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EDITED ORAL HISTORY TRANSCRIPT

LYNN F. H. CLINE
INTERVIEWED BY SANDRA JOHNSON
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JOHNSON: Today is March 17th, 2016. This interview with Lynn Cline is being conducted in Washington, DC, for the NASA Headquarters Oral History Project. The interviewer is Sandra Johnson, and is assisted by Rebecca Wright. I want to thank you again for coming to see us today. I want to ask you if you don't mind to talk about your background and how you first came to NASA and what made you want to work for NASA.

CLINE: I majored in French language and culture, and I thought I was going to become a professor of French literature. I had done three years of college, and I spent my summer between junior and senior year in France, living with a French family in exchange for room and board. I came back very fluent in French. I got a phone call from the chairman of the language department at East Carolina University [Greenville, North Carolina], where I was studying, and she said, "How would you like to go to work for NASA?"

Frankly, having just come back from a summer in France, the opportunity to do something other than go back and hit the books was appealing. It was a paid internship, so that meant it would help with my student loans. I wandered down to check it out. I came into the NASA International Office. I interviewed with them and they said, "Okay, we'll take you."

The backstory is that someone from East Carolina University had graduated with a degree in accounting and taken a job at NASA Headquarters [Washington, DC] and decided to establish a cooperative education program between NASA and their home university, and the

first student who came up and was put in the Budget Office, absolutely hated it, because she was a German language major. Don't ask me why they chose a German language major for the Budget Office, but they did. She was so bored, the Personnel Office said, "Well, what would you rather do?"

She said, "Don't you have an international office?"

They said, "Yes." She went there.

The International Office, that was their first time with a co-op [cooperative education] student, and it worked out really well. So, they called the university and said, "Send us another language student," and the chairman of the department thought of me. That's how I got there. It wasn't like I had always dreamed of working for NASA or that I was looking for a career in science and technology. It was just this opportunity that fell in my lap, and I took it.

I came for three months, because we were on a quarter system at our school. In those three months I worked on U.S.-Soviet affairs. The Apollo-Soyuz Test Project [ASTP] was flown in July of '75, and I started in September of '75. I was in all of the postmission back-and-forth. I also was given the job of writing a report. There's a requirement in the United Nations Committee for Peaceful Uses of Outer Space [COPUOS] that every nation that's a member submits an annual report that explains what space activities they had conducted that year. This is back before Internet, before a whole bunch of resources. [Note: The requirement is now met by providing to COPUOS a copy of the annual Aeronautics and Space Report, which is prepared in response to a Congressional requirement.]

My job as the intern was to walk around NASA Headquarters and interview people and collect press releases and then write a report on what NASA did in space. Through that process I became totally enamored with the subject, with the mission of NASA. Everybody I talked to

was passionate about what they did. I learned about planetary missions and human spaceflight and aeronautics, just all kinds of things. As my time was coming to an end I said, "Can I come back in the spring when we do the next quarter?" They said, "Sure."

I went back to school for the winter quarter. I crammed in an overload of classes. I had just two classes left to graduate. I came back to NASA in the spring and I did those two courses essentially remotely. My major was French and my remaining course was nineteenth century French literature. I was reading on the bus into work every day French literature, and then I went down to the university and took an oral exam. My minor was anthropology and I had to write a research paper. I don't even remember what the subject was, to be honest, but I mailed in my research paper and I graduated.

NASA was able to hire me from the co-op program, just do a straight-out conversion into permanent civil servant, and I stayed 36 years essentially after that.

JOHNSON: As you mentioned, it was at that time right after the Apollo-Soyuz Test Project—which was an interesting time in American history anyway because of everything that was going on and the Cold War politics—but talk about that period as you became a full-time employee for NASA in that period after ASTP and some of the other projects that were going on and the negotiations, and maybe a little bit about when you first got into that side of it, the negotiating. Was that early on?

CLINE: The negotiating actually came much later. But in that time the way things were set up was by subject matter working groups. There was a U.S.-Soviet Working Group on life sciences and another on planetary sciences. There were a variety of topics. It was extremely controlled

from not only a NASA perspective but an interagency perspective. One of my jobs was to look at what we wanted to accomplish at an upcoming meeting, to write a draft report of if we had the ideal meeting this is what we would all agree to and this is the kind of data that would be exchanged.

I had to take that draft report and it had to be cleared with multiple agencies, NASA, Office of Science and Technology Policy, [U.S.] State Department, Defense Department. There were a variety of agencies who all reviewed it. The idea was to prevent unwarranted technology transfer, make sure that we were obtaining information from the other side and not just giving information in an uneven exchange. It was very regimented.

Then the folks would go off and have their meetings. I was never able to travel to any of the meetings overseas, I was too junior; it wasn't part of my portfolio. But, I could attend them when they were here in the United States. After the meeting was over, then you would finalize that draft report, hopefully without a ton of changes, because you had your goals set out, and you knew what you were trying to accomplish. Then that final report on both sides had to go back through the interagency process, so we would have a draft report that we would sign. We'd send it through our interagency process, the Soviets would do whatever review process on their side, and then it would be declared final. It was a very long, protracted, regimented process that we went through during that period.

There was a transition then where the Soviet Union invaded Afghanistan [December 1979]. There was martial law in Poland [December 1981]. The space agreement between NASA and the Soviet Union was allowed to lapse [in 1982] as one demonstration of the U.S. government's dissatisfaction with the actions of the Soviet Union. That led to a very different

period, because we had no agreement that would allow us to conduct all of those bilateral working groups.

A whole bunch of things came to a halt. What we were still allowed to do were things that were multilateral. One of the things I think was in that time period was the Halley's Comet encounter, and because that involved the Europeans and Japanese as well as the Russians, we were allowed to have some work there.

We may also have been able to continue life sciences cooperation. I can't remember for sure. But there was a big pause in our cooperation at that point.

JOHNSON: You mentioned when you were a co-op you were working on the U.S.-Soviet desk. Did you stay with the Soviet relations all the way through that time? Or were you working with the European partners as well?

CLINE: The way the Office was organized at that time, there was one division that did Soviet Union and Eastern Europe, the communist bloc countries if you will. We didn't have much going with anybody else. We talked a little bit to Romania, but there really was not many activities otherwise. All of the free world—if you will—cooperation, was in another division. Later on I applied for and was accepted into a position in another division, and then for that time period I actually stopped working with the Soviet Union/Russia and worked predominantly with Europe and Japan for a long portion of my career.

JOHNSON: I was reading another interview. You were talking about that time when you came in and Arnold [W.] Frutkin was still there. One of the things I thought was interesting, you said

under Frutkin the International Affairs Office was in a formative stage, "making up policy as we went along." It's an interesting time for you to come in during that time period. Do you want to talk about that, how those policies were made and how they were negotiated?

CLINE: I did a little bit of research on this later. Some of the policy ideas that Frutkin had he had actually formulated before he came to NASA in some academic papers. They were policies that evolved, some of them were just principles that we followed, and then some were how do you then apply these things.

There probably is still a book somewhere in the International Office. I created a three-ring binder and we collected things that represented a policy decision by having taken a certain action with a given country. Later in my career, I was teaching all the new international program specialists these are our policies and this is why they're important and how you apply them. But in those early years we were still figuring some of them out.

I think one of the more important ones is each side funds its respective responsibilities. That was important because NASA doesn't have a budget for international affairs. NASA has a budget for planetary exploration, for Earth science, for missions. In order to fit into the missions of NASA, it had to be something that the program office was willing to back, to fund, to support. We don't have a mandate to be a foreign assistance program. That's not part of our [NASA] Space Act authority. It says that international cooperation needs to materially contribute to NASA's missions. That's our authority in the Space Act.

You want the foreign partner to pay for their part and that means they also have a vested interest in it. That makes it with a very mature partner like Europe a very good way to determine what each side will do, how much you can commit to. You bring those things together, and

you're both fully vested. It makes it far more challenging with a developing country that doesn't have a mature program because they have limited funding and capability. If you look across the countries—a lot of cooperation with countries that don't have lots of hardware development kinds of programs—what they really have to offer is scientific expertise on data analysis, or ground truth capability to help to validate measurements taken from spacecraft. Those kinds of policy decisions were just drummed into all of us, that this is important. Sometimes we had to fight against the State Department and even the White House to maintain those policies, because the President or the Secretary of State or somebody's traveling abroad to country X and they want us to come up with some project we can do together, because it's a positive thing. We can't just make those up. That's not NASA's mission.

We would really have to work hard to figure out what expertise do they have, and is it valid. Sometimes we just had to say, "No. We can't come up with anything." But other times you could say, "They have this outstanding tradition in astronomy. Why don't we have them analyze data from Hubble?" The policies I think served NASA very well. If you look at them today, those things that Frutkin put in place very early on have stood the test of time quite well.

JOHNSON: Back during that time period NASA and the nation was changing or transitioning from a time from this whole space race atmosphere that we'd had in the '60s and early '70s to an atmosphere more about cooperation with the Soviets. You mentioned the President or Congress wanting to go and work with another country. But during that time period how did the presidential administrations and Congress react to this whole feeling of cooperation with the Soviets, who were viewed as enemies for so long? Was it harder for them to move in that direction than NASA to move in that direction?

CLINE: I think that there's always a political overlay of the geopolitical view that can put some barriers in place that you don't find at the NASA level because NASA is a mission-oriented agency. If you put an engineer and a scientist from NASA together with engineer and scientist from another country, they speak a common language, they have a common goal.

Whether you're doing a mission together to Mars or you're planning a human spaceflight together, there's a common denominator that is not affected by the politics. But the politics certainly affected very strongly the relationship with Soviet Union and Russia multiple times. The lapsing of the space agreement was one. When we started back up the new agreement with Russia, there certainly were some challenges there. One of the things I worked on a number of years was there was legislation passed that was designed to punish Russia for having a relationship with Iran, and of multiple things that were sanctioned, one of them was civil space cooperation.

Congress didn't prevent military cooperation, or commercial space cooperation. For some reason civil space cooperation was [sanctioned], and the [International] Space Station specifically was called out. There were all kinds of things we could do with Russia, but when it came to Space Station, we weren't allowed to pay the Russians for certain things. That legislation was very difficult, put all kinds of constraints on the program. I won't tell you how many times, because it was too many to count, I had to go up and brief staff in Congress and try and get them to understand the negative impact of this legislation on our ability to operate the International Space Station.

A waiver was granted, an exception built into the legislation, to allow NASA to operate the International Space Station cooperatively with Russia. But it always had a deadline on it, so

we had to amend it, and then amend it. When I retired I said, "One of the reasons I'm retiring is because I don't ever want to have to deal with this legislation again, and it's coming up on another deadline." There was that.

You're seeing the same thing play out now for DoD [Department of Defense] with the RD-180 engines. As I said, the International Space Station was specifically called out and sanctioned, but nobody ever said there was a problem with Russian engines on the Atlas V vehicle that was launching all the military satellites. That didn't make any common sense to me, but it's legislation. That country is one that was regularly problematic from the political point of view, not at the NASA level, but above NASA. Those things can then trickle down and impact your ability to do the program.

The other is with China. There still is legislation that prohibits NASA from doing bilateral cooperation with China. There are people who think we should be having a dialogue with China, they're part of the international environment we should work with. But there's opposition in Congress and there's specific legislation that prohibits it.

Those politics can interfere. The only other one I can think of is briefly there was a concern the very first time NASA wanted to launch one of its satellites on the Ariane [European heavy lift] launch vehicle. With this, each side funds its respective responsibilities, you look at what each side can contribute. The value of having a very mature partner like Europe is they have a lot to offer. One of the things they could offer was a launch, and that helps balance out the contributions of each side. For many many years the U.S. had launched European spacecraft and payloads.

This was a natural evolution now that they've got this vehicle that's capable, we should launch on Ariane. There was a huge outcry in Congress about that. How dare you put a U.S.

government payload on a foreign launch vehicle, isn't this awful? We had to go make the case for why this is actually perfectly reasonable that they would contribute that, the same way we had contributed launches in the past. We got through that and now James Webb [Space Telescope] is going to be launched on an Ariane, and people don't get all upset about that. It's natural evolution. That's the only other one I can think of.

We didn't have issues with any other countries. The ones that are the hot button items in the general politics, those are the ones that tended to affect our ability to do things.

JOHNSON: The political atmosphere I'm sure contributed to a lot of issues. In 1983 President [Ronald] Reagan announced the Strategic Defense Initiative or Star Wars. But back in '67 an Outer Space Treaty had been signed, as you mentioned earlier, to ensure the peaceful uses of outer space. I was reading that the U.S. during that time period viewed the peaceful uses of outer space differently than the Europeans viewed peaceful uses of outer space.

CLINE: Yes. There's an interesting aspect to the International Space Station Agreements that a lot of people aren't familiar with because it's in separate side letters, and a lot of people look at the text of the Agreements. In the first round of negotiations, which I was not personally involved in—I came in in the second round when Russia was invited in—but in that first round, it was stated that the International Space Station would be used for peaceful purposes only.

Part of the U.S. interagency approval of International Space Station was that the Station could be used for national security purposes if desired. There was a big debate as to whether that was realistic or not because would DoD really be interested in putting a payload on a station that

has an integrated international crew. Regardless, they fought for the right to ensure that they could do that.

That then led to the discussion on what does peaceful purposes mean. That was not something that all the countries could agree on—a specific definition. The solution, the compromise, was an exchange of letters where every country who was a signatory, or each partner who's a signatory, to the agreement would basically write a letter that said, "Peaceful purposes to me means *blah*." The U.S. government's letter said, "Peaceful purposes includes national security purposes." Europe could say something different and Canada could say something different and Japan, because they had specific constitution defined peaceful purposes, could say, "Does not include any military activities." We just exchanged the letters.

When I came in to do the second round of negotiations, now we had Russia. We had to explain this whole thing to Russia. They don't make a big distinction between the military and civil uses of space in their program. They were I think a little bit bemused by this whole debate. But they looked at our letter, and said, "Makes sense to us." We just reexchanged all the letters. The Russian letter was identical to the U.S. letter. The other partners all just did the same letter they'd done the first time. That's how it was resolved. Everybody views that phrase through their own lens.

The one other thing was that Japan, because they had the specific legal directive not to do military space activities, they also have in the agreement the right to refuse to let certain activities be carried out inside of the Japanese-provided laboratory, because that's essentially their territory legally, if you will. That doesn't prevent the U.S. from doing national security activities in any other part of the Station. But if Japan had a concern, they could prohibit it from being done in their laboratory.

JOHNSON: They're the only ones that have that provision?

CLINE: It's written for anybody, but I think Japan was the one most concerned.

JOHNSON: You were saying you worked with the Soviet relationship mostly. When did you start moving into the European? I know that you worked on the Ulysses, the International Solar Polar Mission. Was that in the mid-'80s, around that time period?

CLINE: Yes, that was late '80s. Actually I worked more on the Galileo mission than on Solar Polar. I was the desk officer for Germany.

JOHNSON: What does that mean?

CLINE: That means as an International Program Specialist my specific assignment was all cooperation with Germany for a period of time. Somebody else was responsible for the European Space Agency, a guy named John Sakss at the time. What happened was we got in the budget passback direction from the Office of Management and Budget [OMB], and NASA was told, "You need to cut." I don't remember the exact figure but there was a significant amount of money needed to be cut out of the NASA budget. It needed to come from the Science Program. I think the direction was not from Shuttle but somewhere else. The only place you could go to take that big a chunk of money out of the budget proposal was science.

The three missions on the table at the time that had enough funding in their planning that could have met that funding directive were Hubble [Space Telescope], which was cooperative with European Space Agency, Galileo, which was cooperative with Germany, and Solar Polar, which was cooperative with European Space Agency. There was an internal discussion on what to do, and the decision ultimately was made to take the cut in the Solar Polar Mission. What I think gets lost sometimes when people talk about this, it sounds like we canceled the whole program or pulled out, but really one reason why Solar Polar was taken was because there were two spacecraft. You could eliminate one. You lost a good portion of the mission because it was two spacecraft that were going to correlate their measurements. Of course instruments that were going to fly on that spacecraft would no longer have a place to fly, but you still would get a good portion of the mission science. NASA agreed to continue to provide the launch. NASA agreed to continue to provide the tracking.

Unfortunately, one other aspect of the direction from the Office of Management and Budget was we were not allowed to consult with our European partners. We could not tell them in advance that this was coming. We were prohibited from talking to them because the budget is embargoed. No exception was made for this.

Europe found out when the budget went public, when it was a fait accompli, when it was already cut. Europe basically cried foul and said, "You should have consulted with us." Frankly most people at NASA agreed with them and those of us directly involved were pretty unhappy that we weren't allowed to have those consultations.

One of the impacts of all of that was that NASA got the reputation of being an unreliable partner and Europe would tell us that in no uncertain terms repeatedly. When I went to negotiate the missions for the SOHO [Solar Heliospheric Observatory] and Cluster and then Cassini[-

Huygens], I was routinely reminded what an awful partner we were by my European counterparts.

Another impact was to the language in future agreements—we met the legal requirement because the language in the agreements that we signed said, "NASA's ability to carry out the program is subject to appropriated funds," which is just a statement of fact. We have to ask Congress for the money. It's done on an annual basis. We can only do what we're given authority to do.

That is completely different from Europe and the European Space Agency where they can commit to multiyear funding a program from start to finish. They were extremely frustrated by the American system that would not allow us to do the same. How can you not make a long term commitment? Then they were further distressed that this decision had been made internal to the executive branch that had signed the agreement. It's subject to appropriated funds, but you didn't even ask for the funds. Future agreements after that always included a phrase that basically said that you will go seek funds for this program. Station has that clause in it. Cassini has that clause in it. That became the new standard clause that it was expected that you don't just sit back and take a cut. You go fight for the money. You make sure you go ask Congress for the money. That was another impact of that.

JOHNSON: As far as the U.S. side that was a mandate that the U.S. had to do that as part of those agreements?

CLINE: Yes. Europe insisted on it and all the other International Space Station, all the other partners just jumped on that bandwagon and said, "Of course they need to do that."

JOHNSON: I bet they did. You mentioned the Iran Nonproliferation [Act] and then the funding. But there were other issues because of the budgeting cycle being out of sync, other trade restrictions or funding instability, because we're subject to that every year. Were there other things besides those that we've talked about that would cause problems or sticking points in our relationship with Europe and with some of the other partners?

CLINE: I think just Solar Polar was the big one that everybody thinks of because of the way that was cut without consultation. There are always times when the budgets are affected. I'd like to point out that it's not just NASA, but our partners also have had that. While we have the reputation for being the unreliable partner, there are many times we've had to negotiate adjustments to a relationship to account for the fact that another partner has had a change in policy, a change in priorities, a reduction in funding of some kind.

If you look at the original version of the International Space Station Agreements, there are the contribution by the partners and a set percentage value for that infrastructure or laboratory contribution, and that amount was then the amount of their utilization rights and their rights to the flight rate for the crew.

When we went from the original round to the second round of negotiations, Canada and Europe both wanted to negotiate down their contribution, because they could no longer support the level of funding. Europe wanted to reduce the size of their laboratory. Originally the Japanese lab and the European lab would have been the same size. The European one is smaller. Japan stayed at 12.8 percent I think and Europe went down to 8.3 percent. Canada also needed

to negotiate a reduction in its contribution for the robotic system. Those kinds of things have happened.

The Brazilians were at one point going to make a contribution to the International Space Station. Ultimately they couldn't make it. We were ready to terminate the agreement. I wasn't personally involved in this one, I had moved on to other programs by then, but my understanding is Brazil didn't have the wherewithal to make any contribution in the end. NASA was prepared to just terminate the agreement. That would have been politically unacceptable for Brazil, so State Department helped negotiate a suspension of the agreement. Nothing goes on under the agreement, but it never officially ended. One of those things. It's saving face. Again financially they couldn't do it. Politically there was no will to continue.

It does happen from time to time because these are all such long term programs. Governments change, priorities change, your ability to sustain the funding changes over time, or you run into technical difficulties that increase the amount of funding needed. All these things affect the relationship. I think while there are those problems, if you look at the number of successful international collaborations that NASA has, it far outweighs these exceptions where you had this big difficulty, but they're the ones that get the headlines that people remember.

JOHNSON: You mentioned you were on the German desk and that Galileo was one of the ones they were considering at the time where the funds were being cut. What were you doing as far as working with the Galileo Project?

CLINE: The Galileo agreement had been negotiated and signed before I took on this portfolio. I joked for a while that my job on that program was to give the Germans bad news, because

Galileo went through some difficult times where we were going to put the orbiter and probe together, then they were over the mass limit, so they were going to be an orbiter and a carrier for the probe. Then they were back together. We were going to be on I think an IUS [(Inertial Upper Stage) the original plan was to launch on a Centaur and it was changed to IUS]. Then the [Space Shuttle] *Challenger* [STS-51L] accident happened, and so they weren't going to go on that kind of an upper stage anymore. We certainly weren't going to launch any time soon, because we had to go through the whole investigation and return to flight process. My job was to maintain the partnership through a lot of trials and tribulations. Happy to say that we made it through, and that was a highly successful mission, but it was not easy getting there.

JOHNSON: What were you exactly doing at that point? Were you negotiating at that point? Or were you still doing more writing and research?

CLINE: It was negotiating to some degree, but it was more just maintaining the relationship. My job was to be the principal spokesperson for NASA to the German government at the top level. I worked with the German Ministry for Research and Technology. I would be the one who would inform them of a new development on our side or a proposal to do something different. Similarly, the Germans would come to me if they had a concern.

I remember Manfred Otterbein, my counterpart at the research division, called me and said, "Lynn, we're having trouble with JPL [Jet Propulsion Laboratory, Pasadena, California]." Germany was providing a very very key component, the Retro Propulsion Module for Galileo, which essentially is the piece of technology that puts you into orbit around the planet. If it didn't work, we were doing a flyby, and that wasn't the mission. This is pretty critical.

The folks at Jet Propulsion Lab wanted to do some very extreme extensive testing on this propulsion module. Otterbein called me and said, "Lynn, I understand the need to ensure that this works, but the things that they want to test to don't exist anywhere in the universe, let alone around Jupiter. Can you get some sense into what we're doing here? We've done all of this analysis and we don't need to test to destruction all of these different parts."

Sometimes I was the interlocutor to get the two sides talking about what was the issue and how do we resolve it. Now I'm not a scientist, I'm not an engineer. It was more getting the sides together, being the broker, trying to get everybody on the same page.

JOHNSON: The person that ensures communication is actually working.

CLINE: Yes.

JOHNSON: I would assume that's one of the skills that you feel like you came to naturally. Or was this something that you learned over the 10 years before you were working on that?

CLINE: I think it probably came to me naturally. The comment that people have made to me many times over my career is that I'm a very good listener. I think because I majored in a foreign language and learned that other countries say things differently, you think differently when you don't have identical words for saying things, and I've always been interested in other cultures. I can put myself in other people's shoes. I've also been told I have the patience of Job. I can have the same discussion 20 times and not blow my top. All of those are essential in negotiations.

I can remember during the Space Station negotiations we would occasionally have—there was one guy from Japan, his English was rather good, but there were times when he just had trouble expressing his point clearly, so he'd say something, and I'd look around the room, and the Europeans are all frowning and the Canadians are frowning. "Okay, let me try saying it in my own words." Then I'd say, "Do you mean—?" I'd state it in my language, clear English. He would nod his head yes, yes. Then all the frowns would disappear. Everybody suddenly understood the point he was trying to make. They told me I did great English-to-English translations.

I think one of the other things was really good writing skills. Being able to take language from scientists and engineers who aren't trained in plain English writing. They're good at really technical writing and technical lingo. Being able to write in a way that is suitable for the White House or the State Department or a foreign partner or the Congress. Those were all really important skills in my career. Those turned out to be especially important when I moved to space operations from international. By then I had tons of experience in the International Office. Not only did we do international, but we also did interagency cooperation. I'm a veteran of more interagency working groups than I care to admit over time.

I was involved in the drafting of the National Space Policy multiple times. It's gone through numerous iterations. Doing lots of papers for the [NASA] Administrator. Every time the Administrator either has a foreign visitor in or goes abroad, the International Office is responsible for doing papers that are "This is the country you're visiting, this is their program, these are the key things that are going to be raised, these are the suggested responses for how we should position ourselves when they raise these topics." Writing is an absolutely essential skill, and concise writing in particular is important in the International Office.

When I went to space ops, which is a highly engineering-oriented group, and it was right after the [Space Shuttle] *Columbia* [STS-107] accident when I started, it was really important that we could clearly communicate with the press and the Congress, because faith in NASA was at an all-time low and rebuilding that, clearly explaining what we knew, what we didn't know, what we were planning to do, what sort of tests were important, what were the next steps, that was all really important to building back the confidence in NASA and getting us through that return to flight process.

JOHNSON: You started out in a time where women were moving more and more into the workforce. By the time you were on the German desk and working with the Europeans, being female and moving into that negotiating role, was the International Office at NASA, were there a lot of females? Then the people you worked with with these other countries, was it something that made a difference?

CLINE: Yes, there was a big difference. In the International Office we actually had a high percentage of women, and also in leadership positions in that office. Dealing internationally I rarely had women across the table from me. More so at the UN [United Nations], interestingly enough, than working with the other countries. I would say the countries I had the most difficulty with were Japan and Russia, being a woman in a leadership role. This is separate from the International Space Station Agreements. This was before that. We were dealing with the Japanese group called ISAS [Institute of Space and Astronautical Science], which was responsible for the science program in Japan. The guy who was in charge of that group did not like dealing with women at all.

There was this one meeting that is ingrained in our brain, all of us who were there, because it's just so funny. I was there as the lead for this particular topic. We had a woman from the General Counsel's Office. We had the head of the division in International was a woman. The desk officer for Japan was a woman, who was fluent in Japanese by the way. Then we had one guy, very senior lawyer from general counsel, good friend of mine, he was also on the Space Station negotiations, Jay [E. Jason] Steptoe.

There's all these women and one man representing the U.S. delegation, and there's all these Japanese men. The guy leading the Japanese discussions addressed every single one of his questions to Jay. "Mr. Steptoe," whatever the question was. Jay would very nicely say, "You'll need to ask Ms. Cline," then look at me, and I would answer. It was so ridiculous, but he just did not want to deal with women.

When we did the Space Station negotiations, Peggy [Margaret] Finarelli led the first round. The Japanese, I am told, came in and suggested that NASA needed to name someone else because they couldn't deal with having a woman in the lead. Ken [Kenneth S.] Pedersen at the time basically said, "Well, then you don't want to be involved in the Space Station Program, because Peggy is our choice, she's the most competent, and that's who's leading our delegation." They backed off and just dealt with it.

I had a similar thing with the Russians when the time came. They apparently came in and asked my boss at the time could NASA name somebody else. Bob [Robert] Clark basically said, "You want to be in Space Station, you need to deal with Lynn." There were times when you could tell they were a little exasperated. I got some third party feedback that one of the guys on the Russian side said, "I hate those strong American women." Can't deal with them kind of thing. But I think what happens over time is you build up your credibility and your respect.

When I started with the German desk, I was very young, naive, very junior in the Office. The very first time I went to Germany, I ended up at the Ministry for Research and Technology in this big conference room. There are all these men around the room representing all the different components of the German program. But I had done my homework.

They peppered me with questions about the budget, budget priorities, a new mission coming up, the pricing policy for Shuttle. All these different topics. I knew the answers to all of them, because that was my job and I prepared for this. It was like getting this grilling and I passed the test. After that I never had an issue with the Germans. In fact one of my bosses, Dick [Richard J.H.] Barnes, told me years later he was in Europe as the NASA European rep [representative] for a while, and he called Hermann [Albert Ernst] Strub at the German Ministry for Research and Technology and said, "I need to give you a heads-up about such and such," and he said Hermann said, "Well, thank you for calling me, Dick. I'd like to hear it from Lynn." So obviously I had reached the point where I was the person they knew had the portfolio and understanding in the issues. There were those little times where you could tell. It was rough, but I think you just need to prove yourself. Just be professional, stay professional, don't react to it, don't take it personally, just stick to the topic and demonstrate you know what you're doing. You get through it.

As I look across the delegations that we dealt with over time, the Japanese occasionally had a woman, and she was always the notetaker and the tea getter, even if she had a law degree from an elite university, which was the case for one of them. The Canadians, I don't think they had a woman in their Station negotiation. They did have female heads of delegation to the UN. Germany occasionally had a woman in a senior position, like in charge of life sciences program or one of the disciplines. Of all countries that had women, France had the most women in senior

positions in the French Space Agency, which given their chauvinistic reputation is ironic. But they did.

JOHNSON: You mentioned Cassini earlier. Were you working on those negotiations?

CLINE: Yes, I was the lead negotiator for Cassini MOU [Memorandum of Understanding].

JOHNSON: If you want to talk about that whole program. I know you mentioned that because of what had happened earlier it caused some issues as far as the ability to negotiate that.

CLINE: Yes. The good news was that I had previously negotiated SOHO and Cluster cooperation. Those were NASA-ESA cooperations. I'd been through that whole European Space Agency process with them before. So coming to Cassini, that stood me in good stead, even though the negotiators were a completely different crew for this.

That was an interesting mission. One of the things we had to negotiate was how to select the instruments, who was going to do what. You had the Huygens probe to go down to the surface of [Saturn's largest moon] Titan. Then you had the orbiter that would have instruments for the fly-arounds. It turns out that the procurement rules for NASA that we have to follow for selecting instruments in our competitive process, in their details on how it's conducted, are quite different and in some ways contradictory to the rules that ESA has for selecting instruments. For example on the NASA side people write a proposal, they submit it, and the decisions that the procurement process is made on are based on that written proposal. The European Space Agency also gets a written proposal, but then they bring in the principal investigator and

interview that person. They're allowed to ask a lot of leading questions that essentially permits expansion of or amendments to the proposal based on that discussion. That's not allowed in the U.S. system. We had to figure out how do we do this.

We had tried doing a joint one once before and it was just fraught with difficulty because of all these differences. What we ended up setting up for Cassini was the U.S. would put out the solicitation for the orbiter and follow its rules, and ESA would put out the solicitation for the probe and follow all of its rules, but we would set it up so Americans and Europeans could apply to both, so that we weren't excluding anyone from the ability to compete to be on the mission. That saved a whole lot of problems. That just made it so much easier to do the two.

I'm sure we went through the "Okay, who commits first to this mission," because of the NASA cycle for proposing a new mission, getting it through the Office of Management and Budget, getting it approved by the Congress. ESA has a lengthy process. I actually had to go to one of the European meetings. They needed unanimous approval by their council before they sign a memorandum of understanding. I had to go to one of their council meetings where the agreement was presented and be able to respond to questions about it.

There are certain things that individual countries care about more than others. This clause is more important or that clause is more important. Going through that whole process to get the approval on their side in addition to ours and all of that timing.

I don't remember really huge issues in the negotiation itself of the wording in the text, other than the ritual admonishment about how unreliable the U.S. is that was like you had to sit through that every single session. "Oh yeah, okay, here we go again." You just suck it up and let them have their say.

JOHNSON: When was the actual agreement reached? The *Challenger*, did that happen before you actually had the agreement?

CLINE: I'd have to go back and look at the dates to be honest. [Note: the agreement was signed in 1991.]

JOHNSON: I never really got the idea of when the agreement actually happened, because they didn't launch until the late '90s, right?

CLINE: That's right.

JOHNSON: You were the Deputy Director of International Relations during the early '90s, is that correct? Looks like 1990 if I'm reading it right.

CLINE: Yes.

JOHNSON: What changed? What was it that changed in your duties?

CLINE: It changed quite substantially because when you are in one of the divisions—and at that point the divisions in the organization were organized around the missions. We've tried organizing the International Office several ways. We've tried geographically organizing it and we've tried organizing it by mission. You can't have things divided only that way, because none of the foreign countries are divided that way. If you're Germany, you want to know who's going

to take care of you as Germany. You don't want to have to go to three different people whether it's science or human spaceflight or aeronautics.

We've ended up with organizations that somehow combine the two. You'll have divisions like the Human Space Flight Division, which is predominantly responsible for the relationship with Russia because that's the big cooperative program. There may be other people who work on different aspects of the Russian program, but the lead for it is in that division.

When you move up to the deputy role, you have no country assignment, and you have no mission assignment. One of the biggest challenges for me moving up to that executive role was keeping myself from wanting to be the action officer—because I had grown up in the office and I knew everything and how to do it—and become more of the teacher and less of the do it myself, but ensuring other people knew what the issues were, what the policies were, how to do it.

Obviously as the Deputy you're responsible for stepping in any time the head of the Office is on travel or can't make a meeting. Trying to stay on the same wavelength with your boss and making sure that you're representing that person well.

I also had the opportunity that I really enjoyed, having a portfolio of my own. The portfolio of my own was the United Nations, the Committee on Peaceful Uses of Outer Space. That worked well, because it's not one mission area and it's not one country. It didn't neatly fit into any of the divisions. You could certainly put it in one of the divisions, but it didn't have to be. That became my portfolio. I really liked that because it gave me something that I could be fully in charge of in addition to all the stuff I had to do as the number two, all the administrative things with the Office, all the representing the boss.

Working with the UN, my boss at the time was John [D.] Schumacher. He told me, "Lynn, our relationship with the UN has mostly been defensive action, prevent them from doing

things." There were a lot of ideas in the Committee that were things that the U.S. was not in favor of. We were really good apparently at delaying tactics and putting off decisions. You could do that in the COPUOS because you needed to have unanimous agreement to move forward on things. If you didn't reach consensus it didn't go anywhere. Everybody just stated their views and it got documented in the report, but it didn't move forward unless you had consensus.

He told me my job was to change our position to be more proactive and to try and figure out something that could be addressed by the Committee that would take some agenda forward. I took that to heart. One of the things we worked on was orbital debris, which had been a very common discussion for years, and there had been briefings regularly by the technical level folks on what the problem was and approaches to help minimize orbital debris.

We put together a work plan that would say we'd bring forward this understanding that the technical level multilateral group had come up with. We'd bring it into the UN and have it reviewed and hopefully endorsed by the other nations so that we could all be on the same page as to what were the best things to do to try and mitigate debris. Some of the countries wanted to make it a legally binding treaty. The U.S. argued against that because as technologies develop, new techniques come along, you don't want to be tied to you must do something this way. We really wanted it to just have the UN stamp of approval that these were good practices. We didn't really want a new treaty. That was the hard part to negotiate with, because a lot of the countries felt that a treaty was the right way to go.

In the end that whole process played out very slowly. Work in the UN COPUOS is glacial, the pace is glacial. Everything is done in multiyear work plans. You put forward year

one we'll educate one another. Year two we'll begin to talk about what to do about it. Year three we'll start drafting. It's very slow.

A couple of observations about that committee. Number one, there are many countries who are members of that committee who have no space program. The developing countries far outnumber the developed countries. There tends to be a strong push from developing countries to do more to benefit them. Their favorite thing to promote is well, you've got all this technology, just give it to us, which of course our laws don't permit. It can be a very difficult and fractious discussion.

All of my previous cooperation experience, international space activities, had been "Hey, we've agreed we're going to build a Space Station," or "We've agreed we want to do a mission to Jupiter." The negotiation was just about who did which piece of it to achieve this common goal. You go into COPUOS, there is no common goal. Finding the common denominator is the big challenge.

The other thing I learned being there is that the United States is viewed with a great deal of suspicion by especially all those developing countries. If the U.S. forcefully makes a proposal it's almost an instinct reaction to oppose it from the beginning. One of the things I learned was I was far better off if I was not front and center. For things like the debris work plan I put together a coalition of countries, favored allies like Canada and Germany, but also got Brazil and India because they were involved in the technical level group on debris as well as Russia and even China I think cosponsored it. But this multiyear work plan, we got all these countries to cosponsor the proposal. Then we had someone other than the United States make the proposal, so it wasn't a U.S. initiative. It got adopted and worked.

That was an interesting lesson for me, that sometimes working behind the scenes is far more effective than just coming out and stating your position, and that was just because of the atmosphere and the view of the United States.

JOHNSON: There's a lot of those negotiating skills you had to learn as time went on. How did you interpret those skills coming back at you from other countries when someone came across and said, "No, this is what we have to have, we can't have anything else"? How did you determine is that a ploy to get something else that they wanted or is that true that that was nonnegotiable?

CLINE: There were some interesting times in the Space Station negotiations when we ran into that situation. People assume and have made the comment to me a number of times, "Well, the Russians must have been the toughest negotiators." No question, they are very very skilled negotiators. But I found the most frustrating and most difficult to be the Europeans. The reason for that was Germany needed X, France needed Y, Italy needed Z. None of those could be breached. The lead negotiator for the Europeans basically had virtually no flexibility to compromise. He basically came in with a bunch of nonnegotiable demands. That's really hard to work with.

I learned with the Japanese that they will push you really hard. The most important thing in dealing with Japan is if your position is one you cannot bend on, you just need to state it over and over and over. Just be patient, be firm. Don't start trying to say it in three different ways, because maybe they didn't understand the first time. No, they understood the first time. If you start changing it, then they assume, "Ah, she can modify that, we'll go try and exploit that

opening." I learned to stick to it until you can't stand saying it anymore. You've just got to keep at it.

With the Russians there were a couple clauses that we were sure were absolute hard points for them, because they stuck to it and stuck to it and stuck to it. It got to the point where Alex Krasnov and I could have given each other's position because he knew mine so well and I knew his so well. It was like theater going through this, because neither of us was going to change. We both had our marching orders.

Then came this day in the negotiations where whatever they needed to do internally to get ready to say, "Yes, we're prepared to sign," they did that. We went into the negotiations and we were on these last sticking points. I go through my whole thing again. Alex looks at me and he says, "No problem." I just sat there stunned. He actually just agreed to something he's been fighting me on for three years, okay. Then we go to the next one. "No problem." It was only then that I realized that stuff he was vociferously fighting for, that was a stalling tactic, because they needed to get other things in the agreement or other things in place domestically. Once they were ready to go, those things that they'd been holding back on, they actually had negotiating flexibility. They were just waiting until the right moment to use it.

That last meeting I was just like am I dreaming this, did this really happen? I never understood that those were ones—until they gave up on them—that they had room on, because they were just so clear and focused and firm on their positions, never wavered once. Man, they had me on that one. None of us read that.

JOHNSON: It's almost like it is a play, or a dance or something that you're just dancing around each other, trying to figure out who's going to move next. That's interesting. Going into Station

'91, the collapse of the Soviet Union. Of course then the RSA was established, the Russian Space Agency, in '92. Then in '93 here the Station was almost canceled because of funding issues. That's when you started those early negotiations. From what I read, you were working with the European partners, the other partners and the Japanese and Canadians, to get them to agree to allow Russia.

CLINE: Yes. My introduction to this activity was basically after. Here's another case of the U.S. not being the ideal partner from the perspective of our other partners. We had a legally binding existing agreement with Canada, Europe, and Japan for Space Station Freedom. The U.S. decided that we should invite Russia into the Program. Part of this was because of the change in administration and the budget cuts, and we almost lost Station. But if we could bring Russia in with the substantial infrastructure contributions of their very mature, established human spaceflight program, that would compensate for things we could no longer do. This is in the time period of the Gore-Chernomyrdin Commission [U.S.-Russian Joint Commission on Economic and Technological Cooperation, Co-chairs, U.S. Vice President Al Gore and Russian Prime Minister Victor Chernomyrdin]. Gore was given the lead in the U.S. government for a whole range of things with Russia. Space was one of them.

It was very frustrating for our partners to have Shuttle-Mir declared to be Phase 1 for the [International Space] Station, because guess what? We'd been working on Station with the other partners for years. How does this new partnership suddenly become Phase 1 of something preexisting? They weren't happy about that.

Then basically the announcement was made that the U.S. was inviting Russia in. Legally, we can't just unilaterally do that. My first job on the International Space Station was to

negotiate with Canada, Europe, and Japan the formal multilateral invitation to the Russians to join the Program. That was not the easiest introduction, because it was essentially a fait accompli at higher political levels, and they all knew that. They weren't happy. I hadn't been involved in any of the previous Space Station negotiations. I didn't have all of the background on everything that had gone before, all the promises that had been made, all of the baggage around individual clauses and how important it was to each individual country. I was really just thrown into the briar patch here.

We did this, negotiated a joint invitation to the Russians, which they accepted. One of the things we developed was basically a kind of terms and conditions. The other partners, the original partners, were very worried about Russia being a partner who had such significant contributions that it would make them be more like junior partners. They didn't have extremely strong relations with Russia that they could rely on to help shape the relationship. They were counting on the U.S. to be strong on their behalf.

One of the things they wanted to ensure was that there were not substantial changes to the International Agreements because there were years of negotiations into these. The Agreements were signed. They were well established. They didn't want a whole bunch of changes. They didn't want to just reopen all the negotiations when another partner came in.

If you have a treaty that is some general principle, other countries can sign on easily. For the Space Station, there was no amendment process. There was no provision for adding partners. As soon as you invited somebody else in, you did have to renegotiate the agreement. All of the partners wanted what we called the minimalist approach. The idea was you could take the International Space Station Agreements and wherever all the countries were listed, you just added, "and Russia." All the terms and conditions stayed the same. The hard part was going to

be just valuing the Russian contribution, because we had this percentage share arrangement. That minimalist approach probably lasted five seconds into the first negotiation. Then the Russians made clear that the minimalist approach was not going to work for them. That just broke open the Agreements and started that entire process.

What was interesting is in spite of the partners having insisted that nothing could change or minimal changes, once the agreement was opened, that's when Europe came in with all their nonnegotiable demands. They were all changes to the agreement from the original.

It was a challenging process because the way the Agreements were set up, quite deliberately at the beginning, was one multilateral agreement at the top, at the State Department, foreign ministry, intergovernmental level, and that's mostly the legal terms and conditions and just the general framework. But all of the NASA level memoranda of understanding were bilateral. Bilateral with Canada, bilateral with Europe, and so on.

The negotiation rounds were such that since we had a legally binding international agreement with the original partners first, if we were going to change anything in the agreement, I went to what we called the Consultative Working Group and met with Canada, Europe, and Japan, their space agencies, together, the four partners, and we hashed out what was I allowed to change, what could they support.

Then I would take that version of the agreement. We'd go to Russia. I'd propose these things to Russia. They'd accept some, they'd reject others. Then I'd have to go back and say, "Well, I couldn't get them to agree to this, but they counterproposed that. We're okay with it, would you be okay with it?" I went from multilateral to bilateral to multilateral to get that.

Then I also had to make sure that every bilateral agreement stayed consistent on all the common terms and conditions. Then when things happened like the Europeans coming in and

wanting to change a whole bunch of stuff, I'd have to see if that was okay. We'd work that out. Then if it changed something or they proposed to change something that affected everyone, then I had to go talk to the Japanese about it, talk to the Canadians about it.

The round-robin of iterative updates to the agreement was a very complex process. My one regret in that whole system was we were on such a fast track that I would have loved to have more time in between to really internalize and strategize about a lot of those. But we were on the road just all the time. Things were changing quickly and we were being asked, "Are you done yet? Are you done yet?" by all sorts of parties. My boss especially. It was a very reactive process. It was very challenging, trying to keep track of everything.

Then one of the other things I ran into is because I was fresh to these Agreements, I would read the words and just take them for verbatim what they said and what I assumed that meant, because there was no little side handbook that said, "Behind the scenes this clause was fought over tooth and nail. You can't change this comma or that word or Europe will object strongly because it has this added meaning behind the scenes for whatever reason."

There were times when I would think something sounded perfectly logical and it made sense and my negotiating team on the U.S. side said, "Yes, sounds fine, no problem," and then one of the partners, usually Europe, would say, "You can't possibly change that, we spent years arguing over that clause," and then I'd get all the history lesson on why that was important, what it meant. There were a few times where I could have used more background on something but I just was given here's the agreement, go run with it, and do it.

One of the differences between the first round and the second round for the negotiating team was in the first round of negotiations the NASA delegation had a lot of oversight from other agencies because it was establishing the Space Station for the first time. Other departments

had a strong interest. Peggy Finarelli and her team had to regularly backbrief State Department and others on where they stood. I think there also was some interest in Congress in being kept apprised of how things were going.

When I did the negotiations it was like nobody cared anymore in a way. The project had been established, it was going forward. Even talking to the Russians about the definition of peaceful purposes, it was like, "Eh." There was nobody out there saying, "Lynn, come brief me. I need to know what clauses you're changing." I didn't have all this interagency oversight, and frankly, trying to find anybody in Congress who was interested in hearing it, they just didn't have it at a priority level.

Our team had a pretty free hand for just doing what made sense and what the Agency needed and what the partners needed to reach that agreement. It was a very different climate from the first round.

JOHNSON: But it still took a long time.

CLINE: Four years, yes.

JOHNSON: Which was longer than the first agreement, right? I think I read that it lasted longer than the first one, which was ironic, especially given that you didn't have as much oversight.

CLINE: Yes. It was complex.

JOHNSON: You were negotiating for the International Space Station for building the Station and for how the partners would work with that. Were you involved with the Shuttle-Mir, when they decided to do the Phase 1?

CLINE: Yes.

JOHNSON: Were you involved in working that through too? Because that was also one of those that was thrown in on the Europeans and the other partners.

CLINE: One of the things that happened was in this early time period when the Russian Space Agency was established and we were establishing a relationship with this new entity, the head of the International Office at that time, Bob Clark, and the Administrator, Dan [Daniel S.] Goldin, decided one of the things they wanted to do was a contract, I think it was a $1 million contract, with the Russians, where the U.S. would pay them for I can't even remember what. That was used as a test case and a practice run, if you will, at negotiating with them. Exposing them to American procurement laws was interesting, just all the standard clauses included in anything that the U.S. government contracts for. It was a way of everybody getting to know one another and going through this. That contract was one negotiation.

The Shuttle-Mir agreement was another. I still remember that I was on one trip to Russia and we had this agreement. I can't remember the number of missions now. But we had agreed how many times we'd have Shuttle dock to Mir, how many astronauts would fly on one another's vehicles, all of that stuff. We were feeling pretty good that we'd reached a good agreement. We took it to Goldin, and he said, "That's not enough. Add two more missions," or

whatever the number was. We were like, "What?" We were stunned. Those were not so straightforward either.

I think at that time too it was a delicate relationship because a couple things. One, NASA's experience with Shuttle was a lot of short duration, jam-packed, highly timelined, very focused missions. You're only going to be up for 14 days or so and you've got all these things to accomplish, you're going to get them all done.

The Russian program with Salyut originally and then Mir were all about long-duration missions and a fair amount of freedom for when things got done, because if it didn't get done today it could be done tomorrow. It wasn't so jam-packed. Putting those two cultures together was a just very very different experience. That was one thing.

Another interesting dynamic was that the Russian Space Agency was a brand-new agency. It was a very small agency that suddenly was put in charge of all of the big expertise in the state-run companies like [S.P. Korolev Rocket and Space Corporation (RSC)] Energia and Khrunichev [State Research and Production Space Center]. I think they basically resented having this new entity above them because hey, they're the ones with all the experience.

It was quite difficult for NASA that our systems didn't match, because NASA had all this expertise in the field centers, and then we also had all this expertise in the contractor community. The Russians had this tiny little government agency, and then you had these huge companies, and the companies were more like our Johnson Space Center [JSC, Houston, Texas], but they were different, and NASA wanted to treat them to some degree like a contractor. It was confusing and difficult.

One of the interesting things is whereas we'd had huge turnover in our personnel, the Russians brought to the table a whole bunch of veterans of Apollo-Soyuz. They had memories

of working together successfully with the Americans. NASA personnel at the field center level quickly learned that personal relationship with your Russian counterpart was extremely important. You needed to build up trust, respect, and understanding. That was far more important than anything written on a piece of paper.

At the beginning JSC would rotate people through and send a different avionics expert or a different structural expert the next time, and the Russians didn't know how to deal with that, because they knew the other guy. They'd finally just gotten to know him. "Who's this guy that we don't know?" JSC learned that you had to respect that personal relationship. If you were going to change out people, then the original guy who'd built up the relationships needed to personally introduce his successor and say, "I vouch for him, he's really good, and please work with him the same way you did with me."

Culturally that Shuttle-Mir experience was really good for the two sides to develop respect for one another and trust and learn how to work together in spite of having quite different and isolated from one another kinds of experiences, and just get to know one another as human beings and fellow engineers who had this common goal. I think that was extremely helpful as we got into International Space Station itself, because then NASA could help translate for the other partners how this was all going to work. We had some basis for that.

JOHNSON: Did Russia view the other partners during all of this that we're all equal partners? Or did they view the Europeans and the Canadians and the Japanese, since they had been partners with the U.S. first, that those are your partners, now we're coming into it, and we've got all this capability that you need?

CLINE: I think the Russians actually had some level of experience working with Europe. They had their own bilateral relations with Europe. That probably helped a little bit more with Europe. They did not have the same level of experience in working with Japan or Canada. Many many times the Russians made comments in bilateral meetings only, "They're your problem. They're your partners. I don't care. Canada? They're at 2 percent. I don't care what they demand." They were snarky comments, not very respectful.

But whenever we were in a multilateral session none of that showed. They were very polite. They were supportive of the other partners, seconding some of their positions, "Well, we think that Japan is making a good point."

The dynamic going from multilateral to bilateral was very interesting because in the bilateral sessions I would hear from the original three partners repeatedly that it was my job to be really tough with the Russians. They were counting on me to represent their interests. We'd get into the multilateral session and I'd make the point that all of them had urged me I absolutely had to make, and none of them would back me up. It was my job to be the bad guy, the tough one, big bad American. Privately they would insist on that. But as soon as you'd get in the multilateral then everybody was sweetness and light.

The Russians, same thing. "Those partners, they're your problem, you go deal with that." We'd get in a multilateral session and they would be very polite and deferential. The dynamics between the bilateral and the multilateral were really fascinating.

JOHNSON: That is interesting. You're the heavy in every situation. "We don't know what she's talking about." That's amusing.

Did you have any involvement with the discussions on the crew as far as selection of the crew or the Code of Conduct, all of those documents?

CLINE: The Code of Conduct came after the Agreements, and I was not personally involved. Angela [Phillips] Diaz led those negotiations. She's someone you might want to talk to at some point. She led that team that did the Code of Conduct negotiations.

JOHNSON: It's just an interesting point. One of those other things that people don't necessarily think about with an agreement like this.

CLINE: Right. Again there were cultural differences. The ethics rules that we have in the United States that says things like our astronauts can't endorse products runs counter to what the Russians permit their cosmonauts to do. There were issues that needed to be ironed out that were differences in culture and differences in what was legally permitted and considered routine or normal in one country might be prohibited in another.

JOHNSON: One of the things working with partners. Were any provisions put into it as far as commercial use later on? Now that we're having more and more commercial uses up there. But were those provisions put in early on?

CLINE: Yes. Commercial was always permitted. It wasn't highlighted at the time, just because of I think where things stood. But Ariane is ostensibly a commercial system, and Ariane was mentioned as a launch vehicle.

That was one of the changes that came in the second round. In the first round of negotiations the entire program was built on the understanding that the Shuttle was the vehicle that was going to do it all. Launch the elements, bring things back, everything.

When we did the round of negotiations I was involved in, then one of the things that changed was Europe said they really would prefer instead of their financial obligation to NASA to pay for operating cost, the cash across the ocean, they would like to give us in-kind services. What they wanted to offer were Ariane launches. They asked what could they provide that would be needed by the program. That's how ATV [Automated Transfer Vehicle] came about, designed specifically to include propulsion as well as cargo, so that we had a secondary redundant system to the Russian propulsion that was being provided with their vehicle.

Then Japan came along and said, "Me too," and that's how HTV [H-II Transfer Vehicle] came about. NASA said, "Well, we don't need more propulsion but we really could use several different kinds of cargo capability." It was designed to meet that need. The idea was instead of them having to pay for operating costs, when they launched supplies to the Station that would help pay off their obligation for the operating costs. That was a really big change in the Agreements.

One of the things I did the very first time I read the Agreements, I discovered that the Agreements still included Earth Observing System [EOS] platforms. It included a man-tended free flyer that Europe had proposed to build and never did. It included the Hermes spaceplane that Europe was going to build and never did. The first thing I did was go through and redline out all the stuff that no longer applied. Then there were all these phrases in the agreement that referred to the manned Station to distinguish it from the Earth Observing System. EOS went forward but as a separate program entirely.

The first thing was just line out all of this stuff that no longer applied and have a clean agreement starting with that. As these changes came in then all of a sudden you had ATVs and HTVs and Arianes and all these other things came into the agreement. If you look at the two there were some substantial changes in the content of the program.

At the beginning it lists what each partner is going to provide. One of the challenging things was keeping the Russian list accurate, because they kept changing what modules they were going to provide. Sometimes the Johnson Space Center folks would agree to some change with the Russians that wouldn't work its way up to me. I'd get surprised by the Russians. "Oh, no, that list isn't right anymore."

"What?"

"No." I reached a point where I said, "Okay, we're not going to touch this clause until we get to the end. Then whatever you're providing at that point I'll just put it all in," because it just kept changing.

JOHNSON: You mentioned that sometimes when you first started you didn't know the background or you didn't know if that comma meant anything or that phrase. But when you're negotiating a document and an agreement that is going to build the International Space Station, how important is putting some types of flexibility in there? Because as you've said, things change, and technology changes.

CLINE: It's extremely important. Yes. One of the things I learned, when we went through the Galileo agreement, one of the things that happened was anything that went wrong on any planetary program, the JPL reaction was next time we're going to write very clear specific

language into the next agreement in great gory detail that you have to do such and such. That's like putting a straitjacket on yourself, because things will change.

One of the things I learned working on Cassini was the better thing to do was keep the memorandum of understanding more general; the principles and the really key top level points. The technical detail should not be put in concrete in the memorandum of understanding. But you really need to understand those things. What we ended up doing on that agreement was having a technical level document that JPL worked with the ESA counterparts that was going on in parallel with the top level agreement. We just made sure they synced up.

I think one of the great things about the International Space Station Agreements is how flexible they have been. The program has been through a lot of changes, and we've always found a way to go forward with those changes. I think you want to avoid too much detail at the top level. Also what I saw from that first agreement was nobody had any desire to reopen the negotiations before Russia came in to go delete those things that were no longer relevant. Because what would you gain from that? You just put yourself through a whole bunch of pain of trying to recognize what hadn't happened. People just let it lie.

Program managers who would occasionally come with questions such as, "Why isn't this in the agreement?" Or they would cite a clause number. "But Article 15 Clause 2 says dadada." I would tell them if going forward with this program with your counterpart requires you to rely on detailed language, you've got a communication and relationship problem. It should set the framework, and then an awful lot goes on at the technical level. We're a mission-oriented agency. The technical level is what it's all about to get the things done.

You don't want all that detail up at the top level. You don't need the lawyers in the State Department and everybody else second-guessing all that stuff or trying to tell you how to do it.

If things change and you find a better way or a different way or you run into a budget problem that says you can't do something, you want the flexibility to be able to go forward and recuperate from that. You just want the principles.

If the agreement says, "We will supply cargo," well, then whether we do it launching on a commercial vehicle or the Shuttle, it's covered. It may not be what we had in mind when we started, but it's where we are now and we want to go forward. You want to make sure you got enough flexibility.

JOHNSON: Since you were involved so much in that whole negotiation, what do you think would be the legacy of ISS when all is said and done?

CLINE: I think that part of the legacy is the fact that it established a framework for all these countries to work together successfully for the long term. What I hope it will have as a legacy for the future is that it's a stepping stone in research, in human spaceflight, in evolution to the next step.

One of my personal frustrations with the American space program is that human spaceflight has a program that starts, comes to a complete halt, then we start over and do something different and we come to a halt, and we start over and do something. Apollo, Skylab, Shuttle. I look at the Russian program and it has not had those big gaps. It has evolved. I wish we could stay the course on human spaceflight and figure out how to use the previous program to go on to the next one. I hope that Space Station is part of that legacy.

JOHNSON: We're getting close to four o'clock but I wanted to ask you about your move to become the Deputy Associate Administrator for the Office of Space Flight [now Human Exploration and Operations]. That was a big change.

CLINE: Huge change.

JOHNSON: You've moving over from the side you were on to that whole technical side. Why did you make that move? What do you feel like came from that as far as what you were able to bring to that?

CLINE: Yes, that was a huge change for me. I approached it with a great deal of trepidation. I was recruited for the position. Actually I was recruited for a different position and then it evolved. There was an Office of Policy within Space Flight, so that was over the congressional relations and a focal point for the International and a couple other things. The person who was the head of that group, Angela Diaz, was asked to move to the Agency's Office of Education. She was basically doing a good job of trying to recruit her successor, and she came and asked if I would be interested and told me since she had also been in the International Office why it was a good move and would be a good office to work in.

I had some doubts about it because it struck me that the program office was more engineering-oriented and I wasn't an engineer, so why would they want me, how would I fit in. I talked to a whole bunch of folks, just friends around the Agency, what do you think, what would you do, what are the pros and cons kind of thing. I got a lot of encouraging suggestions that I should go for it.

I went down to tell Bill [William F.] Readdy that I was ready to accept the job, and he said, "I've changed my mind." I thought he was just letting me down lightly. He said, "I really would rather have somebody in that position that has more congressional experience," which was an area really, in international you don't work much with Congress. You work more State Department, White House, but not the Hill.

Then he said, "How would you like to be my Deputy instead?" That was certainly a surprise. I immediately said yes, because I had already mentally made the decision I was going to move to that office. He said, "You know you can go think about it."

I said, "I don't need to think about it, I'd like to do it."

Then it took a couple weeks for it to get approved through the system up to the Administrator. I accepted the position and we had the *Columbia* accident. That actually made me want to do it even more, because I thought this is a time of need for the office, and if there's anything I can do to help I want to do it.

What was interesting was when I started in the office I'm sitting there the first day, and there was a parade of people who came through and said, "Hi, Lynn. We're glad you're here. The Deputy used to do X. We think that's in your portfolio. Glad to have you doing that." Just pretty soon I had like this whole long list of things that people told me were my job. It was a little overwhelming.

But instead of people saying, "What are you doing here?" they kept giving me the impression that they really wanted somebody who had communication skills. They recognized that that was part of my expertise. That certainly was true for all of the post-*Columbia* work in how do we go through this process of the investigation, the decision on what to do next, the

return to flight, how do we communicate all of that to the public, to the press, to the Congress, how do we keep the White House informed.

One of my jobs was frequently talking to staff at the Office of Science and Technology Policy and making sure they weren't surprised by anything that showed up in the press: a test result, a plan to do something new. Once we started flying again, I was on the phone to them if we had anything, tile damage was discovered, okay, I'd call and tell them, "We don't know yet what it means but there's some tile damage. We're putting together the action plan." That way they could send word forward if it was significant enough to make sure that people higher up in the White House didn't get surprised. I was that channel of communication to make sure that we stayed in sync during that critical period.

It turns out I did end up doing a whole bunch of legislative affairs-related stuff. That was because there were so many hearings. What would happen was you'd do all this prep for the hearing. Whoever was testifying would do their testimony, and then the Congress has the right to send you follow-up questions. I remember one hearing we had 40 follow-up questions. None of them were simple. They were like compound questions with all kinds of detail required to answer them. We were getting questions from different committees, from different testimony. All of that had to be cleared through multiple offices within NASA and then with the Office of Management and Budget. The most important thing was to stay consistent, when you had so many different questions, and some went to us, some went to the Safety Office, some went to this office. Making sure that whatever NASA said was consistent going out of the Agency.

There were times when OMB weighed in that they wanted us to answer it differently. Sometimes the Office of Space Flight would feel like "No, I don't want to answer it that way,

because that would preclude these other things we're looking at as a possibility." We'd have to go and my negotiating skills came back in again on that.

It was a huge amount of reading and editing text all the time. We were just absolutely inundated with congressional questions for many years. Then the other aspect was all of the reports. If you look at when they pass the legislation with the NASA appropriations or authorization, we would get a requirement to give them a report on certain things. They were rarely a simple straightforward factual question. They were rather involved questions. Policy issues, plans going forward. Again somebody would do a first draft and then we'd have to clear it through all of these different offices. It seemed like no matter how early we started, we could have the report done two months ahead of the due date, that whole clearance process would frequently have us turning the report in late to Congress past the deadline they had established. Then we'd get yelled at for being late.

There was a huge amount of paperwork between the Congress and NASA. When Bill [William H.] Gerstenmaier came in as the head of that office, one of the things we tried to do more was regular briefings, because it's so much easier to have a conversation than to write everything out in detail and send it through this big process. It's not timely anymore by the time you get done with it.

We kept hearing criticism from the staff in Congress. They didn't hear from us enough. But whenever we'd try and set up briefings most of the time they were too busy, they weren't interested in it now, and then we'd hear complaints that we weren't talking to them. We'd get three more report requests.

That was a very frustrating aspect of the job. How do we effectively communicate things that are important and who's really taking this information and digesting it and what are they

doing with it and is it really that important and relevant? Of course the staff will tell you of course it is, because they're the ones who request it. It wasn't clear to me how useful all of that was.

JOHNSON: Especially with all the changes that were happening during that time with President [George W.] Bush's *Vision for Space Exploration* and then everything changing with Constellation [Program] being canceled, and the end of the Shuttle Program. All those things constantly changing, and not because NASA wanted to change it.

CLINE: For our partners we spent years convincing the international community that the next step was going back to the Moon, and we finally got everybody on board, only to change [presidential] administrations, cancel the program, and have the President say in his speech, "The Moon, been there, done that." None of our partners understood how we could possibly have done that to them. How could we have made such a big change? Because they'd finally come around and gotten on board.

That's the difficulty of our system with these big swings in policy. We like to say that space has bipartisan support. Certainly that's true to a degree. But the emphasis from one administration to another, from one Congress to another, can be quite different. When you have a long term engagement with international partners, it is very hard to sustain that interest and partnership if you can't follow through on it.

JOHNSON: Before we end today, I was just going to ask you if you had to look back over 36 years with NASA what do you think was your biggest challenge.

CLINE: Space Station negotiations by far. Definitely. I think that was my biggest challenge on so many different levels. The fact that it was multilateral. Trying to blend a new partner in with established partners. Having the complexity of multilateral and bilateral negotiations. Going through changes in the program during the whole process of the negotiations. I would say that was my biggest challenge.

JOHNSON: What about your most significant accomplishment? What do you feel best about? Same thing?

CLINE: I would say the same thing, yes. That's what I'm personally most proud of that I can look at. But there are other things. I have a soft spot in my heart for science programs. Whenever I see a photograph, an image, coming back from Cassini, I just feel like that was one of my missions. It makes me feel good. I think I enjoyed thoroughly learning all about—I'm a lifelong learner. I just soak stuff up like a sponge. My very first memorandum of understanding was for the ROSAT [Roentgen Satellite] agreement, which is an X-ray satellite mission. I worked on so many different science missions over the years. I just always enjoyed learning the science behind it and what the questions were that the mission was trying to answer.

One other thing that I think was a big challenge for me, one thing we haven't talked about at all, is when I moved to the Office of Space Flight, I don't know whether it was a year or a year and a half into my being there. I guess it was right after [Michael D.] Griffin came in as Administrator and there were a number of personnel changes. The person in charge of the Launch Services Program left. We looked around the Office and said, "Well, who could lead

that?" It turned out to be me. The reason was because I had all this interagency experience on the launch services policy. I was familiar with the program from that perspective. What I didn't have was the technical knowledge for the launch vehicles, but while we were in the process of recruiting a new office head, which took a huge amount of time; it was like a year later before we finally got somebody. What was supposed to be a couple months little thing for me to just look after this group became a major portion of my portfolio. That was a big learning curve for me because we had a strong relationship with the Department of Defense, because both of us used commercial launch vehicles, the Atlas V and the Deltas. We were starting to look at newcomers with SpaceX coming along. I learned tons about the procurement process because NASA goes through a separate procurement for each science mission that we're seeking a launch vehicle for. Going through that whole process.

Every time there was a problem with a launch vehicle it was something completely different. One time it was batteries, another time it was a fairing, and another time it was something in a tank. I joked that by the end of that I deserved an honorary engineering degree because having been tutored by the Chief Engineer of the Launch Service Program—like I said, I like to learn, and I'm a sponge—I would get all this detailed technical information. Then I'd have to go explain it to the White House or the Congress. I could do it, because they told me what I needed to know, and I grasped the concept. But that was totally out of any of my experience in the past. That was a big challenge.

JOHNSON: It's amazing that you were able to do that. That's interesting. Before we end I was going to just check and see if Rebecca had any questions for you.

WRIGHT: No, I think you just answered. You were talking about those types of things and that it was fun every day to see what you were going to learn. I was going to ask what you enjoyed the most. But you just mentioned it.

CLINE: I'll tell you, one of the things that was very interesting as a learning experience, and this is a time that I treasure. After the *Columbia* accident, going through the whole return to flight process. I was Deputy to Bill Readdy at the time. He basically took me everywhere with him. All of the meetings. We went all over the country to each of the field centers that had a role, to various contractors who had a role. All of that. The council that was meeting to review all the next steps would meet at these different places. It was a way of letting the workforce at those places know, "You're important, we care about what you do," and also to see the facilities and the work going on.

For example to be at JSC when they were trying to figure out, "Okay, if we ever had a tile problem again how could we repair it?" They were working with all these different techniques of how do we take this caulking gun and squeeze the stuff into the gap. Then they're describing that what happens in the space environment is it actually expands like a cake rising. You need to underfill it so that when it rises it's flat, because otherwise you're going to have a bump. Then that's a different kind of problem. Just learning all those things.

One of the things that [NASA Administrator] Sean O'Keefe did was he had a little senior council group because he also is not an engineer. He needed to be more conversant in all these details. Once a week he'd have a group of people in his office. The Chief Engineer at the Agency would pick one topic, and it might be the wings, it might be the tiles, it might be the avionics. He just picked a topic every week, and he did a little tutorial for the Administrator on

how the system worked, what were the problems that were found, what were we doing about it, what was the step forward. I got to sit in all those meetings. Again it was a great learning experience.

I can't imagine having had any better career than all of the opportunities that I had.

JOHNSON: It sounds like it was really exciting. A lot of travel involved, that's for sure. How many times do you think you went to Russia before it was over with?

CLINE: Yes, I don't know. We rotated around the world. There were a fair number of trips to Russia. Some of my colleagues have been many more times than me. Certainly the technical folks were probably there a lot more often than me.

JOHNSON: Was there anything else we haven't talked about you wanted to mention before we go?

CLINE: No, I don't think so. I think we pretty well covered the waterfront.

JOHNSON: We appreciate it. Thank you.

[End of interview]