JAMES R. "JIM" NISE

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Interviewers: Michelle Kelly, Paul Rollins

Kelly: Today is February 12, 1998. I'm speaking with Jim Nise, and we're going to discuss some of the information, the background, of Phase One Program of International Space Station.

Thank you, Jim.

Nise: Sure.

Kelly: I'd like to ask, first of all, in your view, when did Phase One begin?

Nise: Well, it took on a new name with the program implementation plan that brought the Russians into the International Space Station, but the actual missions of taking the Shuttle to Mir and having U.S. astronauts on Mir started in the summer of 1992, was when that program was its own evolution just called the Shuttle-Mir Program. The bringing of the Russians into the International Space Station Program, the powers-that-be decided that they could turn the Shuttle-Mir Program into what the Gemini Program was to Apollo, turn that into the Gemini Program for Space Station.

Kelly: Can I ask who those powers-that-be were?

Nise: Well, clearly it's the administrator, Dan Goldin, and George Abbey was certainly a major part of that thrust. Mr. Abbey's purpose was that everybody that had ever been part of Gemini learned so much in that thing and they learned things that they never expected to learn, and yet when the Apollo Program was going on, they worked almost in a vacuum from what was going on in Gemini, even though we were learning the mechanics of orbital mechanics and rendezvous and docking-type ops, those type evolutions. It was like there was a fire wall between the two programs. So he brought that corporate knowledge into the program and didn't want that to happen, in that he understood from the Apollo-Soyuz Program how labor-intensive it is to work with the Russians, at least initially.

So that was a major thrust. Being that there were only two nations with a human space flight capability, the United States and Russia, it stood to reason that we'd have to spend a lot of time with them because they had a very long experience base. To change an experience base takes quite a lot, and that's us changing toward theirs and their changing toward ours. So that was the gist of that, as to how that came in.

But, by and large, you know, the operational Shuttle-Mir Program started on its own with the initial meetings between President [George] Bush and [Boris] Yeltsin in, I believe it was June 1992. The

document's being printed for you right now should give the exact dates that could go in there.

Kelly: Great. What about a meeting between President Bush and Yeltsin really developed into the program itself? What were their objectives?

Nise: The objectives of Bush and Yeltsin meeting was, I think, in the political theater was that with perestroika and the opening up of the Soviet Union and, of course, its ultimate fall into the Commonwealth of Independent States, was that it was time to reopen the agreements that we'd had in the sixties and seventies for cooperative human space flight. We had had some things on the drawing board during the [Ronald] Reagan administration, and we unilaterally canceled the deal, as I understand it. You'd have to find another historian that knows about it, but we originally had on the plan the flight of the Shuttle and docking with the Soyuz vehicle, and then there was also talk of the Shuttle going to one of the Salyut stations.

We pulled that off the table when the Russians invaded Afghanistan in 1979, and we went into the dark ages between each other and the Star Wars funding issues and all that, which ultimately broke the Soviet Union. They couldn't afford to match us, and they were afraid that we would do the things that we said we could do technologically, which was space-based lasers and that type stuff. So it was quite important to break down those fire walls between us and work together, and so it was time. And also we were going to move into the station age, and there are those that still believe in a--I don't think that history will state that it would be hard to imagine going into the International Space Station Program without having had this kind of a program in front of it.

Kelly: May I ask, in your opinion, do you think that the reasons why the U.S. or Yeltsin and Bush actually decided to venture into this area was related to defense and were related to the Cold War itself?

Nise: Well, there was, you know the thawing of attitudes between the sides. I think the Russians finally determined that, with the fall of the Soviet Union and their moving into a Commonwealth of Independent States, it would be quite difficult for them to do the things that they had done in the past, and they were looking for money and they were looking for partners to be able to do things that they couldn't afford. So I think that they saw a little farther down the road a money tree, whereas, since NASA and the government doesn't seem to have a profit motive, we just saw it as a unification of forces in an austere budget time. We saw a savings, and they saw money, okay. And that's what drove us to the table, in my opinion.

Kelly: And from that meeting, what then developed?

Nise: Well, the initial one said that the door was now open to have the people that actually work these type things get together and come up with some kind of a plan, and so about a month later there was the first meeting that Goldin met Koptev, and they sat down to draw up an implementing agreement, which went across a number of areas, liability issues, how do you handle proprietary information, who has the rights to whatever's found out in a research program or the things that we do, a lot of the I's dotting and T's crossing, and yet we really hadn't signed up to do anything. But the Russians were actually quite anal about liability and about what do they do with their proprietary--the term escapes me right now. Intellectual property. Intellectual property is also a very big thing on their side.

So that started, and then the more operational sides got together in the August-September time frame of that year to start laying out who could do what in what time frame, and that was how it took place.

Kelly: Who's primarily been involved in putting together that implementation plan? Was it headquarters NASA or was it JSC [Johnson Space Center]?

Nise: Well, it was headquarters. There were clearly some people that supported those meetings. Headquarters wasn't going to sign the Shuttle up to doing things that it couldn't do, so Tommy Holloway came out of the Shuttle program, who was then Leonard Nickelson's [phonetic] deputy, to work. In fact, just about everybody that worked the program initially was somebody's deputy. It was like a deputy program. All job titles started with "Deputy," so it was quite interesting.

So those teams got together in September and, I'd say, October and November--it was really fast-paced--to try and get something out there. The agreement was for the Russians to launch a U.S. astronaut from Soyuz to Mir, stay for three months; the U.S. to launch a cosmonaut on the Shuttle; and then the U.S. to launch a Shuttle that would dock with Mir and retrieve our astronaut; and that in the research, it would be built around human life science things which were built around the previous exchange of information in science evolutions that we'd had standing all along, even through the dark ages of the Afghan evolution, that kind of human life sciences research program that both sides would sign up to. So that was the initial thing with Arnold Nicogossian who's now the head of Code U, and that was the gist. Did I answer what you asked?

Kelly: Yes. You answer however you like. So then, really, the primary objective was to find out what impact long-duration space stays would have on humans?

Nise: Right. Right. We needed to get back into that if we were going to get into the Space Station world.

You know, we had only 3 short evolutions, 28 days, 48 days, whatever it was, of Skylab, and 84 days, I think, were the ones. Just about anybody that was involved with Skylab was retired, out on the golf course, so they weren't here with the corporate knowledge.

So we needed to get in, figure that out, try and learn from the Russians those things that they would let us learn and then, also, try and convert some of their anecdotal research into something that had a little more scientific rigor to it, more along the lines that we would do. That's one of the problems with the Russian research, is a lot of it's anecdotal. In other words, there's not enough discipline in everything that's done, that there's no control group sometimes. There's N's of one instead of N's of fifty in the way that they--sometimes they would do up-front testing and sometimes they wouldn't, and sometimes they would do post-flight, and sometimes they wouldn't. Sometimes they would do things on orbit, and sometimes they wouldn't, and yet they just kind of used a broad-brush across. I'm not certain that that's not wrong, because there's such human variability across from one body to another that even if you have a 100 data points, build a curve around that that says that's the normal human being will react that way.

Kelly: Was there anyone else left over from the Skylab Program that was able to help out or to give some of their corporate memory?

Nise: That I don't know. George Abbey was clearly here during that time frame, and you'd have to ask him. I can't tell you about John O'Neil [phonetic] and who else was here, whether or not they were making inputs. NASA tends to get in its own stovepipe, and although we talk to each other, we don't necessarily talk business with each other. Then there was a whole faction that didn't want to do anything with the Russians, for whatever reason. So we had that.

Kelly: What events then led up to the actual memorandum of understanding between the two?

Nise: Well, all those went into it, and in here, I believe, there's a document that shows a preliminary draft of it from February, '94, and so the MOU was not signed until probably early '95 or so. I don't think I have a copy of the real MOU. You might have to go to Code I at headquarters for that. And then intergovernmental agreements as well, the intergovernmental agreement for Space Station just got signed last month, I think. It takes a while to get the bureaucrats together, and three or four pages of a document can take forever to be analyzed. It must have to get about three or four pounds of cobwebs on it in somebody's "in" basket before somebody will take action. So, I don't know.

Kelly: As I see it, Johnson Space Center, then, worked very closely with headquarters, from what you're

saying.

Nise: Right. Well, you know, I was a headquarters weenie at that time, so a lot of things have migrated back down here that were up there. There were some choices. Originally the deputy associate administrator who was in charge of the Shuttle-Mir Program was former astronaut Guy Gardner. He had the choice of whether he wanted his office to be down here or up there, and he'd lived here for ten or fifteen years and had enough of here, so he moved up there. So that's where the main office was. Now, the people that worked in the trenches were clearly down here. There's always some tension when--there's always the chance of miscommunication or lack of communication when you're not centrally located, and at that time the program of just being the early Soyuz and two Shuttle flights wasn't that difficult and intricate. When Space Station came along and added the other elements to the game of Shuttle-Mir, making it Phase One, then there was a whole lot more had to get done in a very short amount of time. So it's been interesting watching it evolve as to where the work was done.

Kelly: Can you tell me what some of the pivotal events of the Shuttle-Mir Program were and some highlights and how you may have been primarily involved in those? I know it has a few years of history, at least.

Nise: Right. Well, you know, when you look at just the basics that stand out there that seem to be higher than others, whether or not they have the same value, I can't tell you, but clearly, the flight of a Russian on the Space Shuttle, Sergei [K.] Krikalev on STS-60 in February of '94, was a pretty good thing. Having U.S. astronauts in Russia training, which was Norm [Norman] Thagard and Bonnie Dunbar, over there was clearly something. The launch of Norm was clearly something else. We added [Vladimir G.] Titov to the flight schedule and flew him on STS-63 in February of '95 because things had slid a little bit. Originally they were going to launch earlier in March or the end of February, and we were going to be there in the beginning of May of something like that, and things were starting to slide on our side and their side, so we'd trained Titov to fly as Krikalev's back up, so it was kind of "no harm, no foul."

Then we took that Shuttle up and did a close rendezvous to within thirty-eight feet, I think is the number that's used. So that was actually quite interesting, where we had TV from Mir of the Shuttle up there, coming up. It looked like a big white whale coming up into the field of view of the window where they were sending down the TV. Titov got to talk to his comrades that were on the Mir, and that was the first time our teams had to work together. Boy, you know, we look back at that one, that was really excruciating. We were only going to be in their vicinity for a couple of hours, but the vehicle had

developed a thruster leak so it was kind of spritzing out some fuel--

Kelly: Is this the orbiter?

Nise: The orbiter had. The Russians were worried about that stuff contaminating their external structure, that if we turned it off, then we wouldn't have the redundancy we needed to be that close, and then we could have an inadvertent thruster fire and get the two things together, the stuff could pool in the throat of the thruster and then all of a sudden develop a big ice cube that could be fired at them. All sorts of things that went in there.

Bill Reeves was the flight director who was over at TSUP in Moscow, at their control center, and he had to work all those things out face to face with them, while people on this side are trying to provide the information that says, "Look, this is what it is, and it's really not that bad. It's like saying I just got my car washed and somebody sprinkled it with some water, and now I've got water spots. Okay. It's not that big a deal. Tomorrow it's going to rain anyway, so who cares." But it was quite difficult.

There was all the learning steps that you had to do. We didn't trust each other. They didn't trust us, and we didn't have a vested interest in anything they were doing at the time, so we didn't care one way or the other, we just wanted to go do this. So we had to fight through their distrust to say, "Look, the physics is the physics. The chemicals are the chemicals. We all know what those are. What is the real issue?"

We found also on that, that if you tell the Russians that you need to know, by Time X, their answer, they're not going to tell you two minutes before X, thirty seconds before X. They're going to go right to that time and then give you their answer. They will know maybe hours in advance what their answer's going to be, but you say this is when you need it, and--I mean, it's high theater at times. Everybody, I think, came out of that one very happy that we got through it, but when you sat back the next day or two and looked at what we had to do, "Oh, my God, are we ever going to make it through this evolution?"

But you need to get Bill Reeves' point of view on that, and [Frank] Culbertson will also be able to talk about that, because he was Tommy Holloway's deputy at the time and was over in the TSUP for that evolution. I just saw it here. The majority of the Russians were here and watched it in the MCC from here, you know, [Yuri] Glazkov, Ryumin. All their big-wigs happened to be here on a meeting, and so it was kind of interesting.

Kelly: [unclear].

Nise: Yes. They liked seeing the pictures of their Space Station; we liked seeing the pictures of our Shuttle. So it was an interesting thing. That's the one thing that this program has taught me, that you need to consider the other side's point of view up front or you're going to waste your time. We are culturally significantly different. We're growing closer toward each other, but we're culturally significantly different, and when you have brought something up and they don't necessarily jump at it with glee, you need to go back and reconsider why that is and figure out how to move things along. It makes for an interesting day.

Kelly: That brings me to one of the other questions I had. What are negotiations like with the Russians and how has policy been made? It just seems like such a tough effort.

Nise: Well, you know, I'm not trying to make my job seem more glorious than that may or may not be, but you've hit a very interesting point. Negotiating with the Russians is one of the more difficult things you can choose to do on the face of the Earth. I think, you know, root canal surgery on fifteen teeth at the same time could come close to it.

The good news is that NASA and the people that have worked in a number of these areas has not been its typical self of having people change jobs every year and a half or every twenty minutes or whatever it is. A lot of us have been in the same position for a long time. The Russian culture is more Oriental in this regard in that they put a whole lot more emphasis on the personal side of knowing you and having a long history with you than they do about the particular thing that's going on at that point in time.

In fact, time is not one of their issues, one of the things that they hold necessarily as important. I mean, things happen when they happen. If they don't happen, they're not meant to happen. And, you know, there's always tomorrow and we'll get there. There's a lot of tomorrows. Us, on the other hand, are, "Let's cut to the chase. Let's get to the bottom line. What's all this jack-jawing we're doing here? We're not talking about the real issues. Come on! I've got a plane to catch." "Well, catch your plane."

So, initially they were quite hard, they were quite protracted, and there are some language differences that make it even worse. I mean, they even have seven more letters in their alphabet. We can't even transliterate alphabetically across the board. So that does make things hard. Initially I found a meeting with the Russians with an interpreter to be one of the most laborious evolutions ever, and none of it made sense. The guy changing the staccato of words or syllables at me was saying things that was not necessarily in a syntax that I could understand, and I found that extremely, extremely hard to deal with. I mean, headaches; really, really difficult.

And all of a sudden it got to a point where it's fine, you actually like it. And you find that even though you're not hearing, real time, the words coming out of somebody's mouth, you're getting to see what

they actually feel about it, not knowing. You just look at the reactions. Are they coming across the table at you? Are they laying back? Are they deflecting their eyes or are they looking directly at you? And then you hear the words. And after you've been around them--even though I tried to take Russian language lessons, there's just not enough hours in the day to do that--I know a lot of the verbs. I've heard a lot of the stuff, so I now kind of get an inkling of where things are going, look for the reactions out of them and then listen for the words, and then it's my turn to respond. After I respond, then it goes out on this other strange noise, and I get to think of what my next step is or think of where they're going to come back, what avenue are they going to go down. So it becomes quite interesting.

Now, we're at a disadvantage. A majority of the Russians, at a minimum, read English. Most understand English. A few speak it. It's just like everybody else; you don't want to be seen as not speaking it correctly, so they don't, but they certainly read it and the majority of them understand. So they have an advantage in that regard. But you just move at your own pace at that point.

But they can be very confrontational. They can be extremely direct. Things are said or implied in open meetings where people come in that you've never seen before, and all of a sudden you hear something that was never discussed or anything, and it's with a vehemence and a mean spirit that you just never understood. I mean, early on we got a lot of those when we'd go to an open forum meeting. "Where the hell did that come from?" And it depended on who was the audience on their side as to how they were doing it. They tend to see things as, "Hey, this is business. Business is business. It's not a personal attack on you. This is just the way that things are done." It's one of the ways that they either, (a) show their importance to their own peers or superiors, or they send a message to their folks that things aren't always perfect here, and use that as a wedge. We take personal umbrage a lot when things don't go our way, and they don't.

You've got to get thick-skinned and get above it. It's hard sometimes. It's very hard to not go for the throat when they've done something like that. We tend to have a little more of a concern for others. We don't want to hurt their feelings. They don't care one way or the other about feelings because it's business. Personally is a totally different thing. But we blur that line, and so it becomes very hard. Our biggest problem is we tend to take our culture and our culture's views and the way that we see things and transpose that on top of them, and when they don't do that, it frustrates us and bothers us a lot. They don't do that.

The other way, they look at us with their overlay, and so they become distrustful. We hear a lot of old parables and phrases, and one of their great ones is, "There's no free cheese. The only free cheese is in the mousetrap." So you give them something that they're not expecting, and they become suspicious and, "Where's the trap?" type thing. Because that's not the way that they do things. Everything's a negotiation

with them. Their one great joys in life is to negotiate. It could be about anything. Of course, there's no real entertainment, I think, and that's the only thing that they had to do. So they are very good at that. They play chess; they don't play checkers. More cerebral things. It's not a direct, straight-line path or even just a herringbone path type of a checkerboard; it's three-dimensional. Because they've had a lot of time to do those things and not a lot of assets to do it with. So that's the way that it goes. They're getting better, as we become better at negotiating.

Kelly: I guess their cultural differences, at least to us, is filtered through their philosophy of how to run a space program, too.

Nise: Sure.

Kelly: Can you talk a little bit about that, what their differences are, say, for instance, in operations or technology development?

Nise: One of the biggest things that stands out is, we call it "configuration management," where everything that happens--you know, if you put a dent in the corner of that TV now, if that's the way you're going to sell it and that's the way it's going to be, we've got to go back and change the drawing to put the dent in the TV case, and all those kinds of things. The Russians, on the other hand, have people that will sit in the same seat at the same desk for their entire working life, fifty, sixty years in one area. The secret society that they had was, you don't care about what anybody else is working on around you, and they shouldn't care about what you're working on. The corporate knowledge resides in the person. Corporate knowledge does not necessarily reside in CM documents. He might not even have a document, he will have worked with it so long. He knows where everything is. He made the change. He made the change in 1953; he made another one in '57; made another one in '65; made another one in '78, and knows all the reasons why. It's not anybody else's job to know my job. Anybody that is interested in my job will either, (a), be eliminated or, (b), will be the tip-off to that guy that he's about to be eliminated.

One of the frustrating things that we've had is that an action item will come to somebody. If they're on vacation--they can have deputies and everything else--nobody else will do that guy's job. Nobody will look in his "in" basket. Nobody will do anything. Because they said, "Well, if you do his job, what do we need him for?" And so it's like a railroad-type featherbedding of the unions to have X and Y. Nobody's going to go out of their way to do it. So it's the stovepipe mentality, and it was also the way they broke things up so that very few people saw the entire item or the entire program so that security was maintained that way. A lot of people knew parts, but there wasn't anybody going to pull all those parts together to

make things happen. So that's one of the biggest frustrations.

Configuration management, I'd say, is one of our bigger things. On Mir, they don't know what the configuration of the vehicle is on orbit. They don't know where everything is. They know it's there somewhere, they think it's there, but the crews are at liberty to change things as they see fit. They have, in the past, had a kind of a standing way of doing business. If the crew calls down and says, "What's Part XYZ?" and if the ground doesn't call back up within three days, well, Part XYZ, if they don't know, could be thrown into the Progress that they're going to undock and burn up. It's trash, because "Nobody told me." So there's a lot of those kinds of things out there. So that's one of our big frustrations.

We may not have the neatest Shuttles when we're up on orbit, but we know where everything is. It may look like a real rat's nest of wires and things and stuff moved here, there, and everywhere, but people know. That crew went up with it and they're going to come down with it. Up there it's a relay race. Every six months they change out the runners, and in six months' time, stuff moves and there's no real calldown.

Kelly: In your opinion, could we learn from something like that, or is that something that we find a real problem?

Nise: Well, since I've had a very--by NASA standards--limited time here, just a little over five years, I don't have a problem with that. There are those, though, who have been through every one of the Shuttle missions where everything is choreographed and there's a time line, you know, "Pick your nose," "Look out the window," "Fire a jet," "Play with a Slinky." All these things. "Don't play too long with that Slinky" type evolution. We put TDRS up so that we have almost continuous communications capability. Therefore, since we can, we do, and you know, we overmanage and do this stuff. But with a vehicle that can only stay up nineteen days, you can afford to do that. You can beat the people on the ground. You can get three shifts of people on the ground to do this kind of stuff or, you know, a three-week period. But if you're going to put up something that's up there 365 days a year, can you afford to develop all this stuff on a time line which you know as soon as--like they say with the Shuttle, as soon as the solid rocket boosters light, the time line's out and they're already replanning?

So we have to find some kind of happy medium between anarchy on orbit and rigidity. There has to be something in between there. I think that we learned in these missions--the initial ones, we built a Shuttle time line for everything. And after the third one, we said, "Well, you know, we only have to do the stuff up to rendezvous and then the stuff after undocking, and then all the dock time we can have just as a general plan." And so we've gone to a more template-type thing and have freed up some of the planning that goes into a mission from the outside, from the flight director's side of things, which is more cost-

effective and makes more sense, since the stuff never went the exact way that you'd planned it anyway. I mean, going into the eleventh hour before launch, there's always some hiccup or something else that had to go in there.

So, we're getting smarter. We're trying to be smart about it. It's just hard changing thirty years of a way of doing business to get that way, whether you call it "downsizing" or "rightsizing" or TQM or ISO or any of that kind of stuff. Change is change is change, and people are resistant to change unless it puts a lot of change in their pocket. So, we're getting there. And the crews are getting there. The crews want a little more autonomy on orbit, and I can't blame them, but you also have to make certain that they understand the limits. Some experiments can go in a not-so-structured format. Other things might very well have to go in a structure, and the crew needs to be aware of those things and make certain that you get that. Otherwise, you're going to get screwed-up research.

The Russians, on orbit, are extremely resourceful, and they're all like airplane mechanics, being on orbit up there. The station has a lot of things go wrong. These guys are all good mechanical engineer-type stuff, and you want the guy that's out there working on his Lata on weekends, getting it running and all that kind of stuff on orbit.

Rollins: Shade tree mechanic in space.

Nise: Yes. I mean, Jim Adamson has said that, or somebody. [John] Blaha said that Jim Adamson would have been the perfect astronaut to have been on Mir because he loves to take apart things and put them together. So that's what you've got to look for, and there's a lot to be said for that.

Kelly: I think that brings up another question that's been surrounding the Shuttle-Mir Program itself, and that is, do these changes affect the safety of the crew, and how is risk-mitigation different in this area as opposed to just the American human space program?

Nise: I don't think that the safety of our people has ever been compromised. We have become very used to doing things to--you know, five-nines-type safety margins and double, triple, quadruple redundancy or fail op, failsafe things. The Russians are a little more--I don't want to use the term "cavalier," but a little more likely to move in an area where they're one-fault tolerant or zero-fault tolerant than we are. I think a lot of it is generated around the fact that they've been on orbit for so long, they've seen these things, and their Space Station is different than their Soyuz. They don't treat their Soyuz the same way as they treat their Space Station. They can afford to go to zero-fault-tolerant on the Mir Space Station because they still have a way home and the crew can still be safe.

We, "My God! If that hatch doesn't close, it'll be drafty." I mean, yeah. And why would you be willing to do that? Because it's the only way that they can go do business. It's kind of like if there was a rattlesnake in this room with us, we could all get on top of this table and conduct this interview, and we'd be a little uncomfortable. Or we could get down off the table, kill the rattlesnake, and sit anywhere we want. They tend to not get on the table. They go over, kill the rattlesnake, and move on. It's not necessarily pretty.

It is not unsafe by virtue of the fact that they do have a vehicle that they can return, they can retreat into, and be in there for a day or two to make certain that they understand everything that's going on, reevaluate, and either land or do whatever in-flight maintenance is required. So you could say, though, from our history and the way that we have built our space program and with the things that have befallen us in our space program that we're sensitive to, see them as being a little more of a loose cannon than we are, but I don't believe that anybody's any less safe on their vehicle.

I mean, we've taken all sorts of water samples and all sorts of atmospheric samples of Mir, and we have not found one iota of anything that is outside our SMAK limits--that's a term, S-M-A-K or something--which has to do with the impurities and atmosphere and all that, some kind of a doctor term, a widget term, a known acronym that I can't tell you what it is. Ask somebody that's been here more than five years. I guess they let me see that one next year, I don't know, as to what SMAK stands for.

The crews have not come back with body rashes. Yes, we did have a problem with some ethylene glycol leaks, which is an irritant. It's antifreeze. If you drank it, it would kill you by doing your liver in first and then you're outta here. I'm certain it wasn't pleasant for the people that were around that, but it was not life-threatening and didn't change their health in any way, shape, or form, but it was an irritant for a while. So I'm not going to discount that, but, by and large, we have people that come in contact with stuff on the Shuttle that they probably wish they hadn't been near, with some of the research things and overfilling toilets and stuff like that. So, safety, I don't see a problem. In fact, their launch vehicle has a better safety record than ours for humans.

Kelly: I'm sorry if I moved you away from the subject, but can I go back to what some of the highlights of the Shuttle-Mir Program have been through STS- 71?

Nise: STS- 71 marked the first time we'd flown Russian hardware on a Shuttle. It was an operational evaluation of a piece of hardware that the Russians made. We had contracted for that docking mechanism through Rockwell. It was NASA to Rockwell. Rockwell bought it from Energia. That was quite good.

That was the first time we had--I think there was, what, let's see, seven up and three there--so there were ten people on orbit, the same vehicle, so that's really quite amazing. And we did a crew swap-out. We swapped out the entire Mir crew. The two Russians and Thagard came down, and we put two up there. So we ended up, at that point, having flown four--well, actually six Russians by that point, because the two up and two down was four, and they'd already flown two. So that was a highlight.

We got our hardware integrated into the Spektr module, which launched in, I want to say, April of '95. It was a little later than we'd hoped. We wanted it up there in February. It launched in March, I guess.

Kelly: And what type of hardware was it?

Nise: That was hardware that Norm Thagard was going to use, and it was mostly HLS, human life sciences, hardware, a lot of lockers and stuff we were planning for getting everything else up there along the way. It was supposed to be about a ton, about 1,000 kilograms, but I think we only got about 700 kilograms of stuff through the acceptance process and all that when it was time for it to go. But that was quite amazing. The turnaround of the research world, of getting the hardware ready and having to have it be approved by a totally foreign organization was no small task, and the people that did that out of space and life sciences are to be commended.

Priroda, which we launched in April of '96, the same thing, but clearly we had a year more lead time on that one, and we had more powered things and a lot higher mass of things that went up in Priroda. But those were two highlights. Norm was on orbit for, I think it was about 112 days when he finally came back none the worse for wear, a little thinner. Well, "Wolfie" [Dave Wolf] came back twenty pounds thinner, but, of course, that's from not being in the bars quite as often. I can remember from my days in the Navy when you'd go on cruise and wouldn't have the opportunity to drink, you'd lose weight. I think there's something to be learned here, but I can't seem to figure that out.

We then, on STS-74, carried up the docking module, which was a five-meter-long cylinder with pressurized compartment that had a docking mechanism on each end, plus we carried up two solar arrays, one of which was a U.S.-manufactured solar array, everything but the deployment mechanisms, so that we can evaluate performance of that array, and it's the same arrays--photovoltaic cells that are going to be used on Space Station--so we have an idea how those hold up and what kind of power we get out of them. So that was actually quite an amazing thing, that our hardware got integrated into their evolution.

They managed to deliver that docking module that had two docking mechanisms and another docking mechanism to us in eighteen months from the time that we had the conversation. The original

meeting to talk about how we were going to go do this took place two offices from here, and the engineer that was responsible for that actually took notes on the back of an envelope. I mean, you talk about back-of-the-envelope engineering; it happened. Those guys went to work, and we did not finish the contract for paying for that until June of '94, and it was delivered to the Cape in July of '95. It was quite amazing. It had to meet Shuttle standards for going up in the payload bay and all those kinds of things. I mean, that was quite an amazing feat.

Kelly: Can I ask who worked on that effort?

Nise: For us?

Kelly: Yes.

Nise: Well, Don Noah was the engineer out of Shuttle who worked with Igor Yufremov, who was the senior guy for the manufacture of that. There was another guy, Vasislov Gavrilov, was the senior Russian at the Cape for the processing of that. That was also the first hardware to be processed in a Space Station processing facility at the Cape. They built that whole gigantic new building, and that was the first payload that came in there. So that's another pretty big first. We had forty to sixty-some Russians there at a time for a couple of months for that. Things went well. They worked well with the people down there, people at the Cape. Rich Martucci [phonetic], Richie was the guy that worked out of KSC Payloads that worked on that, and he did a real good job of dealing with the things that had to get done. So that was quite amazing.

Shannon Lucid's 188 days on orbit, I'd say, was a highlight. She maintained a great sense of humor, kind of ran out of things to do, but still, you know, no complaining. [Jerry] Leninger did the first EVA of a U.S. astronaut in Russian spacesuit. [Michael] Foale then did an EVA and Wolf did an EVA. So we had a pretty good cross-colonization. Titov did an EVA in our suit on STS-86, so we had the first U.S.-Russian mixed crew out of the Shuttle, and they had mixed ones with Leninger and Foale and Wolf from Mir.

Kelly: May I ask about some of the people who worked on the EVA teams, to coordinate that?

Nise: Well, the person who has worked the hardest is Richard Fullerton, out of the XA organization. He has been working the EVA aspects with the Russians since we decided to get into this business. He's a very interesting person, not necessarily the easiest person to get words out of, but he works real hard. He's the most dedicated human being I've ever seen in my life, and he has worked to the extent that when the Russians show him an EVA plan, they want to know what he thinks about it, because he has found things--

if somebody caveats something that says, "Well, Richard said," they listen and take that into consideration. That's how good he is.

He has a counterpart by the name of Sagankov [phonetic]--I think it's Oleg Sagankov--who's out of RSC Energia, and I'm certain there's somebody at GCTC, Gagarin Cosmonaut Training Center, but I don't know the name there. But Fullerton has been there when our folks have done their neutral buoyancy training in their big tank at Star City and has been a part of all sorts of things.

The development on STS-71, with seven days before launch, they'd had a problem with the Spektr solar ray that didn't deploy correctly. It went out and kind of stuck like an elbow sticking up. The release point down here didn't happen, and so the crew that we were taking up on 71 was going to have to go out on an EVA to try and release this thing. Our folks generated a tool for cutting the holding mechanism of this thing that started seven days before the flight, and then manufactured it, had the crew look at it, verify that it would work, and we got it stowed, and they went up, and the Russian crew used ours and not the Russian tool that was sent along--we took both of them up--and used it, cut it, and it unfurled, not perfectly, but it unfurled and was a useful solar array at that point.

So, those are all quite amazing highlights. Of course, we had the solid oxygen canister event--quote, "the fire"--and the Progress collision, which depressurized Spektr, turned it into a very empty closet.

Rollins: Those are lowlights, as opposed to highlights.

Nise: Well, you wouldn't necessarily put those as the type of things you would set out to do in a program, but we learned an awful lot about the way that things work and the resourcefulness of the Russians, the way that they managed to take the hatch that they had used to close it, put a centerplate in it to put wire pass-throughs so that they could tap off, take the power from the solar arrays that are on Spektr and get that into the useable volume instead of just having it off the end. We also got to see how our hardware reacted, taking it to vacuum when it wasn't made to go to vacuum. So, I mean, you don't know what you don't know initially.

Kelly: It seems like a real accomplishment because they overcame both of those problems or challenges.

Nise: Right. And additionally, we've gone through some communication problems where it seemed like the Russians went to the press before they told us about things. The Russians are kind of new to talking to the press. Before, they never did, and if they did, the press only wrote what the state allowed the press to write. They initially, on some of these things, were of the opinion, "Hey, it's an open society. We told the press,"

and we're just saying, "Well, the way we do it is we normally tell somebody who's affected before it goes to the press." That way, when the questions come out, everybody says, "Yeah, I know that." And they went, "Oh."

So we had a cultural problem on that, and they use the press differently than we do. Actually, they use the press exactly the way we do; it's just they're up front about it. They don't make leaks. They go directly to the press and tell them A, B, and C, and then it's not like you have somebody go out and be the unnamed source about ABC-type things. So, it's quite interesting.

Kelly: In your mind, who are some of the people that stand out in some of those times, for instance, in the fire, who stand out as someone who really helped out in that situation?

Nise: I think you'd have to talk to Frank Culbertson on that. You know, it's something that I would have liked to have been more involved in, but the way that we're set up, we're not. It was Frank's responsibility, and Frank would have to tell you about that. I sat in on a lot of the things, but I also was not totally aware of everything that went on. I don't know that I could have been. I mean, time doesn't allow--and probably Frank wishes that he had more information. But our people that--I don't know who was on the ground over at the control center in TSUP at the time, would have been--I mean, I know was a great help to everything.

You know, one of the things was that the first communication that they had that problem, I think came down through one of our ground sites. We have Dryden and Wollops ground stations available for communication, and that was the first that anybody knew about it, was through one of those. I know it was that way for the collision of Progress with the fire. I'm not necessarily certain when or whatever, but there's a number of time lines and things out there. I think you'd do better to get it from somebody that actually paid attention to it. I'm aware, but it wasn't in my job to pay total attention to that kind of stuff, so I'll just kind of--

Kelly: I will ask you, however, what some of the involvement of some of the different administrations, say, the [Ronald] Reagan-[George] Bush administration was to the program.

Nise: Good question. Clearly, Reagan and his administration was out there to put the bad Russian bear at the bottom of the deepest pit, and the way that we operated was that way. I mean, that was the canceling, like I said, of the Shuttle-Soyuz, Shuttle-Salyut evolution, which irked the Russians. The Russians, for the first year and a half, brought that up at almost every meeting, "Well, what makes me believe that you're not going to back out of this one like you did that?" So we had that problem.

Then George Bush came in, and he's the one that went over there and said, "Hey, we all need to get

along here. Let's see what we can do," and, you know, "crawl, walk, run" evolution. But all of that was taking place right about the time that he was getting voted out, and the [Bill] Clinton administration came in.

I don't know if you remember, but [Daniel] Goldin was the only one that was asked, of the political appointees from the Bush administration, to stick around, which may or may not have endeared him with the Bush administration, but they were on the out, and we did not have a deputy administrator at the time. So we'd have really been a headless organization. I don't know if you remember, it took the Clinton administration a very long time to get their people in place. I mean, it was eight months or more.

The one thing that the administration did, though, was they let Goldin twist in the wind for the longest while, not talking to him, not giving him a clue of where things should go. So it was quite difficult at that point to understand how this was going to take place.

But the agency--I mean, it was business as usual, make this thing happen, and that's the way that we went forward. NASA had gone to Congress, and you'd have to talk to, maybe, Mary D. Kerwin [phonetic] up at headquarters, who was kind of our Code L or whatever, Code M, worked a lot of those things, and if she's not the one, maybe she'll know who is on that. We'd gone to Congress and told them--I mean, they knew about this Russian thing, Shuttle-Mir Program, and as Space Station was going through redesign and then the increased utilization of Mir in the Phase One program, as it became known, we also decided to fund--I mean, there was contractual obligation that was generated, and Congress approved $400 million to be used in that. It was its own UPN, it's own line item, with Congress.

So that was approved, and they bought into it. I mean, it was just like anything else. Just as many people were for it as were against it, and a couple in between that you never know; it swung both ways. But in the scheme of things, $400 million falls off the table before they finish their first cup of coffee in the morning in Congress, but it set a tone, and there were some things that were coming up, and the Clinton administration kind of decided to take on the Space Station Program, not kill it, and use it and use the dealings with the Russians as part of their international program.

So that came in there, but at that time there were significant negotiations going on between State Department and Department of Defense and the Russians about MTCR, the Missile Technology Control Regime. The Russians, who had just started this--it was like the opposite of the Oklahoma land rush, where everybody was coming in to take the land, it was like everybody bailing out, to try and sell everything to everybody. The Russians had kind of set up a deal to sell liquid cryogenic engines, liquid hydrogen and liquid oxygen, engines to the Indians, and MTCR came down and said, "You don't want to do that. If you do that, we're going to take away your ability to use Proton to launch commercial satellites,"

da-da-da-da. I don't know that you'll find it written anywhere, but, by and large, they said, "Look. Tell you what. We'll give you some money over here to do this human space flight stuff to the tune of $400 million." That was like 360 or 380 was the number that was quoted for that. So the $400 million to some people in Congress looked like payola to the Russians to not transfer the technology. But, okay. So it is. So for a very small price, not the price of a third of a nuclear submarine or a quarter of an aircraft carrier or anything like that, you stop the deployment of a weapon like that, I think that's actually a pretty good deal, for me, John Q. Citizen.

It turned out it was my job to negotiate the $400 million contract, and when I was over in Moscow in October of '93, flew over on NASA 1 with Goldin and, I think, George Abbey and Dee Lee and Arnold Nicogossian and--who was the Center director before George? Carolyn Huntoon and a couple of others, to work out some of these things for not just Space Station--we'd been working all summer on Space Station redesign. Do you remember that, right, Paul?

Rollins: Oh, yeah.

Nise: And the Space station Alpha with the Russians, called Ralpha, at the time. I had the group across the street with all the Russians and their consultative group to make those things happen and get them in there. And then we were trying to get to the point where we had a program implementation plan as to who was going to do what, what the vehicle was going to look like. I think I might have a program implementation plan here.

But we came out of that. Goldin--after we came through this Saturday, Sunday, Monday meetings, we left Friday night; we got there Saturday; he met Saturday night; we met all day Sunday and Monday until four or five o'clock, and then left and got on NASA 1 again and came back and were back about three o'clock in the morning Tuesday morning. I mean, the trips were horrible. The first trip I went on, we left Washington National in NASA 1 at two o'clock in the afternoon Monday and we were back at Washington National Wednesday night at 11:30. So it was not a lot of fun.

This is the document that Dole should remember, because he did a lot of--I don't know if you have a copy of this either, but this was the program implementation plan. Why don't we burn a copy of that for you, because these things tend to get away. I mean, you might be able to find originals and all that out of this for your thing, but I don't know how much you want of this for your--

Kelly: As much as you want to give us.

Nise: Well, this is an open program. We try and give them all away.

But Goldin had the conversation with Koptev about the $400 million, told him, "There's $400 million here," and laid out that we'd also be willing to probably spend another $200 million for FGB. He and Bob Clark--Bob Clark was the other man on this trip--and Shep was on this one as well--he was ecstatic. I mean, Koptev wanted to go do that and all that. But we talked price; nobody talked content. So what got turned around then was, right out of that, we went into negotiations with the Russians on the $400 million contract the week of Thanksgiving and had to come up with a letter contract that had at least $50 million worth of stuff in it till we could get them--we had to come back here, then, and generate an RFP, Request for Proposal, send it to them, send it till it translated, and it was no small document, and then have them respond to it and then negotiate that. It took through June 22nd of '94 to get to that point.

I got stuck with having to do the negotiation on that from the technical side. Lee Evey came in from headquarters to be the head contracting guy, and he actually was the head of the thing because he had the warrant. Contracting officer is always in charge of procurements. We built a team and, you know, it was horrible. This is a picture of the negotiating team, and you might want to copy that picture because I don't think I want to give this guy away.

Kelly: That's not a problem. I don't think you should.

Nise: And I'll see how many extras of these I have.

Kelly: It's a really big team, too.

Nise: Well, that's the Russians and the Americans. Unfortunately, Lee Evey doesn't work for NASA anymore, and the gentleman [Zhulin] who is in these pictures is dead now. He died of brain cancer. This is pretty much--why don't you take those, too. That was the signing of the $400 million contract, which had, nonetheless, some pretty grim moments to it where we didn't talk to each other for two days during the period. We told them to leave. That created a bigger stir with our folks than it did with them. That's Lee Evey and Nicolai Zhulin.

Kelly: [unclear] in front of ASTP [unclear]?

Nise: Right. That is the bunker, Building 265, that was a classified--that's a very skiff-like building. Lisa was in charge of getting all the furniture and phones and everything in there. We worked seven days a week from eight in the morning until midnight for--well, that was well over a month there. I went over to Russia the end of April to go over the RFP with them, go over it line by line and answer their questions, and then the team followed me over there and was there for a week or two, and then they all came back in

early May and were there through the middle of June, through the summer solstice, anyway.

It was an interesting evolution. We didn't get agreement for the Russians to sign it until the night before at headquarters, and some people had flown up that day. Goldin and Koptev had been there, and then they came down and did this, then they went up and did some more stuff. I don't think I'd want to sign up to do that again.

Kelly: Sounds like time is not on your side, necessarily, when it comes to negotiation.

Nise: Right. Well, we were being forced to get this thing done by our side and take the deal that you got, and the deal was a good one, and we kind of got cross-threaded with some of the highest levels of management because we weren't getting the deal done, but they didn't understand. They would not have tolerated the deal that we had at the time. So it's one of those, "If I'm going to get shot, at least I'm going to do the best job I can at this point." It turns out that the bullets that hit you aren't necessarily manufactured by your enemy. But that's common in this type of thing.

Kelly: And as far as the $400 million goes, what was that money, so to speak, appropriated for? What was the contract for?

Nise: The money was for Space Station in Phase One.

Kelly: And what did that entail?

Nise: That entailed up to nine more missions to the Mir Space Station and all of the training and those things on Mir; docking mechanisms for the Shuttle and for the Space Station; modifications to the service module to make it compatible with the rest of the International Space Station segment. Twenty million dollars went to the STAC, which was Arnold Nicogossian's research with the Russians, utilizing Russian scientists, and that was called the STAC, the Science and Technology Advisory Committee, headed by Academician Utkin. That was the 21st of June 1994, it was signed, and on the 24th by Goldin and Koptev.

Let's see here. There was some Mir lifetime extension things, some things to make it more habitable for us while we were there, munitions support, Mir capabilities expansion. That pretty much was putting hardware on Spektr and Priroda. We also had an experiment, solar dynamics experiment, which was a way of generating power, but it fell behind schedule and couldn't fit in, so we killed it. We also did the docking mechanisms. We've since added something in there which had to do with modifying the Soyuz so our taller astronauts and our shorter astronauts could be accommodated, and bought some mock-ups and trainers, Soyuz trainers, for Space Station-type stuff.

Kelly: Did Congress have any involvement as to what went into the contract, or was that basically left up to NASA?

Nise: It was left up to us. I mean, we took a lot of hits on the Hill. Some of the documents that I've generated showed up there. I was in the row supporting Goldin on one hearing, and I saw Sensenbrenner's [phonetic] henchman at the time, who now works for Spacehab out of Virginia. I can't remember his name. He had one of my documents, because I saw my name in the corner, you know, from where I could sit. I normally write my name up in the right-hand corner and that's all these documents up here, but it's one of those. I remember it. I don't remember why they had it, but you know, you take heat all the time. Some people saw it as a loss of jobs. We said, "Well, there isn't anybody else up at the Space Station that we can use right now." They didn't want to hear that. It became a political football, not because it was a real subject; it was just something that they could talk about. And you find that a lot. It's sometimes frustrating, though, to hear the vehemence of Congress around things that you work on. I salute the same flag they do. I've taken the same oath that they've taken, and to have them question your patriotism or whatever, you know--

Kelly: And I suppose it's their job, to look after that.

Nise: I wish that I could get desensitized to the hyperbole that they shine the way I have to the directness and the gruffness of the Russians, but so far I haven't been able to.

Kelly: That's a hard thing to do if you're that dedicated.

Nise: Yes.

Rollins: I have a question. You imply that Russia wanted to shortchange us on that $400 million. So what sorts of things did they want to leave out from what's on that list?

Nise: Well, there were things that were left out. When that RFP went to them, they came back with a price, and I won the pool on this as closest to the estimate. They came back with an estimate of $786 million to do the things that were in there. We wanted, in that contract, to have more--we now have Soyuz back in it. We didn't have anything Soyuz in there. They wanted a whole lot more money than it was worth, and then when we said that we weren't going to pay that much and that we had real doubts about it, they decided to play--they played a really strange card, and Koptev did this to Goldin, where he says, "Hey, I don't know why you want to do *anything* with the Soyuz." I mean, the Russians were trying to get Soyuz

totally out of this contract. He says, "It's an old vehicle. To upgrade it to something that will last a year or two years on orbit, you know, it's too hard. It's got this. It's got that. Why would anybody--" da-da-da-da.

And Goldin finally said, "Fine. Enough. No Soyuz." And so they all laughed with glee that they had won that. Well, what they didn't realize was, when they said no Soyuz, we turned on John Merritt's [phonetic] [unclear] down here with X38 and said, "Fine. We don't care." And when we didn't come back, they said, "Well, when are we going to talk about Soyuz?"

We said, "We're not talking about Soyuz. You killed it."

"What do you mean?" Koptev to Goldin.

Goldin said, "Well, I'm not going to put any of my astronauts in jeopardy," da-da-da-da. And so, I mean, there's one guy in Russia that won't look at me today because of that. The good news is, I don't see him every time I go there, so I don't lose much sleep over it. But it was really kind of bizarre, the way they went about that. They thought that if they got it outside the contract, that we'd come running back anyway, and we didn't.

Kelly: Did the money go directly to the Russian contractors or to the Russian Space Agency?

Nise: It went to the Russian Space Agency. The contract is between NASA and the Russian Space Agency. We had had another contract with Energia through Rockwell for the first docking mechanism. Actually, it was three docking mechanisms. It was a test article, a brass board, and the flight hardware. They wanted to continue that way. In fact, we had a real problem with that one contractor not wanting to do it the way that we were doing it. Even though they were there and in attendance and working the prices of all this stuff, they wanted the contract to be between NASA and Energia, and not NASA and the Russian Space Agency.

So it became a real stumbling block, and it's been revisited every time. I mean, every time we go in there to modify the contract, we have to go back to this one. It's like "Remember the Alamo." It's like they've got to say it every time. And it becomes quite distracting. Well, we let them say it, and we say, "Okay. Can we go on now?" and we do, but they feel like they have to say that.

We thought that the Russian Government would be there longer than any of the space industry, and it was a decision made either by the White House or by the administrator that we had to go through the Russian Space Agency and not directly to any contractors. Although the Russian Space Agency initially was reluctant to get in the way of this extremely powerful company, Energia--it used to be NPO Energia--they did, and it's actually paid dividends now. Now they get along, so it's all worked out. But it was quite difficult.

Kelly: Do you know anybody who worked on the team for the docking mechanism like either Rockwell or Energia?

Nise: Well, one of the guys you need to talk to is Vladimir Syrmiatnikov, who's the professor and Ph.D. designer of the docking mechanism. There are people that work for him, but Sermitnikov was the guy on the docking mechanism.

From our side, Phil Glenn--it was out of engineering directorate here, but Phil Glenn now works for Boeing, and he left. He might have been a part of that. It fell under--what's his name? I can see his face; I just can't hear his name. I'll have to think about the docking mechanism. Otherwise we'll waste all your tape.

Kelly: I guess what we're mainly looking at is not only the topics, but also the people, and I've been asking you throughout some of the people that you think are important. But can I ask you, do you know of any others that you'd like to mention that we should probably talk to and maybe what areas they worked in?

Nise: Well, let's see. If there was going to be somebody that you wanted to talk to about the initial negotiations with the Russians, etc., I'd say Brian O'Conner and Guy Gardner. Guy works at the FAA up in Washington. I don't know where Brian's working these days. I'd suspect he's still up in the Virginia area, up there somewhere. They worked those initial couple of meetings, and then I showed up around late '92, November of '92. They would have some insight on that. You could also talk to Tommy Holloway down here, because he worked some of that initial stuff from the Shuttle point of view and then became the head of a Phase One Program for the first couple of missions, anyway, before he took over Shuttle. So I think he'd probably be a good person to talk to.

Kelly: How about on the Russian side?

Nise: Well, you have Ryumin down here. Ryumin's been a part of things, if you can get on his schedule with him flying now. I don't know how tight his schedule is. But Ryumin is good. Ryumin has changed a lot since the program started. Initially he was one of the more difficult people to get along with. I mean, he could say no before you could even part your lips to say your first word.

Ostroumov would be the other one who's been there all along. Others kind of filled in behind them. You have Alexander Botvinko and Alex Kraznov, but, by and large, it was Ostroumov, Koptev, if you can get in with him, and Goldin. They would have a different view than what it was like down in the trenches. And I think that that's probably good. We tend to have a few more calluses and blisters at this level.

The Russians don't delegate much stuff downhill. All the power resides in one person at the time. Now, they will work stuff down below, but it all gets signed at the very top. So it's kind of difficult in that regard.

But Rumin is one of the upper-tier managers at Energia and has been there since the very beginning and has become a very good ally, actually, in making things happen now. We still disagree, but then, hell, in Space Station we disagree with each other and we disagree with our contractor. I mean, that's kind of common. They have a more--I don't know if it's pragmatic--approach to things as we talk about safety and all that than we do. They remind me of a path-of-least-resistance organization. i mean, they don't do anything flashy. Good is good enough, and with their previous lack of analytical tools and computers and all that stuff, they did a lot of testing and have a lot of margin built into the things that they build. They can't tell you how much margin they have, but they know they've got a lot more than what they're using. So it's very easy to be a little free-form around something that is that robust.

Us, on the other hand, don't build--we build to the finest tolerances, the maximization across the board, and so we get kind of limited once we get to that point. We can't do much more than we have, but we know--at least we think we know. We don't necessarily do the testing we should, I'd say, to failure and those type of things. We test to some analytical model that says, if I get to here, then that tells me I got this. But we don't necessarily test to failure, which would be a whole lot more telling, but could be more costly.

Kelly: That brings another person to mind. Will you tell me a little bit about the relationship and structure with RSA and some of their contractors? It seems like it's different than the NASA structure [unclear].

Nise: Yes. There's only about--I guess now they've got about 250 employees in the Russian Space Agency, and their Russian Space Agency is more like our headquarters. There's no product developed there; I mean no hardware developed there, no nothing. They send out the big-picture plan, and it gets sent out to the other places to be implemented. That's it. Their job is strictly coming up with the program, developing the idea and all that stuff, selling it to the government, getting the budget, and then farming it out. They are not real sticklers for the down and dirty.

Energia, the company, RSA was founded in, I think it was, February '92. So they're just coming up on six years here, right around now. They came in to replace the way that the old Soviet space business was under the Ministry of Machine Building. They have some strange names. It's kind of like "The Organization of Good." Okay. Good what? Good night; good day; good candy; good food. And the Ministry of Machine Building, MOM, as it was known, it was parceled into different areas, and one of

them was rocketry. Another one was nuclear and all that kind of stuff. It was done that way so that they could have open titles in classified areas.

The Ministry of Machine Building, or Machinestrani [phonetic] or whatever the hell is the Russian name for it, got cut significantly or eliminated. So the defense industry was still out there, the rocket industry was still out there, but now there was nobody over top of them. Energia, though, was one of the first of those companies to get a green light to go out and start trying to sell its wares to others. And they went out lobbying, you know, with Buran in the late eighties, early nineties, and selling time on Mir, Soyuz rides, and all that.

Kelly: I understand they're also doing [unclear] theme shows.

Nise: Oh, yes. Well, they're there. You know, they've had Pepsi on orbit and Israeli milk, and the only reason we don't see the Pepsi ad is because they changed the color of the can. A new manager came in at the head of Pepsi marketing and didn't like the blue can. Shannon Lucid said it was the neatest thing she'd ever seen. But be that as it may. Yes, they're quite innovative. NASA and the U.S. Government doesn't have any idea how to make money, and if it got money, what it would do with it. I mean, even the idea of paying off the national debt, you know. Geez. Might try that. You'll see at the control center at the bottom, Hewlett-Packard and a couple of other companies have advertising space there so that when the camera shows it, there's that. Pretty innovative. Not much imagination, but it's certainly not bad either.

So, Energia was allowed to go out and sell their wares. Well, then RSA got stood up, and Energia was supposed to fall under it. Well, they didn't like that idea. So those two were at loggerheads for three or four years. They finally figured out RSA wasn't going away and the only way they were going to get paid was to kiss and make nice to RSA, so now they've fallen under that. RSA has about forty or fifty institutes or organizations that fall under them, and they just picked up--Krunichov now comes under--Krunishev, until recently, didn't. The name "Krunishev" had to do with a manufacturing facility. They were collocated with the design bureau, K.B. Salyut, and in part of the drawdown and getting things together in the new capitalistic Russia, Salyut was made a part of Krunishev. So they're now one and the same, except anybody that works for Salyut still considers themselves a Salyut person. You know, it's kind of like whether you're for the Dodgers or the Yankees. You can move to the Bronx, but your team will always be the Dodgers. So that's the way that works.

So, RSA works the top-level stuff, works the budget issues, and funds those guys. Now, they also oversee the commercial businesses, have some kind of oversight of these organizations that are out there selling things. Energia supposedly sold stock in its company to go private, but the government still owns

51 percent of it. I don't know where any of that stands. So a lot of those kinds of things are still out there. The government didn't forgive everything to allow these places to go private. So that's pretty much the way they are.

It's a real Byzantine way of doing business. The wiring diagram that the Russians give out has the Russian Space Agency in the middle and, you know, it's really kind of hard to see how all that works. I don't know that it's meant to work, but it's the way it is.

Rollins: So many organizations involved, that it shows everybody's logo?

Nise: Yes. It's got the President of Russia, the Government of Russia, the Russian Space Agency. I mean, I've never been able to figure that one out, so I don't lose much sleep over it. But they're in there somewhere, and now you have a President and the government, and I couldn't figure out what the difference of the government was and those other type things.

Kelly: [Unclear].

Nise: Oh, yes. But in the land of 100 percent employment, you know, where they were in the old days, you could build those kinds of empires.

Kelly: How have you seen that it's changed over the years, since you first started there?

Nise: Well, the first time I didn't have enough time to see anything, because it was such a hectic trip. The second time I went there, I woke up at about seven, eight o'clock in the morning, and I was overwhelmed with an eerie sensation, and I didn't know what it was. So I got up and I looked out the window, and I did not see one person or one car or anything moving on the streets. Now, it was a nice day, and I was expecting to see some movement. The hallmark of the earlier times was you didn't start to see anything until nine o'clock in the morning. People in those days didn't get to work until ten o'clock in the morning. They might leave at five, four or five. I mean, the work ethic seemed, to me, to be quite lacking. And, I mean, it was just eerily silent.

Now it is one of the most bustling places ever. There are cars on the road around the clock. Its construction of new buildings is booming, and they really cleaned the place up nicely for the 850th anniversary of Moscow. It was quite impressive. It's one of the more vibrant cities I've been in. I mean, it's really alive and it's really doing things. It's not as gray. It's got lights. It has advertising. It has potholes. It's got real brown, slushy stuff. I don't know what chemical--it seems like it's more than salt that they put on their highways to melt the stuff. I mean, it's colder than can be, and the stuff is still kind of

wet. Crossing the street kind of gets interesting. But they've really come a long way, and the people are dressing better. They all have cars.

Rollins: Are they smiling any?

Nise: Not on the street. When they go from Point A to Point B, it's the typical--

Rollins: Yes. That's what I've always heard about the people there.

Nise: If you're smiling, walking by yourself, they think there's something wrong with you. I mean, people just don't normally smile, and they're not normally looking up. They have their heads down, you know, kind of walking with a worried stride. It's interesting.

What else?

Kelly: What do you think we've learned in our cooperative effort with the Russians, as far as Shuttle-Mir, as far as policy goes?

Nise: Well, I think we've learned that--I mean, we knew that they had a space program. We've learned that they have a space program now and that there are other ways of doing things and that we're not always the most efficient at doing things. I think we've learned that we're a whole lot more similar than we are dissimilar, and I think it's helped us to refocus the way that we're going to go about and do business, because we've been made to think about it and we've been made to have to fit somebody else's way of doing business. To do that and to change them requires some change in thought on our side. So I think it's been real good in that regard.

I think it's kept a lot of the stuff out of the yo-yos' hands the Iraqis, the Iranis, the Indians, and all that. I think it's helped be another focus, and I think that it's provided a very good selling point for human space flight missions to the American public. You know, Congress is going to be Congress, and I don't know that you could give them something good that they would recognize unless it happened in their district. I mean, they have a very parochial view on things. It gets whitewashed as a White House initiative or a Republican initiative or a Democrat initiative or something that's taking jobs off the table and all that. We can never change that, but I think it's been quite good, and it has given us a chance to get people up to speed on what's going to be required for the Space Station.

I'd say that the first few years are going to be quite hectic, and it's not going to be easy, and we're going to be thankful that there are people that say, "I've seen these people. I did something like this." That's going to be quite helpful.

Kelly: It's probably easier the second time around.

Nise: One would hope. One would hope that we're not all Aggies about this, you know, where the second time's harder than the first time. "Did I learn anything? No. I learned that the second time is harder." [Laughter]

Kelly: Do you have any specific examples of areas that we've learned with respect to Space Station? For instance, did we learn a lot from crew training? What did we learn? Did we learn operational integration aspects?

Nise: Well, crew training is still a real issue between the two. On our side, we have one organization that does it. We may have contractors that support us, but they all fall under one umbrella and one organization, and that happens to be here at JSC [Johnson Space Center]. The Russians, on the other hand, have a more fractured group, and they've got the Gagarin Cosmonaut Training Center, which has crew training responsibilities, but they have RSC Energia, which has a training department and generates the training plans that the GCTC folks are supposed to go through.

With their budgetary problems and all that, there's been a lot of jockeying back and forth and a lot of maneuvering done to make one's own side look better that the other side, to force money to flow, yadda, yadda, that kind of thing. So that's kind of been detrimental to what's going on with the Space Station training.

For the training that our crews went through in the Shuttle-Mir Program, we saw the way that they do business, and you can say it works. We've seen their folks on orbit. Their training is much more general in nature, not specific. They have a very general way of doing things. It's more important to know how to replace a fan or a pump or something than it is to necessarily know the fluid physics of an experiment that you're supposed to do. You do the experiment, take the picture, okay. I don't know that I'd have to be a fluid physicist to be able to do that.

So we've learned that a good basis of general training can be helpful, because when you look at long-duration missions, three months, four months, six months, from the time that you had the training on a specific task to the time that you do it is going to be several months removed. The Shuttle is not that way. It might be a month and a half max, but you have people looking over your shoulder constantly telling you stuff. On a Space Station you're going to have a lot more time on your hands and the ability to go through it, so you need to have a generalist view on the equipment and the procedures and all that stuff, and have some kind of way of training yourself on orbit, via some systems like COSS, we developed the crew. I

don't know what the acronym stands for--C-O-S-S (Crew On Orbit System Support)--but it's a bunch of CD ROMS that go up with the crew member, and it normally has--not all the time--a lot of the research hardware and things. It's a way of refreshing and getting people back up to speed. I think that you're going to have to have those type things. I think it's the only thing that makes sense.

We're still trying to deal with the aspects of a Space Station with a Shuttle mission mentality, and so it's slowly breaking down with the realization, "It's different." So this has been helpful in that regard. But, like I say, with Gemini and Apollo, the Apollo types didn't care. Nobody in Gemini knows my problem better than me, and I'm not going to do it your way. We'll get through that. So it's helped be a cross-pollinator and build an experience base. That's its biggest thing.

We have people on both sides now talking the same thing. They know each other. They have the ability to talk to each other and get to the point in a short time instead of the ways that it was early on where the first day and a half was still spent on pleasantries and going back on [unclear] and all those kinds of things. I never got that one. There is a great pride in things that they did, and rightly so. They certainly didn't get paid for it. You can't take their pride away from them.

Anything else out there?

Kelly: Paul, do you have any questions?

Rollins: Why didn't they ever launch their Shuttle, their orbiter?

Nise: Well, they did once.

Rollins: But it was unmanned.

Nise: It's too expensive to get an ESCLSS system and a power system and all that stuff, put one up with batteries.

Rollins: And they figured they'd never really need it?

Nise: No. They wanted to do it. They ran out of money. It was the fact that the Reagan administration made them spend all their money and they found out they were bankrupt. They couldn't afford buying any more paper to print money, I mean, and that's the reason why. They found out what we found out: the Shuttle is a very expensive thing to operate. So they still use their fifties' technology boosters and their sixties' technology capsules and work very fine, thank you. They build things in about a ten-year lot. I mean, you get economy of scale when you only change things every ten years. Wait the first five years to

see the things that have gone wrong and use the next five years to design out those problems, make the improvements, and make a ten-year run out of it.

Rollins: Why did they build it in the first place? Just to keep up with the Americans, do you think?

Nise: Like they put in [Unclear]? Yes. Well, they had to have them. See, they were afraid of what it could carry up. You know, space-based lasers and all that kind of stuff. That was the real fear. But they also don't have a vehicle to bring anything back from space. I mean, they could take tons and tons and tons of stuff up there, but they can bring back grams and grams and grams.

Kelly: Most of the data from the research [unclear] Mir.

Nise: Right. So in that regard, this is the first time they've ever gotten anything back that's reusable. We've been carrying back a lot of their avionic stuff from vehicles that they burn up and all that. That's been quite a good savings for them.

Kelly: We were in mission control during the last mission when they were actually closing the hatches, and it was prior to the undocking, and they were asking if they could take one of the flight engineers, one of the Russian flight engineers' backpack with them on the Shuttle so they could return it to him.

Nise: Yes. I was a little disturbed at the late notice on that, because they knew full well about that, and having that thing coming at the eleventh hour, it means that they're trying to force something down that shouldn't come down, is my reading on it. And if it happened open-mike to the rest of the world, we'd seem like the big ogres if we turned that down.

Kelly: Right. And everyone would say, "[Unclear]."

Nise: Well, there were procedures, and everybody knew about it, and it should have never come.

Rollins: So they pulled a fast one on us?

Nise: Well, it's like having a three-year-old look at you with those doe eyes and then look at the ice cream cone. Life doesn't change much.

Kelly: How has it affected the relationships with the other agencies, like ESA, the European Space Agency or NASDA, the Japanese Space Agency?

Nise: Well, in my opinion, it's allowed a lot of them to reclam some things that happened to them early on in the ISS program of Freedom. That's not necessarily to our advantage, but international things have a lot of posturing and a lot of arm-waving and stuff. Clearly ESA and NASDA and all that stuff have had their budget problems, too, and are having a difficult time keeping their programs sold. I don't think up front they wanted to have the Russians in there. I think now they realize that it's probably a better deal in that there's two different organizations that can carry their stuff up and they can strike the best barter deal or money deal to make things happen to their advantage. So I think that the bottom line is, it will be good for them, but I don't think you'll hear them say that. It's just not politically expedient.

Kelly: It seems as if they're sending up cosmonauts, [unclear] cosmonauts as well. Are they learning some of the same experiences that we are for when they'll be sending people up in Station?

Nise: Yes. Well, I think that they have a real good idea that things are going to be a lot--in dealing with the Russians the way they were for the things that they did on Mir. I mean, leopards don't change their spots. And they're a lot closer to Russia than they are the United States, and so it makes sense for them to have some kind of closer relationship than they've had in the past. I think it's been good, and I think it's good, not for the internationals, but overall for the program because it's helped keep the Russians going with the funding that they've got. So I don't see any of the other internationals coming up with any human-rated vehicles in the time to come. So we're still going to be the only game in town.

Kelly: Too costly for them.

Nise: It's extremely costly to try and build the kind of infrastructure and expert base that you need to be able to go do that. It's a risky business. You have to have the right tools in place to go do it.

Kelly: I have one more question.

Nise: Okay.

Kelly: Will you talk to us again when you have the time?

Nise: Sure.

Kelly: Just because at this point we'd like to gather all the information we can, but I'd also like to get your own more personal views and some of your own involvement, more than just what we've talked about at a later date, if that works for you.

Nise: Sure. The funniest thing was, on my first trip to Moscow, we all stayed at the Radisson Hotel, and we landed about eleven o'clock in the morning and got to the hotel--no, we landed earlier than that. We got to the hotel about 11:30. We had a two-o'clock-in-the-afternoon meeting. I went to the meeting. We were in the meeting with the Russians until about five or six, went back to the hotel, decided to meet in the bar. There's a big lobby. I don't know if you've ever been--have you been to Russia? Well, this hotel has a lot bigger lobby than the one that we stay in now, the Penta, and it had a little kind of a square bar in the corner of a larger area and one area with tables where you could order lunch and stuff like that. Just down the hallways from there were three restaurants that were all part of the hotel. In fact, I think they even had a movie theater in this area as well.

So we're sitting there, and there's eight or ten of us, a guy from the White House, a guy from State Department, Abbey, and me, and a couple of others, and then had a couple of pops and then decided--oh, Dave Modley [phonetic] and Martin Forcash [phonetic]--and we decided to go to dinner. So we just walked out of there and went down and looked into each one of the restaurants to see what they had, and then circled back and went in one. We had just been seated and had just ordered, and I think they had like a salad bar or something, and a couple of people were up at the salad bar, and with that this maitre d' walks up and says, "There's a phone call for you."

I said, "What?"

"There's a phone call for you." I mean, I've never seen this guy before in my life. I've never been there.

Rollins: And how many people know you're there?

Nise: Evidently he knew, because he says, "Yeah, it's either for you or for Mr. Abbey."

I went, "What?" So I walk over to the phone and say, "Hello." It was Arnold Nicagosian calling, but they knew who we were.

Kelly: And individually, too.

Nise: Individually.

Kelly: That's scary.

Nise: We'd seen people that were spending an inordinate amount of time looking at us while we were drinking, and, you know, this was early on in the program, so you kind of felt safe. I mean, you do. When they have that much interest in you, they're not going to let something happen to you, because they don't

know what you're up to if something happens to you before that. And that was the only time I've seen anything like that, but it's an eye-opener as to what can happen when you--you know, the first time you ever go to Moscow, the first time you're going to eat dinner, and somebody walks up to you and says there's a phone call. It's like, "Who the hell even knows I'm here?" Because everybody that would have cared that I was there, was there. So, I mean, those things happen.

But we have the program, the people have been really lucky. We have had extremely minor things, most of them brought on by people's own stupidity. I mean, you just don't walk around or move around a big city late at night by yourself, especially after you've been drinking. Even if you haven't been drinking, if you go into one of those places, I mean, it's a magnet for those kinds of things. Knock on wood. It's not that bad.

Rollins: What's your favorite beer?

Nise: Budweiser.

Rollins: That's an inside joke.

Kelly: He always wants to ask everyone.

Nise: Yes, it is. Okay.

[End of interview]