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MICHAEL F. O'BRIEN
INTERVIEWED BY SANDRA JOHNSON
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JOHNSON: Today is March 29, 2017. This interview with Michael O'Brien is being conducted for the NASA Headquarters Oral History Project. Mr. O'Brien is speaking with us today by telephone from Springfield, Virginia. The interviewer is Sandra Johnson. I know it's been 10 years since the last time we talked, and I want to thank you for agreeing to talk to us again.

O'BRIEN: Almost to the day.

JOHNSON: I wanted to start out by talking a little bit about something you said during that *NASA at 50* [*Interviews with NASA's Senior Leadership*] project in the previous interview [March 21, 2007]. You said that your years in the [U.S.] Navy and experience in international negotiations were apparently of interest to NASA when you were ready to retire from the Navy. I was wondering if you could talk about that transition from the Navy to NASA and how that occurred. Was it in '94 or '95?

O'BRIEN: '94. It was one of those things where a series of coincidences bumped into one another. I was at the end of a really good Navy career. At that particular time, at the end of my career, I was the Deputy Director for Research at the Institute for National Strategic Studies (INSS) at National Defense University in Washington [DC]. I was in my twilight tour.

I'd been an attack aviator in the Navy, flew off aircraft carriers for about 15 years or so. I had command of a carrier-based attack squadron and, later, commanded Naval Station Roosevelt Roads, [Ceiba] Puerto Rico [now José Aponte de la Torre Airport]. But the Navy—during what they call "shore tours" in between assignments at sea—was very good to me, and sent me to a variety of different types of assignments that without really knowing it, in my view, prepared me for a job at NASA.

One of those was an Olmsted Scholarship [Olmsted Scholars Program] where I went over to the University of Geneva, Switzerland to work on my PhD in physics. I already had my Master's Degree in physics from Cornell [University, Ithaca, New York] before I went to flight school, but I got over there after five years flying off aircraft carriers and realized a couple of things. One was it'd been a long time since I'd studied physics; physics was hard, and I didn't like it anymore!

The Navy was very kind to me, and they let me change my course of study. So I spent two years studying international relations at the Graduate Institute of International Studies, also in Geneva, as a lieutenant in the Navy, which set the stage for some future tours that I had at the French Naval War College [École Superiéure de Guerre Navale, Paris] as an American naval officer there with 26 French naval officers, and the tour in Puerto Rico that I mentioned.

Then, when I got to be more senior, I spent two years working for the Chairman of the Joint Chiefs of Staff in Washington, a wonderful patriot by the name of Admiral William [J.] Crowe [Jr.]. As part of my job he had me doing some negotiations in the Middle East for a couple of years, mostly in the Persian Gulf area before the First Gulf War [1990-1991]. At the time it was very sensitive. Now it's fairly common knowledge that we were negotiating bilateral

defense agreements, or just talking about what might happen if we needed to support one of those countries.

I spent a lot of time back-and-forth going to Oman and Saudi Arabia, Bahrain, Kuwait. As it turned out, there were some folks along the way that ended up in NASA later on that gave me a heads up that NASA was looking for somebody to do some international work at NASA.

All that added up—to me anyways, as I look back at it—as a pretty good preparation. Although I had no background in space, I had a master's in physics and a master's in aeronautical systems, but no real space experience. So, I was a little bit surprised when NASA folks called. What they were actually looking for, which probably isn't known by a whole lot of people, was not someone to come negotiate the agreements for the International Space Station.

My first call was from Randy [Randolph H.] Brinkley, who was the Space Station Program Manager at the time. He was looking to set up an office in Moscow [Russia], their first office there. They had one individual that was there that didn't work out, and I'd known Randy from a previous study group [The Chief of Naval Operations Strategic Studies Group] that we'd been on for a year up at Newport [Rhode Island].

He knew my background in international relations and thought that perhaps I would be interested in being the lead in the Moscow office. I told him it wasn't really of interest to me. I was still on active duty in the Navy, but if they'd send me to Moscow I'd look around, talk to the embassy folks there, and give them my impression of what needed to be done, if I were right for the job.

An anecdote for you—you've been around long enough to remember. They sent me invitational orders to Moscow. The itinerary was from Washington to Houston to Moscow. I said, "I'm no rocket scientist, but the direct route to Moscow does not go from Washington to

Houston. Why am I coming to Houston?" Randy said, "We're going to have you meet the Deputy Center Director at the Johnson Space Center."

My response was, "Why should I meet the Deputy Center Director at the Johnson Space Center?"

"It's a guy by the name of George [W. S.] Abbey, and I think you really need to get to know him."

I trooped down to Houston, met George. That was my first meeting with George. Went to Moscow, spent four days there, had a really nice time looking around, came back and told Randy, "Look, I could probably do that job but I am absolutely not the right person for it. You need someone that speaks Russian. You need someone that knows Russian history, which I don't, and is comfortable in that environment. I just am not that guy. Thank you very much."

One thing led to another. It turned out that at that particular time—without going into too many details of the individuals involved—I didn't really know it at the time, but there was really a bad relationship between my former office, which I think at that time was called the Office of Code I, and "Code M," which was running the Space Shuttle and the Space Station Program.

The [NASA] Administrator, Dan [Daniel S.] Goldin at the time, had brought in a State Department [U.S. Department of State] detailee who did have Russian experience to be the AA [Associate Administrator] in my old office, and basically was running roughshod over Code M—as I saw it later on, I wasn't there—and was making decisions without coordinating very much of it with Code M, which as you can imagine was a terrific irritation. Here we were talking about not only redesigning the Space Station, which was going on at that time at Reston [Virginia], but somewhat secretly thinking about inviting the Russians into the Space Station program, which

was a huge deal. We were in the process of thinking about that, without discussing it with our current international partners at the time.

Long story short, the Navy loaned me to NASA for a few months because I was at the end of my career anyway, to see if I could come in there and be basically a liaison between Code M and the Office of External Relations. In so doing, they put me in charge of this team of six folks that would negotiate the agreements for the International Space Station [ISS], which was really four parallel negotiations: three with our current partners, the Europeans [European Space Agency], Canadians [Canadian Space Agency], and Japanese [Japan Aerospace Exploration Agency] to change an agreement that we had already made, and then one brand-new one with the Russians [Russian Federal Space Agency] to bring them into the ISS partnership.

In retrospect, I have no idea why they chose me to do that, because as I mentioned before, I didn't really have a space background. Although I had plenty of background in leadership, negotiations and technical things such as flying off aircraft carriers. If you read the tribute to NASA that I did in my brochure for my retirement, and probably in some of my comments at my retirement ceremony, I think it's a great tribute to guys like Al [Albert] Condes and Jay [E. Jason] Steptoe and Lynn [F. H. Cline] for sure, who was the lead negotiator, and Melanie [W. Saunders] and Peter [R.] Ahlf, that they not only took on this horrendously difficult job, but in the process took me on as their leader and trained me along the way.

So I'm forever in debt to all of them for what I think was one of the most incredible negotiations and international agreements ever attempted. It's the largest, most complex international science and technology development project in history. At the time, when we were negotiating every little comma in the agreement, we weren't thinking about that in those grand

terms. But it turned out after three-and-a-half years we felt a real sense of accomplishment when those agreements were signed in January of 1998.

So, I came on board in a curious way. I don't know if they gave me the job thinking, "We'll see if it works, and if it doesn't we can send him back to the Navy." I really don't know, but we put our heads down and literally for three-and-a-half years that's all we did, "If it's Tuesday, it's Belgium" type of thing. We were circling the globe four or five times a year. Lynn was the master. She was the lead negotiator, who has just an incredible talent, memory for every comma, word, and everything that anybody ever said at the last session.

I can remember dragging around these little goofy printers. Remember, 20 years ago we didn't have all this automation for IT [information technology] stuff. The line-in/line-out stuff wasn't quite as sophisticated as it is now, but we somehow got it done.

That's the top-level background, at least process-wise, how it worked. To me, the day-to-day problems of negotiating an agreement were tough because you had four different partners who had different ideas about what should be in the agreement. Some things had to be exactly the same across four agreements, but some obviously were different because each partner had a different set of contributions.

To me, the first big hurdle we had to overcome was the mistrust of our current partners for the way that we (the United States) invited the Russians, because we basically laid it on them. I don't know if they found out when the President [William Jefferson "Bill" Clinton] announced it. It could hardly be much before that. They were not really involved in the internal U.S. government discussions—nor should they probably have been—but I think we didn't do a very good job of getting them a heads-up that it might be coming.

During the first year or two of the negotiation it was pretty tough with our current partners. They wanted very much to be involved in the bilateral negotiation with the Russians, and we said, "Absolutely not." Actually, our response was, "How about if we have the Russians involved in our bilateral negotiations with you?" They of course said no. We worked out a deal that about every two or three sessions with the Russians, we'd get the other three [partners] together and we'd brief them on where we stood.

The big issue was, "How are we going to identify and distribute the supposed benefits of bringing the Russians into the Space Station?" We told them at the beginning, "We will figure out a way to do that and everybody will get their share." As it turned out, we never really figured out a way to do that. I can get into those details in a second. It all boils down to the sharing agreement that we came up with.

Our idea was you just make the pie bigger, because the Russians are bringing a huge infrastructure into the Station. The pie gets bigger; it still has to add up to 100 percent, and all we have to do is figure out a new set of percentages and make sure that our current partners get a little more than they did in the past under the arrangement without the Russians. We worked for a couple years on that, and it always seemed to add up to 106 percent. When numbers were important, the Russians would have big numbers.

An example was that there were going to be 33 International Standard Payload Racks [ISPRs] on the non-Russian side distributed under the conditions that were already agreed to before the Russians came on board. The Russians went, "Hmm, 33, that's a good number. We'll go back and tell you how many equivalents we have on our side." They came back and said, "We have 64 Universal Working Stations." That's interesting, International Standard Payload Racks are like a telephone booth, all standardized. The best we could figure out, they were just a

bunch of patches of Velcro [hook and loop fasteners] that were stuck around their part of the Station.

Those types of measurement comparisons just never seemed to work. We finally got to the point where the Russians actually made a proposal of which, of course, we were suspicious about two-and-a-half years into it. They said, "Why don't we just keep what we bring?"

We said, "What do you mean?"

"If we bring stuff to the Station, we'll supply it, we'll provide power, etc. You guys bring stuff to your side of the Station, you can do it under your old arrangement with the same percentages."

We went back and looked at that. Peter Ahlf, who's since left NASA, was a member of our team from the Science Mission Directorate, and he was a real whiz with numbers. He came back after a week or two and said, "I think this'll work." That's what we ended up doing. We defined the interface between the Russian segment and the U.S. segment, and all we had to do was measure what crossed the interface—which was mostly fuel from the Russian side and logistics and food and infrastructure from the U.S. side—and figure out a way to value that in terms of upmass, and came up with that as part of the agreement. Johnson Space Center has had a group of people down there that for the last 20-some years measuring those things and keeping them balanced, and it seems to have worked.

That's a five-minute discussion of something that took us three-and-a-half years to figure out. The balance, the sharing arrangement, and the fact that we brought the Russians in without appropriately—in my view anyways, certainly in our partners' views—consulting with them in advance, were the two biggest things, amongst the thousand little things, that were tough to do during those three-and-a-half years.

JOHNSON: You mentioned that Randy Brinkley first talked to you because he wanted you to go to Moscow, and they had made this decision to bring the Russians in. That was around the time that the Shuttle-Mir [Program] was kicking off.

O'BRIEN: Yes, I forgot to mention that. Shuttle-Mir was just about to start or had started. For a long time we called it Phase 1 of the International Space Station Program. But Shuttle-Mir agreements were separate. The idea was to work with the Russians, fly those 11 missions, figure out how to dock the Shuttle to the Mir space station, and if that was all working, we could in parallel be working on the agreement for an International Space Station.

I might mention one other third thing, that just occurred to me, that was a big upset during the negotiations. I called it "six months off for bad behavior." The Russians showed up in Houston in December of one of those years, '95 or '96, with this huge proposal. The Mir station was still operating obviously, and this proposal was to not build an International Space Station from scratch, but just build onto Mir, which was a total nonstarter, both politically but certainly technically. It took Johnson I think a little bit by surprise. They did their normal great job of page-by-page showing them what an idiotic idea it was. They had to deal with it as a real proposal, and that probably set us back in the negotiations four or five months because we didn't know what to do at that point.

The hero in all this was probably Yuri [N.] Koptev. He was the head of Roscosmos [State Corporation for Space Activities]. At the time it was RSA, the Russian Space Agency. He found himself in the midst of some real opposition amongst the nationalists in Russia who wanted the Mir to live on. He came out publicly, I think very courageously, and said that no, the

future of human spaceflight in Russia is the International Space Station with the United States, and it was time for the Mir to come to the end of its life, which it did sometime towards the end of the 1990s [March 2001].

That was a big deal, in my view, for him to have taken that courageous stand. That helped get rid of this proposal to build the International Space Station off of Mir, which wasn't going to work technically, and couldn't have sold politically anyway.

JOHNSON: It was an interesting time for Russia because the fall of the Soviet Union had happened [in December 1991] not long before all this started, and I know they had some financial issues through all of this. Do you feel like politically that might have been some of the impetus to work with the Russians? To keep them from turning to other areas?

O'BRIEN: While this was going on at the political top-level view, which we weren't involved in other than being told what to do by the [presidential] administration, the Soviet Union was only a few years since its collapse, and we were worried about what those Russian scientists were going to do. They were hurting for money. At one point their budget was one-seventieth of NASA's budget. They were at about $30 million or $40 million a year when ours was $14 billion. They were getting a lot for that, because even the leftovers of the command economy were pretty cheap.

So there was this idea that we, the United States, needed to both keep Russian scientists doing things that would be to benefit others and maybe to get some money to them. That's part of the reason that you get this famous $400 million contract that ended up being over $1 billion—or who knows what it is now—for the Shuttle-Mir flights.

Then later on to pay for things like flying Americans on the Soyuz [Russian crew spacecraft] to the International Space Station. Because we, the United States, failed to meet one of our obligations on the International Space Station, which was to build a Crew Rescue [Return] Vehicle [CRV], which, in my view, was a strategic mistake on the part of the United States in later years, the early 2000s.

Yes, it was all tied into politics. I thought it was a pretty gutsy move by President Clinton to do that. It seemed to have worked out. There were years when I can remember traveling to Moscow a lot. During one of those years, it turned out a friend of mine, that I'd known when I was working for the Chairman of the Joint Chiefs of Staff, Bill [William J.] Burns, ended up being the U.S. ambassador to Russia for four or five years, then subsequently Deputy Secretary of State. Every time we'd come to Moscow he'd say, "Oh man, I'm so glad to see you guys because right now the only thing that's working between the United States and Russia is space." It was amazing.

I have to say, coming from my perspective, neither side, on the technical side, or the NASA folks or the Russian folks really had much enthusiasm for this at the beginning, didn't have a feel for how hard it was going to be, and there was a lot of suspicion. The Russians did things so much differently than we did. But once they got to working together, it's like fighter pilots from around the world, they speak with their hands. The cosmonauts and astronauts got together, and after a few knock-down, drag-out fights and some vodka shots at the dachas [Russian seasonal country home] and a few flights to Shuttle-Mir, there got to be a lot of mutual respect, which still exists.

We have never had in the history of the Space Station program an issue that's gone even to the heads of the agencies for resolution. The last thing we ever wanted to do—in the

agreements, if you go to the governmental level, you get Ministries of Foreign Affairs and Department of State making technical decisions. No one wanted that to ever happen. We've always managed to work out any problems—and there've been some along the way, some big ones—and they've been handled at the Bill [William H.] Gerstenmaier [Associate Administrator for Human Explorations and Operations]-level and below. I think that's a real tribute to the way these two organizations work together. I also think that the agreements had something to do with it, because I'm biased in that aspect. Nobody ever mentions that, and that's okay.

JOHNSON: A couple things came to mind when you were talking. You having that military background—as you described yourself, an attack aviator—and for many years the Russians were not people we negotiated with. They were quote, unquote "the enemy." Some of the people we've talked to in the past who were also pilots or aviators mentioned that that adjustment was interesting in their own mind. Going from "Okay, I don't trust these people" to "Okay, I do trust them." It was an interesting adjustment. Did you find that also personally?

O'BRIEN: Yes. My first trip to Moscow was '94. Moscow now is a pretty sophisticated city, but back then there were no foreign cars there, for example. There were all these Russian junk heaps driving around.

I spent most of my career in the Cold War planning for the ultimate war against the Russians. Part of that was flying nuclear weapons off aircraft carriers in my type of aircraft. I had a target, I intercepted Russian bombers in the Mediterranean. Yes, it was a bit of a mindset there, but I was certainly willing to give it a shot.

I remember stepping off the airplane in Moscow in Shere-2 [Sheremetyevo International Airport] and walking into that terminal, looking around and going, "Oh my God, what have I gotten myself into?" It was a real shock. But that all disappears once you start meeting the people and working with them, even though they're your adversaries. The negotiations with the Russians were not easy because they wanted very, very much to be treated as equals, which we did. They didn't want to deal with what they called the "noise partners," the Europeans, the Japanese, and the Canadians. We did not like that characterization at all, but they just wanted to deal with us, and, "You guys take care of those other partners."

That worked out over time as the European and the Japanese astronauts started flying with the Russians, that all settled out. At the beginning there was a significant amount of suspicion, but we had a job to do and we sat down and did it.

JOHNSON: Because of the shift in the position with the U.S. and Russia, a lot of things like export control laws and ITAR [International Traffic in Arms Regulations], those different regulations—you had to get through that during the negotiations to bring them into the Space Station Program.

O'BRIEN: We had provisions for those types of issues, the standard provisions that you have in any agreement between international partners about how you will deal with export control. One of the things we did to design hardware to interfaces, so if their box had to connect to our box, we didn't have to know what was in it. All we had to know was that they could connect to one another and it would work. It was a real challenge because this was the first time in history for such a huge technical project between former adversaries.

As I mentioned, this was a very unique project. One of the very unique aspects of it is you're going to put together this 1,000,000-pound monster in space, and you're never going to test it on the ground. Although we did manage, with some of the delays in the building of Station—particularly a couple years when the Russians couldn't get their first element up because of financial problems—we figured out a way to do some ground testing by connecting some of the modules together at Kennedy Space Center before launch. But basically the first time these things ever worked or were tested as a system was when they were on orbit. They had to work ahead of time.

But the export control tech [technology] transfer issues were not as big a problem as I anticipated. I don't remember there really being a showstopper in there anywhere. There'd be individual issues we'd have to deal with, and we'd work them out. As long as you could identify what the issue was and get State Department and the right people in the export control environment working on it, we were able to work it out.

JOHNSON: Melanie Saunders, in her interview, mentioned that the team worked to get the Space Station classified as a civil space satellite. That way it was under the [U.S.] Department of Commerce jurisdiction instead of the State Department.

O'BRIEN: Yes, that made things a lot easier because then you're not talking about U.S. mission lists and ITAR stuff. You're talking about a different set of rules, and they had a different set of process procedures that were easier to deal with. That was a big deal.

JOHNSON: Also, you mentioned Lynn Cline being the chief negotiator. For some of the countries, negotiating with a woman may have been an issue because that's not something that they normally did. Did you notice any hesitance or pushback from any of the partners, including the Russians?

O'BRIEN: Absolutely, absolutely. I loved it. I loved the fact that many times, particularly the Russians—they would have sometimes a female sitting in a back row, but they never had a female, that I recall, sitting at the table with Alex [Alexey B.] Krasnov and the rest of his gang. I don't remember specific insults, but little comments off-to-the-side that folks made. What I did notice over time, was as soon as they figured out how formidable a negotiator Lynn was, any animosity or pushback went away. They had to deal with the facts of Lynn and how good she was, not the fact that she was a woman.

I never really noticed anything with the Japanese. The Europeans would make a comment every once in a while, because they were mostly men. The Canadians, I don't remember anything specific. But the Russians, oh yes, they're a pretty chauvinistic crowd. We had two women on the team, both of them smart as can be (Lynn and Melanie Saunders). Lynn being in the lead negotiator role, she's the one that did all the actual negotiations, and she killed them. It was just fun to watch. I would say that they ended up with a very deep admiration and respect for her at the end of the process. Maybe a little bit grudging on the side of the Russians, but it was still there.

JOHNSON: You talked about dealing with the attitude of the Russians and how they didn't want to deal with the other partners. Talk about all the different partners, the different countries that

you had to negotiate with, and a little bit about their negotiation style and maybe what was unique about each one.

O'BRIEN: The Russians we already talked about. That was unique both from the perspective of the end of the Cold War, and being forced upon us by the politicians and bringing them in without appropriately consulting our other partners. The fact that they wanted to be more like us than like anybody else, and that dealing with the Russians is always tough because they're just tough negotiators because of the way they've had to live.

The next one that I found interesting—and I'll give you an anecdote to make the point—was the negotiations with the Japanese. Now we're talking about renegotiating an agreement that already exists, so we're working from old text and we're changing it to accommodate the fact that the Russians are going to be involved. It was very tedious with the Japanese. One of the reasons—it gives a little bit of the idea of the mentality of the Japanese, I think. When they decide to do something, they do it. That was good.

I'll give you two anecdotes. One is that we would find mistakes in the previous agreement. They might be a typographical error, there might have been a comma in the wrong place, something like that. We would want to, in the renegotiation process, just get rid of those mistakes. The Japanese were always very hesitant to do that. We finally figured out that someone would have to go back to the Japanese government and admit that they had made a mistake in the previous agreement. That was a bit of a problem.

The other one—it'll take me a second to tell the story, but I thought it was pretty interesting. When you convince the Japanese to do something, they're going to do it. One of the things that we decided had to do with a centrifuge. We decided for a variety of reasons, I think

both cost and technical, the centrifuge wasn't going to work. Earlier, we had convinced the Japanese, with difficulty, that it was an essential part of the Space Station Program, but at the end of the day, they ended up arguing back to us our very talking points that we used earlier.

The Japanese couldn't understand why we needed a centrifuge. I don't know what they had against it. For years, we argued the merits of a centrifuge and how it would help—which I think was true—to have a centrifuge on board for scientific purposes and be able to test gravity. Then we decided to cancel the centrifuge. This was a couple years after we spent two years convincing them how important it was. They turned around and they spent about a year or so—they just could not understand how we could cancel something as important as a centrifuge. Then they read back to us all the talking points we had been reading to them for the previous two years. The Japanese, you convince them something's the right thing to do, they stick with it and they'll get it done.

I told the Japanese, over the many years that I traveled there—maybe 55 trips to Moscow, but probably I made 20 or so to Tokyo—when you look at the Space Station, and you look at all the modules, they're the one partner that decided to build a module of a certain size and a certain quality, and they did it in Kibo [Japanese Experiment Module]. Everybody else changed. The Columbus module [European Space Agency (ESA) science laboratory] is half the size it was going to be at the beginning. The rest of the Station obviously changed with the Russians coming on board. We downsized a little bit, we canceled the centrifuge, we never built the CRV.

But the Japanese, they built that module. It's got its back porch [Exposed Facility], and it's a thing of beauty. They are really, really proud of it.

The Europeans and the Canadians, they're more like us in our negotiation style. The Canadians had such a small percentage. Even without the Russians, they only ended up being

2.3 percent of the overall Station size. But they were a full partner. They got to sit at the table as one of four bilateral partners of NASA, as one of the partners on the Station. I think that was part of the reason that the Russians didn't want to deal with them that much, because it was such a small—but very, very important contribution of course—with the arm [Canadarm, Shuttle Remote Manipulator System].

The Europeans—they were different than the rest of the partners, because it's one agency representing 11 countries of the 15 that were part of the Space Station Program. They had a mixture of French and Italians and Germans and others on their team, which gave it quite an international nature. They seemed to have the most characters on their team. Which was a good thing, they were a fun group. They were also the most, I would say, vociferous in their reaction to having invited the Russians in and not appropriately, in their view, consulted with them in advance.

I have to say that I learned a really important lesson in that. Years later, I became the AA [for International and Interagency Relations] for 12-and-a-half years. One of the most important things you can do with any partner, whether it's an International Space Station-size project or it's one experiment flying on a mission, is to never surprise your partners. It's easy to say, but it's really hard to do. You get into a budget cycle where you're doing budget discussions that are not public until they almost come out, and then boom, they come out, and the United States has decided not to do something.

I think in most cases after the International Space Station, we did a pretty good job of at least informally giving our partners a heads-up on things that might not go the way that we wanted them to go. I think ExoMars [Exobiology on Mars mission] is a good example of that. It was a big deal when we backed out of it, but it was not a total surprise to ESA. That was

because we worked behind the scenes in an appropriate way—without violating any trust within the U.S. government—to let folks know that things may be changing.

It's just when they're surprised and have to go back to their governments and explain how they screwed this thing up, when it really wasn't their fault—that really was not a good thing. That's one of the many lessons I learned out of the International Space Station negotiations. You've got to be up-front, you've got to be transparent, you cannot surprise your partners. They're going to find out anyways.

JOHNSON: You actually had to do an interim agreement to start the work before the actual final agreement. Do you want to talk about that just for a moment?

O'BRIEN: I wasn't really involved in that. The thing we concentrated on was getting the actual agreement done. The forcing function was the first element [Russian Functional Cargo Block (FGB/Zarya)] launch. If we'd had two years to do it before first element launch, we'd have gotten negotiations done in two years. But as it turned out, particularly with the delay of the Service Module [Zvezda], we had three-and-a-half years. I wasn't really involved in the interim agreement.

JOHNSON: Let's talk about the first element launch in [November] '98, and then of course the U.S. [Unity connecting] node went up [in December 1998]. But, as you mentioned earlier, there was a delay with Zvezda, the Service Module. You had to go back and renegotiate with the Russians because the delay was being caused by financial issues, I believe.

O'BRIEN: I have to think about any renegotiations. There wasn't any provision—and I think that's probably a good thing for when you have accidents or delays like that. There's actually a provision in all the agreements that says that these agreements are based on the ability of the individual countries to provide appropriate funds to meet their obligations.

The FGB was launched on time, mainly because it was a contract between us and Khrunichev [State Research and Production Space Center, Moscow]. They met their contractual obligations and launched it. Then the Russian government started having problems funding their contribution. It wasn't money coming directly from us. There was this delay of a year or two, I forget exactly. It wasn't two years, because there was an issue of the life span of the FGB that we had to worry about. It was up there on orbit by itself.

But I don't recall any particular change in the agreements. That was just one of those things that we had to work with agency-to-agency, actually government-to-government. It became an issue during the [Vice President Albert A. "Al" Gore-[Viktor S.] Chernomyrdin [Russian Prime Minister] conversations every time they met. The Russian Space Agency actually asked us at NASA, "Make sure that Vice President Gore mentions this to Chernomyrdin, because we need to get our money so we can build this thing. We need all the help we can get in getting it done."

I don't recall any change to the agreements. I couldn't think of a way you would change the agreements on those types of things. Governments have to meet their obligations. When they don't, you of course have to meet and discuss what the ramifications would be, which we were doing. But then they got it launched and we got ourselves back on track.

Same types of things when you had accidents that impact the rest of the partners. We lost [Space Shuttle] *Columbia* [STS-107]. That was a huge deal, both personally and a tragedy for

the United States' families, and the program as well. Had a big impact on the International Space Station. But we never went back to our partners and charged them any additional money to replace the Shuttle or anything like that. It was just part of doing business, sad as that was.

JOHNSON: Were you involved in some of those early agreements related to the Space Shuttle flights flying international astronauts?

O'BRIEN: Yes, our office would do the agreements for the astronauts as a matter of course. We'd get involved in those. Those were pretty pro forma. I don't remember any problems or issues with those.

JOHNSON: Also, from what I was reading, part of your responsibility in those first years when you were at NASA was not only with the international partners for the Space Station, but also in building relations with some of the other space agencies in Israel [Israel Space Agency], China [China National Space Administration], India [Indian Space Research Organization]. Do you want to talk about how much time you spent doing that, and how that worked?

O'BRIEN: Sure. My job title between 1994 and 2003 was Deputy [Associate Administrator] for External Relations (Space Flight). My concentration was on human spaceflight, and that relationship was mostly Russia, but was not just Russia of course. It was our other partners in the International Space Station, but the Russia piece of it was the one that was the newest and the most difficult.

To give you some numbers, at the time, back in the early 2000s—actually, I'll tell you a story. I didn't become responsible for all of the science side of the house, for example, till I became the AA, and that was in August 2003. I remember I'd been in the office a long time, but my concentration had been in human spaceflight by definition. I asked our staff, "Look, now I'm responsible for this whole office. How many international agreements do we have?" I got some hemming and hawing from the division directors.

Turns out that they all kind of knew within their own individual divisions—they had them stored in books when they were signed, they got copies and they put them up on the shelf—but we didn't have any centralized way of cataloging them. They said, "Oh, we have a couple hundred."

I said, "I actually want to know exactly, plus or minus zero." It got to be kind of a joke. Not a joke, but we probably spent a year getting all this stuff cataloged. It turned out that at the time we had 480 or 500 active international agreements.

I started getting a monthly report to make sure that I knew which ones were expiring, which ones were being renegotiated, how many were active. When I left the office, we had 780 active international agreements in 122 countries. It's interesting to break it down. There were what I call "the usual suspects." They're the "traditional partners." Roughly speaking, of let's say 800, about half of those are with 10 of the usual suspects: Germany, France, Italy, the U.K. [United Kingdom], Russia, Japan, Canada, etc. They average between maybe 30 and 50 agreements apiece.

The rest of the 400 were spread out amongst 114 countries. You have 10 countries that average about 40 agreements apiece, and then 114 countries that average about 3 to 5. I started calling those "nontraditional partners." We made an effort to try to expand our agreements with

nontraditional partners, which usually meant in the area of science, and Earth science in particular. When Charlie [Charles F. Bolden, Jr.] came on board [as NASA Administrator] we talked about that, and he agreed that would be a good thing to do.

Charlie loved the idea of expanding our ability to cooperate with some of these nontraditional partners in the areas of mostly science and education. That would not only improve the lives of those people by the use of space-based assets to understand what's going on in their own countries and adjust accordingly, but would also help us out. We, the United States, particularly in Earth observation, need to understand ground truth around the world, so we need ground stations around the world. We need to be able to have measuring stations in various parts of the world so that we know that our data is correct and can be calibrated—as a short explanation.

It was really a win-win for everyone. Over time the numbers did go up, and that was a concentrated effort that we did within our office, with Charlie's blessing, and not a whole lot of publicity. I think it was worthwhile, and I hope they continue to do that.

JOHNSON: As you mentioned, your job changed somewhat in 2003 when you became the AA for External Relations, or eventually International and Interagency Relations. Just as an aside, when did the name change?

O'BRIEN: The name changed, let's see, that would have been in 2009 when Charlie came on.

JOHNSON: I was curious because I see it both ways and I never knew when it changed.

O'BRIEN: I kid Charlie because I liked the short "External Relations," but most people think "external relations" is public affairs. It was okay with me. Then, when we changed it to International and Interagency Relations, that almost covered everything, but it didn't cover the fact that we had a division within our office for advisory councils. So it cut somebody out of the title, but it is actually a better description of what that office does, so I was fine with it.

I'd laugh at Charlie because I went on every international trip, except the last one when I got sick there towards the end of my tour. I went on every international trip with Charlie, and he would always introduce me, but he'd never remember the name of our office. I'd say, "Thanks, Charlie. You're the one that changed the name."

JOHNSON: He just changed it, he didn't have to remember it.

O'BRIEN: Exactly, exactly.

JOHNSON: You became AA in 2003. As you mentioned, the *Columbia* accident happened earlier in that year. Talk about that time period after *Columbia*. Not only the accident and when that happened, but what involvement you had as far as explaining what had happened. Then we'll talk after that about the Vision [for Space Exploration] that the President [George W. Bush] announced [in 2004].

O'BRIEN: That was, of course, hugely traumatic for NASA. Certainly I had no role in talking to anybody about what happened technically, but of course our partners were all interested in what was going to happen to our cooperation on the Space Station. Getting back to flight, would we

complete the International Space Station, how long would it take? There were a lot of questions along those lines. Of course nobody knew at the beginning. First you had to figure out the cause of the accident and how we were going to proceed, and whether we were going to ever fly a Shuttle again, for example. That all took a couple years.

In the middle of that, before we returned to flight, [NASA Administrator] Sean O'Keefe left to be a chancellor at LSU [Louisiana State University, Baton Rouge] and Mike [Michael D.] Griffin came on, which precipitated a whole new set of reviews on what NASA was going to do, not only with respect to Return to Flight, but with respect to the International Space Station.

That time between February 2003 and 2005 when we finally returned to flight [STS-114] was a very traumatic and uncertain time for NASA, with the CAIB [*Columbia* Accident Investigation Board] commission trying to figure out what happened and how it could make sure that never happened again. Plus, we had a new Administrator—not a new [presidential] administration, but a new [NASA] Administrator coming on board with his own ideas based on his own experience on how we should proceed.

I think if you scanned over my [retirement] comments, it leads a little bit into the leadership aspect of things of this discussion, that Mike Griffin was the right guy at the right time, for a variety of reasons, to come on board and get NASA flying again. And to make the decision having to do with the International Space Station. There were proposals out there which I think Mike, when he came in the door, might have actually supported. I don't know, you'd have to ask him. It was to stop building the International Space Station at what somebody coined "core complete." Core complete meant no European module, and no Kibo on board. You can imagine what the Europeans and the Japanese thought about that.

I didn't know Mike before he became Administrator. We made our first international trip in June of 2005 to the Paris Air Show, where he met with his International Space Station counterparts and wanted to talk about the future of the International Space Station. There was some question about "If the Shuttle flies again, how many flights are we going to actually let it fly?" and "What's going to be the status of the International Space Station?"

He universally heard from Jean-Jacques Dordain in ESA [Director General (DG)] and from his Japanese counterpart and others that "If you don't complete the International Space Station, that's a major major problem for us." Matter of fact, one of them said, "It won't be a problem for me because I won't be the DG anymore, but we'll have a hard time ever cooperating with the United States ever again on anything."

That wasn't the only reason, but I think Mike was convinced, maybe partially because of those discussions, that we had to meet those commitments. If there was any way that we could complete the Station once we started flying the Shuttle again, we were going to do it. He did that. He was also the right guy to make the decision, because he was so technically astute, when he said "This thing is going to fly," I think everybody believed it. He was right, and it did. It flew safely, and we flew it out.

Those two years were kind of a blur to me, as I think about going from that awful day in February—tell you a little anecdote. For Return to Flight, summer of 2005, I'm going down there to [Cape Canaveral, Florida] like I always do, to be with the internationals that are there, escort them to the launch. I get an e-mail or a text from Mike that says, "Hey, I'm busy. You're going to be Laura [L.W.] Bush and Governor Jeb [John Ellis] Bush's escort for the launch." I said, "Really." Literally, this was like an hour before. She was the First Lady [of the United States] at the time.

It was really a wonderful day. It was not only Return to Launch, but I got to sit there with Jeb Bush and Laura Bush for a couple of hours in the stands. Very nice people, it was a very enjoyable couple hours. Mike just needed to be over in the [NASA Kennedy Space Center, Florida] Launch Control Center. He didn't want any part of the schmoozing, I guess.

JOHNSON: Is that something you normally did for Space Shuttle launches, be there for the international guests?

O'BRIEN: Yes. I went to them all, as many as I could. Oh my gosh, I should have counted. I've probably been to 50 or 60 Space Shuttle launches. I didn't miss very many over the years. Sometimes when the launches were delayed I'd have to leave, but I'd always go down there. It was one of the nice things that our office got to do, although it was hard work. We would send seven or eight of our desk officers down, and they would be escorts for the internationals. Sometimes we would have several hundred internationals down there at launch, and we would escort them. It would give our office a chance to go down and look at something real that we were doing.

JOHNSON: It's always nice to know, especially after all the negotiations, that it actually is happening.

O'BRIEN: No kidding, that's exactly right.

JOHNSON: It's pretty amazing seeing a launch. I imagine that for the international people that got to see it, it was pretty important for them to see, too.

O'BRIEN: Oh, yes. We had lots of high-level internationals that would show up on occasion, too. They never forgot it, as you can imagine.

JOHNSON: Let's talk about the Vision for Space Exploration. You talked a little bit about it in your 2007 interview, but I want to talk about what effect that had on the international partners. Mainly the announcement that the Shuttle Program was going to end at some point, because of course the agreements had the Shuttle being there to ferry things back and forth. Talk about how that affected what your area and what was going on with the partners.

O'BRIEN: That was one of the things in my discussion at my retirement, pointing out the three last Administrators, who I think were the right leaders at the right place at the right time. Sean, of course, had the great misfortune of being there when we lost *Columbia*. But, to his everlasting credit, he took care of the families. He really took care of the families of *Columbia*. That was a lot of hard work legislatively, etc. That I give him a lot of credit for.

The other thing he did—and I think his past relationships with Vice President [Richard B. "Dick"] Cheney, and his ability to go direct to the senior leadership in the administration, was one of the reasons we were able to come up with the Vision for Space Exploration that came out in January 2004. He got the president of the United States to come over to NASA Headquarters to make the announcement, which I think may have only happened one time in history previously.

It was a big deal to lay down this plan. I don't remember what exactly it said about the Shuttle, because we were still in this interim interregnum between the loss of *Columbia* and the departure of Sean O'Keefe a year later, and the arrival of Mike Griffin. There was still some uncertainty about the Space Shuttle, when it was going to fly again and how long it would fly. But we did have a Vision. In my view—some people would disagree with that because we've had changes of administration from Republican to Democrat—the Vision, with a couple different vehicles and a couple that are missing, is pretty much intact with a goal to send humans ultimately to Mars.

Some things changed, of course, when the Constellation [Program] was canceled in 2009. But we seem to always at least get back to the overall goal of at some point getting humans to Mars, which was a big change in 2004 from the previous administration. There were questions about whether budgets are adequate to get us there in a timely fashion, and there were always questions about who's going to build what rocket, whether it's going to be commercial or government. But that to me was a huge shift, in a positive direction, in 2004 that came about partially because of the loss of *Columbia*, tragically. But I think it was the right thing to do.

My own personal opinion is that the funding then withered away after the words of the Vision, for a variety of reasons having to do with OMB [Office of Management and Budget], and budgets that were very frustrating to Mike Griffin, I know, as he worked his way through his tenure at NASA. I think that the Vision for Space Exploration as announced personally by the President in January 2004 was a milestone in NASA that we're still striving towards, so that's a good thing.

JOHNSON: When we talked in 2007, you also mentioned that you viewed it as an actual document where the president told you to "go talk to people and give them an opportunity to come up with a mutually beneficial way to cooperate." That was a quote from your other interview. I thought was interesting that you viewed it as that opportunity to go out and bring in maybe some of these nontraditional partners.

O'BRIEN: Yes. I don't remember specifically that particular wording, but there was that aspect of wanting to get as many people involved as possible. That might have even been one of the impetuses to go out to the nontraditional [partners]. The nontraditional partners, as I mentioned, ended up usually being science or education, but we didn't restrict it to that. Everybody was offered the opportunity to participate in human spaceflight if they could find a way to do it. We didn't expect smaller countries to be building modules for the Station, but there were ways for scientists to get involved in the research on the Station, and we encouraged that.

JOHNSON: I want to switch a little bit now to some of the things that you've talked about before in the interview, and also the retirement. You said in your retirement speech that at that time in 2015, 73 spacecraft that were being operated by the Science Mission Directorate, and two-thirds had a strong international component. Talk about for a minute the importance of those international relationships to NASA's science mission and the Science Mission Directorate. How is that maintained by NASA?

O'BRIEN: One of the things I think that is not well known in the public domain—most people are aware of Space Shuttle and International Space Station, that they exist. It's an International

Space Station, must have international partners. But NASA's international relations is primarily in science. Count the numbers.

If you have those 780 international agreements for example, 400 of those are in the Science Mission Directorate. It overshadows and overwhelms the numbers in the other Mission Directorates. That's why I mentioned the 73 spacecraft—that was the number at the time—for 60 missions, some had multiple spacecraft. Of those 60 missions, 44 of them had international cooperation. We could not possibly operate efficiently with the type of data we were trying to get if we were doing it by ourselves.

I'll give you an example. I keep going back to Earth science because that's the easiest one for me to visualize. We're trying to understand the Earth as a system. We have approximately 20 spacecraft that are measuring the various components of the land, air, water, and their interaction amongst themselves. Trying to figure out what is natural and what is caused by humans, and how do you distinguish between the two.

There are several ways that we need international cooperation to do that. First, of course, are the scientific instruments and spacecraft that other partners provide. But perhaps more important is the aspect that we have of ground stations, for example. We have a series of Sun photometers around the world. I think there's 400 or 500 of them that allow us to get ground truth on what the atmosphere is really like so that we can calibrate the spacecraft that are making those particular measurements.

We also have a series of sites around the world that allow us to determine where the Earth is situated in the cosmos exactly, and how is oriented, so that we can understand the exact circularity of our spacecraft so that we know precisely where things are. That's done by things like GPS [global positioning system] and Very Long Baseline Interferometry [VLBI] that need

to be stationed in places around the world. We can't do that without the cooperation of our partners.

It's a combination of the spacecraft that we have on orbit, but the data also need to be calibrated by the use of ground stations that have to be allowed into various countries that are partners. Then, if we are successful in the top-level view of determining the difference between natural phenomenon and manmade phenomenon and we decide that there's something that we can do about the negative aspects, it can't possibly be done without the cooperation of international partners, because none of these phenomena respect international borders.

I think you can probably make the same argument for astrophysics and planetary exploration and heliophysics for international partners. To me it's very, very clear that NASA could not come close to being as efficient in getting its data and doing its research if we were trying to do it ourselves, even if we could afford to do it ourselves. International cooperation in the Science Mission Directorate overwhelms the numbers of the other Mission Directorates and I think is perhaps more important than it is in human spaceflight.

I'll give you an example. We could—we have the capability, perhaps not the budget to support it—but we could embark on a human spaceflight program on our own. In fact, we did it in the Apollo era. For a variety of reasons we chose not to in the future, but physically we could do that. My contention is even if we wanted to, we could not do the same type of thing alone in the science field. So international cooperation in science is extremely important for NASA to achieve its global objectives and thereby achieve the objectives of our partners as well.

JOHNSON: Talk about for a minute the role, if any, that the office plays in balancing presidential, political administration changes—because that happens every four to eight years—and whatever

their ambition or focus is within the overall vision set forth for NASA in 1958 with the [National Aeronautics and] Space Act [Public Law 85-568]. Of course the first objective is listed as "the expansion of human knowledge of phenomena in the atmosphere and space." Also listed is international cooperation, two very important things that you've been talking about. What role does your office have in weathering these changes? What we're going through now is a good example with the noninterest in science or changes in the Earth.

O'BRIEN: That's a hard question. First of all, I think in our office we're certainly aware of the Space Act and use the quote in there all the time in our presentations about the international cooperation at NASA. I think that no matter what the vision or the new administration's new ideas, those bedrock principles remain. We're aware of those and support them.

On the other side of the coin though—and this is another thing I learned—is that the Office of International and Interagency Relations is not its own entity, is not out doing its own programs, although there was a time in the past when that was a problem, as I mentioned earlier in this discussion. That office is to support the Mission Directorates and support the goals and objectives of the Mission Directorates, which of course come from the Administrator, which come from the [presidential] administration, and the Congress funds the budgets. It's a dynamic, ever-changing, and frustrating process as we all know, but that's democracy.

Our role, as I saw it, was to be aware of the bedrock international objectives and missions that NASA has—as stated in the Space Act of 1958—but also be aware that the office is there to support the Mission Directorates, not to be out doing its own thing. Even though we have our own ideas and over time our folks—who mostly had international backgrounds, we did get some folks in from the Mission Directorates to work for us. That was very useful over the years. But

we're a support organization, not one of the big guys. Which is a very important thing to remember, because our folks are out traveling around the world all the time, and are being viewed as speaking for NASA. They have to be very careful to make it clear that they're really supporting the Mission Directorates in their role as the international specialists.

It's hard to answer part of that question because we don't have our own specific role, other than supporting the Mission Directorates and doing what they want us to do. We have ideas and we have recommendations. I have to say all the Mission Directorates have come to rely on our people, but they still make the decisions about their budgets. We don't have a budget. Our office has a $3 million budget, and half of that is for our overseas representatives. The coin of the realm for our office is the intellectual capability and international and interagency experience that our folks have to offer to the Mission Directorates, who are concentrating on other things.

JOHNSON: I know you've made statements before the Subcommittee on Science and Technology at the U.S. House of Representatives in your role. How many times or how often did you represent NASA, making those statements? I know that role was supporting the Science Mission Directorate. Do you feel like that had any influence or does have any influence over policy at any level?

O'BRIEN: Thankfully and mercifully I only had to do that once. I was on a panel on International Science and Technology Cooperation [April 2008]. The only question I got was by someone that came in late, didn't know what the subject was, and asked me a totally off-the-wall question that had nothing to do with my reason for being there. I got to go through the agony of

preparing a statement and all that, but I only had to do that once. Cooler heads prevail when they're looking for someone to go to the [Capitol] Hill. I would quite often go up and brief staff members on things international. That happened fairly often, but I only had to testify once.

One of the things that I learned over the years is that, at least from my view, some people love being interviewed, being in the press. I don't mean an interview like this, I mean by the press, seeing their name in the paper. I hated it, because they never got it right. There's only one journalist for *Aviation Week* [*& Space Technology* magazine] that I would actually willingly talk to, because he always got it right.

The rest of them I just avoided, I let the public affairs people do it. Then they stopped asking. I rarely had to talk to the press, and only once on the Hill. That was fine with me. I considered my role to be internal, even though at one point it was called external. Internal in terms of talking about NASA, I just didn't like doing it publicly.

JOHNSON: Speaking of the press, in 2014 when Russia began some of those military incursions into Ukraine, the press did get an internal email from you, and it was published.

O'BRIEN: Oh, that's right.

JOHNSON: Do you want to talk about that period of time and the reason you sent the email, and then how it was resolved with Russia?

O'BRIEN: I think my mistake on that was that I didn't coordinate that enough with folks around NASA and get some input. It was supposed to be an internal email, of course. It had to do with

cooperation. It sounded like we were cutting off all cooperation with Russia, which we were basically told to do at some level, unless it was impacting International Space Station. What we ended up doing, because of the political climate at the time and what I think we were being told to do by the Congress, was cutting back on a couple of projects that we had—I think we had one going on in science in maybe Siberia—until things settled down.

The way it resolved itself was just time, because we didn't have anything new on the books that we were getting ready to do anyways. There were a couple things that we were doing that were grandfathered, or okayed because they would have had a bigger impact on us than they would have had on Russia. I think it was all part of the Ukraine business as you mentioned. As I recall, I didn't do anything other than to hunker down and let time go by. I think that might have ended up as my only time in *NASA Watch* [website/blog].

JOHNSON: Yes, I saw it there.

O'BRIEN: Other than that I remember it being—what year was that?

JOHNSON: 2014.

O'BRIEN: 2014. Charlie was just a good egg about it, didn't give me a hard time about it at all. We just moved on.

JOHNSON: I want to ask you about that period in 2009. You mentioned earlier about the Constellation cancelation, then it was announced that we were going to move more toward the

commercial partners. Did your office have a part in those negotiations, as far as setting out how that would work with NASA?

O'BRIEN: On the commercial stuff, we weren't involved in all that. Of course, we were impacted by it, I mean talk about surprising your partners. The cancelation of Constellation was a huge deal. I thought the way it was done was a mistake. Of course, the new administration has the authority to come in and change things as they wish, which they did. But I really think they could have maybe used the word "restructure" as opposed to "cancelation." Big upheaval across NASA. Charlie got blamed for a lot of it. I think unjustifiably so, but that's for another discussion. He handled it very well over time, and we inched our way back to, as I mentioned earlier, something that was more like Constellation, which really wasn't that much different than the Vision. Different names for vehicles, although the name Orion [crew spacecraft] survived somehow. It was a painful period, because you had this huge project canceled and you had to figure out where to go from here. Our partners were all asking, "What does it mean, what have you done to us, why didn't you tell us?"

Commercial procurement (as opposed to in-house production at NASA) was part of that, but I think people don't give enough credit to Mike Griffin in this. He's the one that really started with the $500 million infusion of money to the Commercial [Orbital Transportation Services] Program during his tenure. Of course, it got amplified later on, and—with some bumps along the way of course—it seems to be reasonably successful. Now we'll see if the human side of it happens in the next year or two, which is very important of course for International Space Station transportation, to get out from under the yoke of the Russians that

we've been under for the last 15 or so years, paying them for transit back and forth to the Station and crew rescue.

But as far as our office was concerned, on the commercial side of it we weren't really involved.

JOHNSON: You mentioned being underneath the yoke of the Russians. After that Ukraine issue in 2014, the Russians came back and said that if NASA is going to cut this off then maybe we won't give them rides. That was in the press a lot. Like you said, time passes, things settle down. They said they were only going to support it through 2020, and now it's extended again.

International relations have changed all throughout your career with NASA. Budgets have changed with us, different countries had budget issues. Political changes obviously—all the countries do have some political changes. Talk about some of those risks or problems in dealing with all these different countries. Maybe communication issues, or even management problems with people that let political issues overshadow some of the cooperation. Just generally talk a few minutes about some of the risks to international relations for NASA.

O'BRIEN: It's a good question. We've touched on some of this from the NASA point of view—NASA being a good partner, NASA meeting its obligation—which everyone is always worried about because we're the biggest partner. We've talked a little bit about some others that have almost failed to meet their obligations, such as the Russians delaying the Service Module.

Thinking just partner-to-partner, the Japanese, as I mentioned, have been pretty steady. They decided on a 12.8 percent share of the Station way back at the beginning, and as far as I know it's still at 12.8 percent. The Europeans were at 12.8 percent of the non-Russian side for

crew time and experimentation, but over time they figured out that they couldn't afford that, because not only did you get that share, but that's your common systems operations cost share as well. So they traded back 4.5 percent to NASA, and they're down around 8 percent now. It wasn't a crisis, it was negotiated over time as they looked at their budgets and what they could really afford.

The Canadians did the same thing early on, went from 3 percent down to 2 percent or 2.3 percent. Those were deliberate negotiations that were done without malice. It's just that that's the way things are. "Our budgets may not support it, so how can we work together to work this out?" In those cases NASA took the additional cost on our side, but also got the additional benefit of more crew time, more lab [laboratory] space, more power as a result, even though the common systems op [operation]s cost share went up a bit.

I'm thinking of any crises that might have occurred from our partners on the International Space Station that would rival the cancelation of Constellation, the loss of *Columbia*, or the Service Module delay. There probably are some out there, but they don't come to mind right now.

JOHNSON: Let's talk about some of the remarks that you made during your retirement celebration. You mentioned that you believed that one of the aspects of NASA that sets it apart from other federal agencies is the strong leadership throughout its history. Talk a minute about your views on leadership and how it differs from management, and what the inspiration for you has been.

O'BRIEN: I've been very fortunate in over 49 years in government service, to have served a variety of different leaders. I have to say that the vast majority, 95 percent -plus, have been terrific leaders, and I've learned a lot from them. Those that weren't such great leaders, I may have learned more from—things to avoid.

I paid a lot of attention to it over the years, particularly as a young officer in an attack squadron. I didn't go to the [U.S.] Naval Academy [Annapolis, Maryland]. I was over at UVA [University of Virginia, Charlottesville], NROTC [Naval Reserve Officers Training Corps] guy. I didn't get a whole lot of leadership training before I got into the Navy. I spent two years trying to learn how to fly airplanes off aircraft carriers and not thinking of anything about leadership, just trying to survive and get through that.

Showed up at my first squadron, and I said, "Where's my airplane?"

They said, "Well, first you got to go down and meet your troops. Here's the 12 sailors that are working for you."

"Oh my gosh, what do I do now?" That was my initiation to leadership and trying to figure out, over the years, how you get the most out of your people through leadership.

You did mention the difference between management and leadership. To me it's a personal irritation when folks mix the two up, because I think they're very different concepts. To me, leadership is motivation of individuals by the leader to some common end, perhaps to accomplish things that they couldn't otherwise do in the absence of that motivational leadership. Whereas management is just manipulation of things, to simplify it, such as schedules and budgets. Management is certainly a subset of leadership, and a very important subset of leadership, but not vice versa. I really like to talk about leadership more than management.

I've read books on leadership. There's always a book that has the 10 components of leadership or the 20 components of leadership. I can never remember more than four or five. One way, other than observation of my bosses and others, is I've read books about leaders. I used to like to read biographies. Anything about Teddy [Theodore] Roosevelt [Jr.] for example is worth reading. Nathan Miller wrote a great book on him [*Theodore Roosevelt: A Life* (1994)] and Edmund Morris wrote three [*The Rise of Theodore Roosevelt* (2001), *Theodore Rex* (2002), *Colonel Roosevelt* (2011)].

A book about leadership in a combat environment called [*The*] *Killer Angels* [*The Classic Novel of the Civil War* by Michael Shaara (1987)] about Gettysburg is a great short read. Folks can get an idea of how you make decisions with less than 100 percent of the information, which is tough for people.

Or a biography, such as a couple of very different ones. One called [*Jack: Straight*] *From the Gut* (2003)] about [John Francis] Jack Welch [Jr.] who was the GE [General Electric Company] CEO [chief executive officer]—from the ground up, he started as like a 20-year-old, total egomaniac but somehow was successful in a style of leadership I personally do not like.

Then another one by a guy by the name of Lou [Louis V.] Gerstner [Jr.]—who saved IBM from itself after they stayed married to the mainframe [computer] too long—called *Who Says Elephants Can't Dance? [Leading a Great Enterprise Through Dramatic Change* (2003)]. If anybody wanted to read three or four books about leadership, those would be the ones that I would read.

I occasionally talked to the FIRST [Foundations of Influence, Relationships, Success, and Teamwork] group, which I really enjoyed at NASA, a bunch of young leaders. I would tell them that even though they don't realize it—I didn't realize it when I was their age—each of them,

even though they may not have anybody working for them, is a student of leadership. They're watching, they're learning, and they ought to really accept that fact and start thinking about it, because each of them even at a young age is developing their own philosophy about leadership whether they know it or not. Each of them has a reputation that is going to follow them and grow, and hopefully in a positive way.

I tell the folks in a technical organization that even though their technical capability is extremely important, I think their understanding of leadership is equally important. It will stand them in good stead if they give it some thought and gather some ideas as they go along the way. Because sooner or later they're going to be in charge of the group, they're going to be in charge of a division, they're going to be in charge of a working group and they're going to have to provide some leadership.

If you don't mind, I'll go into the five or six things that I think folks ought to think about that are very important.

First one is integrity, people have got to believe what you have to say. You can't be a leader if what you say isn't the truth. People will figure that out pretty quickly. Some of these things are so obvious they seem trite to me, but they're worth saying.

The leader has got to explain the mission of the group. What is that your group is doing? Maybe even more importantly, how does it fit in the overall vision and mission of the larger organization? In the OIIR [Office of International and Interagency Relations] example, that would of course be NASA.

Then it gets to be simple things that are easy to say and hard to do. Once the group has the mission and they have a feeling for how it fits into the overall mission of the larger organization, they've got to be given the resources to accomplish the task. They've got to be

given feedback. To me feedback has got to be in a timely fashion. If it's going to be positive, it should be in public. If it's negative, if you're not doing a good job, it should very much be in private.

One thing I like to tell people is that years later, as you look back at your career, you'll never remember what someone said to you, but you will certainly remember how they made you feel.

I guess the hardest part for the type-A personality you find at NASA, and certainly in the military, is getting out of the way, giving subordinates a chance to accomplish the tasks and not interfering. That's where you get into the fine line—maybe it's not so fine a line—between being a micromanager and being aloof and clueless. You've got the leader that's there looking over your shoulder and not letting you make any decisions on your own, the micromanager. You don't get to do your job without getting advice every 10 minutes. Or, on the other end of the spectrum—which you don't find too often, but occasionally you find—is the aloof manager who's clueless. Which is probably worse.

Some other things that are important include the leader's reaction to change. When things change, as part of the feedback, the subordinates have got to know when things are changing and how it affects what they're expected to do. No surprises. This gets back to "criticize in private" and give laudatory comments in public. Everybody needs to be treated with respect all the time.

The role of failure is a tough one. Everyone's going to fail now and then. How you react to that failure is an important aspect of what type of leader you're going to be in the future—how you handle it, how failure motivates us. To me, if it fits into your personality, I believe that

humor definitely helps. But not everybody can inject humor into the situation, particularly when they're stressful situations. Sometimes that's not important.

The last thing I tell people—and then I can expand on any one of those, and usually got a chance to as the FIRST folks would ask questions—is that you have to be yourself. You cannot pretend to have someone else's personality and have it work. Almost goes back to the very first point about integrity being essential. People will see through that in a moment.

I saw that not so much at NASA, but certainly in the Navy, in the attack carrier environment. I don't know if you ever heard of the movie *Top Gun*. You have these characters racing around the ready room, and some of that exists. People create their own persona, they end up not being themselves. Sometimes it really doesn't work out. They end up being screamers, and leaders who'll do anything to get ahead, and know they're only going to be in charge of the squadron for two years so they can burn out the troops and move on to their next promotion. Everybody else is left behind, burned out.

My advice to folks is you've got a personality, you can't change your personality. Fit some or all of these particular ideas on leadership into your own personality. It'll come out differently for folks, but if you follow those basics I think you're going to be okay.

JOHNSON: I think those are all good guidelines for leadership, and ones a lot of people could read and benefit from at this point in time, I'm sure. Talk for a minute about who some of your mentors were. I know you mentioned the books you read, but was there anyone personally that was a mentor to you, or that helped you develop this philosophy of leadership?

O'BRIEN: Yes, I had some along the way. One of my first mentors was one of my first bosses in my first squadron way back in the '70s, a fellow by the name of Dixie [David A.] Culler. He exemplified all those things I just mentioned. I'm not laughing, I'm just crying—this is what you learn as a naval aviator. Unfortunately, within a year of working for him he crashed in an [LTV] A-7 [Corsair II aircraft] down at [Naval Air Station] Cecil Field [Jacksonville, Florida] and passed away. That was a shock of course to lose him. I learned a lot from him.

I had a CO [Commanding Officer] on the same squadron who was a real go-getter, who exemplified some of the best and some of the worst in leadership. Berating people in public for example, which I detest, but was really motivated to get the job done and really cared about his troops. That meant a lot to me.

Later on, towards the end of my career, I was working for Admiral William [J.] Crowe. He was Chairman of the Joint Chiefs of Staff, and one of the few officers in the Navy that actually was able to defy Hyman [G.] Rickover, who was the head of the nuclear Navy [Naval Reactors]. Admiral Crowe was a submariner getting his PhD at Princeton [University, New Jersey], and the admiral tried to get him to leave school early to return to the fleet. He didn't do it—you never said no to this particular admiral, but he did—and what he got out of it was Chairman of the Joint Chiefs of Staff 10 or 15 years later. He was a very caring individual, had a tremendous sense of humor, and was a terrific leader. I spent a lot of time with him during those two years in the Pentagon [Department of Defense Headquarters, Washington, DC]. That was before I went down to Puerto Rico, and before I ended up at NASA.

Along the way there were a few others, and most of them I would say in the Navy were very, very good. There were a few screamers that you just had to put up with. In the Navy you

knew one thing for sure, nothing was going to last forever. You were going to move on or they were going to move on. It was a two-year deal.

Not so at NASA. Sometimes you're stuck with the same guy for a long time at NASA, like the poor OIIR guys who had me for 12-and-a-half years. We had Dan Goldin for 10 years, for example. Some places it's more permanent than others, but in the military they've got this rotational philosophy. Which I think is a little bit overboard, but you're never in one place very very long.

JOHNSON: Mentioning those personalities, the NASA Administrators you worked for, beginning with Dan Goldin, and then of course Sean O'Keefe, Mike Griffin, and then at the end Charlie Bolden—talk about their leadership style and the effectiveness of that style in your relationships.

O'BRIEN: In my retirement remarks, I chose to talk about three of them, all in a very positive fashion, all well-deserved. Dan Goldin was a rather mercurial fellow. I give him credit, I think he probably saved International Space Station when he worked the Congress as hard as he did. They got that tie-breaking vote from the Vice President [Gore] against cancelation of the Space Station Program in [June] '93.

He's the one that actually hired me, although I never worked directly for him. He approved my hiring to come aboard, as I discussed at the beginning of this session. Dan was a tough guy to work for. I was happy to have John [D.] Schumacher [Deputy Associate Administrator for External Relations] between me and him. He was a little bit tough on his people, particularly in a public way, which I always found distasteful. But he got the job done on Space Station, and I give him credit for that.

Sean was a good leader, and I mentioned earlier that he had the misfortune to be there when we lost *Columbia*, but he did a wonderful job taking care of the crew. I give him a lot of credit for working on the Vision for Space Exploration with the administration and getting that approved before he left. In that respect, he was certainly the right guy at the right time. I don't know that Charlie or Mike Griffin could have done that.

Mike Griffin came on board. As I mentioned, I didn't know him, but I got to know him very well during our various international trips. I admire him a lot. The brightest, probably the smartest technically, of our Administrators—at least the ones that I know. He was the right guy to be making the decision for the Return to Flight. I give him a lot of credit for that. I enjoyed working with him. Straightforward guy, as everybody knows. He's very business-like and always knew where he wanted to go, and had good rationale for making those decisions. I never had a problem getting a decision out of him. As a matter of fact—you may know this—you can send him an e-mail, and if it went past three minutes before you got a response you'd think he was sick.

I asked Mike, "How in the world do you do that?" I wasn't the only one who got immediate responses. He literally was always at work. You'd see him at press conferences working with his BlackBerry [accessing email]. He'd say, "Look, my people are the people that work for me. They're waiting for an answer, they've got organizations waiting for that answer. If they want to know what I think about something, they need to know that and need to know it now." That was at least part of his philosophy, keep his people informed and give them decisions when they are needed, so the organization could function efficiently. I found that a very, very important aspect of his leadership.

Then Charlie. I'll probably talk the most about Charlie because Charlie I spent the most time with, and the guy is an amazing individual. Humble as can be. Survived what I thought were two life-threatening blows, if I can use that term. In the cancelation of Constellation, and the way that that was done with not a whole lot of his involvement. Although he'll probably deny that. I think it was a bit of a surprise to him, although he got blamed for it.

Then, frankly, he had what I can call—I forget the words I used at the retirement—disgraceful disloyalty from below. Without going into any more detail on that, that went on for a couple years. He somehow rode that out and survived it and got us back to a position I think is a reasonable position, given the hand that he was dealt at the beginning of the administration.

What I think folks don't know about Charlie as well as I do, and maybe his most lasting impact if I may be so bold, is his impact on kids. We probably made 50 international trips in the seven years that I worked for him. On every one of those trips he'd often take maybe an extra day, but certainly extra afternoons, to have an outreach session with students. It could be, to give you a range, 15 Israelis and 15 Palestinians in Israel one year, to 2,400 under one tent in Beijing [China] at the International School there, 800 in Okinawa [Japan], 600 in Nairobi [Kenya], 250 in Cairo [Egypt], 1,400 in Berlin [Germany]—you name it.

It was pretty much the same presentation. If it was younger kids it was a little more geared to them, as opposed to the college students that he would talk to occasionally. It was always motivation about working hard, studying hard, and not being afraid of failure. He'd have slides in the background that would show him on his Space Shuttle flights, and talk in a very humble manner. Tell stories about himself, about how he was afraid of failure at a certain point and how he overcame that.

At every one of those sessions, I would come out convinced that one or more lives of kids in that audience were changed forever. I've told Charlie this. To me that's an ongoing legacy from Charlie as a NASA Administrator that no one will ever surpass. Of course, the other stuff that he did was important, running the agency and getting us to a point where we are now, still pursuing the goal to get humans to Mars is important. But as a human being and a humble leader he was at the top of my list. I admire him the most of any of those, and I'm not afraid to say that.

JOHNSON: Yes, I agree with you, I admire him a lot. His stories are compelling, and we've had the pleasure of interviewing him multiple times, before he was Administrator and after. His stories—especially how he started out and how he got to school and the things he had to overcome—are inspirational. There's no other word for it.

O'BRIEN: Yes. You can see the wheels turning, kids are looking at this guy going, "Oh my God, if he can do it I can do it." This is internationally. He talks to kids, and he's probably doing it again already, domestically. But this was an international crowd. They'd come out, and we had 1,000 hanging out of windows in Ethiopia. We were in this little village in Nepal where 250 kids in their little orange uniforms came out and were showing him robots they built. It was just unbelievable.

So in the midst of all this other important stuff that we're doing—we're on these trips for other reasons—he's out as the U.S. ambassador of goodwill to the children of the world, basically.

JOHNSON: Yes, and that's wonderful. And an example of what you mentioned as one of the things you admired in leadership, was being yourself. I think that is definitely his personality.

O'BRIEN: Exactly. For someone who has no idea, only knows Charlie by name, and that he's an astronaut—then to meet him and to figure out that he's this real person, it's a real shock.

JOHNSON: He's so genuine, and doesn't forget anyone he's ever talked to, I don't think.

O'BRIEN: I'll tell you a story about that. "Charlie, one of these days we're going to be in an airport somewhere in the world and you're not going to see somebody you know." It finally happened in the Gobi Desert [China]. We were on a charter flight to fly up to the Jiuquan [Satellite] Launch [Center], first time a NASA group had ever gone to the Chinese human spaceflight launch site. We were in this airport and he didn't know anybody there. We were the only airplane at the airport, so it was natural that he wouldn't know anybody. I said, "Charlie, we've finally done it, there's an airport where you're not stopping to sign an autograph."

JOHNSON: Talk a minute about your retirement, and then your successor Al [Albert] Condes.

O'BRIEN: Thanks for asking about him.

JOHNSON: You said you'd worked with him for quite a while. Is there any advice that you passed on to him when you left?

O'BRIEN: "Don't worry, be happy." I first met Al when I interviewed for the job. I was interviewing the current AA at the time, the fellow from the State Department. Al was in there taking notes as a young—I think he was a GS [General Schedule]-14 at the time. I then spent three-and-a-half years with him on the negotiation group, so I got to know him pretty well then.

Al then became a division director, and then when I became AA, I was AA for about six months without a deputy. I hired Al on as a deputy, and it was probably the best decision I made in my whole time at NASA, because he's a totally competent and loyal guy. He did that for 12 years. That's tough being the number two anywhere for any amount of time. He did it for 12 years, never complained, just did his job, and kept me out of trouble on numerous occasions, I can tell you.

Before I left, I talked to Charlie about my retirement. I wanted to make sure that we didn't go through one of these—I knew it wouldn't happen with Charlie because that's not the way he did things—waiting for months and months and months, and then [having someone in] acting capacity. I was asking him if he was willing to name Al the AA right away, which he did. Which thrilled me because Al certainly deserved the job, and he's doing a great job.

The one person that probably had the biggest impact on me during my career at NASA was Al Condes, and in a positive way. I talked about the leaders I worked for in various aspects, those four Administrators. Al really was the one guy that was always there, always telling me to do the right thing and reminding me what it's like to be a loyal deputy. You can't get your job done without somebody like that. I really owe him a great debt of gratitude.

JOHNSON: Is there anything that we haven't talked about today that you'd like to mention before we close out?

O'BRIEN: I don't know, that was pretty wide-ranging. I'm a little fuzzy on some of the details, but that's what happens when you get to be my age.

JOHNSON: If there's anything you want to add later, or any other details that you think of when you're going through the transcript, that's fine. You can add that later.

[End of interview]