

NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT

ORAL HISTORY TRANSCRIPT

BRYAN D. O'CONNOR
INTERVIEWED BY SANDRA JOHNSON
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JOHNSON: Today is September 18th, 2006. This oral history with Bryan O'Connor is being conducted for the Johnson Space Center Oral History Project at NASA Headquarters in Washington, D.C. It is a continuation of his first two interviews on March 17th, 2004, and April 20th, 2006. Sandra Johnson is the interviewer, assisted by Rebecca Wright.

When we stopped the last time, you had just returned from the STS-40 flight, where you were the Commander, and you said you finished your forty-five days that were required and had made the decision to go back and have your Marine career come to an end as the last tour at Patuxent River [Naval Air Test Center, Maryland] as a Marine Aviation Detachment Commanding Officer.

O'CONNOR: Right.

JOHNSON: So if you'd like to start there and talk a little bit about those ten months, and then how you ended up coming back to NASA after that.

O'CONNOR: Sure. Well, I went back to Patuxent River and felt like I fit right in there, because even though it had been a while since I'd been stationed there, they hadn't changed all that much. The airplanes they were flying had changed some. There were a lot more systems than what I had been involved in in the late seventies. It seemed like there was a lot more attention

paid to testing systems, electronic systems, computer systems, weapons systems, and so on, than testing the flying qualities and performance of airplanes, which is what seemed to be more of the emphasis when I had been a younger test pilot there. But other than that, pretty much the same organization, the same people, a little bit older, some of them; but I saw a lot of people that I remembered. Of course, a lot of the civilian engineers and managers were there who had been there before, many promoted to higher levels; but I felt like I fit right in.

When I was assigned the job of Marine Aviation Detachment, I figured that I would do that job, but that I would also like to go and see if I could do some flying with some of the other organizations, like the Test Pilot School and Strike Test Directorate, which is where I had been assigned in my previous engagement there. When I checked in the [Deputy Commander] for the Naval Air Test Center told me that if I was interested, they could also use me, wearing a second hat, as part of the staff of the Test Center itself.

So I had all these things in mind, and before you knew it, I was involved in about four or five different jobs, including the director of the Naval Air Test Center Museum. They had a bunch of old airplanes that really belonged to the Smithsonian [Institute], but they're loaned back to the Test Center. They're all airplanes that had actually flown there at the Test Center. So the museum needed some leadership, and they had a little board of directors there and so on.

I ended up doing that, getting involved on the staff as a part-time flight instructor at the Test Pilot School, being one of the Harrier test pilots at the Strike Test Directorate, which was a lot of fun. It involved sending me back down to Cherry Point, North Carolina, for several weeks of getting checked out on the new AV-8B Harrier airplane, which I'd never flown. I flew the earlier versions of it, but not the new one with all the systems in it, advanced systems, so I

learned a little bit about that, and then found myself flying every once in a while [at Strike], in addition to the management jobs that I had, both with the Marines and the Test Center.

So I got real busy very quickly, and I thought that was great, because I'd been so busy with NASA that it just didn't occur to me to go and just do that one job and be comfortable only with that. After all, the job of running the Marine Aviation Detachment was mostly carried out by the staff NCOs [non-commissioned officers], anyway, and I had a good Executive Officer there. They really didn't need me to do anything, so I found myself very engaged in a variety of things all around the Test Center.

So by the time about ten months came up, the time had gone very fast. I had planned to do my three years there and retire from the Marines, but I got a call from George [W. S.] Abbey suggesting that I consider coming to work at NASA Headquarters, and that if I needed to retire from the Marine Corps—which I would have to do, because this was not a detailee job; it would have to be a civil service job—that they felt like that would be an easy thing for NASA to help. They would just call the Secretary of the Navy's office and see if they could get a waiver for me to retire without the normal six months' notice, and then switch [me] over to the civil service.

So I thought about that for a little bit, but they were anxious to get me over [to NASA Headquarters] right away, because they wanted to know—they didn't want me to think about it for months—so that if it didn't look like it was something I wanted to do, they could find somebody else. I'm not sure all the reasons why they might have been interested in me, other than I was relatively local. The job they had lined up was the deputy for the new Space Operations [Office of Space Flight], or what we called Code M, Associate Administrator, Jed [Jeremiah W.] Pearson [III].

Jed Pearson was a retired Marine Major General who was a good friend of Mike [Michael I.] Mott, and at that time Mike Mott and George Abbey were up in the front office. I guess Mike had flown with Jed Pearson and knew him and thought that Jed would be a great leader for Code M, but [Jed] didn't know anything about NASA. In particular, he had never been assigned there. So they needed somebody who had been with NASA to be his deputy, and that's why, I guess, they thought of me.

So that made me think about do I really want to keep doing this flight test business at Patuxent River and finish out my career, or do I want to go back to NASA and get into a civil service job, and so I had a little bit of a dilemma there about what I really wanted to do.

But up until that time I was very happy at Patuxent River. I thought it was a great job. They had reorganized while I was there, from the old organization that they'd had for many years to a brand-new one that the Navy was going to, and so I got to be part of that transition. But, by and large, the reason I liked it is because of the flying and the people. I really enjoyed flying with the test pilot students and being part of that staff, and [I] especially enjoyed flying the [advanced] Harrier. The flying that they allowed me to do wasn't high-risk or really interesting test flying as much as it was just being able to be part of the test team.

I was really not there to take really good, interesting test flights away from the younger test pilots, and so I didn't go and try to talk them into any of that stuff, because I remember how I felt when I was a young test pilot about old guys coming in and taking away some of the best test flying. Having remembered that feeling that I'd been through, I didn't want to put them through that. I thought, "[For] those [young] guys, this is their chance to do that stuff, and I'll just come in and get some of the boring test flying, because it's [still] better than the desk job." And it did allow me to see what they were doing and get involved with it.

JOHNSON: You moved on to Headquarters after that, and what exactly were your duties in that position, as you understood them?

O'CONNOR: When I first came to NASA Headquarters—by the way, to close the loop on the decision process, when I came over here—well, I was in the old building—but over here to NASA Headquarters, my sponsor was Darlene [A.] Druyun, who, of course, has been in the papers lately with Boeing and Air Force things and all that. But she was the—I want to say Chief of Staff, but she probably had a different title. But she was in the front office, and she personally took my case and helped me to understand the human resources part of the application process and helped me to develop the position description and the characteristics of what my job would be about.

It was mostly going to be the technical and operations side, as opposed to the infrastructure or the resources side, which were ably carried out by a couple of other Deputy Associate Administrators. Mike [Michael B.] Mann [and Richard J. Wisniewski], for example. The idea was that, because I knew Johnson Space Center [Houston, Texas] and I knew Space Shuttle pretty well, that I could help Jed Pearson with his oversight of those programs. Tom [Thomas E.] Utsman was actually the Program Director for Space Shuttle, and at that time Space Station was not in Code M. That was in a different code; it was Code D, I think, under Arnie [Arnold D.] Aldrich.

So we were primarily dealing with Space Shuttle, and I worked very closely with Tom Utsman and with the other folks in Code M, learning how things work in Headquarters and

dealing with OMB [Office of Management and Budget] and the staffers and some of the things that we worry about in Washington, the budgeting process and so on.

I really felt like I was not needed all that much, because these other very senior SESs [Senior Executive Service] were covering all the bases, but I began to realize that there's always room for another person who's been down in the Centers and comes up to Washington, to deal with the other duties as assigned that come down from the top floor. So I came in thinking, "Okay, I'm a Deputy Associate Administrator. I'm going to be working for Jed Pearson, and I will try to make him succeed." It wasn't long before I realized that my real job up here was to take on these committees and assessments and reviews that they ask Code M to sponsor.

Dan [Daniel S.] Goldin was the Administrator at the time, and he and George Abbey were always together. I think George was still—Goldin had only been here a short time, and George was kind of stuck to him like, "Okay, I'm going to show you what NASA is all about, make sure you understand who all the players are, go with you when you do your Center visits, and so on. And this guy O'Connor down there in Code M is going to be one of the guys we call on to go and do studies and assessments for us." So even though I was assigned to Code M, I felt [like] I really worked for George.

Like I say, it wasn't long before Abbey and Goldin called me up and said, "We want you to go do a special assessment of the Shuttle Upgrades Program." So that was one of the very first tasks I got, and it was a pretty good-sized task to size up and prioritize and give him advice on the relative merits of the different big, major upgrades that were all on different levels of funding and priorities in the program.

Shortly after that there was another one on workforce and how to reduce the size of the Space Shuttle Program, try to get it down to where it had fewer people. Again, I worked with

some other people on things we could do to improve the efficiencies of the Shuttle Program, mostly their operations, and get the cost down a little bit. So I got involved with that.

JOHNSON: What were they looking at as far as the longevity of the Space Shuttle at that point? Were the upgrades something to keep it running twenty, thirty more years, or was it something that they had planned to phase it out at some point? What type of upgrades were you looking at?

O'CONNOR: Well, at that time, and I've got to make sure I don't confuse a later study I did with the NRC [National Research Council] on the same subject, because that particular question, how long is it going to last, was a big question mark later on when the NRC looked at this. But at this first time when I was looking at upgrades, we seemed to think at that time that the Shuttle was going to go for quite a while. I don't know that we had an end date on it. But we didn't seem to be concerned about getting involved in a long-term upgrade and getting our money's worth out of it. That kind of question wasn't big.

The main thing there was we're going to spend a lot of money on these upgrades. Let's make sure we get the most bang for the buck on risk alleviation. They knew that I had been a proponent for quantitative risk management tools and techniques, and when I was looking at these Shuttle upgrades, I looked at the quantitative risk work that had been done in the Shuttle Program since the [STS 51-L, Space Shuttle] *Challenger* accident to see if we could use some of that work to help us prioritize these upgrades. If, for example, we did a lot of work on the main engines to improve them, would the risk to the crew and the Shuttle justify the money that would be involved, because that turbo pump improvement program for the main engines was very expensive. In the end it cost over a billion and a half dollars. Looking ahead, we knew that it

would be expensive; we didn't think it would be that expensive, but we knew it would be expensive.

So I wound up working with a lot of risk people and prioritizing the upgrades based on what I thought was a good risk story. That kind of went against what some of the priorities had been. I really got the impression that some of the priorities had been based on spreading the upgrades around, making sure that different elements had a fair piece of the pie. Even if we would be spending money on things that didn't take care of a lot of risk, at least you'd be keeping the workforce busy and spreading some of the money out among the Centers.

So that part of the story, I think, made a lot of sense to Goldin, and he suggested that Code M use more of that thinking; as a result of my study, that they use more of that risk-based thinking than what they had done before, even if it meant cutting some of the funding to some of the elements. I'm sure that made some of the folks angry.

There were a bunch of external tank things, for example. This is ironic, because of the [STS 107, Space Shuttle] *Columbia* story, but we thought at that time the external tank was not as risky an element as some of the others, and that we needed to not do too much to the tank and do a little more for some of the other things, like main engines and solid rockets. Of course, at that time the solid rocket motors had been through their redesign because of the *Challenger* accident, and they also had a big congressionally mandated independent solid rocket program called ASRM, the Advanced Solid Rocket Motor.

There was an argument that said, "Why do we need that, now that we've demonstrated how well the Reusable Solid Rocket Motor [RSRM] is working and how well that thing is redesigned, and we've got a bunch of flights under our belt now," because this was 1992, so we'd been back flying for [four] years on the new redesign. The question was why do we want

to keep spending hundreds of millions of dollars on the ASRM, and I think that was one of the questions that came out of my study was do we really want to do that, or can we challenge that now and say, "Let's declare victory with the RSRM and stop funding the ASRM." I don't remember if I actually had a recommendation on that, but it was one of the questions we did ask.

JOHNSON: In late summer of '92 you became a leader of a negotiating team that traveled to Moscow [Russia] to establish that beginning framework for Shuttle-Mir [Phase 1, International Space Station]. How did that assignment come about, and when you first got that assignment, how did you prepare for working with the Russians in that capacity? Did you go back and look at any of the lessons learned from the ASTP [Apollo-Soyuz Test Project] Program?

O'CONNOR: Yes. Well, again, this was another call from the top floor. "Can you guys spring O'Connor loose? We need a team to go and work with the Shuttle Program and the Russians on this idea of a joint U.S.-Russian program with the Shuttle and the Mir [Space Station]." So that was my introduction to our External Affairs people, our International Relations people here at Headquarters, which I really hadn't worked with before. Of course, I got to meet the Russians and went over there about five or six times on our way to what became the [Vice President Al] Gore- [Russian Prime Minister Viktor] Chernomyrdin Agreement, which included a lot of things, but [especially what became known as] the Shuttle-Mir Cooperative Program.

When I first got this assignment, I was a little intimidated by it, because I didn't have much experience with international partners or negotiating high-level agreements with other countries and that sort of thing. So I was all ears for people who had been through it before. There was a fellow named Sam [Samuel W.] Keller, who was on the ninth floor [in a special]

staff advisory job [for] the Administrator. He had been Dick [Richard H.] Truly's primary guy on this business of working with the Russians [early on], so I spent a lot of time with Sam Keller, talking about the history.

Another couple of people who were in Washington Headquarters at the time who had spent some time with the Russians were Arnauld [E.] Nicogossian on the Life Science side, who had a long history working with his counterparts at an outfit called IBMP over there in Russia, the Institute of Biomedical Problems. He and [Dr.] Carolyn [L.] Huntoon, [at that time the JSC Center Director,] had spent years working with their Russian counterparts, so I talked to Arnauld and Carolyn. Now, Carolyn at the time was in Houston, but I got some advice from her on working with the Russians.

Then another fellow I already mentioned was Arnie Aldrich. Arnie had worked with the Russians on the potential for some joint-use technology. He was very interested in the Soyuz as a potential escape vehicle for our own Space Station someday, and also the docking system that they had come up with during the [Russian Buran Shuttle program]. There was some talk about something like that for the future of our own Space Station. So Arnie, being the Space Station Associate Administrator, saw joint Russian work as part of the future, and I spent a lot of time with him to find out what he had learned over there, who the people were that he talked to, where they were going on it, and so on.

But then there was one other fellow that I really wanted to talk to, and that was [Glynn S. Lunney]. Glynn had done something similar back in the beginnings of ASTP, working with the Russians, negotiating with them on how we would do ASTP. So I give him a call, and met with him a couple of times and just sat and talked to him about what it's like working with them, how do they operate, where do they come from generically when you're getting involved in

something like this, and trying to get a feel for what to expect when I went over and had my first meetings with them. He was a great source of information.

We didn't talk about technical matters so much as just style and—because a lot of the people over there in Russia running their space program were the very same ones that ran it when he was there. They don't have a big turnover in Russia, like we do. He was able to give me some good insight into these people and who were the important folks over there and how they would probably work with us.

So those are the folks that I tried to get as much information from as I could before I took my team [to Russia] for our first meetings with them.

JOHNSON: If you will, talk about those first meetings and that first trip and some of your impressions of working with the Russians and some of the issues that you had to deal with in those negotiations.

O'CONNOR: Yes. When we first started, we had a concept that said we fly a couple of cosmonauts on the Shuttle [and an astronaut on Mir], in [addition] they help us and we help them to develop a Shuttle-Mir docking system based on something that had been done in the past with ASTP. We understood [from recent Aldrich visits] that they had actually created a piece of hardware called the APAS [Androgynous Peripheral Attachment System]. But this system they actually built and tested for their own Buran Space Shuttle to dock with their own Mir. If we could take that kind of a system, modify it to fit onto our own Space Shuttle and airlock system, maybe we can go up and dock with their Space Station. So that was the idea.

When I went over there on my first meeting, I met with Dan Goldin near the end of the meetings, but I was over there for about a week before he came over. We had some interesting discussions with the Russians. It was a real eye-opener for me, in spite of all this preparation that I had had with all these folks that I had told you about.

When I went over there, the Russians were going through quite a transition of their own. In the Apollo-Soyuz days, there was no [commercial] space program. It was all a part of the government. Now they had a new outfit called NPO Energia, which was a semiprivate company which had spun out of their pure government operation, although it was the same people. They were also beginning the first days of their own Russian Space Agency. So they had sort of an equivalent to our Boeing, which was NPO Energia, and they had their equivalent to NASA, which was Russian Space Agency.

I went over there thinking that I should probably be talking to the Russian Space Agency people, but the NPO Energia folks really felt like they were running things—“This new government outfit, the Russian Space Agency, is just a bureaucratic afterthought. If you want to do anything in Russia, you have to talk to us”—and that they wanted us to have [direct] contracts with them. That [was their starting point].

The Director General of the NPO Energia was a fellow named Yuri Semenov, and he was the fellow that we met with in some of our early meetings. He made this big pitch about what he thought was the right way for us to operate with them, and that they were going to build a Mir-2 Space Station, and that the Mir-1, which was up there right now, would be the first step, Shuttle and Mir-1, and then someday Mir-2. He knew that we had our own Space Station on the drawing boards, but that Mir-2 would compete with that, and that it would be better, and maybe we ought to join Space Station programs, too.

Well, that was way beyond what I was thinking. I'm thinking real near-term, what do we want to do in the near term with Shuttle and Mir. It was kind of tough to get them to get off of the long-term discussion and onto the near-term. There was a lot of bravado in these briefings by Semenov and his staff about how they're the ones that know all about Space Stations; that we had done very little in that area back in the Skylab days. They really picked it up and took it from there, and they had an awful lot of experience operationally with it and that we should really defer to them on all Space Station [matters].

I can't really remember at the time if their Buran was still an active program or whether it had been canceled yet. I think it was still active back in '92, yes. They were talking about how the Buran would fit in and that both the Buran and the Space Shuttle would be compatible with the Mir.

Even though I had prepared myself for these meetings, it was still a little intimidating to me to hear all this and hear these guys talking about how this was really going to be something that they were experts on, and that the whole business of the Space Shuttle was kind of a minor topic for them. It was a major topic for me, and minor to them. So that was my first impressions was that I was a little out of synch with them; maybe not the same priorities as they had.

The only other thing that I really remember distinctly was how, when I first met with their engineers and toured some of their facilities over there, I just had trouble relating to a lot of it, because it didn't seem like there were very many people working, and although the insides of their facilities were really clean and seemed to be well organized and modern-looking and so on, the outside of their facilities looked horrible. There were weeds growing up in the streets, infrastructure crumbling, rust everywhere, and the difference between outside and inside was just amazing.

My background, of course, had been at the Johnson Space Center, where everything outside and inside looked nice, and you felt like you were in a modern place when you were walking out on the grounds. Didn't have that feeling at all over in Russia. It just looked like it was falling apart.

The hardware, they showed me the Progress and the Soyuz boosters and the Soyuz capsules and the mockup. The engineering mockup of the Mir really looked terrific, so it was a little bit of a disconnect. I felt like I had [a little bit of] infrastructure vertigo over there. I couldn't figure out how they could do that.

JOHNSON: It was an interesting time politically for Russia at that point, and I think things had changed somewhat in Moscow. Some of the other people we've talked to said that it was different than what they expected, too, because things were more rundown and a little more dangerous.

O'CONNOR: They were real short of money. They were struggling to try to become capitalists. They didn't have all the tools and the experience of being capitalists, like marketing to other countries and so on. They kind of felt like, "Our space program is top-notch. We're the only ones doing long-term science in space," with Mir, although our scientists didn't think it was very good science. They thought we were doing some pretty good science, even in the Shuttle and the Spacelab. But over there they thought they were the ones that had really developed and had a long-term program. But they were having trouble marketing themselves to Europe and Japan and to us, just because they hadn't learned how to market. They thought if the Director General

stands up in front of these foreigners and pounds his chest about how good they are, why, everybody will come with money.

So we had agreed with them on a certain amount of funding exchange and then a certain amount of cooperative work, where each of us brings capabilities to the table, and they didn't want anything to do with that. They just wanted us to buy stuff from them. This business of cooperating really threw them off. They hated that. They wanted us to treat them like contractors and pay them big money to do things for us. They didn't know how to cost it, because they'd never done that before, either, so it was really a little bit comical, I think, by today's standards.

Of course, they're well along now, but back then when they were first beginning to become capitalists, these techniques that they had caused our own contractors that we brought with us, because at the time we were bringing some [North American] Rockwell [Corporation] people and so on, to chuckle on the sidelines about, "They sure don't act like our own contractors back home. If we're going to treat them like contractors, we need to get with them and teach them how to do it a little bit better." Not how to make hardware—they were good at that—but just how to act like a contractor, how to defer to your customer rather than beat your chest and brag to them. That doesn't work.

And how to cost things so that people understand it; they didn't know how to cost their [products and services]. When you think about the costs to them, and at that time I think I remember somebody saying that one of their engineers makes the equivalent of \$75 a month—for a Russian engineer, a really good one, too. So you can buy an awful lot of stuff from the Russians for a small amount of money. They knew that, but they weren't too sure how to price themselves.

I remember in my first sit-down with Dan Goldin when he came over there [with Brian D. Dailey from the White House]. They were in the back of a limousine, and I jumped in, and he says, “Okay, we’re going to go meet with the big shots. What are your impressions? You’ve been here for a week. Tell us what you think.”

I told him my first impression was that, “This is an unsafe activity over here. Everything’s falling apart. I’m not sure how their hardware is going to fare, because I haven’t had a chance to really look at that too closely.” Of course, I did that later. But just my first impression was their infrastructure was crumbling and they weren’t able to pay their people. They had a lot of folks who hadn’t been paid in months, and I was worried about operating with a partner like this.

When Brian Dailey heard that, he chewed me out and complained that, “Well, what do you expect when you get one of the crew members [over here]; they’re [obviously] going to worry about safety. But, we have to make this work, and it’s going to be okay.” So that was his cut on it. I didn’t really know who Dailey was. I didn’t know how high up in the administration he was and so on, and I guess I must have contradicted him, because he really took offense at what I said.

But anyway, Dan Goldin heard me, and I think he probably had some of the—this was his first visit over there, and he must have had some of the first impressions the same as mine. But we both learned, all of us learned over time, that there’s a lot more to the Russian space program than what first meets the eye. On my second and third and fourth visits I began feeling more and more comfortable with what I saw, the people I talked to, the engineers. I still didn’t think too much of the managers and the leaders. They had an approach to things that was so foreign to me that I never really did get used to that. And there was an awful lot of drinking and

different social/technical side of the story that was different from what I was used to over here, also, that working with those people was little more difficult for me.

But when we got down and talked to the engineers and the guys in [Operations] and their own flight crew, the cosmonauts, I couldn't tell much difference between them and us. We didn't even speak each other's language, and yet you could get us and them standing around a drawing or a schedule, and within a short period of time we were right in synch with one another.

The Russian interpreters, [by the way,] were terrible. We ended up deferring to our own, which we brought with us. They were much more technical people, and we paid them very well. The Russians paid their interpreters very poorly, and so you got what you paid for. All the good interpreters over there in Russia came to work for us, because we paid them so much better.

But anyway, whether it was one of theirs or one of our interpreters, we found that there was much less need for them when you're talking technical matters and engineering things and programmatic things. But when you got up to the higher, policy-level stuff, words meant a lot, and we needed to have good interpreters, and we always used ours. And same with the translators, the people that put these things down on paper, we [always] used ours. Now, they actually deferred to our translators and interpreters, also, because they could see the difference. I remember talking to one of their interpreters. This was a young [grade] school teacher who taught English but really wasn't technical at all, but that's all they could afford, I guess.

But my confidence in the project and how it would go and our ability to carry it out improved over time, and so that first look, in retrospect, turned out to be much more negative and bleak than it needed to be, just out of ignorance.

JOHNSON: One of the things that you were charged with is a memorandum of understanding as far as the astronaut exchange, and your counterpart was [Valery Victorovitch] Ryumin. How was that relationship, working with him and coming to that agreement?

O'CONNOR: Yes. Valery Ryumin was an interesting guy. He was a great big guy; had a lot of time in space; had flown three times, twice back to back, to their Space Station [Salyut 6]. So he had a lot of experience in operations, and yet he was kind of a blowhard in some ways. He really looked down on some of us who came from the Shuttle world, because he counted your manhood, so to speak, by how many days you'd spent on orbit.

A couple of flights in the Shuttle was my [space operations] background, and he just said, "Well, how many days [on orbit] was that?"

I said, "Well, that's sixteen days."

He kind of thought [imitates noise], "You're a ne'er-do-well here." He had more than a year of on-orbit time, and so he felt like he could speak with authority on space matters. And yet over time I think he and I, once we got used to each other, got along pretty well. By the time I finished up my job and handed it off to Tommy [Thomas W.] Holloway, who had been my deputy for that period of time, Ryumin and I were getting along fine.

But, he came over to the United States for a visit, and we couldn't get his attention. The whole thing to him was a vacation, and he really didn't seem like he was interested in anything we were doing over here. So I sensed from him an attitude of, "We don't really care much about you guys and what you do over there. It doesn't measure up to our stuff at all." And, of course, we're proud of some of the stuff we had done [at NASA]. We were glad to show it off to him and all that, but to him it was like, "This is nothing compared to what we've achieved."

That attitude of his was kind of a rough barrier to get over, but after a while, like I say, after about five or six visits over there with him, and him coming over here once or twice, I got to where I understood how he operated and realized that he, like myself, had certain limits to what we could negotiate.

Even though we were each [team] leads—him for his company, a fellow named Boris [D.] Ostroumov, Russian Space Agency, and myself [representing NASA]; it was the three of us who worked together—I found that [although] Boris Ostroumov was [the] Russian Space Agency [spokesman,] he was totally deferring to Ryumin and Semenov at NPO Energia. Although his boss, Yuri Kopchev, was the Director of the Russian Space Agency and therefore Goldin's equivalent, the only way to get anything done was to really work closely with NPO Energia, the company. Sort of the opposite of the way we operated over here. Ostroumov was a nice guy, but he deferred totally, didn't make any decisions, and even though my boss asked me to go through him on everything, he was just a bent pipe straight to Semenov and Ryumin.

I say he was a nice guy. I remember there was one time when we were having one of these very common, after-the-signing ceremony of some protocol or agreement or whatever, and we had one of those every time we went over there, they would have this big sort of like a banquet. Not a lot of food, just finger food and so on, but an awful lot of vodka and [brandy] toasts.

At one point Ostroumov was telling me that his father used to speak very highly of Americans. When he was growing up as a kid, it wasn't common for kids to hear good things about Americans, because when they'd go to school, the Communist school system over there was bad-mouthing us all the time.

[After school, young Boris] would go home, and his father would say, “Don’t worry about what they’re telling you in school. I know [different] from my experience in the big world war. I met some Americans at the Rhine [River].” He was one of the cadre of Russian troops that met the Americans there, just like in the movie, *Patton*, when the Americans and the Russians get together at the end of the war, he was in that group and made some friends with some Americans and had a [warm] kinship with them that stuck with him his whole life.

So when Ostroumov told me this, he did it with some irony, that here he had to grow up in a system that contradicted what his father told him. And now with the walls falling down and the Russians able to talk now freely about their programs and working with the Americans again, he thought it was wonderful that his father, who I guess had died by then, was right that these Americans are good guys, and you’ll like them, and the schools were wrong all along. [Laughter] Isn’t that something?

JOHNSON: It’s amazing. Since you originally had some of those concerns about the safety of the astronauts that would possibly be on the Mir, and then seeing it—as you said you learned that the hardware was more safe than you originally thought. As far as the program itself, did you feel like this was a step forward and it was something that we needed to do at that point? Or was it something that didn’t really need to be done, but it was done for other reasons, maybe political reasons? Or was it going to benefit the space program here?

O’CONNOR: Well, I thought that it was—one of the things we learned from the Apollo Program was how well we in America did when we were competing with the Russians, and that now we were talking more about working with them and cooperating with them together, and that there

were an awful lot of things we were going to have to do to work with them, organize who does what, who's in charge, sharing things that we could, and this business of cooperation, to me, didn't sound nearly as fun as competing would have been.

I didn't come up with that myself; I had heard that with people when we were talking about the Apollo-Soyuz Program and all that, that some of the folks felt like the Russians learned a lot from us in Apollo-Soyuz. We learned some from them; they learned some from us. But in the end it didn't last long, with the exception of the scientists. The medical people did stick together, even after the Apollo-Soyuz thing. Where the engineers and the managers went their separate ways after Apollo-Soyuz, the medical people [continued professional] working [relationships] together beyond that.

Some of the managers and operations and engineering kind of people felt that it really hadn't been worth it, doing this Apollo-Soyuz thing. It was more trouble than it was worth. So I had that bias in the back of my mind when we started working with them again on Shuttle-Mir.

Now, we had people, including guys like George Abbey, for example, who thought that we could really get a lot out of the Russians, working with them on our own future space program; that if we all sat down and said, "Where are we all headed?" we would all agree, we and the Russians, that we're going to Mars together someday. That's where we're headed. So this stuff of Shuttle-Mir and maybe working together on our Space Station efforts was really stepping-stones to the ultimate goal, which is to go hand-in-hand to Mars. And that's what I ended up realizing as we worked together.

We used to laugh that back here [in Washington] we weren't allowed [by Congress] to talk much about Mars. We'd kind of gotten beat up about, "Mars is too expensive. It's too hard. We're not going to do it. Quit talking about it. I don't want to see Mars stuff in your budgets."

This is from our own stakeholders here in the Mall area. But it's okay to work with the Russians; just don't talk about going to Mars.

So when we went [to Russia], the Russians had made a little placard that said, "To Mars Together." They gave us that thing, and we said, "Do we have to hide this [from customs] when we get back to the States?" We had our own private joke over [this] with them, and as time went on I realized that that's really what we all want to do someday, and Space Stations are just one of the stops along the way.

JOHNSON: How did you feel in February of '94 when Sergei [K.] Krikalev flew on the Shuttle for the first time?

O'CONNOR: Oh, I thought it was a great step forward, because he and [Vladimir G.] Titov were going to be the two guys we flew on the Space Shuttle, and when we first sat with them and talked to them about it, they were giving us a little bit of a ribbing about, "I'm not sure we want to fly on your Space Shuttle, because it's not a safe vehicle." They knew that we had gone over there and expressed some concerns about safety with their program, out of just ignorance, basically, and not being able to translate their definitions of safe and reliable operations into how we did it. Our conclusion was therefore maybe it's not safe. Well, it's [really safe, but] different.

For example, the Russians never would have thought of having a manned [launch vehicle] that didn't have an escape system, and here's this Space Shuttle with no escape system. Probably one of the primary reasons why we didn't recover anybody from the *Challenger* accident was there was no escape system. They would also never consider putting a destruct

system on a manned program, and here we are flying over the ocean with a destruct system on a manned program. They couldn't figure that one out. They fly over land—not very populated, but land—and they don't put a destruct system on their manned systems.

So they were giving us a rough time about that, although not too much, because they really were interested in flying on the Shuttle, but it was their way of ribbing us. We had taken our own safety and quality and reliability folks and some of our engineers over there, and we couldn't see [similar processes] to how we do our analysis, [and] there was no equivalent to our [system] safety organization over there. They had something different. And because we couldn't connect those dots very well, it meant we were going to have to get ourselves comfortable with how they operated and make sure there's some sort of equivalence. That took time.

At the same time the Russians were getting more and more comfortable with our own Space Shuttle Program. So by the time Krikalev actually flew, I saw that as the fitting end to this major translation that had to go on in order for us to cooperate with one another, and understanding each other; although not operating [exactly] the same [way] or doing engineering or risk assessment the same, at least understanding their system well enough to where it gave us confidence that they were running a good, safe, reliable program.

JOHNSON: Were they ever concerned about the Shuttle actually docking with their Space Station?

O'CONNOR: Yes. They were concerned about manual docking, for example. They had always [used an] automatic [docking] system. But then again, their dockings were pretty hard. When

they docked the Soyuz or the Progress to the Mir, or now, even to our own Space Station up there, they come in at a fairly high closure rate to hit the docking system and get a good capture.

The system that we wanted was something closer to our own Apollo vintage docking capabilities, where you fly [the final approach and docking] manually and you come in real slow, and your rate at impact is very low, and then the system captures for you when you hit all the parameters properly. That difference in philosophy was something that bothered them and bothered us.

They used to talk about, “You guys do these manual dockings, and back in Apollo-Soyuz you hit us with a real jolt, off-center and fairly high rate and so on. We remember that, and we’re worried you might break the Mir if you do something like that with Shuttle.” What they were recalling was [when] [Thomas P.] Stafford had made the original [very smooth] docking, and then they pulled back and “Deke” [Donald K.] Slayton did one that hit at a little bit of an offset, and he kind of jolted their system a little bit. Didn’t break anything, but boy, they would never forget that, and they reminded us of that later on when we talked about doing manual work.

In retrospect, it’s all kind of silly, because we come in so slow even if it is offset a little bit, it’s not going to hurt anything. I’m sure they’ve gotten very much used to it now. Of course, they probably had their fingers crossed on the first Shuttle docking. [James D.] Wetherbee [flew] the first one.

JOHNSON: Yes, STS-71.

O'CONNOR: Yes, later on, and they probably had their fingers crossed again just their history was different and they didn't really trust this as much as they do now. I think overall the Shuttle-Mir Program went pretty well. I think I stayed—I was in Headquarters for the first four or so of those missions, three or four of them. So it was kind of fun, even though I was in a different job later on. I wasn't working with the Russians there. I was doing Shuttle things by the time I finished my tour here. But it was a feeling of accomplishment to think that I got a chance to go over there and talk [to] these guys about [what] we do and how [we can do it] and all that, and here we're [actually] doing it. It was fun to watch it come through its cycle.

There was one time when we were about ready to finish up the agreement on Shuttle-Mir, and it was going to be two Russians flying on the Shuttle and four visits by the Shuttle to the Mir. We had drawn up all the package. We had all the negotiating points, the whole thing was in a notebook that Lynn [F. H.] Cline, by the way, was very much involved with, and we had our whole story together. I think Lynn was actually on this flight with me. We were flying over to Russia, and Dan Goldin and George Abbey were in the NASA airplane. I believe it was Lynn, and maybe John [D.] Schumacher.

But anyway, we had carefully talked about this with the Russians by telecon [teleconference] [about] what we were going to sign up to, and all the details [had] all [been] worked out [before the actual trip]. [Then, halfway across the Atlantic] Dan Goldin calls me up to the front of the airplane and says, "Let's change this [deal]. Let's fly [ten] flights to the Mir."

Now, of course, the Russians felt like we were paying them some amount—some \$400 million for this whole program—and there was no way in the world, without more money, that they were going to allow us to do any more than that. And that's what he wanted me to now go over there and re-negotiate with them, after all this work. "Oh, by the way, Valery, we're ready

to sign, but just before we sign, I want to add [six] more flights to the Mir on there.” [Laughs]
No more money, you know.

That was one of the interesting challenges that I had. Working with the Russians was a challenge enough, but working with my own boss was a huge challenge.

JOHNSON: Is that something he just came up with on the fly?

O'CONNOR: It sounded to me like he and George were up there eating Goldfish [crackers] and having a Coke and just figuring out how they could tweak things. “This is too easy. Let’s see if we can make this hard.” Sometimes I thought those guys were in that mode. “Let’s see if we can make this hard. It’s too easy. Easy is not fun. NASA is about doing hard stuff, so let’s see if we can make it hard.”

That’s what I was thinking as I walked back down the aisle and sat next to Lynn and said, “Well, guess what. You know that part about the four flights? Now it’s [ten].”

JOHNSON: How did the Russians take that when you got there? Did you have to start the negotiations all over again, or how did that process work?

O'CONNOR: Oh yes, and they were very upset. I came into the room, and I said, “We’ve got a change here.” The other aspect of this was there was some amount of time on the Space Station of our own astronaut. I think it was going to be one visit by one of our astronauts was the way it started off, and then that gradually wound up two years, lots of different people. So we squeezed

an awful lot into that \$400 million, and the Russians were not happy about these [no cost] increases in scope.

But as we figured out over time what things really cost them, I think as we got more insight into that, realized that they're getting a good deal here. We ought to be able to get a lot more out of that 400 million. I got to be the point man, and, of course, George would be sitting in the [back of the] room while I'm sitting down there with Ryumin explaining to him how we want more for our money, and George is just up there snickering and laughing and glad that it's O'Connor having to take the wrath of Ryumin and Semenov. But, that was my introduction to negotiating for the U.S. government.

JOHNSON: That's quite an introduction. Well, you mentioned it was a very successful program. Some of the things that happened, of course, is on the flyby mission on STS-63 we had the first female pilot flying a Shuttle, and then, of course, the first docking, and later Shannon [W.] Lucid being the first female to spend time on a Space Station for the United States. Each one of those were milestones for our program. Do you know how, or did you ever have any feeling how the Russians were going to accept those types of things coming from our side, as far as the female resident on Mir, and were there ever any concerns during your negotiations about whether they were all going to be male astronauts or female?

O'CONNOR: No. Those guys bragged about how all this discussion of the women that we had at NASA and the space program and the Shuttle Program and Shannon and—of course, Sally [K.] Ride was gone by then, but Kathy [Kathryn D.] Sullivan and some of these other people that we had in the Shuttle Program, they really downplayed all that. They [said], "We [are] the ones that

introduced women into the space program with [Valentina V.] Tereshkova. That's nothing new." In fact, at some point there they had another woman come into the [cosmonaut] office.

There was a long gap in there, though, where they didn't have women in the Russian space program, and some of our people, I think, put them on the spot, saying, "Well, you guys did that just as a bragging point, but you didn't really mean it. You really weren't integrating your program like we've done." So then they brought somebody else in. It's as if they were trying to be first or trying to show us that we weren't setting new standards here, that they were more inclusive than we were.

But underneath it, and you can talk to Shannon about this if you haven't already, but I think some of our folks felt like they were doing it more as a bragging point rather than really a change in their culture; that they really still had quite a bit of a—they were behind us by some years when it comes to socially and culturally accepting women in their space program as equals.

It was really hard for me to figure out all this stuff, because you'd go over there, and you'd see they had a whole lot of medical doctors that are women, and yet nobody in their astronaut corps. So it seemed like they were way advanced over us in some areas and way behind us in others. Sometimes when you'd talk to their men about this topic, [they sounded] pretty chauvinistic, the way they would joke about things and so on. They would say things that we had not heard anywhere in this country in business, social kind of gatherings for twenty years or so; very, very politically incorrect kind of jokes, compared to where we felt like we were. So there was a big dichotomy, and it was hard for me to figure out who was further along, them or us.

JOHNSON: Well, before we leave Shuttle-Mir, is there anything else that we haven't talked about as far as that program and your part that you played in that?

O'CONNOR: Well, there were some funny things that happened.

JOHNSON: Do you want to share some of those?

O'CONNOR: There was a fellow named Gary [E.] Coen. Great guy, Flight Director. He was our lead mission operations guy on the first few visits over there to Russia. There was a place called the Arbat, which was a kind of an infamous [outdoor flea market style] shopping area. It was a long street, Arbat Street, and this is where you can go to get some good deals on art and souvenirs and trinkets and Russian military hardware that they are selling out in the street, and so on. So when we had some time off, we went down to the Arbat.

It was wintertime, and Gary wanted to get a fur cap, one of those [military winter] kind with the floppy ears on it, like the Russians wear. Of course, they never drop the ear muffs. That's not [considered manly] over there. Russian men like to have their ears out in the cold. And I'm over there wearing a black watch cap, stocking watch cap, and they said I looked like a Mafiosi guy. The Russian Mafia people wore [black stocking caps]. But I didn't like having my ears out in the cold. I wasn't used to that. So I was okay [if] they wanted to call me that, [because] at least I was warm.

Gary wanted to get one of these fur Russian hats with a big star on the front of it, so he went down and bought one, and we saw him negotiating with the guy that sold it to him. He was proud that [he got a good price]. But a couple of weeks [after we returned to Houston] we heard

that his wife made him throw it away because it hadn't been tanned properly. It was, no kidding, real fur, but [after a few days] it had stunk to high heaven in the closet. They couldn't figure out what it was, and they opened it up and got in there and said, "Oh, it's that damn hat you got," and she made him throw it away.

Then there was another visit later where I was walking through kind of a park in front of their big foreign ministry. We had just finished a big meeting. It must have been one of my last visits over there when they were working with the foreign ministry people and signing off on these [high level] documents. I was walking across [the park] in broad daylight, and it was summertime, and [future astronaut Peggy A. Whitson] and a young [scientist astronaut] named John [J.] Uri was with me. He wasn't too tall; he was maybe five-five, something like that.

Somehow he must have looked like a target, because out of the bushes came a pack of people, mostly children, who just kind of swarmed around him. We each had bags or packages in our hands, because we had done some shopping that day, and we were heading back to our hotel. John started running, and this swarm of people was around him like bees, and they were sticking their hands in his pockets and trying to grab stuff out of his bag. He's slapping at them and so on. I'm standing there looking at this wondering, "What in the world is this?" It was just a bunch of street urchins going after him.

So I thought, "There's only one thing to do, and that's to run up and try to give him some help." So I ran and started yelling at the top of my voice and swinging my bag of—I think it must have been a Matryoshka doll or something in this bag—swinging it around my head, and these people all disappeared twenty different directions. You could tell that they had a preplanned [dispersal tactic]. If I had gone after any of them, I could only have chased one, because no two of them were together [as they escaped].

Poor John Uri, all his pockets were pulled out, and luckily he had kept his wallet in a place that was hard to get, which they always tell you to do over there. I don't think he really lost anything, but that was an interesting lesson for me in making sure you don't get pickpocketed [in Moscow, in] broad daylight, too.

We heard later that this was a big problem in Russia, unseen in Moscow before Glasnost and Perestroika and all that, [when] there [had been] really good security, and people could walk around at night throughout Moscow and not worry about crime. They'd worry about policemen, but not about crime. Now the crime was everywhere. They were talking about murders in the hotels and people being attacked in the streets like this.

In fact, on one of my last visits over there was the time when they had that insurrection in the Parliament, where they had Russian tanks out on their mall, shooting [high caliber shells] into what they call their White House, the big multistory white Parliament Building. It was on fire, and they were blowing holes in it, because there [was] a bunch of [rebel] Parliamentarians who were locked in and on some kind of a strike of some sort, and the Russian Army came in and attacked them. That happened while we were there.

The funny part about that is that we could hear that. It was just over the hill from our hotel. Our pilot—we had a NASA airplane over there, and our pilot was just as nervous as a cat about, “Are we going to have to evacuate the city? Is the whole thing going up in revolution? How are we going to get out of here?” And Goldin was relatively calm.

We had one guy missing [from our contingency meeting]. I can't remember his name right now, but he was the head of External Affairs. His previous job before coming to NASA was that he was in the U.S. Embassy in Moscow, so he knew the area. He knew Russian and had a lot of friends over there, and he had picked that afternoon when all this was going on to go

down and watch and get up close and personal. And we lost track of him, so if we wanted to leave Russia, we'd have to go without this guy. Dan was not happy with that.

But I've never seen a pilot more nervous. He was sitting there in a sweat, worrying how we were going to get out and that, because they don't fuel your airplane until your day of departure, if we were going to have to leave early, we wouldn't have fuel, and there was only enough gas to fly to Helsinki [Finland]. So we were having our meeting on how we were going to evacuate if we had to.

But Dan said, "No, this is no big deal. I just called my Russian counterpart, Yuri Kopchev over and he said, 'The meeting's still on in the morning. Come on over. 'Yeah, this is no big deal. So the Army is blowing up Parliament. Russia has these things happen once in a while, and we don't want it to interfere with our meeting in the morning.'" [Laughter]

So we all went to bed that night wondering what would happen the next day. All I could think of was that scene in *Dr. Zhivago* where [young] Dr. Zhivago and his uncle and aunt walk out on the balcony of their apartment and they look down the street and they see the mob [marching in a peaceful protest rally]. Then they see the Tsar's guards, with their swords drawn, [attacking on horseback] and just wiping people out. I was thinking of that scene when I went to bed that night. We could still hear the tanks firing, and even that evening there was a fight going on up at the big Ostankino Radio Tower. Again, the Army was shooting people there that night because somebody had tried to take over the radio station.

JOHNSON: Definitely an interesting time to be in that country.

O'CONNOR: We were watching it on CNN [Cable News Network] live, by the way.

JOHNSON: CNN, they're everywhere.

O'CONNOR: Yes, and it was live. You'd see the tank shoot a round into the Parliament. You'd hear it on the TV, and then ten seconds later you'd hear the real sound from that same firing, because it was just a mile away or so.

JOHNSON: That's amazing.

O'CONNOR: Interesting.

JOHNSON: I think we're close to the end of a tape and probably close to the time we need to stop anyway.

O'CONNOR: Okay, yes.

[End of interview]