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Apollo/Soyus Test Project Briefing
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Participants:

Glynn S. Lunney, ASTP Technical Director
Milt Riem, PAO

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PAO Wait and take questions afterward.

PAO Ladies and Gentlemen we have Glynn Lunney here, the Apollo Soyus test project technical Director for the U. S.. Apparently we're not on yet.

PAO Ladies and Gentlemen we have Glynn Lunney the Apollo Soyus Test Project Technical Director for the U. S. who will discuss the activities of the working group that went to Moscow in October and some of the ASTP testing that's going on here at JSC. Glynn Lunney will take questions after he has finished his presentation.

LUNNEY A fairly large group of us, with numbers up to about 55, went to Moscow for one of a continous series of meetings on the Apollo crew's test work. We were there the first two weeks in October and ended up being there - some of us ended up staying over for the third week in October. The purpose of the meeting was to continue the work that had been begun. We had representives of four working groups there. We had the project directors in the staff. We had the working group 1, which does the mission operations planning. Mr. Pete Frank, one of our flight directors, is in charge of that group. We had working group 4, which does the work on the communication systems, both the cable communications and the radio communications. Mr. Deats of the Control Center was in charge of that group. And we had working group 5, which is in charge of the life support systems and the crew transfer work. Mr. Ed Smiley, formerly now of the Johnson Space Center, now in headquarters, was the chairman of that group. The main purpose of the meeting was, as I said, to continue the work that had been begun. We had a fair amount of work to do on the Operational Documentation, that is the flight plans, the checklist, the Mission operations plan, describing the operation between the Control Centers etc. And that work was continued. We had, in working group 4, we had continued work on the design and plans for the testing of the radio communications and the cable communications. Milt Riem talked about the testing that is going on here, and we have a short film clip for you to show you some of the docking system testing. But in the first part of 1974, we have communications capability testing to be performed here at the Center. That testing will involve the flight-type equipment that we would use in the Apollo and the flight-type of equipment that we would use in Soyuz. They will be mounted in the special communications racks, and a fairly comprehensive test will be conducted over a period of about 2-1/2 months starting the early part of February. Working group 5 continued the work - I should say one more thing. In working group 4, I think the emphasis was on finishing up

as much of the design and procedures as could be done. And the other emphasis was on preparing for this test that will be conducted here first part of next year. In working group 5 there was continued work on the items associated with the life-support system. There are times when the volumes of the docking module and the Soyuz will be open to each other. So we have a continuing dialogue on the subject of the Life support Systems and how well they work. We had also at the end of the meeting, and I'll come back to this subject, we had a status review. Dr. George Low, the Deputy Administrator of NASA, came over. And the purpose was to assess the status of the work at this point, to see how it was going. And he was joined by Academician Petrrov who acted for Academician Keldich (?), the dep - who is the president of the Soviet Academy of Sciences. He was not able to attend the meeting because he was ill. Academician Petrrov worked in his stead to review the status of our work during the week after the two weeks of meetings. We reached a number of decisions which I think would be of interest to people, and we are able to sign some documents which I think would also be of interest to people. And I'll touch up on a couple of subjects that I know people were curious about and asked about the last time that the Russian delegation was here. We were able to sign a number of safety assessment reports at this meeting, the safety assessment reports that we write -

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LUNNEY - - Russian delegation was here. We were able to sign a number of safety assessment reports at this meeting. The safety assessment reports that we write are over and above the design requirements that we have on the docking systems and the radios, et cetera. The purpose of the safety assessment reports is to address, exactly that, the safety of situations which aren't directly covered by the interface type documentation we have for the design. By that I mean, for example, the pressure integrity of this spacecraft that is how many ways are there to over pressurize the spacecraft and how many ways are there for the spacecraft to loose pressure. Each side prepared fairly detailed reports on the possibilities of such occurances, the warnings or the indications that would go with such a problem, and the fixes with the valves that can be closed in the event of such problem. In the area of that example, the cabin pressure safety, we were able to both sign reports on both sides describing the systems that we have and the methods that we are taking preclude that becoming a serious problem. We had a number of other safety assessment reports, fire, safety, inadverent release of the structural latches, manufacturing and checkout, climability - I mentioned that fire, we talked about ground command systems and we were able to agree on an outline for subsequently reports. So we made a good deal of progress in that area. We also discussed some of the other subjects which we had been discussing for some time. We had been working on the problem of how to involve the experts from the other country, and some of the test that would be preformed on the radio systems. And we reached agreement that specialists from each side would go to the launch sites for the final testing of the radio equipments and for the fit checks of the cable communications equipment. I've walked over that cable communications equipment subject a couple of times here, I'm talking about the system of - of cable which the astronauts make by hooking connectors together as they go through the transfer sequence into the Soyuz. This then provides a hardline system for speaker box, for television, for headsets, et cetera. We've agreed that those equipments and equipments which go in those connectors and wires would be fit checked and tested at the respective launch sites of each others - of each country and that the sepcialists from either side would participate in those tests. We also will probably do some special electromagnetic compability tests. At the time we do those in order to be sure that the systems of one spacecraft are not affecting the commanication lines of the other country, but it remains to be really fully agreed that we would do that. And it also would be remained to be agreed exactly how we would do those electromagnetic compability tests, but I

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expect that we will do a form of testing like that. We have also agreed that we would exchange observers for some of the life support testing. We have some special tests here of an engineering prototype of the life support used in the docking module, which will be - it has been in test in October. It will be back in test in January and we will have several experts from the Soviet Union here to witness those tests. Likewise, in February some of our men will participate - I should say witness some of testing on the Sayuz life support systems in the Soviet Union. We had a number of other interesting, I think, opportunities on this particular visit one of which was especially interesting to the reporters here in Ho ston. We went to Star City again at which time we saw the simulators that we had seen before and we also saw a mock up of the Solyut, which is used to train the cosmonauts for that kind of flight activity. We also saw an area where apparently a new docking - a new simulator is being constructed for the purposes of training for this flight and perhaps for some other work with the Soyuz. We went to the control center in order to become familiar with the operation there; later on this year we'll have some training of our flight control people in the control center. We did visit the facility, saw the main operations area, and spent some time thr - touring the - touring through the rest of the rooms that would support the control center. General appearance it is not at all unlike the control centers that we have in the - in this country, as a matter of fact it's fairly similar, characterized by console with some large dis - screens - large display screens down front and television display system on the individual - -

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LUNNEY - - charaterized by consols with some large screens, large display screens down front and television display systems on the individual console. In all in all I think we had a very favorable impression and a very thorough tour of the control center. During the week that we went to Star City and the control center, we had a formal review by Dr. Lowe and Academician Petrov as to the status of our work. And indeed we were, a least from the point of view of the project, we were very pleased to report to the leaders in both cases that the work is going on schedule. Both the work that we have to do jointly together, like these meeting and the subjects that we try to cover in them, and we also reported that the internal preparations that we are making here in the United States are on schedule. And likewise the representives of the Soviet team reported that their preparations are on schedule. And as an example that might help you, we have identified something like a 100 or 110 documents that we would use to define the design requirements in the test procedures and everything else that we would jointly do including the operational documentation. And we have signed about two-thirds of that documentation at this point. So indeed we do seem to be very much on schedule with the preparation for the flight. And the meetings have been actually becoming more productive and more and more efficent as we go along and each side learns better what to expect from a given meeting. We are better able communicate what each side intends to accomplish at specific meeting and indeed I think the problem of communication in general is one that is - is showing just regular signs of improvement as we had more experience dealing with the problems we had to deal with together. We have to give you a little forcast, right now we have a number of astronauts and some other people with them in the Soviet for familiarization. You may recall that this summer we had the whole group of cosmonauts, that is the entire group of eight cosmonauts who are assigned to the flight, plus one of their supervisors here for familiarization with the Apollo systems and the docking module and etc. We have not quite our full compliment but we have the prime and the back up crew and two of the support crew on the trip to Moscow this time, where they will engage in a light type of familiarization with the Soyuz systems that they would be exposed to during the course of flight. We are planning several small meeting in January, really not full working group meetings but meetings that will address specific subjects within the working groups and we will also have a fairly major communications activity in January leading up to the start of the compatiability tests in February. The next

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full-scale meeting of all the working groups is scheduled for Houston in March of next year. We have yet to set up the exact date, or for that matter to establish the exact adjenda for that meeting. But we would expect it to be some-time in the month of March. We have also on going at the center today and it has been going on since September, a process of testing this new docking system that we have built. We have on site a docking system that was built here in the United States in Downy, California by the Rockwell International Corporation and we have a docking system actually almost two docking systems that were brought over by members of the Soviet test team. Those docking systems have been in the process of testing since as I say about mid-September. Actually we weren't testing all that time, there is a fair amount of set up work in preparation of the test. The test are almost complete with the mandatory test points that have to be taken. There's a period that we have reserved where some additional test points may be taken as time permits and that will probably go on for the rest of the month of November. We have a film clip, I think, which best I think shows what's going on in the docking tests. We had considered going over there and showing you a docking test but there are two problems with it. One is that from the outside both devices are really enclosed in a large shroud -

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LUNNEY - - docking test, but there are two problems with it. One is that from the outside both devices are really enclosed in a large shroud the purpose of which is to hold either hot or cold gas so we can test at hot or cold temperatures; and the other problem is that the tests don't always go on time like the liftoffs do. You might spend a fair amount time standing around waiting for the test to go, I think I'm in way of the screen, but let me show the film and see if I've forgotten to tell you anything and then see what you're questions might be. Am I in the way?

PAO Glynn, I think we'll have a problem seeing it though.

LUNNEY - - systems and it is the active system for docking. You can see the shroud in the background perhaps. Is the mike on? Can you hear all right? It doesn't sound like it's on. Here's the other docking system now coming up, you can see the guide pedals with fingers approaching the guides of the other systems. The system is mounted on a attenuators in order to provide the initial capture and the ring would then be retracted where structural latches would be made very similar - at least in concept to the way we do the Apollo docking. What they are recording there I think are the test conditions that they tested on that last run. Here's the ring down here this time. The systems on it is mounted on a set of base rings, six legs which drive this system up and provide the relative motion that the spacecrafts would have as they approach the capture conditions. That's pretty hard to see, isn't it? You can see that one a little better. I would think that's enough, Mel. Yeah. Perhaps the best thing to do then would be to go to questions.

PAO Bruce?

QUERY One brief one that the film brough up. What happens if the plates of the flonges that are on the outside of the ring hit each other direct and not - and don't meet in between.

LUNNEY I think - -

QUERY Does it twist or - -

LUNNEY No. The purpose of the fingers is to provide a form of guidance so that the - -

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QUERY (Garble) the flanges that are on the outside of the ring hit each other direct and don't meet in between?

LUNNEY I think - No - the purpose of the fingers it to provide a form of guidance so that the two rings where they would capture would be brought together like this. Now the system is designed to be able to take a fairly wide set of misconditions and still effictive. As long as the vehicles were closing, if you get anywhere near getting those fingers right, the rings will slide together and you will get a good capture. As a matter of fact the kind of testing that's going on is to really see how far out you can go and still capture, and to validate all of our predictions about how far out you can be and still capture. But you could bang the two fingers together at the closing speeds we're talking about and it would just bounce off. It wouldn't break them off if that's what you're wondering.

QUERY Is my memory correct that the Apollo will do the closing and no. the Soyuz?

LUNNEY Yes. It is planned that the Apollo would do the approach maneuvers and would have its docking ring extended on the attenuators of the dampers that you saw there, so that it would be the active ship. We are considering whether we would do some test dockings after the two days of dock time, but we haven't yet decided that subject.

QUERY As I understand it the two Cosmonauts that went up shortly after Skylab's second crew return were doing testing of environmental life support systems. Did your working group 5 find out anything about what actually happened on that flight?

LUNNEY We found out in general terms that the flight of Soyuz 12 tested the fixes that were put into the spacecraft as a result of the Soyuz 11 accident, and that indeed all the fixes worked properly.

QUERY In the last run through there, it seemed to me that there was a period of several seconds between the time that the two sections made hard contact and that the observer reported capture. What goes on mechanically in that period of time?

LUNNEY The only thing mechanically that goes on after they actually get capture is that some microswitches on the rings get closed and light a light either in the cockpit or in the test station that indicate that you have capture, and I can only presume that it took them that long to see the light get around to saying it on the net. But other than that, the only other mechanicaly thing is the dampine action of the attenuators.

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QUERY Has the testing this far indicated any problems at all with the docking system?

LUNNEY No, no real problems. As a matter of fact our testing has gone rather smoothly. As you know, perhaps by way of reminder, the systems that we're using are really sort of preproductions systems for development test. But I think what they are telling us is that the assumptions that went into the design appear to be verified and that indeed we can expect that same kind of results when we use the production hardware in the qualification test next year.

QUERY Can you go into the fixes on the Soyuz as a result of that accident a little bit?

LUNNEY Well, they have added a suit loop - let me use some other terminalogy. They have added a system whereby the two Cosmonauts can be suited for entry. They were also suited for launch. And they have a gas supply and hose system. They fixed the valve with - that leaked - with a strong cap that has to be fired pyrotechnically to get it to release. They also changed some of the pyrotechnic systems between the two modules so that they are less strong, and there are fewer of them that explode externally, as the original design had. They also have a manual override on the valve which is more accessible to the Cosmonauts and which can be closed and probably would be closed at the time of separation.

QUERY Has a solid decision been made on the environmental gases in each of the cabins?

LUNNEY Yes sir. The Soyuz uses a air composition kind of a gas which will be reduced to - from the one atmosphere or 15 PSI to 10 PSI. The Apollo by the time it gets there will have essentially 5 PSI of essentially pure oxygen in the command module, and we have oxygen and nitrogen supply -

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LUNNEY The Apollo by the time it gets there will have essentially 5 PSI of essentially pure oxygen in the command module. And we have oxygen and nitrogen supplies on board the docking module so that we can sort of match the environment really of the Apollo and then go up and come close to matching the environment of the - of the Soyuz and then come back down in pressure in the docking module until our men have returned safely back to the command module.

QUERY Glynn, I have two unrelated - I would presume that - that you learned the fact that the - that it was a valve leak as supposed to a hatch leak during the safety review?

LUNNEY Yes. Not, not as part of the safety accessment report but - in our discussions we had a fairly full treatment of the problem, to the point where we are satisified that we know what happened and we know what the fixes are and they appear indeed to be very substantial in terms of fixing the problems that they had.

QUERY And the other, last time we talked with you when the Soviets were here. We discussed press coverage of the launch and other facilities and there were - I understand there was work being done on docking at that time. Now what is the progress of that and what did you learn during your trip that might indicate whether westerners will witness the launch and so forth?

LUNNEY Basically, we have been struggling with the problem of - of - of the public information arrangements for the prelaunch part of the flight. We have not yet really begun to discuss what the arrangements would be for the actual conduct of the flight, which would involve your treasured trip to the launch site. So we just haven't got to the point of wrestling with that yet. Our cosmonauts will be out at Star City. Jack have we had any developments on that? In terms of coverage at Star City, do you know?

SPEAKER Yes, I do, it's my understanding, I don't have it verified, but 15 American correspondents accepted an invication to go to Star City today to view the joint activities between our astronauts and the cosmonauts.

LUNNEY And I think it would be fair to say that - that progress is coming along Bruce, and we - we have yet to address in any detail the coverage that we would have actually during the flight and the kind of arrangements that would have to be made. But I think steps are being taken to provide the kind of coverage that you would be satisfied with in the preflight phase and, I think, the visit to Star City, although right now it's unverified. If that turns out to be the case, that's an example that things are going reasonably well here in this stage of the game.

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QUERY Can you discuss what those prelaunch possibilities are?

LUNNEY Well, I don't have a list of them all here, and I can't - I don't know if I can recite them off memory but to the very - as a matter of fact they've turned out to be very much the kinds of things that we have been doing by way of having press conferences after each meetings, by way of issuing communiques, by way of issuing daily status reports while the men are here, by way of trying to arrange for contact with members of the press and members of the visiting delegations in either country so that the activities could be seen. I don't know how much you were able to see when we had the cosmonauts here. I hope that the correspondents get to see some of the training or at least some of the facilities that we use when our - as our men are in training over there. I'm beginning to run out of things - it's just a standard kind of coverage events that would occur at this stage.

QUERY Glynn, this is a very broad question. But what main problems do you see remaining?

LUNNEY Well, I think our emphasis next year will be on two areas. One we have a lot of testing to perform which would verify the design work that we've been in for the previous year. We have testing of the docking system going on now, which is going well. We have testing in the communications systems which is going on the first part of next year. We have independent testing of the life support systems which we then have to get together and compare results and be sure that all the assumptions that went into that say that the whole system will work properly when we get it working together. That's one area and let me - let me call that by general term, just testing of the techniques and the systems. The second area is the further development of the documentation that we would use to actually conduct the flight. The flight plan, the checklist, the procedures, how the control centers would work together, how they respond to a given problem. That work always follows the design work, of course, in any logical cycle. It always has in our program, and I think next year our emphasis will be on understanding all of those kinds of activities that we would - -

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LUNNEY - always follows the design work of course, in any logical cycle. It always has in our program, and I think next year our emphasis will be on understanding all of those kinds of activities that we will have onboard between Control Centers and trying to anticipate what might arise during the course of flight and being sure we had a procedure or mission role as we have in our own country to deal with that kind of a problem. So the emphasis next year will be on testing and further development of the documentation really reflecting the understanding we would have on how we would conduct the operation itself.

QUERY Glynn, how important was it to you to learn in full the detail of the Soyuz 11 accident? Was this something that you had to have or was it somewhat of an option?

LUNNEY Well, we had, I guess, gone a little bit lightly on that subject. All right, one, I - it's a fairly painful subject as you can well imagine, and two, the course of the mission that we have planned is such that the systems that were involved in that, whatever they may be, are really not at all involved while we have the two vehicles in orbit docked together in a fairly stable condition. So I can't say that it was something that was mandatory that we know, but it did provide us with a very good understanding, (garble) of the spacecraft itself, better understanding of problem solving, and a reaction to a problem in terms of the design steps that can be taken, and probably also a step forward in just the general level of understanding that we have been slowly building in terms of having the kind of a background that allow us to conduct this flight.

QUERY Glynn, I have three that are completed unrelated to each other. First of all, you mentioned the gradual and regular improvement in communications. How is the language barrier falling?

LUNNEY The language barrier - let's see - Actually in the course of the meeting, the problem - the language is really not a problem. We use a very, very good interpeter. We use the same ones as best we can on every meeting. As a matter of fact in each working group there are several interpeters who have become regular members of the working group. And that actually goes very well. As a matter of fact, it sometimes is a asset to have a little more time in the - in the conversation and it also tends to focus the communication between the two groups through some specific people, and it tends to be efficent and concise and to the point. And in terms of the written communications, it's still a problem because the problem of getting out a document means you have to get it in

one language or the other, then get it translated and then get it verified, that it really says the same thing in both languages. And in that case it's cumbersome and fairly time consuming. We have gotten to the point where we fully recognize that difficulty and we - we, in most cases, allow the time for it. And we, in most cases, have the staffs to handle that kind of a problem for meetings either here in Houston or in Moscow. And I think I have to say that it has really gone pretty well. For example, the last meeting - I don't really know how many pages we signed, but we just had a stack of paper about that high that had been translated. Some of it had been sent before the meeting, but had been translated and verified and we were reasonably certain that the Russian and the English were the same. Terms of the spoken word for the flight, which is maybe also of interest to you. We have had our astronauts in language training. Some have had more time than others. The cosmonauts are also taking English and both groups use every opportunity, I think, to try out and try to extend their ability to communicate in the other fellow's language. And indeed the astronauts and cosmonauts seem to be not anywhere near flight level yet, flight proficency, but they do seem to be able to get along with each other pretty well even if there's not an interpreter around.

QUERY Okay, what kind of agreements have been reached - or let me start that again. What kind of scienctific experiments do you have in the back of your mind for - for the mission, either to be conducted jointly or by our side, unilaterally?

LUNNY Particu - we have about ten, and perhaps a few more will be added, experiments that we have planned that would be called unilateral, in the sense that they would be done on our side without any participation. We have five experiments which are considered to be -

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LUNNY - - in the sense that they would be done by our side without any participation. We have five experiments which are considered to be joint. Let me see we have - we have a plan to use a cartridge or a sample provided by the Russian side when we operate the furnace. We are flying in the docking module a furnace similar but upgraded from - improved from the one that we are flying Skylab for further space processing. We have - that's one - we have a UV - naw, that's to complicated of a name. We have a system for sending a signal to the Soyuz and getting it back in measuring the atomic oxygen and nitrogen in the upper atmosphere in order to understand the reaction of the Sun in the upper atmosphere and how all that works in the physics of the upper atmosphere. That's a joint experiment in the sense that it requires two spacecraft. We have the possibility of occulting the Sun with one of the spacecraft in this case the Apollo and - and taking pictures of the corona of the Sun with - I say pictures with various scanning devices on the Soyuz spacecraft. We have two medical experiments one is effectively a study of how the men react when we - we meet people in space, meet them with different environments in bring the two spacecraft together, et cetera. There'll be swabs taken et cetera, in order to better understand that phenomenon. There will also be some samples flown up probably in each - in both ships and exchanged in some way, that is not yet worked out and then they will bro - be brought back down. The purpose being to see what the difference in time exposure in space and perhaps the different environment would be to the same kind of organisms flown on both ships. There are about 10 - 10 or so experiments that we would conduct you know unilaterally um gee, 4 or 5 of them fall under the scientific scanning kind of experiments looking in various frequency radiation spectrums outside that is at the - away from the earth. We have light flash experiments, somewhat similar to the ones we have flown on the latter Apollo flights. We have an electrophoresis experiment, which is intended to see what kind of improvements one can gain in the purity of separating vaccines et cetera, in space similar again to some of the experiments that were conducted on Apollo. We have some Earth observations plans and one or two more that I'm not able to recall.

QUERY Okay, last one, have the duties of the docking module pilot been defined, and if so what are they?

LUNNEY I haven't been through specific duties of each one of the pilots, I suspect that they will be similar to the duties that the right-hand seat has in terms of the life support and electrical systems in the command sp - command service module. I think the duties would involve probably being the specialist, if there is one of the whole

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group on the systems of the docking module. I think we're gonna find that the docking module is simple enough that all three guys will be - as conversant with it as any of the others.

PAO Louie?

QUERY Glynn, has the document been signed yet on press relations that you said expected to be signed in October?

LUNNEY Yes. But - I shouldn't say yes. Yes, but we are still waiting to radify that, with it being an important enough document that we wanted the leaders of both NASA and the Academy of Sciences to radify. That is still in process, Louie.

QUERY In that case can you tell us definitely that some of these things are in, such as an American correspondant viewing some of the training in the Russian centers?

LUNNEY Well, I can't say that for sure. But the indication is that - there is some correspondants are going to Star City today. They did? Well, in effect I think you're seeing what's written on paper happen.

QUERY Are you satisfied with those? Do we - the Russians - there was a lot of wordiness when this came up in July, and it was concerned with - -

LUNNEY Or - on my part?

QUERY No, no. (Laughter). Especially on the other side. And they were having trouble visualizing whether or not that they would be extending the same coverage to our correspondants as we did to theirs. And are you satisfied or how do you feel about that?

SPEAKER Well, I guess my feeling is that it has gone reasonable well. You know there are difference in the two systems and - and I must say that some of the press conferences that we've had have been farily exciting some times, to watch you fellows in action but you know I think all of that's gradually being understood - in - on both sides and I think - you know we have something to understand too about the way business is done there. And - -

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LUNNEY - - Gradually being understood and on both sides and I think, you know, we have something to understand too about the way business is done there. And I think that's gone reasonably well at this point. Maybe Jack will like to make some kind of comment, to .

SPEAKER I think you've covered it Glynn (garble)

SPEAKER Got to catch a plane. Inherent in the activities up to now and the discussions that have taken place, in fact the first time, the first face - the first meeting between representives of the Soviet Union and the United States, each country agreed that they respect the traditions of the other country as far as press operations and news media operations are concerned. Now in our opinion they are very very interested in the whole subject of public information. They are very much aware of the international interest that will be in this mission. And we are dealing in these negotiations on a step by step basis. We agreed we would first negotiate and agree to and sign a document concerned with the pre launch phase. When that is completed and radified, as this is exercised we will continue our negotiations on a second document, which will concerned with the mission phase. And starting early next year, our discussions will proceed along those lines, with an intent of about a year before the mission having that second document signed. And so that's the status of where we are now. I think they're extremely interested in the whole aspect and they certainly show an air of cooperation on the subjects we have discussed thus far.

PAO Let's get Abby Brett right here - she.

QUERY Do you have any new plans to re-evaluate some of the ASTP hardware in view of the cracks that were found on the Skylab rocket.

LUNNEY Yes ma'm.

QUERY Can you go into that, yes - can you go into those plans a little bit?

LUNNEY Gee, I haven't spent any time on that subject in detail. I do know though that - that what was found there in the last couple of weeks is going to reflect itself in a - you know - fairly thorough review of the hardware, not only for the ASTP but we have 119 at the Cape that we are flowing (sic) as a rescue spacecraft. And I think that with a little more time we are going to find probably - just that much more time to explore the subject in more depth.

QUERY What about the possibility of follow-on flights, is that subject one that you're just not going to discuss until after this first one is over -

LUNNEY You're talking about Skylab or ASTP?

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QUERY ASTP. I'm talking about when you have other - are other Apollo's for example which could be used before you get to the shuttle if you wanted to?

LUNNEY Our - our conversations at this time have centered around the following two themes. The first one was the one that started this work, which had to do with making future spacecraft compatible in the area of rendezvous and docking, and those discussions are continuing. But for our purposes in our program, that means we're generally talking about the shuttle. Okay. Specifically, as a test of that, we are engaged in the work associated with the Apollo Soyuz Test Project. And that activity envisages one flight, that is the flight that is planned for 75. We have not talked about flying another one, for example, of the same class. Nor have we been specific about the percise kinds of missions that we would fly when we had compatible systems in our future spacecraft. I think the general thought is that there are two possibilities, one is an area that we have been interested in just in terms of having the systems compatible so that the potential for rescue is enhanced. I can't say that we've solved all the rescue problems, of course, but the potential is enhanced by just making the systems compatible that each country would fly. And the other possibility is that some joint mission of operational or scientific purpose would be desinged and decided to fly, perhaps when we get to the shuttle. But we again have not had any specific conversations about flights like that. And I think probably on both sides that will take its course as we gain some more experience in that - on going activity.

QUERY Glynn you just -

LUNNEY That is the Apollo Soyuz project.

QUERY You talked about, you confuse (garule) you say you were talking about 119 on the pad which is in flow for rescue vehicle. Will that not become the ASTP boost launch?

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QUERY You talked about - you confused me, - you said that you were talking about 119 on the pad which is wo flow for rescue vehicle. Will that not become the ASTP boost launch?

LUNNEY 209 or 210?

QUERY The one that's in the flow for rescue.

LUNNEY Yes, I think we're going to use another one and use - the 209 will stay with the 119 spacecraft. As I remember the assignment, that's the way it is.

QUERY Okay, I got a different impression from Kathy on that, I guess during the - one of the last briefings.

LUNNEY I haven't looked at that in a while. I may be wrong, it may be 209 we're going to use, but I thought it was 210.

QUERY Just hold on a minute here. The other thing is do you know yet what the length of the Soviet Flight will be and will they be docked for two days? What is their length? And refresh me on ours, is ours 6 days, is that?

LUNNEY The spacecraft that they have is denipned to fly - I shouldn't say designed, I should say provisioned to fly up for up to 6 days. I think nominally they would expect to fly 5. They would like to have the day's reserve as anyone would in the systems when they come down. Ours is equipted with 2 sets of cryogenic tanks which nominally, and by that I mean at moderate power levels, enable you to fly about 12 days. You know, you could power down and stretch it out, but I'm talking about the H-class spacecraft we flew to the moon. It's probable though that we will find that the experiment complement that we are carrying will require power usage which will use up the cryogenics and shorten that lifetime to a time that I can't tell you yet for sure, but it would be on the order of probably 10 days. Okay?

QUERY Glynn, you talked a lot about documentation, and it was my impression that at least before this joint meeting that the Russians have been a little reluctant to go into real specific detail about all their systems with you. Is that true, and if so, is that still the case?

LUNNEY Well, let me answer the question this way. We have emphasized, and I think rightfully so, understanding and documenting the kinds of things which we have to make compatible, that is, the systems that we would be using - the docking systems, radio systems, etc. And we've had just - we've just have not had any difficulty in doing that. We have had relatively little time to proceed past that point, until recently when we got into

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the safety assessment reports and other subjects like that, past that point to a more general understanding of the spacecraft. We have introduced those subjects and we found in one case that the work went a little bit more slowly than we would like. But in all fairness that could just as easily be, you know, lack of the other fellow fully understanding what it is we would mean by a certain thing, as I'm sure you have difficulty understanding what we mean by things sometimes. We have though made clear in the one particular case that we had, and indeed we were promised that the information would be coming and we would expect to exchange that in December and be able to sign it in March in that safety assessment report. So I think as much as anything we have been learning to communicate what it is we mean by something with each other. And I guess I'm fairly optimistic and encouraged that's going reasonably well. We have every indication and every evidence of cooperation when we decide that a document needs to written on a subject which pertains to the safety of the flight. And we have had time to discuss it and explain it and go over what we think ought to be in it and listen to what the members of the Soviet team think that ought to be in it. And when we have time to do that, indeed we find that we get what we want and on their side I think they get what they want. At times we have to add something and we choose to. And as I say when we have time to develop the theme and make clear what is wanted from our side, then the information is forthcoming. And I think we'd do the same.

QUERY Is it technically possibly, and separately is there any chance, of either modifing or replacing in particular adding to the list of joint scientific experiments?

LUNNEY The joint experiments? I think there is a better chance that we could add to the experiments that we might conduct - that is, add unilaterial experiments. The program problem at this time is that we are becoming constrained by money and schedule and weight, and by schedule I mean the time to develop these instruments. It is possible that some relatively -

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LUNNEY - - in weight, in the tim - by schedule I mean the time that devel - developed these instruments. It is possible that some relatively simple experiments could come along that would not require a great deal of development time or great deal of money or weigh a lot and we could add those to the mission. As far as the joint experiments go, I have to say that I think it's fairly unlikely that we would add any new joint experiments. We have - really kind of have our hands full and working on the ones that we have because it is a time consuming process to - to develop hardware and make it work on both side of the Atlantic Ocean. And I would say to you that out of the prospect for adding joint ones - a new joint experiments beyond the five we've identified, is not - is not bright and I don't think that we would do that.

QUERY Is - is the major factor if you - assuming you had a cheap lightweight and simple experiment proposed is the major factor just the time of negotiating or working it out?

LUNNEY There is that although I guess in my experience we hardly have the cheap lightweight already developed one (laughter) that we can put onboard. Or if we do it tends to be - it tends to be a selfcontained one that - that you know it's not something that leads itself to joint experiment. You know, we were looking for experiments that really require the participation of two parties or two spacecraft, and we've found that in some cases. In general most of the emphasis that people have put on developing experiments has been on well, let me go build a package to do something and it tends to be a somewhat selfcontained thing and it was for that reason I gave you the first answer. I did - you know if you come across for example, another electro-phoresis experiment that's developed by someone else that looks promising, it tends to be a unilateral one that we would - that we would not have to negotiate the fly. If we found it in a position to fly it, we can make our own decision and get on with it.

QUERY How large is the launch window for the Soviet Union and have you looked into their on-time record for previous launches at all?

LUNNEY I don't know if I - if I remember the exact number Art. The problem with the launch window is that we've had to select times of day that satisified the contraints of both the Soyuz and the Apollo spacecraft. And you know if you start moving the launch of the first one, you're moving everything along with it. I expected - I expect that's on the order of a half hour, an hour but I - I'm not - I don't really remember that number I think it's on that order. What was the second part?

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QUERY Their - their record for on-time launches?
LUNNEY I don't know how to look at that either except that they have conducted a number of rendezvous flights which - which - in the conduct of which you have to - have launched the second vehicle pretty close to on- time. I - you have a message for me?
QUERY No, it's just the way that their launches are if they - if they miss one there is - there is no report that they missed one. There's just the report if it's a success. And I would think you would have to know something about their capability to actually meet a stated goal regardless of whatever their public posture had been previously to now?
LUNNEY Well, my only reaction to that is that they've conducted a number of successful rendezvous missions which required the on time launch and - and they seem entirely prepared to commit to the kind of window that they will have. So I expect that they will be able to do that.
QUERY But you haven't actually looked at it?
LUNNEY Well, I don't know - you know I don't - how - what you mean look at it?
QUERY Well, I mean you haven't said let us on your previous launches we - we'd like to know your planned launch date and time and when you actually launch that sort of thing?
LUNNEY No, I haven't done that.
QUERY Okay.
QUERY I understood that you would use a different atmosphere in pressure and gases - percentage of gases in the inside atmosphere. So at any time you will not have any common or similar atmosphere inside?
LUNNEY We will have a similar atmosphere between the docking module and the front end Soyuz, the Soyuz spacecraft, okay. The docking module is a - is like an airlock in that the men will come from Apollo into it and close the hatch behind them they will pressurize it up to 10 psis, and at that time when they open the hatch to go into the Soyuz

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two can visit Soyuz at the same time?

LUNNEY Yes, let me answer the question this way though. We have agreed that for the purposes of planning and for actually doing the transfer that we would keep - what shall I call them a - a resident crewman in each spacecraft. That is, we would not find ourselves in the posture where we had foreigners in the wrong spacecraft and only foreigers in it. In other words, we will have at least an American in the Apollo, we would have at least a Russian in the Soyuz and that's purely a safety and a kind of common sense kind of view on that. So -

QUERY We have a return capability in either space ship do we not?

LUNNEY We have a return capability of, you know, of two people in the Soyuz and three people in the Apollo. Anything more than that is very risky. There is a time when we have an American and a Russian in the Soyuz and a Russian and two Americans in the Apollo, and we are taking all the design steps necessary to protect against the possibility that they might get stuck there. For example, one of the modes of failure that you could imagine that would stick people in that condition would be the hatches would jam in some way. And we are using the forward hatch from the Apollo in the docking module. And one of the features of the hatches - that on the latching mechanisms - the eight of them that are around on the outside, you can take a little tool and take the thing apart so that if the gears and the handle and everything doesn't work, you can take the latches apart and it will fall out in your hands. And we're doing the same - the Russians are doing the same things on their hatch, the same approach I should say, not exactly the same thing. So that as an example of a design problem that could cause you to have people stuck in the wrong spacecraft, as compared to their orgin, we have taken those kind of steps to preclude that from happening. I should say you can put the hatch back together, too.

QUERY One final question from Arthur Hill. then we'll wrap this up.

QUERY Okay, one thing I'm curious about is what you saw in the Russian Control Center there is - tell us a little bit about their tracking network, do they have very many stations and where do they appear to be using ships or what?

LUNNEY Art, I can't be too specific on that, they use - they had a -

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QUERY - network, do they have very many stations and where are they, and where do they appear to be using ships, or what?

LUNNEY Art, I can't be too specific on that they use - they had a you know - coverage over the Soviet Union which is just one complete seT - overage. o, i t's just coverage a ll o f the way acro s the continent. They had spotted on their map a couple of ships as I recall, two, at various places, around the world. I didn't really frankly pay much attention to where they were. So that's the kind of communications system - or kind of network they use. I'm also told here for your information Milt Reim will be glad to escort anybody over to Building 13, I think they're still in the process of conducting the hot runs, that is the runs at elevated temperatures - high temperatures with the Soviet docking system being the active docking system. I think Milt is ready to take people over there I don't exactly know what you might see today, they might both be in the enclosure and you couldn't see very much but you'll get an idea of the facility. Thank you.

PAO Thank you.

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Chris' decision. With those comments I guess we'll open up the questions.

PAO Arthur Hill.

QUERY I guess this is for Glynn or for whoever can answer. What have you heard from the Russians with regards to crews persons might be and I wonder if Vance can explain what he meant by saying he had worked with other governments before? I didn't follow that.

BRAND Ah, so far in the discussion, of course, the Russians have not named a crew for the flight. We did agree that about two years before the flight, a key, operational personnel, including astronauts and cosmonauts would probably need to be identified in order to help those people together to establish the kind of communications that we have grown to feel is necessary in order to conduct a good and a safe flight. We do not really have any indication of who the cosmonauts might be for this flight. But I expect that some time this year they will be named, if not, the prime and backup sense like we do as least as a group of candidates. Vance.

BRAND Okay, for my part of the question, from 1964 to 1966 I worked with the people from the German Government in southern France. We were testing F-104s and other airplanes down there at that time.

PAO Bill Cromie.

QUERY Tom Stafford. Tom have you been to Star City and and seen the kind of equipment they've got there and what - have you got any idea of what kind of training you'll be going to in the fall?

STAFFORD Well, I've been to Star City and flown in their simulators; both their mission simulator, their docking simulator. An initial training really can be termed as really indoctrination familiarization because as of today, in the summer we will not have any mockups or detailed procedure, but we can discuss systems in the same way that when the American astronauts that are available to go over to Star City late this fall. The real going to a step by step time-line will probably take place in the following year. But their mission simulator was somewhat similar to ours. Has a digital computer that drives it, instructor's console, and it's a high fidelity mockup in simulator.

QUERY Two questions for Deke. Number one, how is your Russian; and number two, what does the docking module pilot do?

SLAYTON Well, number 1, my Russian isn't very good. I studied a little bit through the summer when we had the SHEAI crew working on it. I guess I got 25 or 30 hours, but I think based on that brief experience, I need about ten times that much to get very proficient. I don't speak very good English to begin with. And secondly, the functions of the docking module pilot, since this is the first time there's been one, I guess I find it a little difficult to describe, and we could say you had your choice between being the 31st commander in the manned space flight or the first docking module pilot, I guess I'd have a tough time to tell you. But I think that if you find a job that's primarily associated with the systems on the docking module, environmental control system part of it and the docking part of it, and I assume it'll be [illegible]

familiar with all the details of this to be able to handle all the malfunctions that might possibly occur, and certainly be the expert on those systems, sort of in the concept of the lunar module pilot in the lunar program. Certainly I will also have systems responsibilities on the command module as we've always had there. I would assume I'd probably be responsible for part of that transfer between two visits.

QUERY (Inaudible)

SLAYTON I think I'd have to defer to Tom on that subject. He's been studying this whole project for our director for the last year, and he's more familiar than I on what we might do there.

STAFFORD Well, as outlined, we have a series of dockings to test the total system. The one docking we'll start with for the two day's activities and at the end we're proposing the details have yet to be worked out. The series of dockings at that time are envisioned that everyone - each one of the three crewmembers would have a opportunity to do it, since it's like a test mission and a test project and you have different test pilots, you know, fly the aircraft to evaluate. And to go through all our modes to test the total system, we are going to need more than one if we have a few available on other items.

QUERY For Tom and anyone else that may want to answer. The pressures of space flight are pretty great as they are just in a flight, but on this one there are going to be some additional pressures, that of international politics. How do you think you're going to be able to handle that problem?

STAFFORD The word is diplomacy not politics, isn't it? Well, in our work in negotiations to this date the cooperation and hospitality from the Soviet Union has been outstanding. They have different meanings for different words like than we do. It's just a long and tedious painstaking effort. Certainly there is far more than, say, just a regular mission it would have as far as Apollo because it is looked at by both countries. In fact, people around the world as a means of cooperation between the countries, can be even further missions, further enhancement, or reducing of tension certainly. And this is all part of the problem.

QUERY Deke, I don't know about the rest of my colleagues, but I've got all the time you want to take to talk about your feelings about this mission.

SLAYTON Well, it's a little complex, you know, I could just say great and leave it at that, but I guess I was in this same relative position about 12 years ago in relation to a flight, and got dropped off of it about 11 years ago. And, of course, I guess I felt that I was as competent as anybody else to command every flight that has flown since. And I missed them all, so that's been a thorn, obviously. But on the other side of the coin, I was also equally qualified to hit Ted Freeman's goose and have C. C. Williams' bum airplane and be in spacecraft 12 in place of Grissom, Chaffee, or White. So on balance, I think I've been pretty fortunate. And I don't believe in looking back at the past too much in relation to what benefit it will give me in the present. [illegible] an outstanding flight ahead of

us here; we've got a long ways to go to get ready for it. We've got some of the best guys you can imagine to work with here, and we've got somemore of them just like it across the parking lot that are going to be working with us on this flight that's going to be outstanding as far as I'm concerned. But I guess based on past experience, I'm not going to display any raucous enthusiasm until I hear somebody tell us that we're go for the first orbit. And at that time I'll probably express myself.

QUERY A couple of questions for whoever. Are the cosmonauts going to learn English and then, you know, if they do learn English and you learn your Russian, who is going to talk in what language? And then secondly, beside just rehearsing docking, what are you going to do in togetherness in the spacecraft?

STAFFORD Well, I've worked on most of these negotiations, Mary. The basic area we've worked on the premise today is that each country could speak in its own language, but the crewmen of the other country would have to understand. Now we are compiling a series of special terms for this mission, but it's just too early to have those put together. As far as the joint activities, we've agreed that when we're in the Soyuz we'll eat their food and vise versa. In fact, we'll even use their hygiene facilities.

QUERY I really don't know what you're going to do besides start.

stafford There's a whole series of experiments that are being proposed both by the Soviets and ourselves, and these are being in a review status right now, and it's just too early to tell exactly what those will be.

QUERY (Inaudible) any one thing or a general thing you think you're going to do?

STAFFORD Well the project manager had a list of twenty five -

LUNNEY Yes, we're in a process of reviewing a whole set of candidate experiments that we might take on the flight, and we really have not made any decision or really any narrowing down of large lists. The Soviets will also have some ideas that we will discuss in March. And we probably won't have a much - we can't say very much to you that is definitive until we have those kind of discussions, both to finish our consideration of ours and then finish up our discussions with the Russians in March. So it's still going to take a couple of months for us to pin that down.

QUERY Tom just said that each crewmember will have a chance at docking. Does it mean that will dock and undock repeatedly? And the other part, after the joint mission is over I understand you intend to stay up for a while. What are you going to do?

STAFFORD Well, on the first question, to completely test our system for the active, passive, and the backup release mechanism that we have, requires a series of dockings, and if

the consumables are available and the mission timelines can be worked out, we're proposing a series of these. This has to be finalized yet in our negotiations. Now, as far as the total length of the mission, we are proposing - right now we have a baseline of six days, but we can extend it to twelve, and the difference would be the experiments. And these just haven't been defined yet.

QUERY How many transfers are you planning? Does everybody get a chance to go on to the other persons?

STAFFORD Da!

LUNNEY Let me say something about it too. The reason that we planned to do three because that was the best we could fit into this timeline. But in our last set of discussions, the Soviets proposed and agreed that they would operate their ship at a lower pressure. And that allowed us to save two hours out of every transfer, which now enables us to have a total of four round trip transfers, which really gives every man flying an opportunity to visit in the other ship.

QUERY Two questions, one for Tom. Tom, you're a real believer in Skylab, and don't you regret being transferred?

STAFFORD Sure I'm a believer in Skylab, but I have no regrets as far as having being assigned to this mission, believe me. And, but, I think I'll have been fortunate to be Deke's deputy to furnish support - administrative support on Skylab.

QUERY Question for Deke. Is this the first - well, wait a minute, outside of the crew and the astronaut office you out rank Tom. How do you feel about taking orders from him?

SLAYTON I see absolutely no problem with that at all. I think there's a lot of precedence in the country on this particular subject. Anytime you have a guy flying an airplane in the military service, he's a second lieutenant and you got the highest general in the Air Force. The commander is the commander. And there's no doubt in this flight who's going to be the commander. It's Tom Stafford. Now when we're on the ground working the other programs and the other problems, then obviously, we've got a normal and working relationship. But I see absolutely no problems at all and I'm responsible to Tom to be ready to fly this flight and he's responsible to me to see the crew's ready to go. (Laughter)

QUERY A question for Deke, and a delicate one. Deke, could you address yourself (noise) do you feel like V. A. Little making a comeback?

SLAYTON Well, no. I've always been a slow starter, I guess. For some people life starts at 40 and for me it's going to be more like 50, but I guess I'd rather be a 50 year old rookie than a 50 year old hasbeen. That's one way to put it. Doesn't bother me at all. I'm in as good physical shape as about anybody you can find around here and I intend to stay that way.

BRAND Catch him running around the track all the time over here at the gym.

SPEAKER Could I pursue that, I was present at the original news conference in Washington when you seven described in some hideous detail, the physical exams you went through at the time and if that time a 50 year old was never even considered. What's changed in the space flight program that now a fifty year old man can make it without problems?

SLAYTON I don't think anything's changed all that much. I don't think it was ever all that big a deal to begin with, except that it was an unknown quantity in those days and I think we had to fly some flights to prove that it really wasn't. But I think these guys can correct me, but in my opinion the biggest physical work we've had in Apollo flights has been associated with the lunar surface operations. It's certainly not launch and reentry. And it's certainly no big deal here. We're talking about a shuttle here in the future that we anticipate being able to haul everybody up then as a standard passenger. And we certainly wouldn't expect to run everybody through a full nine yards of physical exams to any more than you would to go out and fly on a 747 from here to Tokyo or some place. I don't think I consider the physical part being all that big a deal.

PAO Barbara Van Der Meyden.

QUERY Do you have any expectency of life TV during the whole program and if so, how much can you say yet?

LUNNEY We are planning to carry a television camera, of course, in our spacecraft as are the Soviets. And we've also made arrangements that with cable such that our television camera can be operated in the Soyuz and then remoted through our communication systems. So on the ground, in effect you will see television like you've seen from our command module, either from our command module or from in the docking module or be Soyuz spacecraft. The Soviets will have a reciprocal kind of system.

STAFFORD We also have the tape recorder on board.

SPEAKER Yes.

STAFFORD Skylab tape recorder so it will be long periods of time.

PAO Mark Cramer.

QUERY I understand lately there's been some question about whether or not observers from the U.S. team will be in the Russian Mission Control and vice versa. Have you any word on how that will be resolved?

LUNNEY Yes, I do. And there has been some discussion of it that I've read. The situation is that we are early in the game of deciding and discussing really how we would best establish and maintain good understanding between control centers. We have found in our programs that it is really vital that the people, both on the ground and in the air, understand each other very well. We've been looking for ways to establish that kind of understanding between the two control centers, and one method proposed is that we have a small staff of people in each others control center who would be available for consultation. Where you could bring the fellow and talk to him about something that might be going [illegible] We have not yet agreed to that as the technique that we [illegible] and discussion.

PAO Go ahead, Wally.

QUERY I guess this is for General Stafford. Is there any reason to assume that Yeliseyev and Nikolayev stand a greater chance of being on the crew than any of the other cosmonauts.

STAFFORD I would hate to take a second guess though what's the selection choice of the Soviet Union. (Laughter)

LUNNEY It's difficult enough.

PAO Bill Cromie.

QUERY This one's to Deke. Deke do you feel that your age will be any problem as far as cardiovascular deconditioning during the flight is concerned and as far as adaptation of 1-g after the flight is over?

SLAYTON I don't anticipate I'll have any different problems than anybody else and I'm - I would expect that there is probably no one - more is known about my cardiovascular system than anybody in the world. (Laughter)

PAO Darrel Mack.

QUERY Deke, do you consider yourself a rookie in this flight. You've been around so long, I don't know - I mean I don't, do you consider yourself one?

SLAYTON Oh, I guess I have to consider myself sort of a mature rookie. I don't know any other way to approach it. I guess you're a rookie in this business till you've flown.

PAO Mary Bubb.

QUERY Do any of you have any idea, first of all, whether the Russians might possibly consider allowing western newmen in for the launch seeing as how it's a cooperative effort; and secondly Glynn, now that you're really into negotiations for the first cooperative effort, has there been any clues that there will be further cooperative efforts beyond that.

LUNNEY Well, on the first one, we have not got to that point in the discussions. We have agreed that both sides would conduct their part of the public affairs in keeping with their own customs and traditions. So what we end up doing relative to television of the Soyuz launch really remains to be seen. I really can't predict for you what will happen there. You asked me a second question.

QUERY Whether or not now that you are in this discussion for cooperative efforts, whether you really see any definite clues for future things.

LUNNEY This actually, for those of you who may not know it, we started off these discussion working on future spacecraft. The project evolved out of the work that is - is still going on to make our future spacecraft compatable in a rendezvous and docking sense. For either the purpose of just enhancing somewhat the capability to rescue someone or for opening the door to future planned cooperative missions. This is the bedrock that we are working on two years ago. The project developed out of that work in a sense that it is a test of that work and really the first exercise of it.

What this will lead to in the future, I think really remains to be seen. For my part, I think it depends on the success that we have on this project. So our attitude is to keep our eyes focused on the work that we have to do to make this succeed while continuing the longer term negotiations on the designs of systems to be compatible in the future. I think the future will then take care of itself.

QUERY There's one point on Mary's question, I think one thing that the Soviets probably could not comprehend is one of those launch day hats she wears. (Laughter)

PAO Abby Brett.

QUERY Could you go into a little more detail about the major training you will have this summer and fall, and the for Vance Brand and for Tom Stafford, how much Russian have you had?

STAFFORD Well, again, we'll use the word familiarization because, Abby, we don't have the time-line finalized or our checklist, so you can't really have quote "joint training". We will have a familiarization for them, you know, for systems descriptions of our docking module and to look at some of the systems in the command module - just basically instruction and show how we operate over here so it's more familiarization in the same, so it's really not training for us, as such as it is, you know for them. The same way is true when the astronauts that are available to go to the Soviet Union late this fall. But after then, as late as 1974, it will be a real quote "joint training" as we have the complete checklist, the complete mockups and we can go through a complete sequence. And as far as Russian, we had a familiarization course that we somewhere between 40 and 50 hours. Vance.

BRAND Abby, I've had 30 lessons on the side, sort of as a hobby in the last few months. I know I used to speak a little bit of German. My wife's quite good at French.

PAO Nick Chriss.

QUERY Glynn, do you have any idea how many cosmonauts will be coming over this summer, and about how long they will remain here?

LUNNEY Right now we are in the process of laying out, that is the men in Tom Stafford's and Deke's directorate to plan their training. They're laying out a detailed daily plan and for the exercises we would go through this summer and we don't really have it laid out how long it would be. I anticipate though, that it would be on the order of a month or perhaps a little longer than that. And I also to answer your question, don't know how many cosmonauts would come, but we are expecting - we'd have to expect and plan for a number up to ten or so. Now, I can't tell you that there would be that many. There might be half that.

PAO Jay Russell.

QUERY For Glynn. Glynn, an earth orbital mission is nothing new, and we've flown several of them as have the Soviets. And I would anticipate over the next couple of years, there are going to be some people that tag this mission as just being another space spectacular and a little international

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LUNNEY - - and that the men would come from Apollo into it and close the hatch behind them, and they would pressurize it up to 10 psi. And at that time when they opened the hatch to go into the Soyuz, the environments in those two spacecrafts would be similar. Then when they go back into the docking module and close the hatch to the Soyuz and bring the pressure in this module down to the pressure that the Apollo is in, the environment would become of course different in the Soyuz and it really is not identical to the atmosphere of Apollo either, in that there would be a lot of nitrogen in the air.

QUERY Their spacesuits -

LUNNEY Yes?

QUERY I mean, the suits would be similar or quite different? Because I understand the pressure is (garble)

LUNNEY No the spacesuits end up not looking too different. I think the construction, etc., is different but the fact that they are in different kind of atmospheres does not affect the design too much of the spacesuit.

QUERY When you mentioned you visit to the Soviet Control Center, where exactly is it located and is it similar in structure and size to JSC or were you only referring to the MOCR?

LUNNEY You know, I can't be real specific about where it's located. It's located on the outskirts of Moscow, sort of north of town, and we drove out for about a half hour or so trying to get to it. The - its - the building that it's in is sort of in two parts. One is sort of a wing where the main operations Control Room is and some auxiliary rooms and equipment, etc., not unlike the configuratio we have over here. There's another wing which has a lot of the equipment that is used to teletype and intercom and the rest of the kind of wire equipment, television system, etc. And that again is not unlike distribution that we would have here in Houston. The main Control Room, you know, it looks different, but on the other hand, it is similar in that there is a row of consoles with television tubes and a large screen down front. And, you know, I guess - I guess without something being identical to - to the Control Center here, you would say, gee, that looks similar to the Control Center here in Houston. Or for that matter similar to the Control Center that we have at Goddard.

PAO We'll take one more from Bruce then.

QUERY Is there a constraint that one of our crewman must remain in the Apollo at all times, only