

ORAL HISTORY 7 TRANSCRIPT

GLYNN S. LUNNEY
INTERVIEWED BY CAROL BUTLER
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BUTLER: Today is October 18, 1999. This oral history with Glynn Lunney is being conducted in the offices of the Signal Corporation in Houston, Texas, for the Johnson Space Center Oral History Project. Carol Butler is the interviewer and is assisted by Kevin Rusnak and Jason Abbey.

Thank you for joining us today, again.

LUNNEY: You're welcome. Glad to be here.

BUTLER: We began talking the last time about Apollo-Soyuz [Test Project (ASTP)], and you told us a little bit about how you got involved with it and how Chris [Christopher C.] Kraft [Jr.] had called you up and asked you to become a part of this program, and how that was a little bit of a surprise, but you jumped into it. What did you think about working with the Soviet Union and people that had for so long been considered enemies, who you'd been in competition with on the space program, but were also enemies of the nation, to say?

LUNNEY: Especially on the front end, it's a fairly foreboding and intimidating kind of an idea. Of course, I was raised and came of age in the fifties and sixties, and we went through a great deal of scare with respect to the Soviet Union. The newsreels had the marches through Red Square, you know, with the missiles and so on, tanks. A lot of things happened to reinforce that. There was, of course, the Cuban Missile Crisis early in [President] John [F.] Kennedy's administration. There was [Nikita] Khrushchev at the U.N. [United Nations]

banging his shoe, threatening to bury the West and so on. And then it seemed like there were confrontations all around the globe one way or another.

We and the Soviets would be backing different sides in various conflicts. In the sixties, we got involved in Vietnam, which we saw as an extension of a fight against Communism. Perhaps more correctly it was a civil war going on in Vietnam, but we saw it as kind of a fight against Communism and part of the idea of containing them.

The space program itself, which I walked into when I got out of college, and worked in until the time of the Apollo-Soyuz efforts in the seventies, was really an element of the Cold War. It was a place that had been staked out, that we would compete in to see who was going to have the better space program, I guess would be one way of saying it, and who could be more successful in that theater.

It was more than that, because at the time it started there were a lot of imagined scenarios about what threats, military threats, could be constituted and would derive from a new theater like space. Not too much of that ever actually transpired in terms of actual threats, but, nevertheless, at the front end of this thing, that was a significant concern in a lot of people's mind. They imagined seeing nuclear weapons in low earth orbit being able to target and shot at people from just fifteen minutes away from a target. So there was a lot of concern about all that.

The Soviet Union presented a rather grim, humorless, dedicated, monolithic view to the world that said they had figured out what their game plan was and were executing it, and they were very, very hostile toward everything that America stood for and everything that America tried to do and so on. And the Cold War, of course, was a part of that.

So I guess I was sort of a Cold War warrior by being a member of the space group, but I think all of us at the time had this rather grim view of what the Soviet Union was and what it perhaps portended or threatened in terms of its desire to be preeminent in world affairs, and what that might mean to our country in the long run. A lot of our people felt the

same way. I perhaps was closer to a part of it—that is, the space program—than others got, although in many ways I think everybody felt threatened by the Soviet Union.

I learned later, unbeknownst to me at the time, probably because—certainly because of my very junior status during the sixties in NASA and policy, that there were a series of discussions and possibilities that had been entertained at various times about cooperation with the Russians, most of which never really panned out. I think, significantly, President Kennedy even wondered and dealt with the subject of whether there was some possibility for cooperation in space, but that kind of fell by the wayside.

I think there were some other initiatives at various points in the sixties, some of which might have led to some cooperation on scientific kind of subjects, but never anything that had anything to do with human space flight, manned space flight, as we called it at the time, because I think that people saw the human space program as the centerpiece of the Cold War race in space. So that whatever chances we had that might have existed for cooperation always seemed to run aground on the rocks of the times, whatever they might be, or the events of the times, and that kind of idea never really got off the ground very much.

Late in the sixties, I think Tom [Thomas O.] Paine, as administrator of NASA, had started the latest round of possible discussions, discussions of possibilities with the Soviet Union, and that did eventually lead to what was our first meeting in October of 1970. At the time I was thirty-three years old, so I was fairly young, and I had been imbued with this sense of confrontation and competition with the Soviet Union all the life that I was old enough to read papers and think about, going back to high school, probably, even. It was a fairly threatening thing.

So when this came about, I was unaware of any of the previous discussions that had been held or any of the previous correspondence. I certainly was unaware of anything that had been going on with Dr. Paine and the leadership of the Academy of Sciences in the Soviet Union. I was called kind of out of the blue, and I was asked to get ready to go to

Moscow for some discussions on the possibility of compatible rendezvous and docking systems for the future.

We went there, five of us. I think Dr. [Robert R.] Gilruth led the delegation, Caldwell [C.] Johnson and I, and George [B.] Hardy from Marshall [Space Flight] Center [Huntsville, Alabama] and Arnold [W.] Frutkin, who, by the way, probably never does get enough credit for his role in the whole subject of international affairs in general for NASA. He was in charge of the Office of International Affairs for NASA, but in particular for the help and assistance that he gave in the human space flight effort, because he had not worked in that field at all within NASA. He'd worked on mostly scientific endeavors with different countries, and this was new for him, but he brought to the table a lot of experience in dealing internationally, and he was of great value to all of us and a big help to all of us and especially in the start-up end of this thing. So I always have a real fond spot in my heart for Arnold, for all that he did to contribute to this thing getting it off on the right foot and keeping it that way.

So we went there. It was October of '70. When we got there it was fairly late in the day, you know, about eveningtime, so it was fairly dark, snowy, not snowing at the time, but snow on the ground, fairly forbidding place. The airport generally had policemen around with—I should say soldiers around, with weapons, walking around and so on. You just had the feeling of flying—it felt a little bit like we were flying into a prison.

When we got there, the people that we dealt with dealt with us in such a way that that feeling diminished considerably, but, I mean, throughout the whole time we dealt with the Soviets over five or so years, you always had the sense that you were in a different place, that it was different from the one you grew up in, had a different kind of a system, and they were still hostile towards the interest of our country, but they were beginning to be willing to open up some discussions of areas of common interest, perhaps best described by the Nixon-Kissinger initiative that was called *détente*.

What became the Apollo-Soyuz Test Project was a part of that general thrust, which, near as I could tell, had to do with engaging the Soviet Union and trying to find areas of common ground, and the building on those and weaving a larger tapestry as you went along.

At the time I remember being impressed with the confidence and the far-sightedness of people like President [Richard M.] Nixon and [Secretary of State Henry A.] Kissinger, who seemed to be willing to try things like that. Of course, Nixon had made or would make—I can't remember what order—the opening to China also, which probably would have been difficult for a lot of other American politicians, but he was kind of in a position to do that.

So here we went there, and landed at this airport and soldiers around with machine guns, and it's cold and it's kind of dark and snowy, and they speak a different language. Then we took this ride into town and we stayed at a hotel right off Red Square. So the place where I had seen all these newsreels of the tanks and the missiles and the soldiers marching up and down every May Day in other times, there it was right outside our hotel, just, you know, fifty yards away. Again, it brings back this sense of foreboding about the place and the country that we're now in, relative to the competition that existed against our country at the time.

But the discussions with the team of people went very well. The first night we had dinner with them, I think, and they took us on a tour of the city, took us up in the hills, took us various places, sightseeing kind of thing through Red Square and so on.

Then we started our meetings, which, I can't remember, probably lasted three or four days. We had kind of an opening round of discussions in which we described kind of—each of us described our own experiences with rendezvous and docking and so on in our country, and they on their side. At the time the meeting on their side was being led by a fellow named—I think his first name was Konstantin [Petrovich] Feoktistov, very impressive guy. He had flown as a cosmonaut, but prior to that as a cosmonaut, I think he was more influential as a designer of some early spacecraft, the Vostok and then the Voskhod

spacecraft, as we knew them at the time, and had obviously been a key player in much of the Russian space program, the Soviet space program at the time.

So he and several other fellows, but especially he, led the discussion, and he was very businesslike, very professional. He and Bob Gilruth, who was our center director at the time and the leader of this delegation, had a chance to visit about the ten years past and some of the things that had transpired on our side and some of the things that had happened on their side, and I can't point to any revelations that they might have had, but it was the beginnings of a comparison of experiences where there had been this great big wall between the two programs, and here two of the key players, Bob Gilruth and Feoktistov had begun to have a chance to just explore each other in terms of their reactions and things that had happened that made the news and some that didn't, and so on.

So it was kind of interesting, and I would credit the success of that first meeting certainly to Bob Gilruth, who was a courtly kind of a gentlemanly manager, executive, who had a good instinct for things and people and a good instinct for staying calm. He was not very excitable, and he didn't jump quickly, but he was kind of a calming influence on the whole thing. And on the Soviet side, Feoktistov was very helpful, somewhat more of a kind of point-by-point guy than Bob Gilruth, you know, do one, two, three, and so on, and Bob was more general in terms of what he would write down or decide as direction, and leave that to staff, but overall direction he would set.

So we had several days of that discussion, which was mostly a comparison, and there was a fair bit of discussion about what the Russians called—they used the word translated as "humane." I guess we would say "humanitarian" aspects of having compatible rendezvous and docking systems in the future so that if something transpired that would affect one country or the other, that there would be the possibility of a rescue. And it was interesting because this discussion came after. Our country had this movie called *Marooned*, which I remember we all went to see, and it had made quite an impression on people. It was about an

American spacecraft that got stuck and a Russian, Soviet spacecraft coming to help the American astronauts get back down. I think they went down in the Russian ship.

But also we had, on our side, the Apollo 13 incident, which I had been involved in as the flight director. So we had these kind of demonstrations, certainly the Apollo 13 a real demonstration to ourselves that something could go wrong and we might have to deal with the possibility of people being stranded. So there was a fair bit of positive attitude towards this idea of a humanitarian purpose or a humanitarian initiative to consider how to make the devices of the future to be compatible so that the spacecraft could rendezvous with each other and dock and presumably transfer people or lend assistance. It was kind of a Coast Guard rule of the sea kind of feeling to it, where people would always want to help any other ship that was in trouble and rescue people that might have been overboard and so on.

So it had that kind of a flavor, and its application was sort of dimly off in the future and it was easy to salute the idea of a humanitarian purpose, being able to do such a thing and having spacecraft configured to be able to do such a thing, and we didn't really address how real that might be or what the applications might be in terms of near term.

We also found in our meeting that one of the significant things that we ended up having to do each time was to write a summary or a communiqué or whatever the right term was at the time, a summary of what the meeting would be, perhaps a set of minutes, technical minutes, and then a public kind of a summary. We found that we had to spend a fair bit of time working on that, because we in NASA and in the United States had a different set of constraints and realities that we dealt with in terms of public information than they did on their side. On their side, they were very cautious about releasing any kind of information, where on our side we almost went overboard the other way. So each of us had constraints and so on that we didn't realize.

As a matter of fact, one of the many things that dawned on me as I went through the beginnings of this process of dealing with the Soviet Union was the realization of how kind

of automatically I had come to accept the role that the media played in the coverage of the space program and the media role in general in our country, and how it interacted with the government and reported on what the government—in this case, NASA—was doing. Of course, I had done a lot of that in my days in the flight business, but again I reflected on how just generally we had a policy of being open about our discussions on any subject and so on and so on, and the Russians had almost the opposite one, dealing with government-controlled media and so on.

So we had these differences, and I came to begin to realize this was one of those differences as we went along. So we had to deal with communiqués that would pass muster in each of our respective worlds, but the writing of the technical minutes was also a challenge because it was the first time we tried to write a joint set of minutes. Even at that meeting, it dawned on me that it was worth paying considerable attention to how you wanted a meeting of this type to turn out so that in the future, after this first meeting, we got to the point where we would try to write the minutes of the meeting before we had the meeting, in order to outline exactly not only what our agenda was, but how we wanted the results to turn out, so that we had a very crisp and clear idea of what we were trying to accomplish in each meeting in the future going into it.

But the process of having to do that was an enlightenment because it was not one that we routinely had to worry about that much. Minutes were more a matter of the routine coverage of various in-house meetings that we had, and we didn't have to pay a lot of attention to exactly how the minutes were written or what exactly they might portend.

So we had to spend time working on that, and one of the lessons I learned was, it pays, especially in these kind of meetings, to have a good idea how you want the meeting to turn out, even go so far as to make a draft, so that the next time around we'd have a better way of planning for that meeting.

So we came back from that meeting and generally were fairly positive about this humanitarian initiative to create rendezvous and docking systems that were compatible in some future spacecraft, and then we gradually went through a process of thinking about all that and began to come to the opinion that as useful as it would be to work on those sorts of things, our shuttle program was in a very early stage of development at that point, and we were a little loathe or reluctant to put new requirements on the rendezvous and docking system that might derive from these kind of discussions, because we had no idea what the shuttle system was going to be. We just knew that it didn't need additional requirements and additional constraints on it. We evolved to starting to think about doing it with our near-term ships, the ones that the Russians had, the Soviets, and the Apollo spacecraft or something like it that we had in our country. So we began to think in terms of what that might be.

But I would say, looking back on it, that the first meeting was quite an interesting one. We not only had meetings in—I've forgotten what the name of the building was, but one of the buildings that the Academy sponsored over there. We also went to Star City and visited with the cosmonauts at the time, and got to see their simulators and their training complex, and spent some time around the place, probably an afternoon, if I can remember right. They had a little banquet in the evening, which was an interesting event in itself for us to see how the two cultures sort of came together.

But it was done on a Soviet side, I would have to say they did this with, whatever their feelings might have been about it personally, they did it with a kind of positiveness and agreeableness that was really, if not engaging, it certainly helped to diminish our trepidations going into such an activity with them, and it made it easier. They were fairly forthcoming in taking us in the simulator and showing us a little bit about what it looked like. It was hard at the time for us to derive real specific impressions or specific answers to questions as we went along, but it was more of a generic and kind of a general freshening and familiarization with what they had to fly with.

We met a number of people at the cosmonaut Star City. [Colonel Vladimir Aleksandrovich] Shatalov, I think, was in charge of the cosmonaut corps at the time. Either he was in charge of it at the time or shortly thereafter, I'm not sure which. I remember meeting General [Georgiy Timofeyevich] Beregovoy and then a room full of cosmonauts, all in military uniform, by the way, and we had the usual toasting and so on for a while, and then we had a banquet of sorts. Then we tootle on back to the hotel to get ready for the next day.

So all in all, it was a fairly positive meeting. It was easy to be on the side of the purpose that the discussions were revolving around, and that is the ability to be able to do this in the future. But as I said, afterwards, upon reflection and upon thinking about it, we began to think of the idea of maybe doing something specific with the spacecraft that we had at the time.

There then were several meetings, some of which involved George [M.] Low, who was the deputy administrator of NASA at the time, and Arnold Frutkin, who probably went over to do business with the Soviet Union, probably on a variety of subjects. I think they had meetings where they were talking about weather satellites and communication satellites and other kinds of planetary exploration, so they had kind of an agenda, and this was kind of one of those subjects and hadn't yet taken real form yet, although a number of us, and probably George Low and Arnold on the next visit in January, had begun to entertain the idea, began at least in their head to entertain the idea of a test project that would allow us to see how this stuff worked.

That went kind of slowly for a while, and we had another meeting with the Russians, a follow-up meeting to the October meeting scheduled for May, as I recall, and they canceled that one, which that was a surprise to us, and canceled it without a great deal of explanation. It turns out that they were launching, I think, the Salyut at the time. I think I've got this timing right. And they put the meeting off until June.

That was getting to be a problem for me because I was still in the flight director business, and we had Apollo 15, I think it was scheduled in July, so I didn't want to be distracted with the meeting with the Soviets, you know, either during or right before that flight, so we ended up having a meeting probably a week or ten days or two weeks before the flight actually occurred, because I was the lead flight director for the Apollo 15 flight, so I had a lot of things and people to take care of and so on.

But, nevertheless, they came over and again we developed more of these ideas about what it would take to make these equipments compatible. I suspect it was about here that we began to talk about a different kind of a docking system. In the October meeting, both of us described our docking systems, and ours was a probe, what we called a probe and a drogue, you know, the kind of part that stuck in and caught in this conelike device. And the Russians had a similar system, different in many respects, but similar.

But we began to think about, in the meantime, how do you make something so that, I mean, you don't want to fly where you have two probes, because there's no way to make them dock. So how do you do something that—the word "androgynous" came up, sexless, which means that they each could work with another. And we came up with this—people began to evolve this idea of a ring with fingers on it, so that it could mesh together as a capturing device and then bring them together and dock them for structure.

Caldwell Johnson was on the October trip and was instrumental then throughout the project, although a number of other people became involved in the docking system. We also, in the October meeting, met [Vladimir Sergeyeovich] Syromyatnikov, who I still see today, some twenty years later, on various occasions and various places. He was the designer of the docking system that the Russians had been using.

Again, the impression of him was a fairly hard-nosed, hard-edged kind of a character, which indeed he was and, to some degree, still is, although that certainly changed over the years as we got to know each other better. But he was very proud of his design and his

device, as our people were of ours, so it took a little coming together and, frankly, getting to a completely different system made it easy for people to begin to conceive of a different design problem than trying to adapt the probe-drogue systems that we had, which wouldn't work for this kind of a condition anyway.

So they came over in June of '71, and we had our second major meeting, technical meeting, and a lot of things began to come together. We started to have the idea of working groups. I think originally we probably had three working groups, Working Group One, which was rendezvous and docking and operations and missions and stuff like that, and then—not docking. The other one was communications, and the other one was docking systems. So we began to start thinking in terms of organizing our work in these working groups, and we began to develop a considerable agenda, still maintaining the idea of the humanitarian initiative in designing requirements for compatible systems, but beginning to think about how we might use those in terms of docking with Apollo and Soyuz spacecraft.

Let's see. I have to get the sequence of events right. So that was like in the summer of '71. We probably had some more discussions. I'm trying to remember when the next meeting would be. Let me refer to a note and see if I can remember.

BUTLER: Sure.

LUNNEY: There's one other thing about that meeting that was significant, and that is that at that time the reason they had delayed the May meeting was they had launched the Salyut, which was a new space station, a small space station by today's standards, but a space station, the first attempt to have a permanent or a semi-permanent space platform for people. And they'd also launched a spacecraft up to it. So when they came, they had the Salyut as an achievement, and they were, of course, very, very proud of that. And the reason they delayed the meeting was a lot of people were tied up with the flight and so on.

And then the discussions of how we might apply this idea to the near term took the form of Apollo visiting the Salyut, although we had entertained other options like Soyuz visiting the Skylab that we were going to launch in 1973, which we did launch in 1973. So there were a set of options on the table, but clearly the move from doing something with the Soyuz to doing something now with docking with this Salyut itself, and so on.

Connected with the first manned launch, the first Soviet launch with the Salyut, they had a flight called, I think, Soyuz 11, and I can't remember where that was, where that flight occurred with respect to the meeting that we were having, but the three cosmonauts died, were killed during the reentry portion of that flight in 1971, I guess. I hope I have the year right here and am not off by a year.

So we went back over in October and continued these discussions, at which time the idea of a mission with the Salyut and the Apollo spacecraft were beginning to take some more form, so we had a fairly extensive agenda and a fairly major meeting designed around how we might accomplish such a mission. That would be in October.

I think the Soviets came back over to America then early in '72, which we continued the discussion maybe with just one or two of the working groups, not the whole group. But what was happening in the United States and the Soviet Union is that there was a major summit meeting scheduled for May of '72. In that meeting between President Nixon and the Secretary, I guess, or President, perhaps, [Aleksey Nikolayevich] Kosygin, they had a variety of subjects on the agenda, one of which could conceivably be this possibility of a manned spacecraft test program.

George Low, I think, and Tom Paine, who eventually retired and Dr. [James C.] Fletcher came in but continued the same thing, so George Low was kind of the continuity here, George and probably the administrator were involved with the President, but mostly with the White House staff and at times with Kissinger himself and so on, about the possibility of this.

All of a sudden it started to dawn on us early in 1972, in the winter of '72, that we had had these set of discussions, we'd had this set of possible technical description of what an Apollo and Salyut mission might look like, but we hadn't had any discussions about fundamental questions about how we would conduct ourselves in an organization sense, what would be the ground rules for such a mission, what would be the schedule for it, and so on and so on.

When the idea that this might be put on the agenda or for the summit in May of '72 took shape during this winter, it became clear that we needed to go over and clarify, besides a set of technical descriptions of how these systems might work, how would we work together, how would we handle public affairs, how would we handle communications, and so on and so on. So we had a bunch of these how would we work together, what would our schedule be, and so on, constraints or subjects that really had not been yet discussed because we had spent all of our time working on what this might be as a technical proposal.

Let's see. Let me just back up a moment, too. For me personally, let's see. Apollo 15 was the last flight I was an active flight director on, so somewhere late in probably the second half of '71 I was assigned to the Apollo Spacecraft Program Office, where I began to learn what you do in a program office as opposed to in-flight operations, and I had some assignments there, but I also began to pick up—I think in the June '71 meeting was the first time that Konstantin [Davydovich] Bushuyev, Professor Bushuyev, joined us, and he and I were named directors of this activity, which still did not have the name or the same context that we later developed.

So here we were with the President's summit coming up in May, and we realized that there were a lot of things, ground that we hadn't covered about how we would work together. So George Low and Arnold and I went over in, I think, about April of '72, about a month ahead of the summit, maybe six weeks, and our objective was to go through how would we work together. Let me call it management principles, for lack of a better term: how would

we interact together and what kind of principles would guide the program and what kind of schedule would be propose.

So we went over. As a matter of fact, George Low did not want to make a big point of this publicly, so he wanted to do the trip in kind of a private way, without getting too much up front, so he made special arrangements, travel arrangements, and so did I and Arnold, so that we went in kind of a way that we weren't disclosing where we were going or what it was about and so on, except to our families. I remember we left on Easter Sunday to go there.

So we went and met with a man that we had met early on, whose name I haven't mentioned yet, Academician [Boris Nikolaevich] Petrov, and probably Academician [Mstislav Vsevolodovich] Keldysh, I'm not sure. I'm sure we met with him somewhere in the course of this particular meeting, because we had to pound out this business of how we were going to work together. So I had written a technical proposal. Our team had written a technical proposal, an organization plan, which was a kind of "how do we work together," and a schedule for what all we were going to accomplish between now and the launch date, that we had begun honing in on as July of '75.

We felt these three things constituted a management framework that would then set the stage and give us the confidence that we knew what we were proposing to the President, because we hadn't had such a thing up till this time. We had mostly technical discussions. So we went over there with these three documents and found ourselves a little bit wrapped around the axle of not having worked together that much and having a lot of ground to cover, especially with these management principles, some of which to us were natural, having to deal with open communications and open communications with our press, which were very different on the Soviet side. So we snarled around with that for a while and realized that we would probably not get through the meeting and get documents signed, three different documents signed, so we took the—I don't know, dozen or twenty most important things,

principles we call them, out of those documents and laid them out in a form that we could then engage the Soviets in discussion of the principles to guide us in this thing. We eventually got through that satisfactorily, and it turned out to be a good context, framework for what we would then have to do to execute such a program.

However, in the middle of this meeting, six weeks or a month before the summit, the Russians and the Soviets introduced something that was a complete surprise to us. To this day I don't know how they were intending to resolve this subject without a meeting, but we had been the ones to initiate the meeting and so on and so on. The new idea was, they wanted to substitute, instead of using the Salyut, they wanted to substitute the Soyuz. They were concerned about the newness of the Salyut, and, I can't remember, a number of other things that they didn't want to really get involved in using the Salyut in this joint activity, and they proposed to use the Soyuz, which we had thought about before.

In the course of the meeting it was up to us to decide whether that would still satisfy our intent or our objectives and so on, and whether it would introduce any particular new constraints or things that we hadn't considered when we were thinking about the Salyut that would make it more difficult or less difficult or whatever.

Anyway, going through all that stuff, it seemed like the Soyuz would still provide us a good test of all the things that we had talked about. That is, it would provide us a test that would accomplish all the objectives that we originally talked about, although we might have to do some things in a different way and so on and so on.

So during the course of the meeting, you know, between George and myself and Arnold thinking about it mostly in political terms, we decided that that would be an acceptable substitution. That was the thing that I could never figure out. The Russians, the Soviets, wanted to do that, but they had not done anything to prepare, to schedule a meeting or anything, because the meeting was scheduled at our initiative, and, by the way, although they may not have been concerned about the management principles about how we were

going to run this project, presumably in their system somebody would ask them if they knew how they were going to run it.

So I never did know how they were going to deal with it, but we had scheduled this meeting and went over there somewhat secretly, I suppose you'd say, secretly with respect to the American side, because the business of the summit was something that NASA felt it had to keep secure and let the White House deal with, not have NASA deal with. So we were trying to protect the White House prerogatives and position and not put the White House in a position of getting out front with something that then might not occur or not be able to be pulled off or something.

So anyway, respecting that, we did this in kind of a secret way, as I said, and not very many people knew about it. We went through this meeting. We managed to find our way through these principles. We managed to deal with the Salyut surprise and the substitution of the Soyuz for that. When we were done with all that, we were fairly satisfied that we had a good understanding of what we were going to have to do. We talked about open communications. We talked about having telecommunications, regular telecons with them. Up until that time I think we'd had a couple of telephone conversations, but generally they were very limited. But we recognized if we were going to do something like this, this was 1972, we're talking about a flight in three years, there would be a substantial interaction that would have to be supplemented by telephone communications outside of regularly scheduled meetings that might be two or three or four months apart.

So it took them a while to get them used to that idea, but they gradually did get used to that idea, and it took form, so we got through the business and we were able to conclude, when we were done, that we had a good idea, a good technical proposal, that we knew how we were going to manage and organize the run the program with the Soviets, and that we had an agreed-upon schedule, which was—I don't know if it was precisely July 15th, but it was July of 1975 by that time.

So that ultimately was confirmed in the Nixon-Kosygin summit in May, and in June, within NASA, the fellow that ran Office of Manned Space Flight, I believe it was called at the time, Dale [D.] Myers, was putting out instructions to the whole team that that was going to be done, the centers, the three different centers. That was going to be done, and we began to engage more specifically the contractor, Rockwell [International Corporation], to help us with that process.

At that time, let's see, yes, at that time Owen [G.] Morris was now head of the Apollo Spacecraft Program Office, so I was working for him on some things in that program, but also mostly on this Apollo-Soyuz thing, having gotten out of the operations business. We had one more Apollo flight to do in December of '72, when Apollo 17 would fly. That would be the last of the Apollos.

Let me see. Somewhere in there, I believe it was in '72, maybe January, Chris Kraft was named the [Johnson Space] Center director, or maybe it was after Apollo 17. I have to stop and think. Where he was named the center director. Chris, of course, had been my personal mentor and leader in the flight operations business for so many years, and then he had been the deputy director to Bob Gilruth, I think starting in about 1969. George Low had been Apollo Spacecraft Program manager up through Apollo 11, then he went to Washington and was the deputy administrator. So I was comfortable with all the management that was around me at the time, and I guess they were comfortable with me, because they gave me these fairly big jobs to do at a fairly young age. And off we went. So we got started with it in earnest, so we had to get the contract arranged and arrangement with Rockwell.

Early on when this thing first got started, after the first meeting, for about the first, I don't know, maybe up to a year, there were actually two kind of activities. One I was doing with a team of people dealing mostly with this Russian interface thing, Soviet interface. And one that there was another fellow who was running studies within the country, Rene Berglund was doing that. Leonard [S.] Nicholson, who came to be an absolutely invaluable

player in Apollo-Soyuz and in later things at the center, Shuttle Program and so on, Leonard was working with Rene, and they were dealing with the contract and getting a study contract and getting the funds for it, all of which was new to me. I'd never done any of that, but Rene was well versed in how you go to Washington headquarters and seek approval and justification for money for studies and so on. So Rene and his team were doing that, and I was sort of organizing the working group teams.

Within less than a year of this thing getting started, the study money and all that stuff had been delegated to me also, so I kind of had all that stuff once I became the project director in '71. At that time it was mostly studies. We didn't really get into real implementation contract with the contractor until after the summit, when we knew we were going to do such a thing.

So then we got rolling along. I'm trying to remember what else happened in '72. We probably had a couple of meetings both in U.S. of A. and in Russia. The way that worked was, each one of these technical disciplines or maybe the whole group of people would recognize that they have another significant set of steps to resolve with each other. We would schedule a meeting to our mutual satisfaction and we generally alternated them one country or the other. We'd create an agenda ahead of time. We would take ourselves through the discipline of writing the minutes and writing the summary ahead of time so that we knew exactly not only what the agenda was but how we wanted everything to turn out. We began discussions of how that was going to occur.

Even then, we still would run into surprises. I remember when we first started talking about what the launch sequence would be, the Russians wanted the—I keep saying "Russians." Russians. Soviets. The Soviets at the time wanted to launch the Soyuz first, and we couldn't really figure out why they wanted to do that. They had a technical story about why they wanted to do it, but it didn't really hold water too much. So we were left kind of puzzled believing that they really wanted to launch first so that nothing would start until they

had the launch off, and if they had to delay and so on. Then the burden would be on us to launch second and launch on time. So the second launch had more constraints and more of a requirement. The first one's up, so you've got to get the second one up.

We couldn't figure out why exactly that was the case, and then somewhat inadvertently, almost, they talked about having a second spacecraft and launch vehicle ready to go. So they had this idea that if the first one didn't work, well, then they would launch the second one. Then we would follow that. So their willingness to put up two vehicles to accomplish the first launch kind of washed out our reluctance at being number two, which means you've got to launch on time when the other fellow gets off. But the fact they're willing to put up two to do that seemed to us to be quite a demonstration of good faith on their part, and so we went along with that.

We had a lot of different kind of things that gradually became good-faith subjects. They were hard-earned. I guess when I look back on Apollo-Soyuz, I sort of think about it in a way—there is a way of thinking about it that has to do with making it a bank account, and the more we dealt with things objectively and fairly and did not appear to them to be prying into their business, the more we accumulated some money, in effect, in the bank account of trust, kind of a trust account, I guess you'd call it, rather than money. But we would accumulate some capital in this trust account.

For example, when we first went there, they knew Bob Gilruth and they knew me and they knew Arnold from international affairs, but they knew Bob Gilruth from reputation, from all the publicity that he would get over the years, and me, I'd just gotten off this Apollo 13 thing, among others. So they knew that we were real players. There was a tendency, at least certainly a suspicion, on their part at the time that delegations got staffed with spooks. They did that. [Laughter] So they were always concerned that the other side was always doing that. But in our case, our credentials were kind of public knowledge and they

immediately knew who we were. So things like that occurred over a period of time where they would accept that we were who we said we were.

We made it a business not to pry into their activities, in what you might call a fishing trip fashion or a curiosity exploration. We did not just try to unravel things about them that had no bearing to the Apollo-Soyuz. We constantly used the Apollo-Soyuz, the safety of it, the success of it, we used that as a criteria for what we did with them, and although sometimes they had a difficult time with it. They became convinced over time, by example and by real events, that that was what our primary interest was, and we were not conducting some other kind of exercise or some other agenda or whatever that they might be concerned about.

We were careful about explaining expectations. We worked hard at explaining what we wanted to accomplish in each meeting. We went out of our way to build good documentation that the Russians accepted as the way of documenting the program, the way of documenting the missions, the way of documenting the meetings, and basically we took the lead in a lot of that stuff, but by doing so, we made both of our jobs easier and we were making a positive contribution, kind of a unilateral thing that we were willing to do this in order to help the whole thing along. So that and those and a lot of other things, both professional and personal, built this trust bank account of sorts so that we had pretty good understanding with them.

Another example of that was they had this accident where they lost the three cosmonauts during entry. I still am not sure what year that happened in, but, nevertheless, I had started to ask them about that because I was concerned that whatever the cause of that accident was, the cabin decompressed, so our concern was cabin decompression could occur while we were docked with them. So we wanted to understand that. I believe I raised it with them at several meetings, maybe three, and I raised it with them in an increasingly harsh way, insisting that we needed to know the answer to this.

It was interesting. To digress a moment on that score, the way we were allowed to run this program, we were not manipulated or managed by Washington, either official Washington State Department, National Security Advisor, whatever, Mr. Kissinger, any of that. We were able to run it, even within NASA, relatively free of headquarters and Washington influence. It was basically dealt with as a Johnson Space Center—called the Manned Space Center at the time to the Soviet Academy of Sciences—and it was basically run that way.

But they began to see that. The Soviets began to see that, so they began to have a lot of confidence that they were being dealt with primarily on a technical basis, and they weren't being investigated. However, they had had this accident and we wanted to get to the bottom of it, so I spent several meetings doing it, and I did it in an increasably direct way, about we needed to know this because it might have implications with respect to safety, and despite their assurances that it did not, we needed to know the technical details of why it did not, so we could satisfy ourselves.

The point I wanted to make a minute ago, that I didn't complete, is that so in our country with the freedom to do that, we had a strong hand in dealing with the Soviet counterparts of ours, because they lived in a system where when the orders came down, there must have been implicit, with orders to do something, some threat if it didn't turn out that way, that there would be consequences. That, of course, was true in our system, but it was nowhere near as—their system was much more autocratic, I guess, internally than ours would be. So they felt like they were really on the hot seat.

So we learned early on, maybe by the time of the second meeting, no later than the third, by the second meeting, we learned that in their system they were much more on a hot seat internally with respect to the success of this whole thing than we were. Now, we were, but we didn't feel it. We don't get threatened by anybody in our government to make

something come out right or anything like that. And maybe they weren't threatened either, but lived in a system that had more of that by large amounts than ours did.

So we began to realize that in a way we could push the hell out of issues, and as long as we stayed on grounds that were directly applicable to the safety or the success of the mission, that we were on solid grounds. Although it made them very uncomfortable, because many times we were treading on what they considered to be security items, like this accident, and not wanting to reveal the details, we could be very firm with them, and I would be very firm with them about, "You will tell us what we want to know or we will recommend canceling this project." We got to that point. We were very harsh with them about it. And they accepted what I said was true, that I would do that.

So after several meetings of unsuccessful probings, where I had to escalate the harshness with which I was asking the questions, we finally had a meeting, I think it was in '73, in October, it was in conjunction with George Low coming over for a review, where they took me aside and went through the technical details of the accident with a couple of the specialists.

What they explained made perfectly good sense and jibed with everything, and they showed us the data of what happened to the pressure and how when the pressure relieved out of the cabin, how the thrusters fired to correct it, because it, in effect, was another thruster. So they showed us the data that corroborated the story and how this happened just when they separated. Their theory that the pyrotechnic shock kept open one of the valves and it bled the cabin down and the guys in there did not have space suits on, so they didn't have any air after a while.

It was very credible, very technically credible story. It was supported by the data, the evidence that they showed us, and although it took the best part of a year over a course of meetings to get that information, we stuck to the mainstream argument we used over and

over again, that this or other things like it pertains to the safety and success of the Apollo-Soyuz, and we want to know the answer to it. And they did. They eventually came through.

I think internally for them it was a difficult struggle. I can't explain to you why that is so. They had these very strong concerns about security and classification, not releasing information and so on and so on, and they did not want to talk about why the spacecraft failed technically. They wanted to say that it didn't apply. They wanted to generically assure us that it didn't apply to our mission, but that was not good enough for us, and we pressed it and they finally told us the story.

But I think we were able to get that story because over the period of time up till that point, we maintained and fought off, in some cases, desires on the part of others on our side to introduce these curiosity exploration expeditions, and we didn't support any of that stuff and shut it down and so on, wouldn't particulate with it. So that they gradually became convinced. I told them that we were going to cancel this thing if they didn't tell us what went on there, because we felt it might apply. And they finally did and so on.

By that time, a lot of things had transpired. We had built up this fairly substantial trust bank account with them so that they believed us when we said something, and they credited us with having the right objective with respect to our questions and that we were not, you know, exploring or fishing about things on their side. That worked out.

As a matter of fact, later on, several months before the actual flight, they had an abort on the pad, where they actually had the spacecraft hop off the launch vehicle and land. We had a fairly brief discussion of that with them, but it was clear that that didn't relate to the safety and success of our mission in terms of it happening. We were mostly concerned with how their spacecraft would operate while we were docked together.

This was an entirely different set of problems having to do with the launch vehicle and so on, which was a somewhat different launch vehicle to some degree than the one they were using on our flight. So, therefore, that did not have the direct application to our flight,

and the worst that would happen, had it happened on our flight, is that their launch would have been delayed till the next vehicle. So we were fairly comfortable with that, and we were able to accept that at this much later time.

So let me go back a little bit. 1972 was kind of a big year. I think that was the year—was it '72? No, it was '73. In January of '73 we named the flight crew for the flight, prime and backup, and then some three or four support guys. The Apollo Program was over, so a number of things got changed. A lot of the Apollo Program Office people went away. I was appointed program manager for all the Apollo spacecraft missions after that. We had Skylab coming up in May of '7[3], and I was manager for the three spacecraft plus one rescue ship, and I was also the manager of the contract and everything that went with those vehicles, and then with the Apollo spacecraft 111 that we were going to use for the flight and the docking module, the new docking module. We were going to build a docking system and all the new stuff.

So these things started to unfold after the last flight of Apollo. The crew got named. I got these additional responsibilities. We continued through this and we began to aim towards what we called the midterm review. We proposed to headquarters internally and then with the Soviets, and I think we had talked about this early on, that we have about a midterm review so that George Low and Keldysh or his designee—and Keldysh passed away somewhere in the preparations for the Apollo-Soyuz, and I can't remember where it was with respect to the '73 meeting.

But the idea was that George Low and a senior official from the Soviet Union would share a review of our preparations for the mission, and after several meetings during '73, that got scheduled for October of '73, at which time we had a fairly major formal, very formal thing, you know, green tables, big conference room over there, very official-looking thing like you would see in the photographs, review of all of the different parts of the mission and the status of it.

By about that time, combined with this reluctance on the part of the Soviets to talk about the Soyuz 11 accident, which had been an increasing a burr under my saddle and several of us over the year, '73, and finally resolved in an October of '73 meeting, I believe, but there was a series of other things. The Soviets, for some reason, had trouble delivering on schedule, delivering things on schedule, whether it was paper or analysis or this or that. They just seemed to have trouble.

Somewhere in this period, I wrote a kind of private multi-paged letter to Konstantin Bushuyev, my counterpart, who, by the way, was a delightful gentleman. Let me come back to that in a minute and talk about him. Kind of a lengthy letter laying out as objectively as I could what it is had been going on and why some of these delays and kind of half answers and half solutions, half-baked products, just weren't going to get us there. I laid it out for him in, again, a fairly harsh and critical way, and told him that they just simply have to get their act together. That was one of the subjects that we had on our agenda going into the midterm review with George Low and whoever the chairman was on the Soviet side. We made no bones about it, made an issue about it, and so on.

To go back to the point I was going to talk about, I met Konstantin Bushuyev, I think in '71 at the second meeting, and he was kind of a sober-faced gentleman, probably twenty years older or more perhaps, maybe thirty years older than I at the time, and had been in their program for some time. A relatively quiet-spoken man, relatively unemotional, fairly grim of countenance in a way, especially officially, as so many of them were, but who became a good friend over time.

There were times when, for example, the Soviets would be in town, we would invite them to our homes. I remember one occasion where he was at our house, and our youngest son, Brian, was—how old was Brian? '66. He was probably about seven or eight years old. He's to take Professor Bushuyev out in the woods behind our house, big thick woods, and walk him around. Brian would show him everything that he played on, trees that he climbed,

and jabber away in English, American, and the professor didn't understand a word that he was saying. But they used to go off in the woods and they'd kind of wander around, and Brian would tell him all this stuff and take him up to the pasture and show him the horse and the fence and all this stuff. He just used to get a real kick out of it.

He openly was proud of his couple of grandchildren he had in Russia, and I, likewise, had visited his apartment, had dinner with his wife and daughter, and met some of his family that way. So over a period of time, I came to know him reasonably well. We never did speak each other's language to speak of. I mean, I could fake it a little bit, but I couldn't really understand very much about the language. I could say hello and goodbye and some necessities. I could follow the drift sometimes of what people were talking about. I couldn't always tell precisely what they were saying about it, but I could sometimes follow the subject matter that they were working on, the language. But he and I were never proficient in either language to do that, so we always worked through an interpreter. Let me return to that, too, in a minute, for a success story. But he was quite a gentleman, and everybody on the team, on the American side, especially, came to admire him and respect him.

He told the story one time, just when we were somewhere in an informal setting, he talked about how during World War II he had worked in an airplane factory, trying to build Russian airplanes, and how they were being repeatedly bombed by the Nazi Luftwaffe, and how they had to take the factory, dismantle it, put it on trains and take it back behind the Ural Mountains outside the range of the air power that the Nazis were projecting in the Soviet Union, and he told that story about taking this—and his wife also worked in the factory with him at the same time, how they worked together and how he worked with so many other people to dismantle this factory and move it back out of range, in effect, behind the mountains, conveying a sense of some of the toughness and situations that they had to deal with.

We generally found the Russians to be mentally tough, physically also, but they lived in a system where they had to be able to survive, and they learned what it took to do that and to do it reasonably well. They had a tendency to be oblique, especially when we first met them. They had a difficult time with "yes/no" answers. A question would usually introduce a kind of lateral slide right or left. We always got amused by it, after we recognized it. But it was like they had some built-in inability to say yes or no to a question. It was like they had to kind of answer in a way that wouldn't get them in trouble. "Yes/no," might, so they kind of had this way of sliding off questions. After a while it just got to be amusing, because in many cases it wasn't deliberate. You could ask them an informal social question and still this kind of oblique slide off a "yes/no" answer.

But he came to be a dear friend and a valued fellow who worked hard at making it come out right. He also seemed to have the same dedication to the success and safety of it, and worked very hard at managing it. I suspect within his system internally, he had a much more difficult bureaucracy and set of constraints coming at him than I did. For example, we took him to the factory in California at Rockwell, where we were making it, showed him a lot of the stuff out there.

Several observations. One was that he noticed that Rockwell, as a contractor, was very, very responsive to government, to the program office, to me in particular, and to all of us who had to deal with them. He was always kind of—they were somewhat surprised by that. I think they had some other view of how the country over here worked. But they were very surprised at how—they didn't exactly understand contract stuff, but they were surprised at how responsive Rockwell always was.

As a matter of fact, I remember him telling me at one point, he was describing his difficulties with his own internal system, and he was expressing his frustration to us, and he said something to me like, "And Dr. Lunney, I know that when you want something done, you just pick up the phone and tell those people at Rockwell to do it, and they do it." He

says, "You have—" I forget how he put it. "The financial arrangements that that works out." He says, "In my country, when I call them up and tell them to do something, they may or may not choose to do it." So at various times he expressed his own frustration with the difficulty he had in dealing with his, and he would see how I would do it and, for him, it seemed to be so much easier.

I suspect he had a lot of security constraints on him, too. For example, we took him to the factory in California, and somewhat—not in a quid pro quo way, but in a somewhat seeking-balance way, you know, I asked or implied that they should do the same for us and show us the stuff that's being built. And they just could not do that. He explained that in their factory they make many things. This is his way of talking. "In our factory we make many thing, and the people who are responsible for those things really would not want to have other people, Americans, walking around the factory."

And later on, when I went back there in the nineties, that is indeed true. I mean, they make a variety of things in their factories, and some of them are connected with the military production lines and so on.

So we didn't get to see them. But he did offer that we would see the spacecraft at the launch site. Tom [Thomas P.] Stafford especially made a big point of wanting to be able to see the spacecraft. That was when we were talking about will we be permitted to visit the factories, and the answer ultimately was no. We couldn't get to see the factories for their own security reasons, but as a compromise, they did want us to see the spacecraft. Tom had this view of wanting to see the spacecraft he was going to fly in up there before he actually flew, and so did we, but Tom was very vociferous about it and so on. Eventually that played out in terms of launch site visit. We went down, I don't know, several months before the flight, probably April of '75, we went to their launch site.

They had been to Kennedy [Space Center, Cape Canaveral, Florida] in the winter of '75, January, February. We took them down to the Cape. We took them to Orlando, to

Disney World and so on. We had a grand time with that, and they had a grand trip. They really did enjoy it, swimming in the ocean. For them, swimming in warm water like the gulf or ocean is a big treat. Disney World blew their minds, I think. They had a great time there. And the launch site.

In that particular visit, they were able to reciprocate, and we went to their launch site, as I said, in about April, I suppose, and got to see the cosmonaut quarters down there and the launch complexes and the launch pads and so on, and some of the history that they'd had, that they carried. Tradition, I should call it, I guess, that they carried with respect to their launches. We had some of our launch people along with us at that time. The crews, of course, got to see the vehicle down there. It was quite a nice event. Again we had another chance to visit with everybody in the cosmonaut quarters down there at the launch site. So it was a nice event.

By that time we'd gotten—I passed over this kind of lightly, but we had all these social events, dinners and banquets, and early on, there was a little bit of a flavor of vodka toasting, but after a meeting or two or three, that kind of wore off. It became much more in accordance with our own taste for that sort of stuff, where it wasn't excessive and there was toasting, but there was not a lot of chug-a-lugging vodka. So it got much more manageable, as far as we were concerned, and comfortable. Of course, when they were here, we often had groups of them at our house for dinner.

I haven't talked yet about a flight that they had in the last of '74. They had a test flight, a rehearsal flight, where they sent up a couple of guys, [Anatoliy Vasilyevich] Filipchenko and [Nikolay Nikolayevich] Rukavishnikov. It was called a rehearsal, and they built it that way. It went by the book. The spacecraft did most everything that they could by themselves in terms of rehearsing for what we were going to do on our flight, and it was a success.

However, I think they had a problem with entry. I think what the cosmonauts had done is they had taken some souvenirs, I think. I remember this story, anyway. They'd taken some souvenirs out of the spacecraft, the part that was going to burn up on entry, and they'd put them in the part that was coming back so they could have some souvenirs of the flight. But it affected the center of gravity of the vehicle and affected the way it flew on entry, so the vehicle didn't quite fly the way it was supposed to. It might have been dangerous. I don't know if that's exactly true, but it might have been dangerous.

Anyway, the two guys who flew apparently were in trouble with the powers that be back home, and they were at our house, a bunch of them, after their flight. So this must have been somewhere in the six months leading up to the flight in 1975. There at this big party, and those poor fellows, they were really feeling—they were acting like they had done something that had offended a lot of people and they were on the outs. So they learned to cut their vodka with creme de menthe. [Laughter] They were out there trying to jump in the swimming pool in the winter. It was cold here. And, you know, their buddies would have to surround them and kind of take them away. But it was clear they were suffering the effects of having done something that didn't meet with approval from their higher-ups, and they were probably a little bit on the outs. I never did know how those guys turned out after that. But anyway, we had a lot of those kinds of events.

There was another aspect to this thing. I talked a little bit about the preparation of documents. There's another aspect of this thing that was also very personal, and that is that we had to develop a cadre of interpreters, people who were good at both languages. One problem we would have in America is that many of the people who could speak Russian were former émigrés or the children of émigrés, and some of them had a somewhat hostile attitude towards the regime back in mother country. So finding some people who weren't still bitter towards them was sometimes difficult, but we did find a good cadre.

By the way, a digression again. We lived behind the Catholic church where we went, and Father John was the parish priest up there. One time when the Russians were coming to our house, I invited him to the house to meet with them. He said to me, "Glynn, you know, I'm Lithuanian, and I don't forgive those people for what they did to my home country." A priest. "Enough said, Father." So there are people with hard feelings towards them and so on.

But I was really blessed. Early on, not the first meeting, Bill Krimer [phonetic] was the State Department guy that went with us in October of '70, but soon thereafter a fellow came in to work with us, whose name was Alex Tatischeff, and Alex was probably about seventy at the time or thereabouts, and had had a bumpy life that I'll describe in a minute, but viewed this opportunity late in his life as one of being able to help bring his mother country and his new country together again.

Alex was born around the turn of the century, I suppose, and his father was the ambassador to Germany of the Czar, so he was born in aristocratic circles. The Tatischeff family had apparently been in those circles for some decades or centuries perhaps. But they had been around the court of the Czar and had different places they lived and so on.

Alex left the Soviet Union at the time of the revolution, down through the Crimea some way geographically, and escaped, if that's the right term, because the Bolsheviks were knocking off all the people that were associated with the Czar. Then he had kind of a checkered life for a while. He lived in Paris and made a living playing the piano and singing in the cafes and bistros, and then somehow along the way he came to America and he was working in the agricultural department or something. He got fired when Joe [Joseph Raymond] McCarthy, Senator McCarthy, went on this campaign for Communists in the government. So he got fired.

Then I don't know what he did for a while, but there was a series of things like that that happened and had made him fairly bitter. Then he apparently had done various

interpreting jobs and so on. There are big gaps here that I don't know what he did in time. But by the time he came to us, he did have some bitter aspects about his life in terms of his treatment and so on and so on, and how it didn't work out for him, and the McCarthy firing thing didn't help him either. But he sort of overcame that. He was somewhat bitter when he first came to it, but he kind of put that aside and saw one of his final professional roles in life might be to contribute to this program that would be important to both his mother country and the new country. So it was kind of admirable in that way.

Alex was interesting. We were walking in Leningrad. We were walking through this place that the Soviets had some real fancy name for, the Palace of Good Friendship and whatever. We were walking through, and this guy's explaining all this to me. It's a big ballroom, two-story, three-story room, ballroom. And Alex leans over to me and says, "My sister used to own this place. My sister was married to the man who owned the place."

We had walked down the street in Moscow, and the little babushka ladies, when they saw him, would give him a little nod of the head. It was almost as if they recognized someone from a previous regime and paid him some respect. It was curious to watch, and he wouldn't say anything. There was just something about him, the way he looked. He'd walk down the street and the little old ladies would kind of give a little nod. They didn't do that to any of the rest of us, but they would do that to Alex. You could tell they recognized him as one of theirs.

Alex had a fondness for history. He was very critical of the regime, as he called it, the Communist regime, and all they stood for. But he still was sensitive to what was going on. There would be times when he would take me aside and say, "Glynn, he can't do anything about this, so it doesn't do you any good to push it any further with him," or he would say, "Glynn, he really needs time to check with people before he can give you the answer to that, so give him some room to go do that."

Fatherly advice from a person who was trying to bridge two cultures and knew them both, and had again the objective of the safety and success of the mission as his primary goal, and that was fairly clear to people on both sides. He was very, very helpful. I mean, he knew more about Russian history than the Soviet host that I would be dealing with, and could recount it. It was very interesting to have him by my side, because here I was this little thirty-year-old guy, and Alex a seventy-year-old patrician-looking man, an aristocratic-looking man, big, tall, bluff, built almost like a Western rancher is the best stereotype I can think of in our country.

He was very good at sensing things and being able to pull things back when they got a little too testy or push them a little harder when they should be and so on. He was very helpful to me and to a lot of other people. He was helpful to people on their side, because there were times when he would do them clear favors, no questions asked, and they knew it and they never really made a point of it, but you could tell that the bank account and trust went up a little bit more because we had done something to help them out and got them out of a situation or whatever.

So by the time the project was nearing completion, we had had a considerable opportunity to engage them. It was interesting. We also had opportunity to see what we called the one-night stands. They had these exchanges where ballet companies or whatever would come over, American to Soviets, and they would spend one or two nights doing an event of some kind, and they'd have some vodka, and they would go back. We always laughed about those things because there was no substance to them, you know. A one- or two-night stand or a weekend or whatever, it just didn't have any lasting effect.

We had a chance to work with them over a period of five years, where they really had a chance to come to the United States and to be here long enough not, in official Washington or any other official place, but here in Houston, Texas, or down in Florida, and mostly here, where they got to see a lot of things. Propaganda could not be supported, you know.

People's homes, people's cars, the relative freedoms, the shopping centers, what was available, it just couldn't be denied. They came to appreciate a lot of stuff.

I remember early on they were having a discussion somewhere with some of the leaders and the cosmonauts. Tom Stafford and I were there. They had this image that those of us who were running the space program, for example, had to be the sons of big capitalists. We were the ruling elite or something in our country. And, you know, Tom talked to them about how his parents or grandparents were in the Oklahoma land rush and they all went out there in wagons and got a place to live. I think his parents ran a drugstore or something in town. I talked about how my dad had worked in the coal mines back in Pennsylvania.

It was funny. You could tell that we were continually mismatching what we were and how we lived with what their expectations or what all of their teachings had led them to believe about us. You could see them continually shift ground as one sort of assumption after another would kind of fall apart on them. And to their credit, they were willing to observe and to arrive at their own conclusions about things, and you could tell that inside their own heads they were reevaluating us and our way of life and so on.

Let's see.

BUTLER: We'll pause real quick and change our audiotape.

—talking about how they began to realize the differences between the different cultures.

LUNNEY: Yes, it was.

BUTLER: Was there a major challenge throughout this whole project that—

LUNNEY: I think the biggest challenge was in getting through this narrow opening that was compressed with everybody's preconceived notions of what the other side was about, to get through this narrow opening and make it bigger and make it work. All of us came—all of us, including all the people on our side, all the people on their side, and everybody else around us, came to this thing with certain sort of notions about what it was about and how it was going to be and what they were like, and so on and so on. I think we constantly, much more so in the beginning than at the end, because at the end we were benefiting from having done it, but on the front end we were probably constantly finding ways to seek understanding as opposed to just take positions.

We found ourselves often not being able to understand why they would take a position, and then as we explored it and explored it, it turned out they had a very logical reason of their own for why they were taking a certain position. But it took a while for us to develop the patience to go about that, because it would be easier to just react emotionally to it, a little bit of our prerecorded conversation.

So the biggest challenge was to find a way to open up that little opening and get a broad base of understanding so that we can all build the hardware and build the procedures and build the relationships in such a way that when we actually flew, it would go safely and successfully. From a very narrow opening, I think over the course of five years, almost five years, we built that into a very broad-based understanding with a very large bank account of trust on both sides, where the views could be respected, the motivations were respected, even sometimes making a mistake or getting too carried away with something was allowed for and skipped over, passed over, and the kinds of things that occur in human relationships, that all began to fall into place for us and served us very well.

Even with all that said, they still lived in a system that had a different set of constraints on them than the one I lived in and our team lived in, and that occasionally showed up, but we at least came to understand why it was so and would react less to it and

we found ways to work with it and so on. So that was probably the biggest challenge of the whole thing.

We were operating with space hardware that was relatively known. It was not huge state of the advance, although the docking system was new and some of the radios and so on, the docking module, but all that stuff lent itself to being tested, which we did very much of. We were pretty confident that it was going to work if we could get it all in orbit together. We were always concerned about the launch vehicles. But it did and it worked. So building this opening and building this trust, I think was the biggest challenge that we had, and I'd have to say that it worked pretty well.

As a matter of fact, looking back on it, perhaps we wondered what the "T" was for in "test," Apollo-Soyuz Test Project, and perhaps we wondered what happened to the idea of compatible rendezvous and docking systems for spacecraft, but the cooperation has morphed into, transformed into a fairly large-scale cooperation on the Space Station Program, on the International Space Program, very large-scale cooperation.

I guess I would have to think that at least the foundation for starting that and the foundation for believing that that could be successful was the experience we had in the mid seventies, early seventies, when conditions were, in terms of public positions that the governments were taken, much more hostile and much more adverse than they are today. The Russians today have a different set of problems than the Soviets did, the Soviet Russians did in the seventies, a different set entirely, but, nevertheless, somewhat less adverse in terms of getting together and cooperating.

But I think people would have had a difficult time embracing the level of the cooperation that is inherent in the International Space Station without the experience that we had in Apollo-Soyuz. I don't know that many people have stopped to give that a great deal of thought, but I think that's probably the case. It probably would have been a staggering thing to think about in terms of never having had any experience before.

So the experience we had I think served us all well in terms of this round of cooperation, which, by the way, has its ups and downs and its puts and takes and its negatives and its positives, but it seems to me that to some degree this international cooperation is going to be the way many things are going to be done in space in the future because of the scale and the money involved and so on. Therefore, it's a good thing and we ought to continue, but it does have its own set of problems today that people are struggling with over here at the center and in Russia. But it's a good struggle for them and I think that will all work out pretty well.

So we got through 1974 and a series of events in 1975. We visited the launch site, both launch sites. The Russians went through a pad abort they described to us. We had a flight readiness review, kind of a formal flight readiness review with them, again the green tables and the mineral water and everything. We went through "Are you guys ready? Are we ready?" and so on. This occurred probably about two months or so, six weeks before the flight. Of course, we had our own internal one here. I expect—I don't recall, but I expect we had observers at it from the other side at our review. I can't remember if they did the same on their side. I can't remember that.

Then we got to the flight. By that time, you know, hardware had been prepared, plans had been laid, and things were in pretty good shape. We had spent a fair bit of time discussing the public affairs aspects of the flight. As a matter of fact, it was a series of some difficulty within our own country, because about halfway through the project or thereabout, we got a set of folks participating from Washington headquarters, and they were the fellows in charge of public affairs at the time, and another couple of people.

Relationships between us here in the field at JSC and people here, it was a little bumpy at first. I'm sure to them we looked like we wanted to shut them out and keep them out of it, and to us it looked like they were a little naive in terms of dealing with the Russians and were going to come in with a hard hand and break some things that we didn't want

broken. So there was probably some suspicion of motivations and sort of how things were going to go on both of our parts, and within the United States we had some fairly heated discussions about how that was going to be and what the limits were and constraints and how we would circumscribe these activities so that they wouldn't spill over, so that nothing bad would come out and spill over into the other activities.

But on the other hand, that gradually worked its way out. It did start off, when this group of people started with the Russians, it was fairly testy, and that was what I was concerned about. I didn't want, on the public affairs front, to get people taking unreasonable positions just right off the bat and getting things into confrontation state, because we had progressed to the point where we had got past all that and were making pretty good progress. And we were concerned that that would be the case, and it, frankly, had some of the makings of that as we went along.

But on the other hand, it certainly was very important that we get the right kind of public affair coverage. I think we could have accomplished the same thing with the folks here in Houston, because they are completely competent at doing this, but, nevertheless, we had this additional help that we sorted through. It was probably the only place where Washington headquarters, which is traditionally a place of friction between the field centers who are doing something and the Washington headquarters office, setting policy and defending the budget and so on. I worked in both places. I worked in headquarters a couple of tours, so I had a fair bit of respect for what they have to do up there. But the public affairs was the only place where the Washington headquarters had an active front-line role.

We actually had Chet [Chester M.] Lee primarily as our Washington liaison, I guess I would call it, who represented our positions in Washington and helped us with all that, and also provided guidance that headquarters felt they needed to give us. That worked very amicably. It was very amicable. As a matter of fact, when it came to the PAO dispute, I think Chet was on our side more than he was on headquarters side. But it all worked out.

Maybe it was just being unreasonably concerned, on my part, unreasonably concerned about new players entering this and breaking some things that I didn't want to see broken, but it worked out after a bumpy start. It worked out okay.

I don't have much recollection of specific events during the flight. By that time I had been in flight operations all my life. I knew everybody that did all that stuff. I knew how well they did it, so I didn't have a great deal of concern about that. I kind of sat back and enjoyed the whole flight.

We had a couple of bumpy things happen. I think we had a little trouble stowing the probe or something and getting the hatch right in the docking module, but we got that cleared up the next day before we got the docking with the Soyuz.

Let's see. When we did one of the redockings after that, I think Deke [Donald K. Slayton] docked them a little hard, harder than they were expecting. [Laughter]

BUTLER: Oops.

LUNNEY: But the most serious thing was on entry, our guys had some switches that didn't get in the right configuration during the last portion when the parachutes were coming out, and we ingested some hypergolic propellants into the cockpits, which are very dangerous for people, very toxic, burning lungs and so on. That didn't last very long, thirty seconds' worth, some contaminated air getting in the cockpit. But it was enough to give us concern, and we kept the guys under observation in the hospital, I think, for a week or two before they got back. I think they landed in the Pacific, perhaps Hawaii, and I think we kept them in a hospital there before they got back.

But the flight itself—and by the way, there's a lot of names I didn't mention here. Working with Tom Stafford and the crew was a delight. We were a united front in all respects, at all times with respect to the Soviets. Tom and his team developed a wonderful

relationship especially with Alex [Alexei Arkhipovich] Leonov, and to this day I still see Tom and Alex at different things, and they have a lot of the same routines they did back then for amusing people and telling them about the flight. They're great friends.

In the nineties, I was over to visit the Russians on some of this other stuff that Tom Stafford is doing now, and we all went out to Alexei Leonov's dacha, his house in the country, and had a grand time. It was very pleasant, very comfortable. It was a very family-like feeling. It's not put on or anything. It's very comfortable. [Valeriy Nikolayevich] Kubasov, the same thing. I've been to his apartment back there. A lot of the cosmonauts that didn't fly were helpful. General [Vladimir Aleksandrovich] Shatalov was especially helpful in all this. I had a number of—I guess primarily—I don't know if Dave [David R.] Scott was with me while this was going on. He probably was. He was in the program office working for me for a while, and then Gene [Eugene A.] Cernan was in the program office working with me for a while, mostly looking after kind of crew affairs. We had a lot of people who did very well.

Probably the unsung hero on the American side was Leonard Nicholson. Leonard Nicholson was like my right-hand staff guy, I guess is the way to put it, whatever job description for that. But Leonard was very observant, and Leonard participated in the meetings, but many times when I was conducting them, he had the opportunity to kind of observe as kind of a shotgun rider, observe what was going on and help. But he was very, very good at estimating what we should do, what we shouldn't do, how to do things and so on, and was, I think, the unsung hero of the Apollo-Soyuz. He didn't have much of a title to speak of, but he was very, very effective in helping me push the agenda. I mean, many of the things that I ended up dealing with in terms of a document or paper or whatever, Leonard would have gotten ready to the point where I was ready to deal with it with the Soviets. He and I went on to work together for years and years and years after that, and he eventually was

the Shuttle Program manager for a number of years. But great to me and to the project as a whole.

I talked about the interpreters. The flight crew. We had a backup crew. Al [Alan L.] Bean, Ron [Ronald E.] Evans, and several support crew guys, all of whom were good, [Robert L.] Crippen, [Richard H.] Truly, Bob [Robert F.] Overmeyer. They were all real helpful. Chet Lee was great in Washington.

I remember going to see [Olin] "Tiger" Teague. He was the chairman of the House committee that dealt with the space stuff. Tiger was genuinely concerned about the safety of the thing, of the mission, and he was genuinely concerned about how the Soviets were going to come through. I remember going to his office. It was the only time I'd ever really been to Tiger Teague's office. He took us in the back, took me in the back, and mixed his bourbon and branch water, sat me down, and said, "Now, look, Glynn. This is no horse shit. I really want to know what's going on here, and I really want to understand how you personally feel about this thing."

So we talked for however long, an hour, told him about it. I mean, it's a wonderful example of maybe government in operation. This man, who was extremely well respected, had run the Space Committee for quite a while, he wanted to know how it was because he wanted it to be safe, he wanted it to be right, so he didn't have a hearing on it. He took me in his office, me and a couple of other folks, took me in the office and just asked me questions and asked me to talk about it. When we were done, he was fairly satisfied with it, and he was disposed to be suspicious going into it. He was disposed to be suspicious, I believe, but it came out fine. He was completely supportive of it.

There are hundreds of stories of people who were helpful to the whole thing. All the working group chairmen, I mean, they were great. They had to deal with, as I did, a counterpart on the Soviet side. They had to learn how to walk the line. They had to learn how to entertain.

One thing we learned from the Soviets, they were extremely thoughtful about gifts. Frankly, we were buffoons when it came to that. We did not, at the beginning, pre-plan or anticipate this thing, and it's very important to them and they do it very well, very classy. I mean, they have these suitcases, and out of these suitcases they just seem to emerge a perfectly appropriate gift for a circumstance. You know, book or statue or whatever. You know, we were a little bit cloddish at first, you know. We didn't think of gifts. We were all focused on this job and getting it done and so on. We came to realize that there really was a lot of redeeming value in the way they went about that and the way they made that kind of contact. So we learned how to plan for events and circumstances, even some that might not happen, and bring along some things that would work.

I had very little time here to talk about the interface we had with Rockwell as a company. It was the first chance I had to manage a big spacecraft contract. But they were great. They were very supportive. They joined the working group teams. They participated in a lot of them. George [W.] Jeffs went to Moscow with us on one trip. George Merrick went to Moscow with us on another trip. They even worked at learning the language, George and George did, George Jeffs and George Merrick, two big names, very big names in the Rockwell structure.

And Rockwell, as a company, they were very supportive of all the things we were trying to do in developing the new hardware and doing the best they could to get it done on time. So there were just a lot of people came together.

In another respect, it was a small team. I mean, compared to the Apollo Program or compared to the space shuttle that was engaging most of NASA at the time, we had a fairly well-connected, reasonably-sized group of people involved in this, and we were able to keep everybody fairly intact and informed about what was going on and so on, so that we could get inputs from a lot of different people about upcoming meetings or issues or whatever, and

we did our best to keep everybody on our side informed to the extent they wanted to be. But basically people kind of left us to do the job on NASA American side.

Dr. Gilruth went a number of times. Chris and Dr. Gilruth were on one trip together with us. They had a chance to see what it was like. I give them both credit for, in Dr. Gilruth's case, several case. In Chris' case, he didn't have to go, but he wanted to go and see what we were dealing with, and he did, and helped us. They always supported us. Just a great time all around.

Quite a learning experience for me, a young man, started out at thirty-three, going over there to the Soviet Union. It scared me quite a bit, but, you know, five years later, four and a half years later, I had managed to learn a lot about it. I think I represented our country well. I think I was probably the first American since General [George S.] Patton [Jr.] that had chewed them out. [Laughter] And we had to do that a number of times. But it gradually got better, and as long as we kept it professional and businesslike, it was okay. But it was a great time. It was a great adventure, and here we are twenty years later now.

As a matter of fact, as we speak, our youngest son, that one that used to walk around the woods with Professor Bushuyev, is in Moscow working on the space station stuff in terms of the planning and training for what's going to go on in the area that he's working with over here at the center. So, twenty years later, he's not in the same capacity I was, but, nevertheless, still a space participant.

He has dealt with a number of the Russians on the early flights. He worked on some of the early Shuttle-Mir flights and, as a matter of fact, had a hand in some of the cases where they had to do something special with the control system in terms of isolating it and making the approach. I think it was STS-63 where Brian was one of the people who carried the argument all night that even though we had gone beyond the failure modes that we had postulated, that we could still present a reasonable case to go one more step and pull off this approach, which was done.

I saw the Russian hierarchy later when I was over with Tom Stafford on a visit, and they talked about the decision to go ahead with that. They referred to it as a political decision, kind of jokingly, because it was stretching the rules a little bit. I kind of reminded them that I didn't think it was a political decision; I thought it was a good-judgment decision on their part. They kind of smiled, thought that was a good way to express it.

BUTLER: That's very interesting that you were able to bring it full circle and you had your own very good contribution to make in the Apollo-Soyuz, and now through a family member you are still able to work and he was able to bring that experience and rely on what he had learned at the time, but more so from you as well and make a new program happen.

LUNNEY: So there's a lot of heroes to that story, a lot of heroes to the Apollo-Soyuz story, a lot of heroes. It's hard to just recount them all, but a lot of Americans learned a lot about themselves, a lot about themselves and their values and what they take for granted and so on. We learned to stop and, number one, appreciate that, and, number two, examine it perhaps in some more detail than we otherwise would.

I found in the American press a predisposition to put the Russians down. I found they would always ask me leading questions, like, "Well, Glynn, their technology really isn't as good as ours in (blinkety-blank) area." It was always a leading question so that I could knock the Russians, I guess. But I generally found that I would answer that in a more positive, more constructive way. But I was surprised at how predisposed they were to be negative about the other side and to be willing to—almost to be anxious to find ways to criticize and find fault with them, when, based on our experience with them, that really wasn't warranted.

Yes, they did things differently than us. Yes, it looked different than us. But on the other hand, if you measured things on the basis of their effectiveness at doing them, at getting

done what you set out to do, they work. So they work. So stop finding ways to criticize them. They do a good job within the constraints that they have. And the hardware that they built, the space hardware, works, so you have to respect it. You have to respect the people who do that.

BUTLER: And it obviously did work and it all came together, two totally different technologies and cultures.

LUNNEY: Yes, it worked. Now it's playing out again. It took a while, almost twenty years, but here we are again.

BUTLER: You probably would have never thought it would take quite so long.

LUNNEY: No, we never did. We thought it would be back much faster than that, but life is surprising in many ways, and here we are.

BUTLER: Many ways.

LUNNEY: Here we are.

BUTLER: Thank you very much for joining us today and sharing all this with us.

LUNNEY: Glad to do it. Glad to do it. Thank you.

[End of Interview]