock today just missed the actual performance on the downlink? All we ever saw was set up on both.

BOURGEOIS Okay. I really couldn't comment on that. The Mission Manager would have to comment on the experiment timeline activities. Harry Craft will be here for the next Change-of-Shift Briefing and he should be able to answer those experiment related questions.

SCHWEITZER Ignoring just the timeline status then, isn't it - it seems a little curious to me that we would have the 20 to 30 minutes of live downlink of the preparation but none of the performance itself.
PAO        That's really not an orbiter question. That's a
          Spacelab experiment kind of question. We're here to talk about
          the orbiter.

          If you're running about 1 and a half kw low on
          predicted power is there anyway to put a number on how much more
          cryo you had in the fuel cells than you would have expected?

BOURJEOIS  Right now we haven't fully, we can't say accurately
          how much cryo we have but it appears we would have enough
          hydrogen for probably another extension day if required. That's
          very preliminary though.

PAO        Jerry Schweitzer again.

SCHWEITZER I believe it is an Orbiter question to find out
          then if we're ever going to get a dump of that video that we
          missed, is it not?

BOURJEOIS  I couldn't say, I don't know.

SCHWEITZER Because at last call the recorder was switched over
          and the tape was full.

BOURJEOIS  Some of the power video is dumped and some of it is
          held onboard and requires on tapes. And I couldn't say what the
          plans were for that video. I can say one thing about that video
          though, and that I was watching at the time and the video ended,
          we had LOS about that time, at the time the video ended that's
          why when it ended.

***
BOURGEOUS ... video is dumped and some of it is held onboard on tapes, and couldn't say what the plays were for that video. I can say one thing about that video, during that, I was watching at the time, the video ended, we had LOS about at the time the video ended, that's why we ended it at that particular time, and that's all I could say.

PAO Any more in here, back 4th row on this side.

JACKIE JUDD (CBS) How is it going in Columbia's living quarters, before they went up, John Young was saying that there may be some problem with all the noise from the machines for the crew that was sleeping at the time.

BOURGEOUS I've had no comments that they are having any difficulties at all. The only assumption I can make is that things are working out fine. We are sending up teleprinter messages and I've had no comments as to difficulties with that.

PAO Ok, over here on the side.

DOUG MILLER (KTRH) You haven't heard aloft comment from the crew about aloft of things, as a matter of fact. Is it that the crew is so busy this time they haven't had time to talk, or what do you think is the reason we aren't hearing quite as much.

BOURGEOUS Well, they are busy, as you know, there is one guy in the Orbiter how has to do all the Orbiter activities and a couple of guys in the Spacelab that are working pretty hard, and I would say they are busy, although we have had some comments, so I would think it's an unusually quiet crew.

PAO Ok, over there.

Getting back over to the noise factor. Is the teletype still in the, on the middeck there, or have they moved that there?

BOURGEOUS We launched with the teleprinter on the middeck, and they were going to move it if was too loud for the to sleep. I have not heard if they have moved it, they have not said whether or not they have moved it. I do not know.

PAO Any further questions? Jules

JULES BERGMAN (ABC) Larry, the TAGS system still is not working?

BOURGEOUS That's affirmative, we are not using the TAGS, it is not powered up.
BERGMAN As far as you know, the 3 bunk, one on top of the other, 3 bunk system is working.

BOURGEOIS As far as I know, I have had not comments on it. And the reason the TAGS isn't working is because as you know is because we don't have the forward link on the Ku-band so we can't the TAGS.

A scheduling question. "Do you know when Owen Garriott is going to start using the HAM?"

Do you know when Owen Garriott is going to start using the 2-way radio for contact the HAM's?

PAO No, but I think the Amateur Radio League on opportunities on when he can do it. I think its its his option, when all the things coming together: opportunity, stateside pass and he's off duty.

BOURGEOIS As far as I know there is no schedule for those activities, I'm not aware of a schedule, that is suppose to be done on his own time, when he has an opportunity to do it.

PAO Carlos.

CARLOS BYARS (Houston Chronicle) Lets see if we can find, something they have commented on, do you want to volunteer something, or do we start going down the list?

BOURGEOIS Something they have commented on?

BYARS Alright, the head, the food, the bugs in the capsule, surely somebody has said something.

BOURGEOIS Well, Brewster said How are you, you look nice!

PAO We just got word that Brewster Shaw commented that they had not, are not going to move the teleprinter, and it was working fine were it is. Well, there you go. That's the question on the teleprinter. Anymore questions here? Ok, lets go to KSC.

FRANK (GARBLE) (Today) The question to do with the RAU, are there more procedures planned to try to overcome the problem, and are there some chance that they're not going to be solved, and the particle accelerator experiment may have to be cancelled?

BOURGEOIS There is more analysis being done on the RAU, and I would expect there would be more procedures attempted to try to recover the RAU, as to the probability of recovering it, I think we would probably have a good shot of recovering it, although I can't say for certain. The affect on experiments, again I'd have
to defer to the Mission Manager. I do know that, I spoke with Harry on the way over here and the experiments on the RAU some would lose a good portion of data, others would still have considerable success, but I couldn't say which experiments, and Harry could speak to them in the morning.

Ok, thank you. A follow up question, is it essentially a software problem with the RAU?

BOURJEOIS Well, we don't know, we suspected a software problem, potential software problem, well let me rephrase that, we attempted to fix the problem by modifying the software in the experiment computer, so it would accommodate that which we thought was the higher than normal data rate, but that didn't work so we're back to the drawing board, and we're not really certain what the problem is.

Thank you.

PAO Ok, back to Houston, then. Any questions here? Thank you very much.
COX On Spacelab-1, on my right is Dr. Rick Chappell of NASA's Marshall Space Flight Center. He is the Mission Scientist of Spacelab-1, and on his right is Dr. Karl Knott, who is Project Scientist for the European Space Agency. Since this is our first briefing, I've asked Dr. Chappell to begin by giving you an idea of how he and Dr. Knott intend to operate these briefings in format, and then we'll begin with the science information.

CHAPPELL Thank you, John. What we want to do is to give you sort of an overview of what happened on the 2 shifts that Karl and I both work on, and in order to do that chronologically, Karl is on shift before I am, so we'll start with his summary and then I'll give you a summary of the second 12 hour period and then we'll take your questions or problems, what ever detail you'd like to go into. So Karl, why don't you go ahead, beginning with the launch yesterday morning.

KNOTT I covered the first 12 hours of the Spacelab 1 Mission and the first part of these 12 hours, the first 6 hours were just viewer entertainment for me, because first I could view a flawless launch, and then I could view the Spacelab activation, which was very nicely transmitted on real-time TV. And finally I would witness a trim burn at about hour 5, which brought Spacelab into its final good orbit for our scientific data collection.

The purpose of my being at the console already at this early stage of the mission, was to just give advice in case we would not have achieved this absolute nominal orbit on this mission. We would have then had some opportunities to do some corrections and there were options open and we would have to advise on which way we would gone in adjusting a non-nominus orbit. But fortunately, we did not get into this situation. Spacelab is in a good orbit and at hour 6 of the mission, the activities were turned over to the Marshall Payload Operations Team, supported by the (garble) Operations Team and payload activities begun. The first activity which was carried out was the transfer of important life science experiment specimen from the middeck where it was stored throughout the launch into the Spacelab module. I'm speaking of experiment 31. This experiment is looking at the proliferation of the lymphocytes in zero-gravity. It is expected that they will proliferate at a different rate than they do on Earth, and in order to demonstrate this, there are 2 identical samples, one is kept on the ground, one is flow on Spacelab, and into both samples, antigens are injected at a particular point in time, at the same point in time in fact, into both samples and the proliferation of the lymphocytes is then started. This is going on for about 72 hours, and the experiment is in fact still running and after 2 hours, after 72 hours, mitogen is injected into the lymphocytes, this is a radioactive material to which the activated cells react more heavily than the nonactivated cells, and as soon as this activation is completed, the experiment is turned into a freezer and stopped and frozen in, and after the
turn of the sample, the 2 samples the one which has been grown on ground as a reference sample, and the one which has been grown on Spacelab for 72 hours will be compared. So that experiment is very successfully on its way. The next activity was, co-activity concerning experiment 25, that's an experiment which looks at the possibility of the crew to do mass discrimination in zero-g and the adaptation or the increase of skill of the crew of doing this over the days. So this was the first activity which was also achieved during this shift. Then the one activity which was not entirely scientific but which caused us some difficulties and a slight delay in our schedule was the installation of a plasma-physics experiment on the airlock table. This was started at about hour 7:30 and it took considerably longer than we had anticipated, and this caused some difficulties toward the end of the shift, however these difficulties could be worked around. And in particular the hop and drop test of experiment 102, an experiment where the otolith and spinal reflexes of the crew in zero-gravity are studied. That experiment was completed before the end of the shift, and the final messages which we obtained toward the end of the shift was that experiment 20, the one which goes into the airlock was successfully extended into space and experiment 19, which is a supporting plasma experiment, space plasma experiment, had its cover successfully removed and was ready for the operation during the following shift. So all in all, this was an extremely efficient and good shift, in particular in view of the fact that the crew had just gone thru the excitement of the launch and thru the stress of the launch and had to start working hard, activating Spacelab almost immediately when they were on orbit, and I think the crew during shift performed extremely well, getting all the activities which had been scheduled for that particular shift, that they got it all done in time and turned it over to the follow on red crew on schedule. I think Rick is going to take over and tell you about the achievements of the red crew during the last 12 hours of the mission.

CHAPPELL Well beginning at 9 or 10 o'clock last night, there was crew hand over and within the POCC we did our handover at the same time period. What we do every 12 hours is we get together representatives from each one of the disciplines and we look as a group at the activities, the science activities over the previous 12 hours. So we did that last night and we in fact have just completed a 2nd one of those meetings at the end of the second shift. We assess how things have gone, we look at the balance of science among the different disciplines, and we give guidance to the timeline engineers for the replanning activities based on particular imbalance that may be developing because of problems of a given discipline or a given instrument or a replanning opportunities that may be needed by a given instrument either because of problems or because of new results that may have been seen in some of the earlier observations. The shift that I
Worked last night was a particularly good demonstration of the Spacelab as a micro-gravity laboratory. We did an awful lot of life sciences over the past 12 hours. It's particularly important at the beginning of the mission, early on, to do a number of the life sciences investigations because the adaptation to the weightless environment takes place fairly rapidly in the first day or so. And there are a number of investigations on this mission that are directed toward the study of the adaptation. So -- had, particularly during this shift, a great deal of vestibular studies and these surround the study of the balance organ, the vestibular organs, in the inner ear - particularly the otolith organ which measures linear acceleration. It is thought that one of the contributors to the space adaptation syndrome is the conflict in cues that you receive in low gravity where the vestibular organ does not function as it does on the surface of the Earth because there's no gravity, yet the eyes are trying to tell you which way is up. The postural cues that you get from the muscles when you stand or sit are trying to give you information on which way is up and early on the brain seems to have trouble dealing with the conflicts between all these cues. One of the theories is that in the course of the adaptation over the first couple of days, that the vestibular cues, the otolith for example, just lowers -- that sensory mechanism just changes its output. It drops its output down so that the conflict is less. Now that is one theory. Another theory says that the brain just learns that that vestibular cue is not a good cue and begins to disregard it. So a lot of the experiments, these 2 in particular, one by Larry Young from MIT and one from Uri Von Baumgarten from Germany address measurements of the change of the otolith organ in the inner ear to try to see if indeed its threshold - the threshold of output of the otolith organ does change rapidly in the first couple of days. And the way you study that is that you look at reflexes like changes that the eyes make when the body is actually moved - it's called counterrolling or nystagmus -- adjustments that the eye makes as the body moves which are driven directly by the vestibular organs just to see if those eye movements change. And so, a number of the experiments then focus on picturing the eye either with television or with film cameras as the body is moved in zero-g to see if in the course of the mission the response of the eyes, which then is an indication of the response of the vestibular system, is changing or adjusting to the low gravity. So we did a number of those and as I said, these early days are important for the adaptation because it does take place in the first couple of days. There were also a number of experiments done in the second physiological adaptive part of the body and that is the cardiovascular system.

***
There are a number of measurements just blood draws that were made to see if the characteristics of the blood changed. For example, we know that there is a decrease in red blood cell masses as humans stay on orbit for longer periods of time and one of the experiments addresses that. One in fact, which is a very unique one addresses the dynamics of the blood in the cardiovascular system. It's a set of accelerometers. This is from Professor Scano in Italy. A set of accelerometers that the payload specialists or mission specialists wears, and the subject is sort of suspended, floating, and the accelerometers can measure the actual recoiling of the body as the blood moves through the cardiovascular system. And this gives information that is very difficult to get on the surface of the Earth because of the inability to suspend people easily. In the 1-g environment this sort of thing can be done on orbit very nicely. So, there are a number of experiments then that address the changes in the cardiovascular system. It has been, even though it's only the second 12 hours of the mission, one that has been full of a number of investigations that are getting started, just being initialized, in fact, on the order of 20 to 25 investigations have been initialized or started in one way or another in this first 24 hour period, and over 20 in the second 12 hours alone. And these investigations spread across the gamut of life sciences and one in material sciences, a number in atmospheric physics and in space plasma physics, and 2 in astronomy, and solar physics. And so we got a variety of things that are getting started. And by in large, things are going extremely well with all those investigations. I guess one of the things that struck me about the middle of the night, I guess, I think Owen Garriott was about ready to turn in and he, and as he is prone to do, he's a scientists right down to the heart and he never stops looking for interesting scientific phenomena, and I think he was apparently sitting up in the flight deck looking out the window, and he commented to several of the investigators on the shuttle both the phenomena that was going on, both of the pods, the engine pods were going very clearly in this glow was especially enhanced when the vernier thrusters were firing, so he was passing on that information to two of the investigators in particular. One of the astronomy experiments, Deter Andresen who is from the Netherlands, his experiment which is an X-ray spectroscopy experiment, turned on flawlessly, he got his high voltage up, and then opened the shutters, and all, is verified that his instrument is working very well. The back ground on the instrument, the natural backgound on the instrument is quite low, so he expects to have very sensitive measurements of X-ray stellar sources. But one thing that happened last night, is that the instrument was directed toward the Earth, because the shuttle was in, the Spacelab was in that particular orientation for some of the other experiments, and Deter's instrument verified that indeed the Earth is also a good X-ray source as you may know that
The energetic electrons and the radiation belts when they interact with upper atmosphere they cause brim straw in the electron. So, if you have a very powerful X-ray telescope and turn it on the Earth itself, you'll find that the Earth is a good X-ray emitter as well, and these instruments showed that very clearly. In fact, he was surprised at the level of X-ray emission that the instrument saw. And finally, in the active experiment category. We had an excellent series of operations from the electron and ION accelerators that are furnished by the French investigator Christian Beghin. This experiment, the accelerators themselves are on the pallet, the diagnostic instruments were deployed through the scientific airlock in the first shift as Karl mentioned, and they had a number of successful beam firings, both in the ION beam and the electron beam, it worked out very well. So, we've been able to see in this first shift, the use of the Spacelab as an observing platform, the use of the Spacelab as a microgravity laboratory for life sciences, and material sciences investigations, and the Spacelab as a base for active investigations, active stimulation of the ionospheric environment around the shuttle, and then the measurement of its response. So, even though we are only at the end of the first day, it's been a very exciting day so far.

We'll take questions here in Houston. Craig Covault.

CRAIG COVAULT (Aviation Week) Rick, in your planning sessions, how much change traffic have you had? And what has been dominate in terms of changes?

CHAPPELL A modest amount of change traffic so far, there have been principally change requests that have addressed fine tuning the timeline that was generated for the November 28th launch of the investigators because we had only a short time to put that together. In fact, the engineers, the timeline engineers, did that job in a marvelous way, in less than two weeks. The investigators had had a minimum time to fine tune that and so they were able to make some adjustments, and the bulk of the replanning requests that we've had so far have been in that category.

DAVE DOOLING (Huntsville Times) Rick again, on the business with this RAU 21. Will SEPAC essentially be lost if you can't get the housekeeping data through it and could you describe a little bit what kind of housekeeping data has to come out of it. Does it have to interact with the hardware that it has in the module in order to operate? Is that the same problem with the acrom, and is the horizon sensor also lost, or has that been brought up?

Rick Well let's see. All of those of course are associated with the uncertainty in the RAU 21 right now. I think Harry talked that earlier today, and as I'm sure he mentioned
There are a number of ways that are being looked at right now, both software and then really thinking through the hardware possibilities to look at workarounds. I guess I shouldn't speculate as to what might happen to any of the given investigations until we really have a chance to look at some more of that. They are affected in different ways. The ISOL for example, all of the data return from ISOL experiment one, comes down through the HRM and so they lose no data at all, since it seems to be the case now that the commanding is okay through the RAU, so the instruments can be commanded and then the data have to come back down. On the other hand of the spectrum, if it were the case that we weren't able to find some workarounds, then the active caddy radiometer depends entirely on the RAU to get its data back down so it will be impacted severely. Fortunately, it's operations are toward the end of the mission, so I think it's on day 7 or 8, so we have more time from the point of view of the radiometer to work on things. SEPEC is a combination of both, it gets data through the HRM it also gets data back through the RAU, they are now looking at the ramifications of the RAU situation, as we are the same time looking at ways to work around it.

PAO Tom Knight.

NIGHT Rick, now that more and more of the experiments have been turned on, do the power supplies seems to be handling that without any problem.

CHAPPELL Really well. In fact we heard today that we have a very substantial energy margin at this point from the Orbiter, which is always good news, because we have worked all along to maximize the number of experiments we could get for the energy budget that we had, and things look very good energy wise at this point.

PAO Mark Kramer in the back.

KRAMER There seem to have been a few instances over night when one could detect, what could been interpreted as little testiness on the part of the crew, might of been caused by them being pushed and in fact there were a few remarks which said, which were along the lines of we don't do things instantly here, and that sort of thing. And on my part, makes me think back to Skylab 4 when everyone got pushed, and everyone's performance went straight down hill. And I wonder if it's too early to say whether or not what you think you planned is too ambitious, or if you think you can fit it all in, or if you think the crew is going to continue along that line or what?
APPEL  That wasn't what we were trying to accomplish.

BYARS  No, but that's part of that game, some of those experiments are, I think would probably make most of us sick standing here with our feet on the ground. How has that been going, and then I've got a couple of communications questions.

CHAPPELL  Okay, the we have not noticed, none of the payload specialists, mission specialists have got'en sick. In fact we haven't noticed any specific significant changes.

***
There are an awful lot of lines of discussion on that topic, I think Harry mentioned this morning that we feel fairly comfortable with the amount of time that we have left available in the timeline, and I certainly feel that way. I watched the launch yesterday morning too, and I didn't ride on top of the thing, and I was pretty tired in the middle of last night myself, and in fact spent most of the evening marveling at how well the crew was doing after what they had been through with respect to the preparations for the launch, the launch itself, what has to be a minimum first night's sleep, and then 12 hours of work, which is hard on you when you've had plenty of sleep. I think they did really well. Certainly, because in these early days you want to do the adaptation experiments in life sciences, there are things that you want very much to get done in these early days, and I think they did a great job at doing them. I would hate to have tried to do that myself.

Jim Addamson.

First of all, you said that up to about 20 to 25 investigations have been initiated. So far, how many PI's have had the opportunity for direct communications with Spacelab?

Are you talking voice communication, or command -

Voice communication -

Oh probably on the order of 5, 6 something like that. Many of the investigations are command only, and don't involve the crew, so they weren't needed. But on the order of 5 or 6, I may have missed that by a factor or two, but its'

Okay, and the other question is, we talked about how well the crew has been holding up, how about the ground personnel in the POCC and the PIs, how are they holding up so far in the mission?

I think very well. Now fortunately, we didn't have to go right, or unfortunately depending on your approach, but we didn't have to ride on top of the vehicle, so most of the POCC (garble) and PIs have had an opportunity to adjust their work/sleep cycles over the past almost week at least 4 or 5 days, so they're in pretty good shape, and of course the excitement of this event is such that you really don't get tired.

Carlos Byars

Rick there are two or three things I'd like to touch on here briefly. One, space sickness, what have you learned, has anyone gotten sick, you know they were supposed to. Did you succeed?
APPPELL We haven't noticed any specific significant changes, what you see they are generally, they are, I believe as it has been described to me at least, the early phases of the adaptation involve tiredness, and you see that, as I said I think I would be tired if I were working on the ground at 12 hours a day, but you see, you can sense that they are making the adjustment in terms of the tiredness. But they are caring out all the investigations really well. They haven't, and there has been no sickness that we detected.

Okay, on communications, one, how are the communications systems holding up in general voice and data transfer, voice, video data transfer? There have been some problems last night, weak signals, strength scratching signals, possibly loss of data and secondly, last night, I was hearing of what sound to me, like a lot of chatter, from the FOCC Ops and it seemed a bit of lack of communications discipline. I was wondering if perhaps, this got the attention of the crew or your attention, is something is being discussed along that line?

APPPELL You know that chatter is what this is all about. We have the opportunity for the first time to have this interactive give and take between the scientist on the ground and the scientist in orbit. We've never been able to do that before. The chatter is great. That's what it is all about for Spacelab. It is different. It's not the regiment thing, the clipped phrases that your used to. These are scientist that are excited about what is going on, scientist on the ground, and scientist in orbit who are also excited about what is going on and there talking to each other about it. Their learning as they go. Which is really a nice thing. The communication have been fine, as you mention, there were times when there was scratchiness, etc., and I think, I don't know specifically of a loss of data, there have been only a couple of instances where we didn't, for example, in one or two of the life sciences experiments, when we needed high rate data and we weren't configured right for it, so we had to delay that piece of the investigation. But the communications have been fully adequate and we haven't been hampered at all by bad communications.

PAO The gentlemen in the second row.

CHRIS JOYCE (News Scientist Magazine) Have there been any data returned so far that can be interrupted, I was thinking for instances the mass discrimination experiment when the crew was asked to perform these differentiations before and they have been doing them since they've been up, perhaps some of the video tape of the eye movement, I wonder if any of these have set back any data now that have been interrupted one way or the other?

PAO Knott is that yours?
But the data for the mass discrimination experiment 25, they are return by voice. The crew is just determining which are the lightest ball, which is the heaviest ball, and how they come in sequence then. And the result of this basic discrimination there are carried to the ground by voice. And this has been done in the mean time. However, this was only the first data point, over a whole series of measurements which will be done almost every day during the mission now, where the so called space adaptation is determined. You can see that for example experiment 25 have gotten yesterday it's first data point.

JOYCE Only data though, no interruption yet, no diagnosis?

CHAPPELL Let me answer that

KNOTT The interruption basically comes then from the looking at the count, which is set up during the mission, which has no particular interruption from one point. From one point you cannot draw a curve, for example.

CHAPPELL You mentioned the eye movement and what we did here today as they were going, I'm sure your aware that one of the experiments has a very high resolution television that watches the eye and so we set here in the POCC and watched very close up very high resolution, Ulf Merbold eye and Bob Parker eye and they were how many thousand miles away from us, but they were, you could already begin to see the investigators sort of looking at the way the eye was moving, responding or was not responding, they were beginning, you could see the lights beginning to come on about well maybe it fits this or maybe it fits that. People, scientist are beginning to get ideas, if one is a careful scientist though you begin to collect a lot more data of the first view images.

PAO Craig Covalt Speak into the mike.

CRAIG COVALT (Aviation Week) Rick, on the ISO, have you heard any conversations over the POCC loop from Marsha Toro over Coeye, really her satisfaction with the data. What has she said.

CHAPPELL She, we in meeting which we just had, the instruments working really well. She's very excited about what she is getting. So the command, and she is on RAU 21, the commands are thru to her instrument and it's returning excellent data, she is very excited about it.

COVALUT Can you put an qualitative on the type of data she is seeing. Has she commented on any way on that?

CHAPPELL In terms of interruption Craig?
VALUT Just a little on the interruption or the sensitivities?

PAO Not yet, the spectro clean, decisive as she had expected, that's a survey experiment, so you start to generate global information on the upper atmosphere, so she is going to acquire data for a while to begin to put a picture together. But the instrument itself is working extremely well, so far.

COVALT And quickly have you gone after an celestial targets yet with any astromony?

PAO Not yet. The x-ray instrument is the one that has been turned on first and it's doing background measurements right now.

PAO Dave Dooling

DAVE DOOLING (Huntsville Times) Carl, on extending the pic paps thru the airlock, what was the problem there, they just not have foothold or having trouble adjusting to working 0-g or what.

KNOTT Well it is a fairly involved procedure of getting the experiment, this part of experiment extended to space. They have to unstow the experiment, which is stowed safely for launch, they have to unstow it, they have to place it onto the airlock before they have to do that, they have to lower down the airlock table and put it on there, fit it on mechanically, fit all the cables to it, then have to do a calibration in fact, when its still on the airlock, not deployed yet when it is still in the module, and then finally after all the check out and all the scientific calibration is okay then they can deploy it. It's quite an involved activity, and I gather we haven't got a debriefing, a detailed debriefing on this one by the crew, but I guess it was just basic finger topple of not getting it ready in time. So it over run just about 100 percent activity. But like I said it was not detrimental for the men of the shift, the time could be caught up at the expense of just one of oh, experiment 25 moving further down, just before the sleep period of the new crew.

PAO Take one more question, then we'll move on to other centers and then come back here. Mike in the back?

MIKE MECHAM (Gannett News Service) Knowing what you know now after the first day, can you look forward to todays activities and kind of overview which you can be doing and how you think it will go.

KNOTT Today will be a day which is just dominated as far as crew activities concerned by life science investigations. We'll have a second part of the shift several more runs by experiment 102, the vestibular experiment and then this morning these activities should already be running now, or atleast should
prepared for right now is experiment 104. That's the drop and, not hop and drop experiment like 102, its drop and shock experiment, so it gets a bit more involved. The astronauts will be fitted with small electrodes, and while they are being dropped in this particular device, which is also being used by one and two, they are mildly electrically shocked at the same time. And the investigating by experiment 104. So this is as far as the life science activity this shift goes. We will then have quite a number of Ulf's observations during the forth coming shift. The attitude of the week, of the dominating attitude of the week during this particular shift will be with the -zataxis pointing at (garble) that means we are looking down to the earth, which enables a lot of atmospheric physics experiments to operate. One major experiment which obtains its fast measurement of opportunity will be the (garble) spectrometer, which is a European experiment provided by M. Ackerman from Brussels, in cooperation with a French Institute, and his experiment has during the last shift, at the beginning of the last shift, been successfully calibrated, so they are sure the experiment works, and they will then start their routine operations of observing the atmosphere during the shift today. And there will be some investigation running in the Astro Physics discipline, that's the experiment that Rick already mentioned the x-ray spectrometer, which is continuing its spec ground observation north celestial object yet, even after doing this particular shift and then the number of long duration, life science experiments which do not require any specific crew attendant, they are also being exposed on the pallet, and we have even already one material science experiment already activated, and that's an experiment which is growing a crystal from a solution. Several methods of crystals growths are pursued on board of this Spacelab 1. The first crystal which is growing is crystal growths from solution. And that crystal growth is a very slow process and this experiment has run, has to be run over several days and it has been started on the last shift and it will be running almost until the end of the mission, just in order to get sufficiently large crystal grown during this mission. That's basically what is happening in the forthcoming 12 hours.

CHAPPELL Mike, I should add, you know in terms of just, in general terms, if you look at what happened so far, the Spacelab demonstrating its capability, you've got to be excited what's coming because we're doing, the Spacelab is effectively doing scientific work and this broad range of science now. The scientist themselves feel the excitement, and we certainly do to being part of it.

***
PAO We'll go now to the Kennedy Space Center in Florida for questions.

PHIL HILL (Washington Post) I'd like to hear more about the hop and drop experiment - what exactly you expected to see, what you are looking for and what you've seen so far.

CHAPPELL Generally, the hop and drop experiment uses the bungee cord drop technique to give a stimulus to the otolith that I was talking about earlier. The organ in the inner ear that measures linear acceleration so that the bungee gives an acceleration to the crew, of the crewmen unexpectedly and the electrodes measure the signal that's sent to the legs is an automatic signal that goes from the vestibular system to the legs when you drop in 1 g and this experiment then will be done over the course of the mission to see if the magnitude of that signal - the effectiveness of the otolith in sending out that signal changes as a function of time. So the drop part is to measure this very basic reflex between the otolith organ and the response of the muscle of the leg.

KNOTT Interesting part of this experiment is, by the way, that when you drop in gravity - when you just drop - when you just jump from a chair onto the ground then you are in 0 g for just a very short moment while you are dropping while in space it's just the opposite. In space you are dropped by the pull of the bungee cords and you are being accelerated so the drop in space is quite different in terms of acceleration from a drop on earth.

REG TURNELL (BBC) A couple of questions. First, could Karl Knott tell us a little more about the mass discrimination test. Which crewmembers please are taking part in this. How long does it take and do they hold each of the steel balls in the hand and do a sort of weight getting game calling out a number on the ball back to control and so on.

KNOTT Well eventually, every crewmember will do this experiment. During the first shift it was Brewster Shaw who was scheduled to do it and Byron Lichtenberg to carry it out and they have in fact both done it. Well, as I explained earlier what they do they get a set of balls which all look the same but they all have a different weight. And the aim of the game is basically to determine which is the lightest ball and which is the heaviest ball and then solve all the ones which come in between into the right order. And on earth this is pretty easy because you have gravity telling you more or less which is the lightest and the heaviest ball while what you have to do in space you have to just with your hand try to accelerate these balls and the acceleration necessary to move these balls around in 0 g tells you which is the lightest ball and which is the heaviest ball and it is completely different ball game on the ground and in space. And the investigator, which is Helen Ross
STERLING UNIVERSITY, I think what she is basically after is now quickly can the crew adapt its skill to just getting these balls into the right order. I think she expects a lot of errors and probably a lot of errors have been done yesterday during the first run but I think she expects that after nine days or during the last time a crewmember gets the opportunity to do this experiment, he will have acquired a skill to just in no time order the balls into the correct sequence. That's basically how this experiment...

TURNELL Can you tell me how they're identified? Does each bear a number or a color?

KNOTT Say again please.

TURNELL Can you tell me how these balls are identified. Are they be colors or do they carry a number?

KNOTT They carry a certain identification which allows the crew to, of course, right down the precise sequence. But if you want to go into this detail of the investigation I think we'll get you in touch with the prime investigator of this experiment.

TURNELL Thank you and a question on space sickness. If the payload Specialists failed to make themselves space sick with these tests, I mean can one consider the tests a failure in that they won't have succeeded in finding out what causes space sickness.

CHAPPELL Well as I mentioned earlier, I think there was good reason to begin to refer to this as space adaptation syndrome rather than space sickness. What's being studied is the way in which the body physiologically adjusts to microgravity. Not whether you get sick or not but what the adjustments are and that's what's being studied. If the crewman doesn't get sick that's marvelous. He will still adjust to the microgravity environment and those adjustments are the things that are being measured.

MICHAEL WATSON (World Astronomical Society Of Canada) I have a question about the crews themselves. In past missions we've seen of the crews of taking great pride in getting their assignments done and the experiments completed in good time. Do you expect to see, and more importantly, have you yet seen any evidence of any rivalry between the crews - the red and blue crews - in terms of getting their assignments done within proper time.

CHAPPELL Not at all. These are guys that have worked together very closely for almost 5 years now. They are extremely good friends, they are colleagues and throughout the training
I've never seen any of the rivalry sort of thing and for a number of the years the Payload Specialists, the four Payload Specialists knew that only 2 of them would be flying and even in that environment there was never a rivalry that surfaced. They have always been mutually supportive and they continue to be.

KNOTT And apart from this, there is very little opportunity for any rivalry because if you look into the timeline you will discover that most of the investigations which are co-attended, which require co-attention are done by both crew members who are in Spacelab at the same time so that they are basically doing experiment together. One very often is the test subject and the other one is helping him to get on his electrodes and perform these various tests. So they do a lot of these activities together and not in, certainly not in rivalry.

LARRY BERNARD (Ft. Lauderdale News) Dr. Chappell several questions. First, have any theories concerning SAS been confirmed or eliminated and could you answer that question for any of the theories of any of the five disciplines?

CHAPPELL Larry, I think we're a little premature today on day 1, or the end of day 0. I really believe that within the space adaptation syndrome that there'll be some significant information that comes out shortly after the end of the mission. I think the number of tests and experiments that the crew is able to go through on themselves will be such as to give us information that we just haven't had before and that's bound to lead us down one path or another in the explanation of the space adaptation syndrome. We don't have it today I don't think, but I think we can look forward to information in the near future after the launch. And probably in Life Sciences you'll see results more rapidly than in many of the other disciplines.

BERNARD Okay, also the light from the electron beams — could they have been seen from earth and if so, what part?

CHAPPELL Well, the specific timing of what the SEPAC people call the artificial aurora experiment — the specific timing of that is not set up yet because they have a number of experiments that they go through as they checkout the electron beam and understand its characteristics. So as of today, we can't say exactly where that would take place as far as over what particular part of the earth. I would hope that as we get closer to that day which is in about the middle of the mission that we will be able to make some prediction of at least the area of the world that it could be seen. It is a very faint light. It should be a streak of light no more than a few degrees, maybe 10 degrees in length and fairly narrow with an intensity of the order of a moonlit cloud. So you could see it if you knew the
section to look at the right time and I hope that will be the case for some people some place in the world but we can't narrow it down yet as of today.

BERNARD And finally, what has been the most exciting part of the mission - most exciting data for you or any of the PIs?

CHAPPELL I think to me the exciting thing is seeing the Spacelab in general in operation and seeing my scientific colleagues have this capability available to them to be able to interact with the scientists onboard. All these things are just brand new and it's exciting to watch all that. Of course, it's exciting in general to participate in manned spaceflight and the Spacelab mission is significant in that it merges manned spaceflight with space science which is largely done or has been done largely from free-flying satellites. So it's a new arena for the scientists and they feel the excitement of the new capabilities and the new opportunities and we feel the same thing.

PAO No further questions from KSC?

PAO They will now go to Cologne-Porz to the European Space Agency News Center.

This is Cologn-Porz. We have no questions here.

PAO All right. Thank you. We'll take a few more questions here in Houston. I might mention that I know Dr. Chappell has been up since yesterday morning and has to be back on shift tonight at about 7 so if we could be somewhat brief we would appreciate that I think. Gentlemen from the Los Angelos Times, white shirt.

***
DENBAR  (Los Angelos Times) Is there any significance to Byron Lichtenberg's discomfort during the hop and drop experiment?

PAO  I think not, I believe, as I mentioned, that those are bungee cords, and you do the acceleration that way. I think Byron felt, and that is his type of investigation, in fact that is his speciality. I think he felt the results would be more effective on his own particular situation. Once he got into zero-g and using it, I think he used a single set of bungee's as opposed to the three. And I think he felt that was just going to give bad results. I don't think anybody attributed anything significance to that in terms of discomfort.

PAO  Carlos Byars

BYARS  Carl, I had a follow up to a question, quite a bit earlier, you were talking about the mass discrimination, you got a single data point, and it's not enough to draw a curve. I'm just wondering where that data point falls in relation to the existing curves. Is it on it, or way off in one direction or another, or do you know where it is plotted yet?

NOTT  I think this type of experiments have not been, particularly type of experiment has not been carried out before. And I don't think there is any curve. I think the only thing you can say the curve is increasing, or should be increasing physically. But how much it is increasing or whether it goes into saturation or whether it is going to increase exponentially, or whether it will level out after a few days. It's not yet determined. I think there will be perhaps more feelings, done once this experiment has been performed. I think it will trigger also theorist to speculate about this type of experience and then develop a theory perhaps to fit the result of them during the mission.

PAO  Dave Dooling

DOOLING  Two quick ones, Rick. Has the rotating dome been used on the 102 and is Marsha Tore keeping an eye out for possible Atomic oxygen degradation on any of her optics.

RICK  I'm sure she will be doing that. I guess hasn't been operating long enough to see any effects like that yet. And the rotating dome was used today.

PAO  This Gentlemen here in the second row.
RIS JOYCE  (News Science Magazine) Dr. Chappell, question about post landing, continuation of the space adaptation syndrome. How long are those going to last? I understand one of the requirements is that several crewmembers have to lie prone for several hours, or for quite some time. I would like to know how long that is going to be. I also understand that it means the last waking shift, aboard the flight, is then going to have to stay awake another what will amount to 24 straight hours. Is this going to cause any grousing?

CHAPPELL No grousing, I think it's not as bad as 24 hours, I believe that there are some adjustments and it's a pretty significant job to sort of match the base line data collection that's done at (garble) with the things on Orbit, in that there are a lot of experiments that are going to be covered there. And you do want to let the crew, you need to make these measurements right away as they readapt, and yet you don't want to drive them too much. You have got to be reasonable in what you ask. I think there's been a fairly good compromise schedule, testing schedule put together for them. The question about being prone, involves the fact that since your measuring, your trying to understand the way the otolith organ changes it's output. You'd like not to necessarily move, continuously move your head once you get back into 1-g, and unnaturally accelerate the adaptation. We'd like to see a natural readaptation, which then means that you want to minimize the motion your head goes through which then readapts the otolith organ.

JOYCE How long do they have to lie prone then?

PAO I believe that it's a matter of hours as they are moved into the baseline data collection facility, and then there are a number of test then that are done in the facility there that involve using a sled, which then gives linear acceleration.

JOYCE Then how long does all that take?

PAO The overall Dryden activity is of a order of a week to 10 days, and specifics of it I can get you that information, I don't have it on hand.

PAO We'll be addressing that in a briefing, a special briefing on baseline data collection and flight day 6 I believe.

KNOTT (garble) the life scientist they have always made the point that the prelaunch data collection, which they have already accomplished, and then the data which they would like to assemble during the flight, plus the post flight data collection is basically their experiment. If they would lose any of the three portions of this experiment, they would lose basically the experiment.
AO Have any other questions? Gentlemen in the blue coat, in the front.

JULES BERGMAN (ABC NEWS) - Thank you John, I have a question for Rick, and for Dr. Knott if he cares to tackle it for I think it involves him in a lesser way then involves us here. Rick, you began to touch on what Spacelab would do in bridging the gap as I put it, or you may put it, between manned science and unmanned science. Could you expand on that for a moment?

BERGMAN In other words does this end the jealousy between the unmanned planetary scientist for example who accused the Space Shuttle of taking all their money, etc. etc. etc?

RICK I think what it does Jules is it opens a new arena, if you look at the history of Space flight in general, we all of us, as scientist started with very puny little sounding rockets that would barely punch up thru the atmosphere. We did the best science that we could on that. Then as our rockets got better and in fact we were able to Orbit things completely, that stayed up for longer than 10 minutes, we modified our science to that, to make best use that. Now, we are moving from a regime, in which we dominately had small free flying satillite to do science in a regime, in which we have a tremendous capability both in manned space flight, capability of the shuttle; and now the marvelous capability of the Spacelab. So, it's a new horizon, and I think rather than competitive, what it's going to be is a new capability that scientist who have done things historically in free flying satillite, will look at and access as a new potential way for them to do their science in the future. I think it's going to help tremendously bridging the gap. Very important in that regard. All of us who do, things like Space plasma physic, and astromony, have largely used free flying satllites, and you know your bound to a certain extent by your history. You do things the way you've always done them, to a certain extent. And now there's a new capability thats available for us. It opens new horizons, I think Spacelab is tremendously significant in that regard.

If there are no further questions, we'll conclude this science briefing. Thank you very much.

END OF TAPE
Good morning everybody, welcome back, let me introduce on the immediate right John Cox, the Flight Director of the off-going Flight Control Team, and Harry Kraft, Mission Manager for Spacelab-1, and as is our custom, I will let each of these gentlemen make some statements about the evenings events and then entertain your questions. John.

COX During the night we had a fairly quiet night and things went very well from an Orbiter point of view, one of things we're getting a handle on right now is the consumable look pretty good, they kind of look promising that all the concern we had preflight about being really tight on the hydrogen and the prop, looks like that and the whole situation is improving and looking pretty good. We did a COAS CAL today on the Aft station and the data on that compared to previous flights like it is right on the money again. We've gone ahead and figured out the compensation for the IMU's, we're running on 1 and 3 right now. They were small drvs, typically we see, we went ahead and compensated them, it looks like they are running on the money. We've done a fuel cell purge, and we did the ECS redundant components check and all that ran without finding any anomalies. We will begin some interconnect operations towards the end of the upcoming shift, and get us back on the situation where we use the OMS prop for most of our attitude control. As far as the trim burn wind, did the trim burn earlier, and that was required on the last shift, one of the things we're seeing, we have lots of attitude maneuvers going on and we're, more so than we typically see on flights, so we've been updating the Orbiter State Vector from time to time, but it does not necessarily take in all the changes we're in about a 136 by 131, we'll see that eccentricity go up and down and what not, I think the averages were probably dropped about a mile due to probably drag, which we're seeing. That will go into computations for the trim burn that they'll be doing on flight day 2. The only other work that took a great deal of time was the RAU 21 work. We did some more troubleshooting, that has been kind of a combined effort with the POCC and the MOCR team and the HOSC folks, and we have probably a partialy working valve, commands are going thru and we're having some data problems coming back thru it, the folks are still working on what we'll do with all that. There's some patchwork development underway right now where maybe we could make some changes in the experiment computer that is reading the data back from the RAU and may improve the situation. I'll let Harry go ahead and explain what that's new in his experiments and where he plans to go with it. That's all I had.

KRAFT Ok, just a couple of just top level statements. I wanted to point out that we are in a very good orbit for the experiments, the launch and all went really flawlessly from a payload standpoint, and we got Spacelab activated on time. We've currently got 21 experiments that are activated and operating,
ne of them have been turned down subsequently by premission
design, they take data at various times during the mission, but
we have seen data from 21 of the experiments. And we've seen
real good data by the way. The only really concern we've had and
had to work with was the RAU 21 problem, we have 4 experiments
that are attached to that particular RAU. We are pretty
confident we have work-arounds for two of those, and infact 1 of
those 2 we have already gotten good science data down, we are now
looking at some patches, as John said, to allow us to continue to
operate all 4 experiments, so that's quite promising this
morning, and we think we are going to be able to recover from
that. Rich Chapel will be up in about an hour or so, and I guess
its for the science briefing, and he'll fill you in on what some
of the results are, but there are a number of very excited
investigators in those user rooms and they're really getting some
good data back. And that's really all I have. We'll take some
questions and answers.

PAO We'll take your questions here in Houston, first and then
go to the other centers. Lets begin with Craig Covalt, please,
Aviation Week.

COVALT Harry, describe the degradation in the data you see
coming back thru the RAU before you completed your workarounds
and can you describe in more detail what your workaround are to
be RAU, and the 3rd part, the 2 experiments that you are
expecting a full recovery early on.

KRAFT Ok, lets see if I can keep those in order, the
degredation, the data on the RAU is primarily housekeeping data
and that is just looking at internal temperatures and how well
the experiments performing. For the experiments there, 3 of the
experiments have data that comes down, the science data comes
down thru the high rate multiplexer to the ground. So what we've
been able to do on 2 of the experiments is basically command them
to go ahead into their experiment operating mode, and without
that housekeeping data, just go ahead allow them to gather
science, and what we're basically doing is looking at good
science data and assuring ourselves that the instrument is within
parameters. The other 2 require the RAU in order to exchange
data between the experiment computer. And that is the experiment
C-pack or referred to as 002 and the active cavity radiometer.
Those 2 need to exchange data with the RAU and we need to get
those patches incorporated into the experiment computer and get
that RAU back on line. Craig, did you want to follow that up
some more?

COVALT Yes, and doing it from the other way, Harry, the 2
experiments that are working, better than the c-pack and the
cavity.
Those 2 are the THOWST, which is a telescope and its data comes back on film, and so what we're basically doing is commanding it to go ahead and take its pictures and its data comes back on film. The other experiment is the ISO and we again commanded it to go into a data gathering mode and its high rate data did come down on the high rate multiplexer, and it looks good. Yes, Craig?

Dave Dooling, Huntsville Times

Harry, on the ISO, would the validity of the science be compromised any by not having housekeeping data on the onboard temperatures, I believe one of the, one portion, one of the modules in the ISO was supposed to be cooled, and secondly could you give us a little bit of information about the RAU itself, what kind of electronic device is it, and who is the vendor.

Ok, as far as ISO there are verification flight measurements in the area for thermal, and also there are standard Spacelab operational measurements that allow us to understand the general environment that ISO's seeing. We don't foresee that as a problem. As far as the RAU and the vendor, we need to, I don't know that answer, we'll get that back to you, we'll get that back thru the PAO office here.

I can tell you a little bit RAU. The RAU, I don't know the vendor, but the RAU acts just like our MDM's, where they are a data gathering device, RAU stands for Remote Acquisition Unit, and serial data, and analog data and bilevel data is acquired by the experiment computer and we have similar things for the subsystem computer. We also then send commands back thru them and they route them out to the different experiments. So it acts very much like our MDM's. In troubleshooting, we used the trick we normally use on MDM's, where we port mode MDM's, or we swap couplers with the RAU, which is a very similar thing and found that didn't help the problem any. But you can treat them, mentally, you have very similar devices.

Wayne Delcaphino with KTRH.

We've had lots of communications problems today, we had big lapses in silence and we've had lots of static and scratch all morning long, and I'm wondering whether that's a TDRSS problem, because I heard it on UHF too, and I'm wondering whether its the communications gear upstairs or if its down here or what the deal is?

The problems we're having, there's a variety of them, they're all mostly expected, and its a lot of its learning how to work with the TDRS system. When we're applying all these various attitudes, we get into what is sort of a ratty calm situation,
in the signal, the s-band which we’re all working off of for voice traffic, when the satellite view from the Obiter is off the nose or off the tail or within 10 or 20 degrees of it, we get very margin and drop and out, and we get that ratty calm, I don’t know any explanation for the UHF other than we may have had signal strength problems at the particular site.

DULCEPHINO One other question, this may concern more of the Spacelab part of it. This was supposed to be a light day, and I guess because of these little problems were already behind schedule, we already had to cut off a third of the vestibular experiment, and I’m wondering whether or not the time line was too ambitious experimentaly wise.

KRAFT Well, I checked before walking over here, and our Payload Operations Control Center people tell that the crew is about 15 minutes behind. I consider that very close to nominal. As far as whether we over taxed the crew, we off-loaded these early days and only went for about a 50 to 70 percent utilization because we knew there was going to be adaption problems just getting used to unstowing items and getting things set up. And right now, we’re not terribly uncomfortable with where we are.

COX I think though also you want to keep in mind, we have sent them troubleshooting procedures that have used up some time.

PAO Your name and affiliation, please.

JOYCE (Newscientist Magazine) How many other Remote Acquisition Units are operating, and how many experiments are they controlling? Have you had any trouble with them, do you expect them all to go alright?

KRAFT I don’t know the exact count of the number of them, on the order of a dozen or so, we haven’t had any problems with any others. Okay?

PAO And your name and affiliation, right back here please.
JCKIE JUDWTH (CBS) Along the line of what Wayne was asking, how much flexibility has been built into your schedule before you start falling behind because of some of the problems the Astronauts are having with the experiments?

COX Well, I'll go back in again the early days of the mission, the first two days, we use something like a, in varied by crew members, because all the test cannot be equally distributed, but it's like a 50 to 70 percent utilization, of the crew by plan. In addition to that in the early days of the mission we allowed a 25% error in our prediction of a task if we estimated a 5 minute task, we would add a 25%, or a 10 minute or hour task, and we did that again to provide flexibility so that they wouldn't get behind. The 15 minutes or so they were running when I was left to come over here, that's nominal.

PAO Your name and affiliation.

BRIAN SIZLACK (Voice of America) I'm a little bit confused. We have basically four experiments running off this one random axis unit that we talked about. Why is it that two of them has been essentially restored and are generating data, while the other two apparently haven't been, if they are going thru the same box as it were.

COX Better make sure we understand some of the remote acquisition unit.

SIZLACK In Layman's term of the flex box, or what ever.

KRAFT Let me hit the RAU part and you can talk about the way the experiment gathers data. As far as our ability with the RAU is concerned, we're able to command thru it. That does not seem to be a problem, so when we want to send information to an experiment or turn something on or off, the RAU seems to be working alright in that direction. It's ability to gather data from experiment, we turn it if we have a problem in the different types of data and not all experiments have to send their data back thru that RAU to collect it.

SIZLACK So in other words you can talk to the experiments thru the RAU, but they cannot talk back to you basically. Or send data back to you.

KRAFT Yes, I think that information is correct.

COX But we do get some data. Isn't that correct that it's just getting --

'RAFT We're getting the science data via another route on those experiments.
ZLACK  Oh, okay.

COX     Did you want to add something to that, Harry?

KRAFT  No, I think John did fine.

PAO    Okay, Right up here Peta, your name and affiliation.

PETER SPOTTS (Christian Science Monitor)  Bearing in mind that the major portion of this mission is designed to verify the Spacelab system, is this problem with the RAUs something that you would have, you would rather have it happen now than later or is this the electronic equipment involved in something that probably shouldn't had problems in the first place?

KRAFT  John, do you want to try that one?

COX     I don't know that you'd rather have it happen at any time to tell you the truth, but we're going to obviously learn something from this and probably by the time that we're finished we'll find a way to work around it and acquire all that data, at least that seems to be the way that we are headed. I don't know if that answers enough of your question or not.

JIM ADAMSON (Eye Witness News)  With the RAU problem, I understand that it is with the particle beam accelerators, and the charge particle experiments aren't able to be used right now. Are they going to have to be delayed or held off then until you can correct the situation? And if so is that going to put a crunch on the number of times they plan to release particles and test that out?

COX     We'll we have a premission timeline and any time we miss an opportunity, it's something we have to look ahead to find out when we can recover. Right now we don't see a problem, fortunately where this has happened has been a very low level use of the RAU. There's only been one or two experiments that needed to operate with it at all. So we haven't really fallen that far behind. Where we are right now, we're looking at some work arounds, and we really believe that in the next couple of hours we'll have it up and operating and we don't think we will have a situation that we can't recover from.

KRAFT  Part of our lack of knowledge of the RAU is the fact that it hasn't been used much. We're trying to troubleshoot with a very little data.

PAO    I'll take one more question here in Houston, and then go to the other centers, Craig Covalt.
COVALT  Two quickies really. John, is the RAU or Harry, the RAU out on the pallet itself buried down on the floor there?

COX  That is correct.

COVALT  To change the subject dramatically, John is the lakebed wet.

KRAFT  Yes, the lakebed's wet and the r.n way, Oh! I'm sorry, I'll be John, go ahead.

COX  It rained last week. Hasn't been rained on since. The last report was of no standing water on it. It's different experts guess on when it will be good for landing the shuttle on it, the range goes anywhere from Wednesday to Thursday of this week, all the way down to the intermission, when it will be in great shape. We'll be getting another report on that and they will be checking it today.

Clear your overall situation on that---

KRAFT  The lake bed is a contingency entry would probably go use 22 now and intermission is still a good chance for the lake bed.

AAPT  We expect to be using the lakebed at the intermission. In fact, earlier than that if we need to, but at the moment were using 22.

PAO  Now that Kennedy Space Center, Florida. Then we'll come back here to Houston to pick up any remaining questions.

REGG TONN (LBBC)  I've been having reports that the French have been lighting or going to light bonfires along the Greenwich Meridian what seems to be an unofficial experiment. Can you tell us anything about this and whether the Astronauts either have seen these bonfires or going to look for them?

COX  There were some experiments, like that, I think, the best way to categorize them were similar to student experiments that NASA had considered in the past. Those were talked about between the two agencies very late and it's my understanding at the time of liftoff, we had decided the mission was - the timeline was crowded and we were not going to try to accomplish some of those proposed experiments.

TONN  But we have reports that the bonfires have actually occurred. Have there been any comments from the crew about them?

COX  I'm not aware of any, and I don't believe the crew has been specifically instructed to try to locate them, as I point out again it was something that both agencies agreed, had been
PAO  Okay, now to the East Press Center, Kalone Pason, Germany.

PAO  Okay to Germany, to the East Press Center, can you hear us over there please?

(Garble)

PAO  Okay we didn't get anything that time let's try once more and if it doesn't work we'll have you light some bondfires or something.

HENRY JOHNSON  Can you hear Kalone?

PAO  Yes that's great. Thank you, go ahead.

LEO ENRIGHT (Irish Television)  Can you tell us if it's true that Ulf Merbold wouldn't go to bed last night?

KRAFT  I can't confirm that. We sent him to bed. I'll put it that way.

I don't have any input on that either. From past experience, crews are generally pretty excited on that first couple of days up there, they stay up late looking out of the window a lot. So I wouldn't be surprised if someone was staying up.

PAO  Any further questions?

ENRIGHT  That's all from Kalone.

PAO  Anything remaining here in Houston?

... mission is concerned with Space sickness, can you tell us how people are feeling up there?

KRAFT  I asked the question before I came over. I haven't heard any reports at all on any problems unless John has.

COX  No indication.

KRAFT  Pro work on them.

PAO  Any lingering concerns your questions? Yes sir? Just wait for the mike.

Could you describe what a typical RAU looks like? Is there some sort of general description that you can give?
IT'S a typical electronics box if your familiar with some of the typical packaging for Space flight, it's 15 inches, say 15 by 8 by 12 rectangular box, sits on a cold plate, and the cold plate that it is presently attached to is on the floor of the pallet.

PAO Okay, thank you very much, we appreciate you coming out this morning. Thank you Harry and John.

***
Well, so far we have flown 9 of them, and we've gotten to orbit with enough gas every time. I think we have a good launch system, and we've proved it and as long as we have the performance, we can take any payload the system requires.

Also I think TDRS A was heavier than Spacelab as far as payload went.

Probable was.

37,000 versus .33,000.

Still any more questions at the Cape.

That's all.

Okay, back here. Fifth row back.

CHRIS JOYCE - NEWS SCIENTIST MAGAZINE - The launch window was shortened, to 9 minutes because of getting darker in Spain at least faster than I anticipated, was that because of weather or because of miscalculation in the time it gets dark in Spain?

No, we set up the flight, we picked the flight arbitrarily, not arbitrarily, but by pilot experience that we'd be willing to land in Spain anytime up until sunset plus 15 minutes. We also sent an observer from JSC out to Spain to fly around the area in the days proceeding launch, and to make an evaluation whether for that particular site local, 15 minutes was the right number to be using. As we were making these flights in the days leading up to launch, it became apparent that there was a factor that we hadn't considered and that was the fact that the farmers around the (garble) bay are burning off their fields. And as the result to that, there is a haze condition, that nobody anticipated and that was factor, that was the reason we sent somebody out there, to find out what limitations were and we decided that sunset plus 10 minutes was about where we ought to call it a day.

Joe, the farmers were not aware that NASA was launching the Space Shuttle and they were therefore not prepared.

Carlos,

Jay, have the SRBs been recovered?

I heard they were sited floating, I don't know whether they are underground yet.

They inconfirm undertoe (garble).
GREEN Impact point was about nominal.

We have an interest in those this time.

GREEN Anyone else here? Okay we stand adjourned.

***
PAO Good afternoon. This is the first change of shift Flight Director Press Conference for STS-9. Jay Greene, the Flight Director for the ascent team. You're on Jay.

GREENE Okay, fortunately there's not much to talk about during this briefing. During the prelaunch phase of the flight we experienced one failure and that was in one of the OMS engine TVC systems. It was the left OMS secondary system. Pitch actuator was inoperative. During our planning for contingencies and eventual loosing of launch commit criteria. We had looked at this possibility and we all agreed that we had enough redundancy in engines, this engine is still working and is fine. We have another engine that has 2 TVC systems, RCS is a translation means and we waved the requirement for both TVC systems and pressed on. Ascent was on time. At the time of liftoff we had acceptable weather and our abort once around site Northrop at the Cape for an RTLS if we had to do one. And at Zaragosa, Spain, our transatlantic abort site. First stage of ascent was about nominal. The trajectory might have been slightly loft although not very much at all. Our adaptive guidance system indicated that maybe the SRB's were a tad hot, performing better than nominally predicted and that's measured by the depth of the thrust bucket we go through during first stage. Nominally, the thrust bucket throttles the main engines down to about 80 percent, they went down to about 78 percent which is compensation for the higher thrust out of the solid rockets. Solid rocket burn time was about nominal, maybe a little over a little quicker than nominally and that coincides with a hot performance. All our abort boundaries fell about the times predicted premise. MECO was perfectly nominal. SRB's were located, they landed within maybe half a mile to a mile of a nominal splash point. External tank, you judge by the MECO target and how well you achieved it by the way we achieve MECO the external tank went into the Indian Ocean with no problem. On orbit the crew seemed to be ahead of the timeline and accomplishing all events as expected or better. We had two minor problems with transducers that failed. One was in the flash evaporator system and one was in the hydraulic system number 3 if I remember, and both of these transducers failures only. Not indicative of any problem. Side from that when I left about an hour ago, everything was progressing nominally and watching the TV it seems to be doing rather well.

PAO Okay, please wait for the mike. Front row up here. Identify yourself and your affiliation please.

AL MARSH (Aviation Week) Were you doing an RCS burn to trim the orbit?

GREENE When I left there was some question about that. Preliminary data indicated no but the ground tracking arcs was just being established to make that decision.
LOS BYARS (Houston Chronicle) Jay, on your — the failure on the OMS, could you tell us what this little thing does in terms —

GREENE Yes sure. Each engine — we have an engine bell and the engine bell is gimballed with a thrust vector control system TVC. Thrust vector control is accomplished in 2 axes, pitch and yaw, up and down, left and right and the particular failure we had is in the secondary of two totally independent systems. So what that says is we have one system that was verified prelaunch and post OMS 1 to be operating perfectly nominally. We have a backup system that is in op and should be of no consequences.

BYARS This is a little piece of machinery that moves this engine bell around to help guide things better. Is this a reasonably over simplified explanation?

GREENE Yes, yes. Perfectly acceptable.

BYARS On the 2 transducers these are simply sending you a couple lines of data.

GREENE One of the transducers was on the topping evaporator is an exhaust duct that measures the temperature on that duct. That (arble) went off scale low, the other was a hydraulic line return line temperature with no consequences.

DAVE DOOLING (Huntsville Times) Earlier I missed getting the Orbital parameters and also the alarms from the transducers. Are those the ones that John Young's referring to as getting a number of alarms?

GREENE Yes, he got two messages. The messages are referred to by the display number that the crew is reference to when the alarm comes up as spec 87 and 88. Those were the messages he was referring to when they were caused by the transducers failures.

DOOLING Okay, he made the first call on those during ascent didn't he?

GREENE No, he made a call during ascent regarding cabin atmosphere message that was due to some PPO2 sensors that were running closed to caution and warning limit. Once we got on orbit we told them to disregard the caution and warning and allowed them to raise the limit a little bit.

DOOLING Okay, and the orbit numbers?

GREENE Whatever is in the nominal flight plan is it.

DOOLING 134 by 136.
BRIAN SIZLACK (BOA)  A few minutes ago we saw that the astronauts we're having some trouble opening the airlock leading into the tunnel that goes to the Spacelab. Is there any possible explanation why the doors was so difficult to open?

GREENE No, I was at home but I missed it.

SIZLACK It was a lot of fun to watch.

GREENE Sorry.

PAO Back here 4th row, identify yourself please.

DAVE JACKSON (Time Magazine) I noticed when they are trying to wrestle that door open it appeared that they had all six members of the crew on that. How unusual is that? Totally abandon the flight deck.

GREENE Well, I don't think it was totally abandoned. As well as this vehicle has performed so far, it was something to work

JACKSON In other words that's not unusual at all.

GREENE I wouldn't see anything unusual about it.

CHRIS JOYCE (New Scientist Magazine) I noticed that Merbold and Lichtenberg both had head gear on with a metal pack in the back. Which experiment is that? That's one of the vestibular ones I think is it? Or (garble).

GREENE I don't know.

JOYCE Have they already - do you know whether they started doing any of the vestibular work already?

GREENE I don't know. I just came in. When I left them we had just completed ascent. Terry, maybe you could --

PAO I think Merbold had that gear on for the eye movement part of the experiment at launch.

JOYCE It was recording data.

PAO No, at launch. Any other questions here? Up front?
FER SPOTS (Christian Science Monitor) Just overall how would you rate this launch compared to the last 8 in terms of smoothness of operation or --

GREENE Is was as smooth as any we've had and I think the last 4 or 5 maybe the last data comes so smooth that it becomes meaningless to compare them. It's going the way it should go.

PAO Okay, I understand there are some questions at KSC. Why don't we switch now to Florida.

REG TURNELL (BBC) Do you have an impact point please for the ET?

GREENE Not off the top of my head I don't. We don't specifically measure the ET impact point. We put it in the middle of the Indian Ocean and allow enough room that with worst case dispersions we're in no problem of putting it in a bad spot. As I said before the MECO conditions that we achieve were essentially nominal and so from that you deduce that the ET impact point was nominal and even if you put dispersions on it it's in the Indian Ocean and clear of any land mass.

PAO Frank

FRANK Two questions. Can we get an exact time for the first pass over European landmass and also second question, is there any report yet of what oh, first words in space were?

GREENE Terry, take it.

PAO Who's first words?

FRANK Merbold.

PAO Merbold's? It was during activation. I don't think I heard him until then. But I don't recall what he said. Say what? Also first landmass was on ascent orbit. It came over central Europe.

GREENE Would have been somewhere around 18 minutes maybe a little earlier.

PAO Yeah. Any more to Cape?

Al STEGANARO (Space Unit Astro File) I'd like to ask how does this launch with the heaviest Shuttle payloads so far represent in respectively a maturity of the Shuttle program and are you confident that future payloads as heavy or heavier can be launched and operated in orbit?
END
DATE
FILMED
AUG. 02
1984