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MEMORANDUM

TO: PA/Manager, Apollo Spacecraft Program

FROM: PA/Special Assistant for Mission Operations and GFE

SUBJECT: ASTP Mission to Moscow, June - July, 1973

A NASA delegation of 35, arriving in two groups and representing Working Groups 0, 1 (partial), 2, 3, 4, and 5 (partial) visited Moscow from June 18 through July 11, 1973, to continue discussions on the ASTP. This memo will summarize the visit relative to major items within each Working Group (WG), logistics, and general comments of the status and progress of joint meetings. Specific details of agreements and commitments are contained in the individual working group minutes; summary joint meeting minutes were not considered necessary. A list of joint documents signed at this meeting is included as Enclosure 1.

The meeting was conducted in the standard format of individual working groups and subgroups. At the suggestion of Dr. Legostayev, who had overall responsibility for this session, the chairmen of each WG summarized their progress daily at 1400 for myself and Dr. Legostayev. Professor Bushuyev participated in these reviews almost every day.

Working Group Summary

WG 0

a. Siemers, Eradshaw, and Sullivan did an outstanding job on our documentation and logistics. Their attitude was can do, everything was on time, and the efficient and pleasant atmosphere generated around the focal point of their office enhanced the entire operation.

b. When requested, the Soviet side presented an excellent Glossary of Terms in both languages as a response to a verbal agreement in March 1973, to begin work on such a document for signing in September 1973 (in striking contrast to other documentation preparation).

WG 1

a. The discussions on joint experiments proceeded in a logical, organized, manner providing a good initial understanding and sound basis for final selection in October 1973.

b. Dr. Timchenko was on hand several days for brief periods, kept current on the status, and made several suggestions for the forthcoming July meeting in Houston. (With his obvious interest, I was surprised he did not arrive in July.)

c. The details of the "Visual Observatories" experiment were discussed with Professor Bushuyev (Enclosure 2). He agreed in principal with the value of such an activity, but felt the crew would not have time to accomplish the tasks and deferred further judgment until after the definition of the Crew Activities timeline in July 1973.

WG 2

a. Docking Target DAR: The hifi working model of the Soyuz target was excellent.

b. Soyuz Control Requirements: Even though previous documentation had specified the docked attitude, control, maneuver, and translation requirements for the Soyuz, the Soviet side was unprepared and reluctant to provide the data and level of detail necessary to fulfill the agreed requirements. A precise presentation of detailed requirements by H. E. Smith was necessary to obtain the required commitments. However, the information was still not available until July in Houston when Dr. Legostayev made a special one-week trip to complete the June effort.

c. Safety Assessment Report (SAR) for Propulsion and Control Systems: Professor Bushuyev agreed to provide the necessary data for the Soyuz SAR, but was surprised at the level of detail of the U.S. version, the amount of preflight planning, and the "remote cases" that Dr. Smith used to prove his points (Gemini 8, Apollo 13).

WG 3

a. Seals: Dr. Syromiatnikov agreed to provide a Soviet seal of the correct diameter and to conduct a formal test of both U.S. and USSR seals at Rockwell International.

b. Docking System DAR: Phase I was completed; Phase II, the U.S. review of USSR drawings, to be completed in Houston during October.

c. Soviet Docking System (DS) Compliance: Using combinations of existing contact criteria, the Soviet DS "bottoms out". Of the three possible solutions: fix the DS, change the criteria, or have both spacecraft go free at contact, the Soviet side would like the free/free mode even though they understand the U.S. concern of gimbal lock. Needs resolution.

d. U.S. /USSR Flight Units Mating Test: The proposal is to mate the units of the Space Institute without the Soyuz.

WG 4

a. The lack of agreed documentation, the late documentation, and the occasional unscheduled absence of Soviet delegates (Nikito, Savitski, Morgulev) made an already overburdened agenda extremely difficult to complete, which understandably it was not. Professor Bushuyev was made aware of the problems early in the session and stated that positive action would be taken to correct the deficiencies. Positive action was taken on most issues but it was not adequate to completely resolve all of the deficiencies of the session. (See R. H. Dietz memo on same subject for details.)

b. One document deserves special comment, 50113: Being 13 months late, it was presented to R. H. Dietz with one meeting day remaining and an insistence that it be signed by the Technical Directors before the conclusion of the meeting. Several approaches were taken by the Soviets to get this document through the signatory process. Dietz rightfully declined because inadequate time was available for U.S. review. Only the specialists who prepared the document signed in June, and its attachment to the minutes seemed to satisfy the Soviet requirement for some sort of completion on this article, the only planned document not signed in June (almost like they had made a promise to have everything signed if all the late documents were released).

c. Preliminary Systems Reviews (PSR): The USSR apparently did not understand the significance of a PSR before this meeting (1). The two PSR's (FM and Cable Comm) which had been agreed for the June meeting were not included in the initial Soviet agenda. Even though 20000 specifies the content of a PSR, and a U.S. twx delineated the details of the FM PSR, the Soviet side was not prepared to provide the

necessary information to support the FM PSE (first scheduled in March 1973). They said they had not agreed to the details specified in the U.S. twx. Hopefully they understand the meaning of a PSR now.

d. The VHF-AM test equipment previously delivered to Moscow was all set up and ready to turn on upon our arrival. But the U.S. had not carefully specified the power requirements, and the USSR had not checked the power source to insure it would provide even those requirements the Soviet technicians were aware of. Two days were lost while manual voltage regulation of individual phases was provided and verified. Subsequent testing proceeded smoothly, the Soviet technicians were well qualified, and the effort was completed ahead of schedule.

WG 8 (Thermal)

a. Thermal discussions relative to WG 3, 4, and 5 proceeded well once rapport was established.

b. The Soviet side requested the U.S. side to provide analysis of Apollo RCS impingement on Soyuz docking seals to include methodology and answers. T. Taylor agreed to provide an analysis of one point on the seal only so the Soviet side could verify their technique.

Logistics

For future reference the following subjects relative to the logistics of moving a group to Moscow and return are included. Each visit will of course be different, however many requirements, relationships, and facilities will generally be the same and most likely improvements will be made as techniques develop.

a. Departure from U.S.

1. Visa applications should be submitted to Travel early.
2. Immunizations are not required (Dr. Hawkins), however some are recommended depending on the source. Dr. Hawkins will provide a group medical briefing; and the Dispensary (Mrs. West) will provide individual medical kits (if requested).
3. When travelling as a group, the total excess baggage can be handled by one individual; in fact if one or two members also handle all of the tickets when checking in, the rest can clear the aisles, relax, and avoid much confusion.

4. To assist resetting the physiological time clock, an overnight stay in Europe prior to arriving in Moscow is recommended, e. g. depart Houston Saturday AM, RON Amsterdam Saturday night, arrive Moscow Sunday afternoon and be rested and ready for a full day Monday.

5. Other items of interest are indicated in the enclosed memo (Enclosure 3) sent to all travellers on this particular trip.

b. Arrival and stay

1. At arrival and throughout the visit, the host for logistics is your friendly Intercosmos representative, e. g. Prisevok, Kozyrev, Pershikov, etc. They handle hotel, transportation, special events, and any questions, etc.

2. The American Embassy is extremely helpful with their limited resources; Dr. Jack Tech, the Science Attache, is our direct contact, and Mary Ann Elliott is his excellent secretary. A note of caution is in order, however. They are not geared to handle large U. S. delegations, and we should be careful that we do not overtax their hospitality and facilities.

3. The Hotel Rossia was very helpful in providing a room and incidentals for our traditional party for our hosts at a nominal fee, see Mr. Ilia I Rappoport, Deputy Director, good rapport.

4. Other items of interest included as "Notes by Lois Bradshaw", Enclosure 4.

5. A list of planned extracurricular activities should be requested from the Intercosmos representative to allow people to make their own individual plans around the group events.

6. Siemers and Co. recommendations for supplies and the usage this trip are included as Enclosure 5.

c. Departure from Moscow

1. To simplify the transportation to the Airport, as many people as possible should depart at the same time. Also, Intercosmos can do a much better job of clearing a group through the Airport than the individual himself.

2. Confirm airline reservations soon after arrival, and provide a list of names and departure times to the Intercosmos representative

early so he can make necessary arrangements. The Service Dept. (Floor 2) of the Rossia will assist in the confirmation effort.

3. See Enclosure 4 for other details.

4. Supplies and documentation left at the Institute on July 11 (in room 223 behind auditorium, H Scott has the keys) are listed in Enclosure 6.

General Impressions

Other than specific comments included in the minutes of the several working groups, the following comments are made relative to events and general impressions observed during the course of the visit.

a. The most interesting single event of the trip was the day at the Yuri Gagarin Center of Cosmonaut Training ("Astro Village" or "Star City") enjoyed by Scott, Smith, and Helms. An invitation was extended to me by Gen. Shatalov to include two other members of the delegation. Of the two WJ Chairmen present, R. H. Dietz had already made a visit to Star City; therefore H. E. Smith and C. Helms, as a representative of the contractor, joined me on this very pleasant and informative tour. Gen. Shatalov, Gen. Beregovoy, and six other cosmonauts escorted us through a very thorough 4 hour tour of the Soyuz Entry and Orbital Module Simulators, the dual docking simulator (which I flew with Leonov), a hifi mockup of the Salyut, inside and out (Leonov conducting very thoroughly), and a Soyuz entry vehicle that had been recovered from an unmanned flight. I can't remember ever having had a better tour of anything. The day was concluded with the Yuri Gagarin movie, the museum, and library, followed by a dinner with the ever expanding warm Soviet hospitality.

b. On the first day of the meeting Professor Bushuyev was presented the draft July Houston agenda and was informed he would be receiving an official letter of invitation to Downey and the SL 3 launch within the next week. He made no commitment, but asked who would sign the letter, and seemed surprised at the "Dr. Lunney" answer.

c. Documentation production and control by the Soviet side was unsatisfactory, particularly in the WG 4 (communications) area. Soviet documents prepared to meet agreed joint requirements (signed by both Project Directors) were late, inadequate, and often handwritten. Their system appears to be the problem, they simply cannot get them through the mill, even when Professor Bushuyev directs his personal efforts to these details which should be handled by his subordinates.

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Many excuses were made. The requirements were not specific enough, documents must go through many levels of approval, positive action will be taken on the problems, the people responsible are occupied on internal matters, the mail system needs to be improved (which it does), etc., etc. Some members of the Soviet delegation expressed optimism that things are going to get better - I hope so.

d. With the addition of the new docking system, the Soyuz appears to have a severe weight problem to the extent that it's configuration is not yet defined. At the meeting we learned that filters were removed from the autopilot (probably associated with reduction in control propellant); the communications configuration has been recently changed due to weight, except that which interfaces with U.S. equipment; the docking system weighs 250 kilograms now, they hope to get it down to 210; and another not necessarily associated change - the B & W TV camera with light was changed to a color TV camera without light.

e. Another example of one level of experts: the arrival of the Intercontrol Center Communication specialist Savitski was promised the next day almost daily; but he was involved in the Brezhnev Washington/Paris visit, and did not arrive until two days before the end of the meeting. No substitute was available at his level, but when he did arrive rapid progress was made.

f. The Professor stated that he planned to discuss the overall test philosophy, to include the witnessing of each others tests, in July, and deferred discussion of a few testing issues.

g. Professor Bushuyev and Dr. Legostayev independently mentioned the need for reorganization within the working groups.

h. Dr. Podelyakin, who acted as Professor Bushuyev's deputy, mentioned in response to documentation complaints that if it were just them, everything would be OK.

i. A brief discussion of the Skylab problems and the technique of providing the parasol solution in a short time period was well received by the Professor and his staff, and with amazement and admiration for their American colleagues. Professor Bushuyev expressed concern several times about the attempt to fly Skylab III 56 days.

j. I had the pleasant opportunity to chat with Academician Keldysh and Academician Petrov (twice) at Embassy receptions. Both were quite interested in the progress of ASTP, very friendly, and requested their regards be passed to Dr. Low, Dr. Gilruth, Dr. Kraft, and their many other colleagues in the United States.

k. I covered the response of Professor Bushuyev to your letter on Salyut 2 in my note of June 30, delivered by Bill Speier. However, I might add that I had a discussion on July 3 with Dr. Novikov (Academician Petrov's deputy) concerning the same subject. The occasion was a dinner at the home of Cosmonaut Sevastyanov. Dr. Novikov was well informed on your letter and asked essentially the same questions the Professor had several days before. The discussion ended when in response to his query of Salyut/Soyuz association, I explained the possibility of the same control system. He quickly said "we will talk tomorrow, thank you, good night". But it was indeed late, and I did see him the next day at the July 4th Embassy reception. On this occasion he was very congenial, insured I had a chance to visit with Academician Petrov, and that same subject did not arise again.

l. When Bob White arrived with WG 3 on June 27, the movie of the docking system was shown in color, sound, and to the Professor's dismay - Russian (he thought they had the English version). The system and the "semi-dynamic" testing looked very good.

m. Our mail system to them needs improvements; as an example of delays encountered: Lunney to Bushuyev WC2/L137 (Enclosure 8) was signed May 17, left NASA Headquarters May 23, left the Dept. of State May 28, received at Embassy May 31, and delivered to Soviet side the same day.

n. This note would not be complete without a feather for the caps of our interpreters, they are professionally excellent, interested in the success of the project, patient, and do double duty, day and night, with a disposition obviously pleasing to the culture of both sides.

In summary, and as can be seen from the individual working group minutes, the visit was quite successful from both the technological and cultural aspects. Our rapport and understanding improves with every meeting, and even though some of the problems seem major at the time, when put in proper perspective, I believe the progress of each exchange is outstanding, and this project is on firmer ground than any in recorded history. However, there is obvious positive desire by both sides at all levels to insure the project gets off the ground on July 15, 1975.

David R. Scott
Colonel, USAF

cc:
NASA Hqs, C. Lee, MA