NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT
EDITED ORAL HISTORY TRANSCRIPT

ROBERT D. CABANA
INTERVIEWED BY JENNIFER ROSS-NAZZAL
HOUSTON, TEXAS – 17 NOVEMBER 2015

ROSS-NAZZAL: Today is November 17th, 2015. This interview with Bob Cabana is being conducted in Houston, Texas for the JSC Oral History Project. The interviewer is Jennifer Ross-Nazzal, assisted by Rebecca Wright. Thanks again for taking time this morning. We know your schedule is quite packed.

CABANA: My pleasure, Jennifer.

ROSS-NAZZAL: So we certainly appreciate it.

CABANA: I was thinking before I came in for the interview. I can't remember everything. I keep notes, and since we've gotten in the digital age my notes in my notebook aren't quite as copious as they used to be. Back at home I've got stenographer notebooks and three-ring five-by-eight notebooks that I've saved over the years that chronicle everything when I was chief of the office and all the issues that were going on. I think it'd be nice if I would have sat down and paged through some of that stuff, just to bring back memories on it all. It's amazing how much has transpired in the last 30 years since I've been at NASA. That's hard to believe too; 1985 to 2015, it seems like it's gone by in the blink of an eye sometimes.

STS-65 was my first command. It was on *Columbia*. It was a Spacelab mission. It was International Microgravity Lab [IML]-2. It was a great crew. Jim [James D.] Halsell was my

pilot. It was Jim's first flight. Carl [E.] Walz was MS [Mission Specialist]-2 and flight engineer. Rick [Richard J.] Hieb was the payload commander. Rick was one of my classmates in our astronaut class in 1985. Had Leroy Chiao and Don [Donald A.] Thomas. It was their first flight, and Chiaki Mukai was payload specialist. Chiaki, of course, was the first Japanese female to fly in space.

It was really a good time. We had a Spacelab in the payload bay. We had 83 experiments from around the world. It was a model for how science was done on the International Space Station. We were working with the folks up at Huntsville [Marshall Space Flight Center, Alabama], out of the Payload Ops Center up there, as well as folks overseas. We trained all over. We went to Japan. It was very much the model the International Space Station uses. I got to do a couple of experiments back in the laboratory. Things I remember—just anecdotal stories.

We had a red shift and a blue shift, because we worked 24 hours a day, 12 on, 12 off, doing the science. I was in charge of the red shift, and Carl Walz was in charge of the blue shift. The tools that we have now are much better, but back then we had the Hi8 video cameras. I'd take the day's events that we'd recorded all day, and during my off time I'd condense it, edit it, and make a really nice flow of the day on everything that we did and dump it down to MCC [Mission Control Center] with a narration that they could easily put on NASA TV. It was very time-consuming. One night I remember Carl said, "Are you ever going to go to sleep so I can be in charge?"

We had sleep compartments down on the middeck instead of sleeping in sleeping bags, so that you could still be down on the middeck making food. There were four of them on the wall on the starboard side of the middeck. They were really nice. One of the advantages of

being the commander was I had my own, whereas the other three had to hot-bunk and share. So they had to set up their sleeping bags every night and roll them up in the morning to make room for the other crew [member] that was working, whereas mine was mine all the time. It was nice.

There's another interesting story too. It was fun. One of the experiments –Chiaki Mukai was doing this lower body negative pressure (LBNP) [experiment]. It's a suit that you climbed into, a tube that wrapped around your waist, then it would suck on you essentially. It was like drawing a vacuum in it, to pull all the fluid down into your lower extremities, to simulate being on Earth again. They were looking at how it impacted the heart. We were back in the lab; Chiaki was in the LBNP. They didn't want us to be doing the experiment when they didn't have contact with the ground so that they could monitor Chiaki and make sure that she didn't have a heart arrhythmia.

We came into a zone of exclusion. It was back when we had TDRS [Tracking and Data Relay Satellite] East, and TDRS West and we didn't have full coverage all the way around. I can't remember exactly where, the Indian Ocean somewhere. You had this zone where you had no communication with the ground, so they asked us to stop and wait till we got on the other side. It was one of the longer ones.

I didn't have anything to do at the time, so I decided to entertain Chiaki and Rick. They didn't see me. On the end cone of the lab we had this large IML flag mounted on the end of it. When they were looking I went down there, took it off the wall, and tied it around my neck like a cape like Superman. I pushed off the end of the end cone and went flying over Chiaki with my arm out like Superman flying by. I said, "IML man." I was going back and forth, having a ball, and they were laughing. We're almost out of this [zone of exclusion], so I went and put it all back. The folks called up from Marshall. The recorders were still running with the cameras, and

they said, "We can downlink." I said, "No, that's okay. There's nothing to downlink; we weren't doing anything." Somewhere in the archives of STS-65, nobody's found it yet or went looking for it, but there's IML man flying around in the Spacelab.

It was a lot of work. We spent a lot of time. Being in space was fun too. We're still normal people up there. The mission just went extremely well. At the time we set the record for the longest Shuttle mission. We had the EDO pallet, Extended Duration Orbiter pallet, on board. At the time we were flying the Extended Duration Orbiter Waste Management System, which was different from the regular toilet on the Shuttle. It's much like the toilet that's on the Space Station. Anyway, we set the record, but it got broken; records are made to be broken.

I'll never forget coming in to land. My first flight, I really felt gravity when I got back, just felt heavy. The second flight was better. The third flight I was thinking, "Oh gosh, you've got to land the Space Shuttle, I wonder how I'm going to feel." I had so much adrenaline going, I couldn't even feel gravity. We had a detailed test objective. That was interesting.

Here it's July 1994, and we're still doing test objectives to better understand the Orbiter's aerodynamics. At the approach and land transition, I did a roll doublet and a rudder doublet. It's essentially a displacement of the vehicle in roll, a set amount at a set rate in each direction, and the same thing in yaw. Then they can back out from that the actual aerodynamic characteristics of the vehicle at that point. The other day I was looking at a videotape of that approach and land transition. I said, "Okay, stand by for the maneuver." You see everybody's heads in the vehicle going back and forth as I did the roll and rudder doublet. Then nailed the landing. That felt really good. I just remember getting off the vehicle. I didn't want to give it up. I was sitting in the seat, and finally the commander has to get out.

Phil Stepaniak was our flight surgeon. He was always over at the gym. I got out of the seat and we were in the passageway between the crew vehicle and the middeck. I looked up and I said, "Phil, you want to wrestle?" He said, "No, I can see it in your eyes." Those were fun stories.

It was a great flight. We didn't land on the first revolution or first day. Weather was bad. We had to go around and came back and landed on Runway 33 at KSC [Kennedy Space Center, Florida] the next day. I remember after we got the payload bay doors back open and out of our suits, I was just really tired. I just curled up on the floor of the flight deck back in the corner, underneath where the controls are for the arm, and took a nap.

Chiaki, I love her to death; after 15 days in space it was still like her first day. She's just bouncing [off the walls]. She never learned how to move with finesse. She banged into me and woke me up, and she didn't even know it. That's another story. We were in Japan afterwards for the postflight. She's a national hero. Japanese are very proper, and she always deferred to me as the commander. I embarrassed her a little bit. "Mukai-san." I'm following her. Good person. That was a great crew.

Leroy and Don, just great guys. They really enjoyed their first flight and went on to bigger and better things. It all worked out very well.

ROSS-NAZZAL: I wanted to ask you a few questions. When you were named commander did you get a chance to weigh in on who would be part of that crew?

CABANA: No, the crew is picked for you. The chief [of the Astronaut Office] picks the whole crew. I did the same when I was chief. There's a method to it. You got to balance it out. All

astronauts are equal, but some are more equal than others. You got to balance the crew with the right talent. You want to give new guys experience and fly them with the right experienced guys. You also want to be fair in the rotation. You can't fly the same person right after another. You got to wait your turn a little bit. Then you also have to pick based on what skills are needed for what's being done on the flight. It's a pretty complex problem. But no, I inherited the whole crew as they were, and it was a great crew.

ROSS-NAZZAL: You mentioned that you traveled all over the world training for this flight. Was the training flow really long because you were working with so many investigators in so many countries?

CABANA: I can't remember if the payload crew got assigned a little bit sooner. I think we were all assigned about the same [time]. It was about a year. It was a normal year training flow. Right after I got back from that flight, Dave [David C.] Leestma was Director of Flight Crew Operations [FCOD], that's when Dave asked me to be chief of the Astronaut Office. Of course I said yes. We were just finishing up all our postflight stuff. Those guys got to travel everywhere, and I couldn't go with them, because I had a really hard new job.

ROSS-NAZZAL: You had other responsibilities.

CABANA: They were over in Italy doing all kinds of neat stuff.

ROSS-NAZZAL: We interviewed Leroy Chiao many years ago. He mentioned that he thought on launch day you guys were going to go out; you weren't going to launch. They were surprised that you guys actually ended up launching on that day.

CABANA: We launched on time. I remember on ascent Leroy, he took his mirror, and he was looking out the overhead window at the plume, and he couldn't believe all the flame that he was seeing out the window. I remember him commenting about that, pretty impressive. I was more focused on the gauges and where we were going.

ROSS-NAZZAL: Your last mission you had flown *Discovery* but this time as you pointed out you flew on *Columbia*.

CABANA: Actually my last one was *Endeavour*. My first two were *Discovery*, then *Columbia*, then *Endeavour*.

ROSS-NAZZAL: Were there any differences between the vehicles?

CABANA: *Columbia* looked different for a number of reasons. It was heavier. The tiles were different, the way the pattern was. At one time it had ejection seats, so some of the closeout panels inside were a little bit different, but as far as how it operated, how it flew, you couldn't tell the difference between the Orbiters. They all flew essentially the same.

In fact if you were in *Discovery*, *Atlantis*, or *Endeavour*, unless you knew, you couldn't tell one from the other. *Columbia* was a little bit different, being a little older. It was pretty neat to be able to fly *Columbia*, the very first Space Shuttle to fly.

ROSS-NAZZAL: You mentioned that this was an EDO mission. Were there any other differences besides that extended duration toilet that are worthy of pointing out?

CABANA: No, being up 15 days is a long time in a Space Shuttle.

ROSS-NAZZAL: In that small space.

CABANA: It was a little over 15 days. It was learning how to operate and get all the experiments done. You get into a routine, a pattern. Space Shuttles are a little more of a sprint than the International Space Station. A lot of work gets crammed in, because you're up there for a shorter period of time. The Space Station assembly missions were extremely challenging because they put so much into them. You want to accomplish everything. [STS]-65 was a great mission, really enjoyed it. It was a great first command, just went really well.

ROSS-NAZZAL: You flew three very different missions. You had a deploy mission, you had a DoD [Department of Defense] mission, then you had a Spacelab mission. Can you compare and contrast flying those missions for us?

CABANA: The first one was really short. It was a very different mode. We didn't go up into space to stay and do a lot. We went up for a mission and came right back. Our mission on the first flight was to deploy Ulysses. It was over Columbus Day weekend. I remember we went to the Cape [Canaveral, Florida] for the launch, flew our mission, and five days later we were home. It was like being gone for a long weekend. It was like, "Were we really in space?" It just went by really fast.

The DoD mission was a little bit longer. We had some science that we did while we were up there in addition to deploying DoD-1. The Spacelab mission was long. Again, that was a lot of science. The Space Station assembly mission was just a lot more complex. Everything had to go right. It was a sequence of events between the three EVAs [Extravehicular Activities], all the assembly, the checkout. I can't even remember. I don't think we even flew any other experiments on board. There were probably some, but all I remember is the assembly and all we had to do. I don't think there was anything else.

The first flight, I was in charge of the rats that flew. We had an animal enclosure facility, and I had to make sure they were doing okay every day. That was interesting. Second flight, we did some fluids experiments. We did fire in space; that was cool, looking at how flames propagate. Going back to the first flight, we did a "Space Basics" video. Bill [William M.] Shepherd was our director. This was part of his idea from the very beginning, an educational video on what is microgravity, how do you get to space, why are you weightless. He storyboarded the whole thing ahead of time. We shot some of the stuff here on Earth before and after the flight, and then we had sequences that we shot on orbit. My favorite words from Shep—we didn't have that much free time, but when we did we were working on this "Space

Basics" video. We'd shoot a scene, and Shep would say, "That was really good, but." We'd shoot it again. It really turned out [well]. It was a neat video. Turned out well so that was fun.

ROSS-NAZZAL: Speaking of video, I read that you shared some footage of the ascent with Mission Control right after you went into space.

CABANA: I don't know if that was the first flight. I think it might have been. We had a camera in the crew cabin, and it was mounted between the rear windows on the back and showing forward, so you could see the back of the heads of the four guys on the flight deck, the gauges, and see out the front windows. It really turned out to be a neat video.

The other neat thing about it was on the ground, when you watch a launch, you don't hear what's going on on the ICS (intercommunication system) in the cabin. All you hear is the air-to-ground and Mission Control talking. So we also downlinked what we were actually saying to each other. You can go on YouTube and google STS-65 ascent, and you'll see it. There's also an entry video. You can see the entire entry from deorbit burn to touchdown. That's out there on YouTube somewhere too. I got a DVD [Digital Video Disc] of it also, the whole crew does. We had videotapes, and we converted them to DVD. It's really a neat video.

ROSS-NAZZAL: Was that your idea to film that?

CABANA: No, it was something that we'd talked about in the Office, and we decided to do it. We volunteered to be the first crew that got it ready in time so that we could do it. It turned out really well.

ROSS-NAZZAL: Did Mission Control learn anything that they applied to future missions from that?

CABANA: No, I think it was a neat training [thing]. It was nice to be able to show guys that hadn't flown before what actually was going on in the cockpit on ascent. I think it was more a great memory but a nice insight for folks to see, just makes it a little more human. Then it became the norm after that. I think pretty much all the flights have it since then. I got it for my last flight too, on [STS]-88, ascent and entry.

ROSS-NAZZAL: It seemed unusual. I notice that you did the SAREX [Shuttle Amateur Radio Experiment] on this flight. Can you talk about that?

CABANA: KC5HBV.

ROSS-NAZZAL: That's your call sign?

CABANA: I still keep it up to date. Haven't used it in a while. In our spare time we talked to schools. We did hookups with schools around the world, got to talk to them, got their cards. We mailed back and forth. That was fun. Ham radio is a neat way to communicate with kids on the ground. Technology has changed so much. You look at Scott [J.] Kelly on International Space Station now with Twitter. We didn't have all that stuff back then. Ham radio was another way

that you could communicate on a personal basis with folks, and it was unique, that somebody on the ground could talk to you in space.

ROSS-NAZZAL: Did you have a chance to talk to your kids while you were in space on SAREX?

CABANA: Yes. Talked to some schools. Had a ham radio hookup. Worked out well.

ROSS-NAZZAL: Sounds like a neat experiment. I noticed you also gave some tours of the vehicle while you were up in space. Can you talk about that? Talk about some of the TV programs you talked with.

CABANA: Oh, I can't remember, but it's something that we pretty much did on all the flights just to share the experience. Starting on the flight deck and videotaping it and going down through the middeck and just floating through and back in through the tunnel into the laboratory and allowing folks to see firsthand. Did the same thing on 88 when we went inside the Space Station for the first time to share that with the folks on the ground. Now it's commonplace to look up and see astronauts floating around in space with all the cameras. Didn't have so much live video in the past, although [we had] some. [It was] just an opportunity to share. Also turns out having those videotapes afterwards, it's nice to be able to help remember.

ROSS-NAZZAL: I saw that you talked with the *Today* show and *The Larry King Show* while you were up in orbit.

CABANA: Oh, Jennifer, I can't even remember what I said, but it's standard stuff. You get to hook up. They ask their questions, and you talk to them about what it's like in space, the experiments you're doing, and why they're important. None of that has really changed. It's pretty much the same message today as it was 20 years ago. The importance of why we're up there, what we're learning, how it applies to life here on Earth, and how it applies to helping us advance as a civilization, as a nation, the importance of science and technology, our ability to explore beyond our home planet eventually. So it's pretty much all the same stuff, just got to keep reinforcing it. People never get tired of asking, of seeing it firsthand, of being able to relate to it.

ROSS-NAZZAL: I also read that Dan [Daniel S.] Goldin called your flight while you were up there. Were you surprised to hear from the Administrator?

CABANA: No, it was cool. I'll tell you another Dan Goldin story. I don't know, can't share all my stories.

ROSS-NAZZAL: You can share, we can always edit them.

CABANA: We were over in Shep's Bar. Ken [Kenneth D.] Bowersox was training for his mission. It was after Shep's first mission, right around that timeframe. I can't remember exactly. In the basement of Cottage 3 in Star City, where the astronauts live—there's three cottages that they live in while they're training over there. Shep, when he was training, was the first one to move in. They had just finished Cottage 3. They were still working on the others.

There was a weight room in the basement. They were duplexes, but the basements were connected. There was a weight room in one, and Shep built this bar in the other one. We had a Ping-Pong table down there and television for watching movies.

It was a social gathering place for all the folks that were working and training in Russia. We'd invite the Russians and have parties, and we'd have cookouts; shashlik, it's a Russian kebab that they grill outside. It was a great social gathering place. The bar has been signed. Tom Hanks signed it when he was there. It's got patches and stickers and everybody's signature all over it. We were playing liar's dice one night, and when I was chief of the Astronaut Office I called back to the States. We had decided to call Mr. [W.S.] Abbey. George was Center Director then. George said, "I think you need to talk to Mr. Goldin." He had us on hold. The next thing I know he's connected us to DC and we're talking to the Administrator from Shep's Bar.

ROSS-NAZZAL: There was a pretty significant anniversary when you guys were up in space for 65 and that was Apollo 11.

CABANA: It was. That was the twenty-fifth anniversary of the Apollo landing. We flew.

ROSS-NAZZAL: Would you talk about that?

CABANA: At the last minute they had all these twenty-fifth anniversary commemorative Apollo landing flags, and the idea was to fly them all and give everybody at NASA one. I've still got mine mounted somewhere, and it's signed by, I think, the Administrator; I can't remember.

They came in at the last minute. They were trying to get them all stowed on board. We wanted to stow a lot of stuff; there's stowage space back in the laboratory, but it had already been closed out, so they crammed those things everywhere. They were in lockers. Then we had to move things around, but we got them all on board.

That was pretty cool. At 25 years to the date and time that they did the burn to go to the Moon, the TLI burn (translunar injection burn), the ground sent us up a PAD for a TLI burn for the Orbiter to go to the Moon. Unfortunately we didn't have quite enough propellant, but it would have been pretty cool.

ROSS-NAZZAL: That would have been cool. How exciting. You had a lot of historic things going on during that mission.

CABANA: Yes, it was cool.

ROSS-NAZZAL: What did it mean to you to be in space and hold that record for a short time of the longest spaceflight at that point?

CABANA: It was cool. We got a neat plaque from the FAI (Federation Aeronautique Internationale) recognizing the record. Like I said, records were made to be broken. I think 18 days ended up being the longest Shuttle mission that we flew. It was cool to have it for a while.

ROSS-NAZZAL: This was a mission that included a woman. You had never flown with a woman before. Was that any different for you?

CABANA: No. It's like anything else. You just respect people's privacy. It's no different. We all got along fine. I had Nancy Currie on my last flight. It's like anywhere. It's easily done.

ROSS-NAZZAL: How did you handle issue of privacy and things of that nature?

CABANA: There's plenty of space on board the Shuttle. When a female needed privacy from all the guys—the WCS [Waste Collection System], the way the door opened up and the curtains were on it, there was a private space there where she could be while the rest of us were getting cleaned up or whatever out on the middeck. Again just respect each other's privacy. It wasn't even an issue.

ROSS-NAZZAL: What about the fact that she was from a different culture? Was that any sort of issue? She was from Japan.

CABANA: No, I'd lived in Japan for two years in the Marine Corps, two separate times, a year at a time, in Iwakuni. That's another thing. The Japanese are very respectful of other people's privacy. When you live in a nation where everybody is so close and walls are paper-thin in some houses, you learn to respect other people. Be unto yourself; respect other people's property and privacy.

ROSS-NAZZAL: As you mentioned, this was almost a dress rehearsal for Space Station. What lessons learned did you pass on to folks that were applied to ISS [International Space Station]?

CABANA: I think how we operated the experiments, the training, it evolved. It was a good model. We weren't the first Spacelab mission either. IML-1 was before us. There was USML [U.S. Microgravity Laboratory], and there were some flights, Neurolab, that focused on the human system and biological system. I think it's something that evolved over time. We get better at it all the time.

ROSS-NAZZAL: I thought we'd turn now to talking about being chief of the Astronaut Office. You mentioned that Dave Leestma had asked you to take that position. What were your thoughts when he approached you? Were you surprised that you would be getting into management?

CABANA: Yes, I was, very. Very surprised. There were other folks that had been around longer than me. Hoot [Robert L.] Gibson was chief before me. Hooter told me something the other day. We were talking. He said, "It was an easy choice. We just wanted somebody that we knew would take good care of the people in the Office." I thought that was a pretty nice compliment.

ROSS-NAZZAL: That is.

CABANA: I think that's probably the hardest I worked when I was at NASA, those three years that I was chief of the Astronaut Office. It was a lot of work, long days. I'd come in on Saturday mornings just to get caught up on paperwork. I had an open door policy. I was always at work by 7:00 in the morning and stayed till 6:00, sometimes 7:00 at night. People would walk in. I'd always talk to anybody. There was a lot of paperwork. I still maintained all my

proficiency in the simulator. In fact I used it as an opportunity to see how other guys were doing. I'd go in the sim with them.

Then you're still supporting all the launches. At that time we were flying eight to nine launches a year. There was one period while I was chief, in a 12-month period we flew 11 flights. I spent a lot of time in Florida supporting launch and landing. When you consider delays to launch and weather delays on landing, I bet I spent half of those three years down at the Cape. I wouldn't have traded it for anything. I think one of the hardest things is assigning people to fly in space, being fair about it, but riding out to the launch pad with them.

I would have gladly gone in their place, not just to fly in space, but knowing the risks that were being taken. That was a good three years. We flew a lot; a lot of good things happened. It was an interesting time. We were doing the Shuttle-Mir Program, and that was a huge challenge. The first crews for Shuttle-Mir had already been assigned. Norm [Norman E.] Thagard had not flown yet, but Norm and Bonnie [J. Dunbar] were over in Russia training when I got assigned to be chief. They had just gone over there.

My first trip to Russia was in January of 1995 to see how they were doing. I'd been chief six months. That was very interesting. John [E.] Blaha and Shannon [W.] Lucid had already been assigned and were learning Russian. They hadn't moved to Russia yet. Then I assigned the rest of the crews that went—Jerry [M.] Linenger might have been assigned too. Andy [Andrew S.W.] Thomas, Dave [David A.] Wolf, I have to go look at them all.

ROSS-NAZZAL: I know we've got a picture in here. Just had to find where it was. [Points to photo.]

CABANA: Mike [C. Michael] Foale, yes. How could I forget Mike? Mike and Jerry had a real challenge. The one that's not up there, I assigned Jim [James S.] Voss to be the backup for the last Shuttle-Mir mission. The thought was he'd get the training so that he could fly on Space Station, which he did on the second increment. But, that poor guy, he spent a lot of time training in Russia before he actually got to fly on Space Station. Of course Jerry Linenger was up when they had the fire on *Mir*. Mike Foale was up there when we had the collision on *Mir*. At the time Tommy [W.] Holloway and Frank [L.] Culbertson, I don't know. Tommy started out Shuttle-Mir and moved over to Space Station. Frank Culbertson then moved up to take [control]. You can read the book *Dragonfly*. I see it over there. Are we recording?

WRIGHT: Yes.

CABANA: Just remember that's one man's opinion of how things went. That's not necessarily the truth.

ROSS-NAZZAL: We've heard a lot of complaints about that book.

CABANA: One man's view. He never interviewed me, but I'm quoted in that book. He never talked to me. Frank Culbertson was working really hard with the Russians back then. I remember trying to get information, trying to learn, ensure our crews were safe.

The Shuttle-Mir Program was critical to us working with the Russians on the Space Station Program. We would not have been successful on Space Station had we not done Shuttle-Mir. Learning how to work with them; I think we established great relationships during the

Shuttle-Mir Program, but it was not without challenges: getting crews certified to fly, getting through their medical processes. They didn't do things better or worse than us. They did things different from us. In some ways they were very inflexible. This was their system. This had provided them with success. They were going to force our guys into their system.

Over time now we've worked, and they do things a little more like us. There's more flexibility. It's been an interesting process, but back then it was really interesting. I'll never forget when I went over there to see how they were getting ready for Shannon Lucid. They had not flown a female cosmonaut in a long time.

Shannon, good Oklahoma girl that she is, went over there and jumped right in. I was going through the apartment that she was going to live in and make sure things were right. General [Yuri] Glazkov, who has since passed, was in charge of Star City at the time. We were walking through the apartment, and there's a brand-new washer and dryer in it. Glazkov didn't speak English; he always worked through an interpreter, or you spoke Russian, but he knew some English. We get to where this brand-new washer and dryer are. I don't even think they were hooked up yet. He goes, "See how much we love American astronauts." That was in Shannon's apartment. That all worked out.

Brenda Blaha took very good care of John over there. She went over, and John had a great mission. It was hard for those folks. They had to learn Russian, pass all their tests in Russian, and it wasn't easy. We got better at how we got folks prepared to go over there and train over the years, but a lot of that happened because of Shuttle-Mir.

ROSS-NAZZAL: Would you talk about that first trip you made when you went to go see Norm and Bonnie?

CABANA: I got to Moscow and this was only a few years after the wall came down. Moscow today is not anything like it was back then. Even the traffic, they didn't have all the cars that they have now. Out at Star City 1 in 10 lightbulbs worked. The linoleum was peeling up off the floors. The paint was peeling on the walls. Pretty grim in places. That all changed as we worked through Shuttle-Mir, and things got more stabilized over there. The Russian people, they're good people, very warm and gregarious. They just grew up in a different system than we grew up in. I think we had common goals, and we united around those goals.

I've done a lot of traveling around the world, and everybody wants the same things. They want good things for their children. They want a future. They want food on the table. In the end people are pretty much all the same. I think we're much more like the Russians than we are different from them in a lot of ways.

So we learned to work together, and it was an iterative process. You had to develop relationships to develop trust. When you developed those relationships and developed the trust that came with it that helped from the technical point of view getting things done. Once you have that trust then you can work together. The relationships that I developed when I was chief of the Astronaut Office, they really helped when I was Manager for International [Operations] in the Space Station Program and other positions that I've had at NASA that involve working Space Station, having developed those relationships and trust.

I just remember I was over there, my first trip. I'm a colonel in the Marine Corps. Christer Fuglesang and I, Christer was a Swedish astronaut that was training over there to fly, went out cross-country skiing in the middle of the night. It's eleven, twelve o'clock at night, and we're skiing through holes in fences and all around [to see] what was this secret city. It wasn't

even on a map. I'm thinking, "This is surreal." It was just so neat in the woods in Star City cross-country skiing in the middle of the night with a Swede. That was pretty cool just seeing Star City for the first time, the training facilities, how they operated compared to how we operated, all that learning. I got to admit, when I got back to Sheremetyevo and got on the airplane and when the landing gear came up it was like this sigh of relief. It was like, "Ah, I'm going home." That changed over time, but that first trip was still pretty much like it was during the Soviet Union in Moscow. I [didn't feel] totally comfortable.

Then when I lived in Russia, I felt more at home in Moscow than big cities in the United States. I felt totally comfortable there, but again that's a learning process. It's getting to know customs, people, the language, and so on. [I] used to give tours. I could give a better tour of Moscow than a lot of folks when folks would come over and visit. I had Russians come up to me on the street and ask me for directions.

ROSS-NAZZAL: You just fit right in.

CABANA: They might have been spies, I don't know. Checking me out but I could give them directions in Russian. It was great.

ROSS-NAZZAL: After you came back from that first trip and saw what Norm and Bonnie were dealing with and some of the hardships that they faced, what changes did you start to implement or what discussions did you start?

CABANA: We had a great program. Our life sciences guys are awesome and the psychological help that they provide—I think the real challenge wasn't so much the technical part. We worked on that, but I think what our docs did working with the Russian docs to get folks qualified, making sure that from a psychological point of view the crew had [support]. We worked very hard to ensure that the crews had good support in Russia, that we were taking good care of them. We had a DOR (Director of Operations-Russia), an astronaut, working in Star City that was a direct interface with the Russian in charge of training. We were providing the right support to our crews. They were being taken care of.

They had good support and comfort over there, because it was a harsh environment to be thrown into to learn. I can't remember which mission it was now. Scott [E.] Parazynski wanted to fly on *Mir*, so we sent him over there to get him measured. I didn't share this story last time, did I?

ROSS-NAZZAL: I think it was too tall, too short.

CABANA: Yes. All right, I ain't going to tell that story again.

ROSS-NAZZAL: It's a good story though.

CABANA: It is a good story.

WRIGHT: It does show that progression.

CABANA: But it was prior to the [Soyuz] TMA, the modifications that we did to allow a greater buttocks-to-knee length in the vehicle. It was really hard finding folks that fit in a Soyuz TM that could actually fly to *Mir* that wanted to do it. Wendy [B.] Lawrence and Scott Parazynski, too tall and too small.

ROSS-NAZZAL: You told us last time that it was really hard to get people to want to go live and work in Russia and train. Were there any folks in the Office that were just really excited to go over there and willing to step up?

CABANA: I think all the folks that went. Mike Foale wanted to go. Andy Thomas wanted to go. I think the folks that went over there wanted to do it. That makes a big difference, to do something begrudgingly or to do something because you want to do it. Finding the right people was important. You wouldn't just assign somebody just to assign somebody. You needed to assign somebody for the right reasons. They had to want to be there, or it would never have worked.

ROSS-NAZZAL: While you were chief of the Astronaut, Carolyn [L.] Huntoon was Center Director and then George Abbey. Would you talk about working with both of them?

CABANA: I didn't have that much of a direct interface with Carolyn. Dr. Huntoon, I got on her bad side at one point. In the Astronaut Office you have different jobs. [M.] Rhea Seddon was in charge [of medical issues for the office]. Rhea was working with the life sciences folks on experiments that we were doing from a human point of view. She had written this letter for me

to send to [NASA] Headquarters [Washington, DC]. I can't even remember what it was on now. I read it, and it was all very reasonable on how we were going to deal with these things, so I signed it. I made the mistake of not going through Dr. Huntoon. Of course Carolyn had been head of life sciences before becoming Director here at JSC. She wasn't very pleased with me, but we got over it. I made sure I kept her informed after that.

ROSS-NAZZAL: What about Mr. Abbey?

CABANA: I love George to death. I don't know of anybody that was more concerned about America, our space program, and doing the right thing for the space program than George. I loved interfaces with him. I don't know how much to say here.

I remember taking crew [assignments to him]. I worked really hard on getting good crew assignments. Dave Leestma and I would go bring the crews to George. I had a master spreadsheet where I had all the logic laid out, and I'd explain it all to Dave. We'd write down all the names. We'd take it to George, and we'd sit across the table from him. When you got to the meat of the discussion you'd finally get talking about the crew.

You'd move it across and explain why. Piece of paper would be sitting there on the table. Eventually he'd pick it up, slide it, fold it in half, and put it in his pocket. All right, that's a good crew. Or else, all of a sudden, it would come back across the table to you.

ROSS-NAZZAL: Without any explanation?

CABANA: Yes, but if you changed it, if you weren't right the first time, what makes you think you're right the second time?

ROSS-NAZZAL: Did you learn that or was that something Dave had told you?

CABANA: No, but I knew the right reasons why we had the crew. So I'd just bring the same crew back the second time and explain why. It always worked out. We ended up getting the crews assigned. I really enjoyed interfacing with Mr. Abbey. He's a good man.

ROSS-NAZZAL: Looking at the context of the times, the NASA budget at that time was really in turmoil when you were chief of the Astronaut Office. There were a lot of cuts. Dan Goldin said, "Nothing is sacred." I wondered if that impacted, or how it impacted the Astronaut Office at that point.

CABANA: First off, the Astronaut Office has a minimal budget. There just isn't that much. You got to browbeat people into doing things because it's the right thing to do, not because you have money that controls them. The money is in the programs. I don't see that the budget at that time really impacted us in the Astronaut Office. It was more an impact to the programs. We were part of the Shuttle Program. Shuttle Program was paying for everything. They had a fair amount of money. There wasn't a real impact in that regard to what we were doing.

Now as time went on, when I was Director of Flight Crew Operations and had to do a budget, then it became more challenging as budget cuts came in. Working for Bill [William H.] Gerstenmaier when I was over in Russia, it was really a challenge, because Bill was looking for

ways to cut money and continue to build Space Station. So I took significant budget cuts to our operations in Russia. It's continued to today. Today it's just extremely challenging with the flat budget to do everything that we're doing.

At KSC going into this next year we're $16 million under what we really should have. There's cuts that are made and a lot of things we're just running to failure, hoping they don't break. I think we're doing pretty good overall. I think we accomplished a heck of a lot with the funds we were given.

ROSS-NAZZAL: There were a couple furloughs during that time. Did that have any impact on missions or anything of that sort?

CABANA: No. When you have people flying in space, the critical things get done. I look back. Supporting human spaceflight operations and the Space Station, that's always well supported for the critical operations that need to get done. People understand human life is at risk and it's going to get supported.

ROSS-NAZZAL: Would you talk about your role as chief of the office and working with other heads at JSC, like MOD [Mission Operations Directorate], Space Shuttle, all those different offices?

CABANA: I'll share another favorite story. Brewster [H.] Shaw was Program Manager for the Space Station Program. I'd been chief for about a year. He had a little side conference room off his office over on the fifth floor of Building 1, and we were having a meeting in there. The

conference table was full, couple guys standing in the back. Had the folks at Marshall and KSC on the line. I can't even remember what it was now I presented to them. It was something that we needed to do. Brewster almost got mad at me. He wasn't mad, "No, we're not going to do that." I thought, "That was the right thing to do." He was just vehement about it. He pointed at me and said, "I want to see you in my office." Oh, dang.

I get in his office and he says, "You were absolutely right; I'm going to do what you wanted to do. But I didn't want those other guys online to think I was being soft on the Astronaut Office." Thanks, Brewster.

WRIGHT: Had to keep his image.

CABANA: Like anything else, if you have good technical rationale for what you want to do and you present your data well, you're going to get what you want. I just made sure that whenever I interfaced with any of the other programs I had good data to support what it was we were doing so we could make informed decisions.

ROSS-NAZZAL: There were several astronaut classes that came in during that time.

CABANA: I really enjoyed being on those Astronaut Selection Boards. Prior to being chief of the office I was screening a couple Boards prior to that. I think, really, when you look at an astronaut candidate class and how you get to that, when you've got 3,500, 4,000 applicants, and you neck it down to 120 that you interview to pick 20 or whatever the number is, you can pick any week's interviewees and have a good class. To sort through, you're really splitting hairs

when you get to deciding on who you're going to select. It's a very fair process. It was really interesting being able to talk to all those folks and learn about their experiences and their backgrounds.

ROSS-NAZZAL: You guys took a pretty big class at one point; I think the Sardines came in. How did that impact the Office?

CABANA: With all the Shuttle missions we were flying and the folks that we needed for International Space Station, at one time I had 115 astronauts in the astronaut corps, if I included the international partners. It was huge. I think we're down to around 45 right now or something like that.

ROSS-NAZZAL: It's pretty small.

CABANA: I'd go back and fly again though, if they got desperate. I'm ready.

ROSS-NAZZAL: You want to fly commercial crew?

CABANA: Sure.

WRIGHT: You'd fly anywhere, wouldn't you?

CABANA: If it gets me out of a meeting, sign me up. I'll go to Mars. I'm old. I can take that radiation. It's okay. I can still pass the physical.

ROSS-NAZZAL: You just want to fly in jets again, right?

CABANA: Absolutely. Yes, that was a big class. Lot of good folks in it.

ROSS-NAZZAL: I can imagine your Office was bursting at that point.

CABANA: We had a lot of work too. Everybody was working hard to get everything done. When you're flying eight flights a year with five to seven people on every flight, right there that's at least 50 folks in a year that are flying in space. You can't just turn them around. They have some time off between flights. When you're flying 50 folks in space a year, you need a pretty good size astronaut corps.

Most of what astronauts do is not fly in space. It's support other people flying in space. You're working in SAIL [Shuttle Avionics Integration Laboratory]. You're working on software. You're working in Mission Control. All kinds of collateral duties that still have to be supported, which are also good learning tools.

ROSS-NAZZAL: Any particularly memorable missions when you were chief of the Astronaut Office or anecdotes you want to share?

CABANA: Those two *Mir* missions where we had the fire and the collision with *Mir* and lost pressure in the module. Those were exciting.

ROSS-NAZZAL: How did you find out about both of those?

CABANA: I don't remember how I got the telephone call or how I found out. But boy, we got together quick. I remember getting over to see Frank Culbertson and trying to get more information and find out what was going on. Our communications have improved greatly since then too. The International Space Station Program is different from the Shuttle-Mir Program in that during Shuttle-Mir we didn't have a control center here in the United States. We had our folks over in the Russian control center.

Bill Gerstenmaier worked on console in the TsUP over in Moscow in the Russian control center while Shannon was on orbit. He was her controller down on the ground in Moscow. Today information flows much more freely. It's easier to get information. We got the information, but it wasn't quite as easy as it is now.

ROSS-NAZZAL: Mainly telephones and faxes.

CABANA: Yes, absolutely. You want a lot of information right away, and it's hard to get the details.

ROSS-NAZZAL: Did you go over to Russia to find answers?

CABANA: I traveled over there a lot while I was chief of the office to interface with the Russians on crew assignments and how things were going and seeing how our folks were doing over in Russia, and then just for verification of some stuff and learning. Most of the technical details were handled through the Shuttle-Mir Program Office.

ROSS-NAZZAL: What do you think was your biggest challenge being chief of the office?

CABANA: Having 115 type A personalities working for me and keeping everybody in line. It's like having 115 teenagers, only you got more control over your own kids.

ROSS-NAZZAL: I guess you can ground them or something.

CABANA: You can ground astronauts too. Don't want to do that.

ROSS-NAZZAL: While you were chief of the Astronaut Office you got assigned to the first assembly mission. How did you juggle your task as commander?

CABANA: Got assigned to the first assembly mission. Actually when I got assigned to that mission, I stepped down as being chief.

ROSS-NAZZAL: You did, okay.

CABANA: Yes. After three years I had a choice. I could quit being chief and fly in space, or I could stay being chief and not fly in space. They were doing things a little different. When Dan [Daniel C.] Brandenstein was chief of the office, he actually had an acting chief while he trained and flew his mission, then came back and was chief again. They'd gone to a model where if you were going to do that then you weren't going to be chief anymore, and I really wanted to fly that first Space Station assembly mission. I wanted to fly in space again.

ROSS-NAZZAL: Tell us about the crew. As chief of the office did you get a chance to—

CABANA: I picked that crew.

ROSS-NAZZAL: Talk about that. I think that's interesting.

CABANA: Picked Rick [Frederick W.] Sturckow to be my pilot. It was Rick's first flight. It was a great experience for him. Again trying to provide balance to the crews, you can't fly everybody that's experienced. Jerry [L.] Ross, picked him for EVA. Jerry was lead EVA guy in the office, and this was the first assembly flight. It had three spacewalks on it which were challenging. Jim [James H.] Newman has great skills from a computer point of view and also EVA. Nancy [J.] Currie, superb robotics arm operator, and we had some challenging robotics tasks on that first flight.

Guess that's everybody. Then we got a crewmate added on partway through the training flow. Sergei [K.] Krikalev joined us. Sergei had flown on the Shuttle and ended up being on the first Space Station crew. They knew he was going to be assigned to that first crew, so they

thought it'd be good to get him up there during this assembly mission. The Russians were pushing to having a crewmate on board since it was the first assembly mission, and it was the right answer.

I think one thing if I had it to do over again, instead of having Jim and Jerry do all three EVAs, I would have split it up so everybody did two. I'd have put Jim and Jerry together on one, Jerry and Sergei on one, and Jim and Sergei on one. Hindsight is 20/20. It all worked out great. The EVAs went superb.

A number of challenges too. The Russian FGB had a couple of antennas that didn't deploy properly, and the guys were able to deploy them during the EVAs. The advantages of having humans in space, being adaptable and fixing things when they aren't exactly right. Yes, that was neat. Had to make sure I had a crew that was up to the challenge.

ROSS-NAZZAL: How closely had you worked with most of those folks before assigning them?

CABANA: I'd never flown with any of them, but as chief of the office I knew them all. I knew all the astronauts in the office. I got to know everybody really well. I probably spent time in the simulator with everybody at one point during the three years that I was chief. I knew them by reputation, I knew them by the jobs that they'd held in the Office and what they'd done. It worked out.

ROSS-NAZZAL: Would you talk about the crew relationship and building that team?

CABANA: I didn't tell you the dog crew story last time, did I?

ROSS-NAZZAL: You told us about dog crews.

CABANA: I guess I did tell you, all right.

ROSS-NAZZAL: We talked about Dave [David M.] Walker and the dogmobile.

CABANA: So this was a stealth dog crew.

ROSS-NAZZAL: That's right. Yes, you did tell us that.

CABANA: So that built camaraderie. Our trips, our traveling together, we went to Russia for training. Can't remember if it was December or January. We were out walking around the Kremlin at night. There's this one wall where there's a huge hill, and these kids were sliding down it on cardboard. Newman and I, we grabbed cardboard and started sliding down with the kids. The rest of the crew thought we were nuts, thought I was going to get hurt.

We did a lot of fun stuff together just traveling around. We were in a Russian grocery store before they'd all been converted to Western stores. Under the Russian system, I think it was a jobs program. You went into a store. There was a produce section, a dairy section, and a meat section. If you wanted to buy something from the meat counter, you went up to the meat counter. You waited in line to get to the meat counter, and you said, "Okay, I want a pound of that." You got a little chit, went back to the cash register, and paid for it. Then you got back in

line to give them the chit to show that you paid for it, so that they would give you what you paid for.

We were in the store, and Newman wanted to buy some milk. Moloko is the Russian word for milk but he couldn't remember it, so he just holds his hand out like this [demonstrates]. He goes, "Moo." He got his milk. Common international language there. It was a great crew.

ROSS-NAZZAL: Talk about bringing in a Russian to the crew.

CABANA: That was easy. Sergei, his English skills are excellent. He's just a genuinely nice guy, smart, congenial. He fit right in. We had a great time. It was no issue at all. Worked out really well.

ROSS-NAZZAL: Would you talk about working with the mission directors and the lead flight director and FAO [Flight Activities Officer]? Putting this mission together was pretty significant.

CABANA: Mark [A.] Kirasich was my lead Station director, and John [P.] Shannon was the ascent/entry flight director. You got a close bond. We worked very well together. Of course the flight director is overall in charge of the mission, but as the commander on orbit, you can always override him. You better have a good reason to. We worked very closely together to ensure success.

One of the trips that we took to Russia, we went over on charter flights that used to fly out of here. We flew over on the G2. We went to Goose Bay, Labrador, to Ireland, to Moscow.

It wasn't Goose Bay, Labrador, it was another one of our abort sites up there in Newfoundland. I can't remember. Then we came home on the charter flight from Moscow. We went over there to see the FGB [Functional Cargo Block] while it was still in the factory at Khrunichev.

When we went home we had some of our flight controllers on the plane with us. We had trainers. On the way home we changed the procedures and edited from what we'd seen when we were in Russia. I remember sitting at a table, all of us around, Sergei and the rest of the crew. We're going through the procedures making red lines and changing things. We also played a lot of cards, played hearts. That was fun. You develop a real bond with your flight control team, going through procedures, and your trainers.

ROSS-NAZZAL: Any interesting stories from training and simulations? Any jokes or pranks?

CABANA: None that jump out at me. It was pretty nominal training flow. It ended up being longer because the modules weren't ready. We didn't fly as soon as we thought we would, so we ended up with more training time than expected. I guess I was still chief of the office for a while while we trained. It just made for longer days, that's all. Yes, the initial part of the training, I was still chief of the office. Then a year prior to flight that's when I stepped down and spent full time training for the mission. We got extended a little bit.

Going back to [STS]-65, I chaired a source board while I was assigned to the flight. We weren't six months from flight yet. So I was spending all day out chairing a source board for the maintenance contract for the aircraft out at Ellington [Field, Houston, Texas]. I'd do that all day with the source board team, and then I'd train in the simulator at night for 65.

ROSS-NAZZAL: Long days.

CABANA: Yes, but at the early part of the training flow you got low priority in the simulator, so you're going to train at night anyway.

ROSS-NAZZAL: I had seen some articles where you had been invited out to the State of the Union address and actually were able to sit next to [First Lady] Hillary Clinton.

CABANA: Yes, that was very interesting. The President's State of the Union address, that was in January of '98. The Space Station was supposed to be mentioned in the State of the Union address. They always sit people through a relationship of one sort or another that are talked about in the State of the Union address. They had representatives sitting next to the First Lady in her seats.

So I ended up sitting next to Hillary Clinton because they were going to talk about first Space Station assembly mission then the speech got rewritten the day of the State of the Union address. Instead of talking about the Space Station, they talked about John [H.] Glenn flying a month prior to our mission. It was still a NASA connection and space. It was really neat to be there for the State of the Union address sitting next to the First Lady, and then being invited to the White House for the reception afterwards. That was very cool, very cool.

One of the other things we did on that flight was deploy an Argentine satellite. SAC-[A] I think was the name of it. We went down to San Carlos de Bariloche in the Patagonia area of Argentina, where their Argentine science center is, to train on the satellite. While we were there,

the president was meeting with the president of Argentina for a summit. They were also in San Carlos de Bariloche while we were there.

Mr. Goldin was supposed to introduce the president at this event, because it was at the science center, and the NASA connection. He said, "I can't do it. I have to go back to Washington." I can't remember why. He says, "I want you to introduce the president." "Yes, sir." So I wrote a speech to introduce the President of the United States, got it blessed by the White House. I'm up on stage with the President of the United States and the president of Argentina, with the mountains behind us, and this beautiful blue lake. I have this picture, and I introduced the president at this conference.

It's a really neat picture. So I took it with me to the White House at that reception after the State of the Union address. I went up to the president, and I asked him if he would sign it for me. I didn't expect him to remember me from Adam. "Sure, Bob." Very charismatic man, Mr. [William J.] Clinton. He put, "Thanks for your leadership in space, Bill Clinton," on the picture, so I got that framed.

The other interesting thing I remember from that evening was while I was waiting to talk to the president, Jesse Jackson was talking to him. He's a big man. I mean Bill Clinton is a big man, but I think Jesse is a little taller than President Clinton. He's thumping the President of the United States on the chest as he's talking to him. Wham!

ROSS-NAZZAL: Something important to say I guess.

CABANA: That was very unique. That's another thing. I've been blessed. I got to meet President Clinton. When he was down to see Senator Glenn launch, since I had already

introduced him once at a meeting, Goldin wanted me to escort him and the First Lady so I was on the roof of the LCC [Launch Control Center] with the President and First Lady when Glenn launched.

Then I got to meet President [George H.W.] Bush prior to that on my first flight in space. After [STS]-41 we got invited to the White House, the whole crew, so I got a picture in the Oval Office with President Bush and the rest of the crew.

Then Bush 43 [George W. Bush], of course, was president when we lost *Columbia* [STS-107]. Working with the *Columbia* families in the aftermath of all that, I got to go to the White House and meet him. Then I got to meet President [Barrack] Obama when he came to KSC. So that's pretty cool.

ROSS-NAZZAL: That's very cool.

CABANA: I didn't get to shake President [Ronald] Reagan's hand. I got really close to him, but I never got to. I would have liked to have had a picture with him too, but it was pretty neat.

ROSS-NAZZAL: Yes, it's a catalog of U.S. Presidents right there. Curious about launch. There was an attempt at launch, but there was a master alarm that went off.

CABANA: Yes. Did I tell you my *Wizard of Oz* story?

ROSS-NAZZAL: No.

CABANA: I have to share that one. My daughter and I are real *Wizard of Oz* aficionados, and right before I went in quarantine for that mission, they rereleased *The Wizard of Oz* digitally mastered in color. She and I went to see it then I went into quarantine.

I had launched on time my three previous flights, maybe not right on time, but within the first launch window, on the day of launch. This one, that night we were out there, the weather was lousy. Things just weren't running smooth. It just didn't feel right.

We had problems starting one of the APUs [Auxiliary Power Units]. Everything got sorted out. We got it started; we held at 31 seconds. You have a five-minute launch window. Finally we come out of the hold, and we're counting down. We didn't hold at 31 seconds. When we came out after starting the APUs and the hold, I can't remember where we held. We held for a little bit, then we came out of it. I'd have to go back and check.

Bottom line is we counted down to 18 seconds and didn't go. We had waited too long in the launch window. We didn't have enough propellant to do the rendezvous. LOX [Liquid Oxygen] drainback got us, so we scrubbed. We backed out of it and went back to crew quarters. We were down, but not that down, smiled for the media, looked good getting out of the Astrovan going back to crew quarters. Get to do it again.

That next day in the *Orlando Sentinel*, and I think it was in *Florida Today* too, after the storms came through, there was this picture of a rainbow over *Endeavour* sitting on the launch pad. It was beautiful. The next night, we went out, and it was just as smooth as could be. It was just a perfect launch count, perfect launch. Everything just went like clockwork, just really really well.

Our first day on orbit, the wakeup music my daughter had selected was "Somewhere over the Rainbow" by Judy Garland. It brought tears to my eyes. I tell folks somewhere over the

rainbow dream do come true, because we launched over that rainbow and we had an absolutely dream flight from start to finish. Just went perfect. That was special. Yes, things just weren't right on that first launch attempt. We could have gone if it all worked out, but I'm glad that it wasn't when we launched, because the next night everything was just perfect, and the weather was better, everything was better.

ROSS-NAZZAL: Perfect start to a perfect mission.

CABANA: Yes.

ROSS-NAZZAL: Tell us about the mission itself and your memories of that flight.

CABANA: It was busy from start to finish. First thing we did was get Unity out of the payload bay. Nancy just did a superb job. I didn't know you could move the arm that slow. She had less than an inch of clearance on either side. It was like watching grass grow. Perfectly out, we positioned it over the Orbiter docking station with PMA [Pressurized Mating Adaptor]-1. I fired the thrusters to bring the two pieces together just like you dock with Space Station. She positioned it with the arm. Then we lift the arm, fire the thrusters, and then the APAS, (Androgynous [Peripheral Attach System]), a docking system, brought it together. Jerry Ross was working the docking system. He was in charge of all the switches. Everything worked perfect, drove the latches, and Unity was secured to the Orbiter docking station. Then we did the rendezvous with the FGB, Zarya, which means sunrise in Russian. The rendezvous went

flawlessly. It was really good. That was a little bit exciting. Did I share that excitement with you last time?

ROSS-NAZZAL: No. Would you tell us about that?

CABANA: As I said the rendezvous went flawlessly. Jim Newman, prior to becoming an astronaut, was one of the trainers in rendezvous and prox ops [proximity operations]. He wrote a program for the PGSC [Payload and General Support Computer], the onboard personal computer, that was called RPOP (Rendezvous and Proximity Operations Program). It basically showed your rendezvous profile with predictor dots on where you'd be at certain times and what would happen if you did certain things. You could see the whole thing, follow it. It was a very nice visual representation of the rendezvous and where you were going.

I had RPOP; I had the Shuttle onboard computers; I had the Ku-band rendezvous radar. Somebody was using handheld laser to get range and range rate, and I had Jim Newman giving me verbal advice all through the whole thing. "What do you think about a couple of ups? How about an in?" I'm using my Kalman filter to filter all that and do what I think was the right answer. It all went flawlessly.

I flew the FGB down into the payload bay, and I couldn't see it out the windows because the node was blocking our view. So I had a centerline camera looking up at it and a camera on the end of the arm looking across at it. I'm watching it on the two TV monitors. I got it perfectly stable, and we're waiting to get over a Russian ground site so that they confirm the FGB is in free drift, because you wouldn't want to grab it with the arm and have its flight control

system on, have it fight the arm, and break the arm. So you have to make sure its control system is off.

While we were waiting to get over a Russian ground site, the Orbiter maintains its attitude. There's six degrees of freedom that you can fly. It's hard to do all that. So we programmed the autopilot to hold the Orbiter's attitude then all we have to worry about are the translations. It hit a dead band. There's an area where it doesn't fire the jets as long as it's within that dead band, and it's proper in pitch, roll, and yaw. As it slightly drifts and it hits a roll dead band or a pitch dead band, it'll fire the jets to center it back up. When it does that you don't get a pure roll, pitch, or yaw maneuver. It couples into a translation. When it did, all of a sudden, this 45,000-pound mass is moving into the payload bay and towards the arm. So I started firing the thrusters to back away from it, and nothing happened. It's still coming at us.

You program the digital autopilot [DAP] depending on what it is that you're doing. I had it programmed for very fine control at that point. Fortunately, I had enough good sense to reach up and go from the B DAP for very fine control to the A DAP, which had more control power, and started firing the jets, and we backed away from it, and then came back and got all stable again, ready to grab it.

When that happened, there was just dead silence in the cockpit. Got my attention. I mean it wouldn't have been good if it would have hit us. That would have been the end. Newman always had all that advice during the rendezvous. When it was all done, I turned to Jim and I said, "Hey, Pluto," his dog name. I said, "Pluto, how come you didn't have any advice for me there?" "Well, I know when to keep my mouth shut." That was probably the most exciting time on orbit. Fortunately I knew what to do.

We got over a Russian ground site, and they cleared us to grab it. Nancy grabbed it with the arm. The Orbiter flies so well. In the simulator I got it like three feet away from the end of the arm. I could just fly the arm onto it, but I let Nancy grab it.

She lifted it up. We couldn't actually see. We're using camera views to make sure that it's centered. We had this system on board where we had a bunch of dots on the node and on the FGB, where using visuals and computers it would tell you if you were aligned or not, but it didn't really work all that well. We had some other graphics that we were using of what it should look like. We got it all positioned over the PMA-2 on the node and lifted the arm and fired the thrusters again and brought those two pieces together, drove the latches, and that was it, they were linked together.

Then we did the spacewalks to hook up the data and power connectors. We actually disconnected some stuff so that you couldn't fire things to separate the two pieces; they're joined. It's not coming apart.

I'll never forget when we got to go inside, open up the hatches and go in for the first time. That was pretty cool. Sergei and I went in side by side through every hatch. I'm the first American, and he's the first Russian to enter the Space Station, but we entered as an international crew side by side.

ROSS-NAZZAL: Was that something that you had discussed? Or was that something that you just decided as commander?

CABANA: I don't know if I told you that one last time or not. The media kept asking me who was going to be first on board. I didn't tell anybody. I didn't even tell the crew. I just waited

until it happened. It was my plan, always. I said, "Sergei, come up here." I brought him up, and we went in side by side, because the International Space Station, I thought we ought to enter as an international crew. It worked out really well.

I remember that once we had all the hatches open all the way back, we set up cameras, and we did a little downlink to Mission Control from inside the FGB, inside the Space Station. That was pretty cool. The two days we were hooked up to Space Station, we did a lot of work. I think I told you that story about being up in the Space Station with Sergei.

ROSS-NAZZAL: You may have, but why don't you tell us again?

CABANA: Oh, I know I told you this one. I had a couple crew members that really needed eight hours of sleep, so the rule was the middeck had to be dark during sleep time. You had to really be quiet. You could stay up, send e-mail, look out the window, as long as you were quiet. Jim stayed up later than anybody. He was up on the flight deck doing e-mail and looking out the window, and he decided to go back into the Space Station one more time before he went to bed.

He went through the hatch down on the middeck. It's totally dark. Everybody's sleeping. He was going back through these huge bags where the airlock used to be on the middeck—these huge bags full of parts and supplies for the Space Station— now it was in the payload bay, making sure he doesn't wake me or Nancy Currie up, CJ and Jerry are off plastered on the wall elsewhere on the middeck.

He goes into the airlock, turns through the PMA, into Node 1, and who does he see but me and Sergei Krikalev. We stayed up till like 4:00 in the morning, just working and talking inside the Space Station. That was really cool. Never forget that. Talking about the future, what

it meant. International cooperation, what the Space Station was going to be. How important this was, and how neat it was just to be up there together laying the cornerstone for the Space Station. That was a neat night.

Finally I said, "Guys, we got a really busy day tomorrow. We got to get some sleep." I made us all go to bed. So we got about three hours of sleep, and then we got up for another really busy day.

ROSS-NAZZAL: *Endeavour* actually boosted ISS into a higher altitude. Can you talk about that?

CABANA: Yes. We did that on a lot of Shuttle missions. Even though it's a couple hundred miles above the Earth, it still has decay. The Progress vehicle regularly boosts Station. The ATV [Automated Transfer Vehicle] had the capability to boost Station. [We use] these vehicles now that we don't have Shuttle anymore.

We always used whatever extra propellant we could while we were up there to give Station a little boost to keep it to a higher altitude. Where Zarya was launched on the Proton, and then we got all joined up, we had extra prop. With there being a delay until the Service Module could get there, we wanted to get it as high as we possibly could, so it wouldn't come down too much before the Service Module got launched.

ROSS-NAZZAL: Would you talk about the media interest in this flight? This was a first.

CABANA: Yes, there was a lot. First Space Station assembly mission, a lot of media interest, kind of standard.

ROSS-NAZZAL: Just standard? Nothing stood out?

CABANA: No, we did a lot of media interviews on orbit and on the ground afterwards. It was the beginning. I look back on Space Station, and it's really a phenomenal accomplishment. Folks didn't think we'd be able to do all the EVAs to get Space Station done, and they all went flawlessly. There were hiccups along the way, things didn't go right, but the crews overcame so much and were able to fix things that couldn't have been done autonomously with the issues that we had. I look at the solar array deploys and how we worked through that issue. It wasn't until Luca Parmitano had that issue with the water in his helmet here about a year ago that we really had an issue on an EVA where we had to cut it short. Pretty amazing how well everything went.

ROSS-NAZZAL: Would you talk about undocking to Space Station, pulling back, and your memories of that?

CABANA: Yes. Being a good commander, I had to train my pilot and give him some experience. As much as I would have liked to have flown undocking and fly around the Space Station while we took pictures of it, I let Rick Sturckow do that. I just watched and supervised. When we undocked, Rick got to do the undocking and the fly-around. That prepared him for his command going to Space Station where he did a rendezvous with the Space Station. It was pretty cool when we backed away. Got some really neat pictures that ended up on the cover of *Aviation Week*.

The one that's on *Aviation Week* wasn't the one I think was the best. They picked one where you could see the Earth and the clouds behind it. My favorite is just the blackness of space behind it. It's the beginning of the ISS silhouetted with that black void of space behind it, and it really looks neat in my opinion.

ROSS-NAZZAL: Was that an image you took?

CABANA: I can't remember if I took it, or somebody else took it. You lose track of which pictures you take. You take so darn many. I got it framed in my office. It's a cool picture. The Sun is shining on it. The stars are actually there, you just can't see them. The Sun is so bright that your irises shrink down in your eye, and all you see is this black void of space because the Sun is so bright. The Space Station is lit up with that dark black void. There is nothing that compares to the blackness of space. It's just the deepest darkest black. No pictures, nothing does it justice here on Earth.

ROSS-NAZZAL: Did you know, going up, that this would be your final flight?

CABANA: My last flight? No. I should have probably figured that out. I got back after that flight, and George used to always have a private debrief with the commander before we debriefed senior staff with the crew. We were in his office prior to going in to debrief senior staff. He's just telling me what a great job we did, how well the mission went, and how pleased he was. I said, "George, I don't know how I can top that flight." "Well, I don't know why you'd want to try." I've been wearing a tie to work ever since, but that's okay.

Also I got back off that flight. My daughter doesn't remember it, but right after landing she came up to me. She said, "All right, Dad, four is enough for anybody. You're done."

ROSS-NAZZAL: How old was she then?

CABANA: Seventeen. It's easy for us to fly in space. It's really hard on the families. I think the hardest job I ever had were the times I was family escort. Standing on the roof of the LCC holding a two-year-old next to some of your best friends' wives watching five to seven of your close friends on that ball of flame going off into space. My heart is pounding. I've got tears running out my eyes. It's hard. It was hard sending people to fly in space. You always knew what risk you were taking.

People ask me if I was scared. Was I ever scared? I was never scared, but I have to admit with each mission I was more apprehensive getting into the vehicle. Standing up there at the [195]-foot level looking, knowing the risks that you were taking. Each time with every flight there was a little more apprehension. Once inside the vehicle, just total peace. I knew I was really good at what I was doing. I had a great team on the ground supporting me. God was going to look after me and my family one way or another. I could even take naps on the launch pad. There were some long holds. I could just drift off a little bit, catch up, relax.

ROSS-NAZZAL: You were named Deputy Director of FCOD for a time.

CABANA: I was Deputy Director for a very short period. Then went off and was the Manager for International Operations for the Space Station Program. From there I went to run our ops in

Russia for a year and a half. George asked me if I would go do that. I was working for Tommy Holloway at the time and I said, "Yes, sir, of course."

The last job I applied for was to be an astronaut. Ever since then I've just done what I've been asked to do. I said I would but I said, "I really think rather than working for the Director of the Johnson Space Center it ought to be working with and also for the Space Station Program Manager," and he agreed to that.

I told Tommy. I said, "I'd like to get full-time Russian language training before I go." I knew a little bit of Russian from being chief of the office and traveling back and forth to Russia. I have a little bit of an ear for languages, but I wanted formal training so I was really good. Tommy said, "Absolutely, but there's a couple things I'd like you to finish before you go into full-time Russian language training."

He never did let me get full-time Russian language training. I'd get to work at 6:00 in the morning. I'd work in the Space Station Program till 8:00. I'd go take Russian language class from 8:00 to 12:00. Then I'd work in the Space Station Program from 12:00 to 6:00. Then I'd study Russian trying to get my homework done for the next day. I did that until I went to Russia.

Tony [Anthony J.] Vanchu was really proud of me. He was my Russian language TTI [Techtrans International] instructor here. I was his first student to make it all the way through the book. When I got to Russia I continued to take Russian language lessons from Dr. Vladimir Sergeyevich Beldushkin [phonetic] who taught at the University of Moscow. He was a tutor to make extra money part time. He had his own way of teaching Russian. This was the way he taught it to non-Russian language speakers as a university professor. So I had a new set of books, and I had a class once a week with him.

I was reading Russian poetry at the end. I think [Sergei A.] Yesenin was a better poet than [Alexander S.] Pushkin. I liked his poems. He hanged himself in Saint Petersburg. Sad life, but he wrote some good poems. I was actually giving speeches in Russian when I was there. I used to have to write them out. I could do the introduction and the closing ad lib without notes, but I had written text so I wouldn't screw it up.

ROSS-NAZZAL: You still keep up your Russian?

CABANA: *Net, k sozhaleniyu ya ochen' staryi i glupyi. Ya zabyl vsyo moi russkiy yazyk.* Unfortunately I'm old and stupid and I've forgotten all my Russian language.

ROSS-NAZZAL: That sounded pretty good.

CABANA: I was just thinking the other day. I'm staying over in the Marriott Residence Inn on Bay Area Boulevard. That's where all the Russians stay that work in Mission Control. Hearing their language I'm tempted to sit down and try and strike up a conversation just to practice, but it's been, oh gosh, 13 years since I lived in Moscow. Unfortunately, if you don't use it you lose it. I've forgotten so much, but if I get back over there, if I'm in the environment for a while, it comes back.

Then I ran our ops in Russia for a year and a half. That was great working with the Russians over there interfacing for the Space Station Program, for the Johnson Space Center, and the Astronaut Office as our Director of Human Space Flight Operations there. That was good.

ROSS-NAZZAL: Did your family come with you?

CABANA: Yes, all the kids were out of the house. It wouldn't have been my choice to pack up and move to Russia, but all the kids were gone. Youngest one was off in college, had just graduated, in fact, from college. I didn't see a reason not to. So we sold our house, put everything in storage, moved to Russia, and lived in the Volga Apartment Hotel over there. I really enjoyed living in Moscow, went to a lot of concerts, got to spend a lot of time touring the city on weekends, giving tours to all the Americans that came over, helping them see stuff.

It was a great time for the Space Station Program too. We'd just gotten the first crew up there. We were continuing with the assembly flights. It was getting crews assigned, still learning how to work together. It was a lot of decisions being made. Just really worked out well getting our Mission Control operating well over there in our little back room in the Russian control center.

While I was there Tommy Holloway retired and Bill Gerstenmaier who was his Deputy took over as Space Station Program Manager. Bill asked me to come back and be his Deputy. So I left Russia and moved back to Houston. I think for about three months I was the Space Station Deputy Program Manager, and Beak [Jefferson Davis] Howell was Center Director and asked me to be the Director of Flight Crew Operations. I moved out of the Space Station Program and was Director of Flight Crew Operations.

My very first flight as Director of Flight Crew Operations was STS-107. We lost *Columbia*, and that was a challenging time. God puts you in a place for a reason, and I wouldn't have chosen then to be Director of Flight Crew Ops, but it worked out, working with the

families, getting us back to flight, working with the Astronaut Office, working with the crews on orbit.

That was challenging, not having Shuttle, having to rely on our Russian partners to get crews up and down. We went through a lot during that timeframe. I'll never forget. Ken Bowersox, Don [Donald R.] Pettit, and Nick [Nikolai M.] Budarin were coming home from the fourth increment. Frank was Increment Three. Those guys were Increment Four I think it was, or Five. Now I'd have to go back and look. They had a ballistic reentry. I was over in Kazakhstan to go out, greet them at landing, as part of the contingent, seeing how things went.

We're on this Russian helicopter, the weather is lousy, and we're just flying forever, and they're not where they were supposed to be. We didn't know all the details. We're trying to find out why aren't they where they were supposed to be. Having just lost *Columbia*, now I'm dealing with a Soyuz vehicle that landed short.

The Soyuz is a very robust vehicle, and it's capable of a ballistic reentry as opposed to a guided reentry. They were about 300 kilometers short of where they were supposed to be. They got out okay. Because they landed short, we didn't have enough fuel for all the helicopters. We didn't end up taking everybody there. I ended up waiting, didn't get to go all the way to the landing site. Talking to Sox afterwards, they got themselves out of the vehicle on their own. Ken says the thing he remembered most was the smell of the Earth when they opened the hatch.

Don wasn't feeling all that great. They got everybody out, and they just basically sat there and waited for the recovery team to show up. That was scary for a while. It was great when we heard they were okay.

ROSS-NAZZAL: I can imagine, a big wave of relief.

CABANA: I remember a flight after that being at the landing site. We're out in the middle of nowhere on the steppes of Kazakhstan and all of a sudden here's this little green Lada bouncing over the terrain. Comes to a stop. This Kazakh gets out with his daughter and comes over. He had brought her to see these folks returning from space.

The Russians let him into the tent to speak to—I can't remember who the Russian cosmonaut was now. I have to go back and look at my flights back then. I thought that was so neat. Here's this guy trying to share this with his daughter then the Russians let him into the tent with the crew to actually let this cosmonaut greet this young girl. I thought that was really special. It was pretty neat. Different way of doing things.

I like the way the Shuttle lands on the runway.

ROSS-NAZZAL: It's very dignified, isn't it?

CABANA: But we're going back to capsules. Yes, that was a very interesting time. Then after—it was about two years or so as Director of Flight Crew Operations, I got asked to be Deputy Director of JSC for Beak Howell.

I spent a year and a half as Beak's Deputy and a year and a half as Mike [Michael L.] Coats's Deputy. I thought I was well prepared for that. One of the things about being an astronaut is that you get involved in so many things across all the directorates here at JSC, but not just at JSC, at other Centers also. I knew JSC very well and got to apply what I knew and the folks I knew as the Deputy Director. Beak Howell was very much an up and out kind of guy. I got to run down and in the Center from a budgetary and personnel point of view.

ROSS-NAZZAL: What are your memories of when President Bush announced that new Vision for Space Exploration and the impact that it had on JSC?

CABANA: I think it was great looking forward to the future, to Constellation, and where we were going and what we were doing. It was very disappointing when that all came to an end. A lot of folks had put a lot into it. Huge challenge to stand up a program and move forward.

If you look back on what the Augustine Commission said in their report, it wasn't that it was a poorly managed program. It was an underfunded program. Where we were going, what we were doing, had it been funded properly, we could have made that happen.

Where we are with SLS [Space Launch System] and Orion, of course Orion survived Constellation, and SLS is a different rocket from what the Ares V would have been. Using the resources we have and the budget that we have, this is the right answer for what we're doing now, although we got to be careful that it's not underfunded also. In 2010 when that Program got canceled, that was a real hit to everybody. I was at KSC at the time. That was hard.

ROSS-NAZZAL: When Beak asked you to be his Deputy Director, what were your thoughts?

CABANA: Yes, sir. Good marine. Randy [Brock R.] Stone was retiring and Beak asked me to do it, and I said, "Okay."

ROSS-NAZZAL: Had you worked with Beak much?

CABANA: No, didn't know him from Adam. Yes, he was a fighter pilot; I was an attack pilot in the Marine Corps. Knew of him only by reputation and having been Director of Flight Crew Ops when Beak came on board, knowing him from that point of view. Working on crew assignments and astronaut selections and loss of *Columbia*, but I had not known him prior to that.

ROSS-NAZZAL: What's the role of the Deputy Director at JSC? Can you share some of those [details]?

CABANA: I think it varies depending on who the Director is. Beak, having worked for SAIC, was very much not involved in some things like fee-determining boards and source evaluation boards. From a contractual point of view, I was the fee-determining official on a lot of the contracts at JSC. I consulted with him. At one point he said I wasn't keeping him well enough informed on what I was doing, so I started informing him on everything I was doing.

ROSS-NAZZAL: You went overboard.

CABANA: He said, "Okay, enough." He pretty much allowed me to run the Center, and he worried about the up and out kind of stuff. I worried about the down and in kind of stuff. It worked out well.

When Mike Coats came on board, we kept the same model. Mike, I had known for a long time. Mike is one of the finest individuals I know. He is a really really good man. He'd actually tried to get me to come work for Lockheed Martin at one time. I wanted to stay where I was. I've only worked for one person since I graduated from high school, and that's Uncle Sam.

I went to the Naval Academy [Annapolis, MD], I went in the Marine Corps, and I came to NASA. I think what we're doing is really important and I really enjoy being part of this team here at NASA. So I wasn't ready to leave and do something else. I really enjoyed working for Mike. He's a good man, good friend, and I'd do anything for him. It worked out well.

ROSS-NAZZAL: What are your memories of that return to flight after *Columbia*? You were Deputy Director then. How involved were you in that effort?

CABANA: A lot. Was very concerned that it would go well. We put a lot of work into it. The crew worked hard to make sure that it all went well. It was an interesting crew assignment in that that was supposed to be the next crew, and we didn't really change it. We allowed that crew to be the crew that continued to fly. Ken Bowersox was the Director of FCOD and it all worked out well.

ROSS-NAZZAL: Any special memories?

CABANA: I'm trying to think. At that point Kent [V.] Rominger was still chief of the Astronaut Office then. Or had Charlie [Charles J.] Precourt taken over yet?

ROSS-NAZZAL: I'd have to check the dates. I can't speak with certainty.

CABANA: Yes, I have to go back and look. I can't remember. My memory is not as good as it used to be, too much stuff to keep track of. There is a lot. I've been very blessed. I look back

on all the things that I've gotten to be a part of, and I often thank George for giving me the opportunity to be an astronaut back in 1985. I wish I'd made it in '84, but it's okay. I was really disappointed when PJ [Paul J.] Weitz called me, and I wasn't selected. I'll never forget. He said, "We're going to take some more next year. We'd like you to try again." "Yes, sir." PJ is another good man. I think the world of him. He's enjoying life out in Arizona, he deserves to.

The second time I interviewed George said, "Yes, we're looking for some Marines to guard the gates." "Whatever you want, sir."

ROSS-NAZZAL: On that return to flight there was a tile strike. Were you surprised by that?

CABANA: Not really, just had to make sure that it wasn't something that would cause a problem. Every flight, as good as we got at putting foam on the vehicle, there was always a little debris that ended up striking the vehicle. It was minor. Look at *Atlantis* right now in the Visitor Center at KSC, and you can see a couple of dinged tiles. That was probably the cleanest flight that we ever flew, perfect flow. That went really really well, that Orbiter flow. Very clean vehicle when it got back. Every flight had tiles that either needed to be replaced or repaired.

Hindsight is always 20/20. On my first flight, we had a strike on one of the tiles right behind a carrier panel. The carrier panels were right behind the RCC [Reinforced Carbon-Carbon], and then a tile right behind that took a hit. It gouged it really well. You could look up, and it actually slumped the aluminum, the metal, back behind the tile. "Geez, you're going to have to repair that before it flies again." We never really thought that much about it.

On my last flight, if you look at the video, there was a huge hunk of foam that came off the intertank flange. It just missed the Orbiter. We were lucky.

That's the advantage of having a capsule on top of the rocket. You're out of that debris zone. Plus, you have an abort capability that gets the capsule off the rocket if there's ever a problem. Much easier than getting the Orbiter off the stack, depending on when it happens to safely get the crew down.

ROSS-NAZZAL: I've heard that you were able to allocate money to different programs as Deputy Director with Cabana's bucks.

CABANA: Oh, that was a joke. Yes, we always worked the budget for the Center. The guys came up when I went away, and they had a Cabana buck and presented me with it. What they also did was—I forget which Mexican restaurant it is. They got those little empty thread spools that are red and green. You turn it green if you want more and red if you don't. The guys made up one for me that was red on both ends. Just say no.

ROSS-NAZZAL: Probably needed it after being Deputy Director.

CABANA: To budget requests, to more money. I had a hard time not giving folks the money they needed to do what they were doing, but you had a limited budget. You had to allocate it fairly and do the right thing, always a challenge.

ROSS-NAZZAL: There was a pretty big challenge when you were Deputy Director and Mike Coats became head of the Center, and that was the shooting out at Building 44.

CABANA: Oh, yes.

ROSS-NAZZAL: Would you talk about that and the role you played?

CABANA: Watching that on TV, just what was going on, and working through all that, that was a scary time. Now that you bring it up, I can't remember where I was. I have to go back and think about that. It was just working through all that and the hostage situation. Jackie [Reese] of the Employee Assistance Program did an awesome job after that working with folks to work through all that. That's one thing I think NASA does extremely well, our Employee Assistance Programs at the various Centers. Really provides good support for a lot of personnel issues and personal issues that folks have, helping them work through it. I think we do well in providing that service to our folks. That was a scary time. It was very sad, but I think given what happened we worked through it well. We responded, and we took care of it afterwards and provided the right support in the aftermath to take care of folks that were impacted by it.

ROSS-NAZZAL: Were there any lessons learned that you applied to the Center?

CABANA: I can't think of any specifically. I think the important thing was what we provided to help folks afterwards. Working through it in the proper manner with our reaction, our security team here at JSC, having that training at other Centers on a rapid reaction force to a situation like that. I think it brought up training that's required. You're not going to be able to stop somebody that really wants to do that on Center. Guns are illegal on federal facilities, but we don't stop [everyone]. We do random checks. We rely on our security training to help prevent it. If

somebody wants to come on board [with a gun], chances are you're not going to catch them with a random check, they're going to get on board.

So what we need to do, and I think what we've done, is help folks recognize when somebody [is struggling]. In any situation where somebody has done something like that, there are issues leading up to it that had they been recognized you might have been able to stop it.

Folks always look back and say oh, yes, he wasn't acting quite right, or she wasn't quite right. I think stressing the NASA family, stressing how we look out for one another, if we truly do that and we recognize when folks have issues and we help get them the counseling that they need, you can help prevent something like that. You're not going to stop it with your security force, then you're in a reactive mode. Having the training to help in a situation like that is really good. We trained for it at KSC. I know it's trained for here. We provided training to people.

This isn't something that happens just at NASA. If you look across our country right now, these crazed people with guns that have gone into malls and schools, you can't just be a target. If there is a lone gunman in a confined area with 50 people, yes, some people are going to get hurt, but you can react to that and do the right thing to stop it before hundreds of people are hurt. It's not easy but there are things you can do.

From a NASA point of view where it's a single incident like that, a single person that ends up taking their own life, which is really sad, there are issues that probably could have been caught ahead of time had they been handled properly then. It's ensuring that we provide that kind of training to folks to help recognize when somebody needs help. I think we've done that, but it's something that needs to be constantly reinforced.

You always have new people coming on board that you have to integrate into your family. You need to ensure that they get that training too. That was sad.

ROSS-NAZZAL: Did you have much contact with the congressional delegation or state government as Deputy Director?

CABANA: Always, as the Deputy and the Center Director you're constantly going up on Capitol Hill, going to the various congressional delegations, educating them on what we do and why it's important, doing it at the state level. Texas State Capitol in Austin is really cool because Texas used to be a nation. It hasn't changed a whole lot when you go in. That's part of the job, ensuring that they understand why it is we do what we do and the importance of it.

ROSS-NAZZAL: What do you think was your greatest challenge working out here at JSC?

CABANA: I paused because a lot of things are running through my mind. First off about challenges, everything in life is a challenge. You tackle it through knowledge and training and understanding, and as you gain that, challenges are whittled down. Initially working with the Russians was a challenge. Integrating our programs together to be able to do the International Space Station. Learning Russian language was a challenge. Being chief of the Astronaut Office was a challenge. All things are challenging, but they're rewarding. You just got to put the effort into them.

I tell folks the first time I saw inside the Shuttle simulator. How am I going to learn all this? I'd flown some sophisticated aircraft. It's like anything else, you learn it one system at a time, one bit at a time, the nominal, then the off-nominal procedures then you integrate all the systems together. Pretty soon you know it all. It's just a matter of working through things. It

helps to have a good team, and we are blessed at NASA. The folks that are part of this Agency, that are part of the Johnson Space Center, the Kennedy Space Center, wherever, they're there because they want to be there, not because they have to be. It's not just a job. For most of us it's a vocation, it's a calling, it's something that we really want to be a part of that's important.

When you have that, when people are passionate about what they do, and they want to be a part of it, it makes it a whole lot easier. Why is NASA the number one agency for the last three years and hopefully again for the fourth year in our federal government? I think it's for a couple reasons. First off, I think it's because we have a meaningful mission. People want to be a part of it. They're making a difference in the world. That is very important. I think it's also the way we take care of one another. We care about the people in the team. We really do look after the folks that work at our centers and in our Agency.

I think that meaningful mission really helps too to make us number one. So everything's a challenge in what we do in human spaceflight and at NASA. There's nothing that's not challenging, but it's all very rewarding, and it's all very achievable as you work through things step by step and build on your past experiences to help you with your future work.

ROSS-NAZZAL: If you had to pick one thing, what do you think is your greatest accomplishment, working here at Johnson?

CABANA: Be a lot easier if you asked me about Kennedy.

ROSS-NAZZAL: Oh, I'm sure. That's a whole other oral history.

CABANA: It's been an amazing seven plus years at KSC with a huge transition.

If I had to pick one thing, one of the things I'm most proud of—it's hard to pick one thing. The first Space Station assembly mission, having that success, having it go as well as it did, and setting the stage for the construction of the International Space Station, setting the tone for how it was to be done, how to work with our international partners, how to be successful on orbit, how to work with the team on the ground, all the testing that we did, everything. That was a huge accomplishment. I'm really proud of that, how well it went. I was very fortunate to be the commander, and I think it went extremely well. But that's flying in space, that's technical.

I think working with the *Columbia* families in the recovery after *Columbia* and getting us flying again from a team point of view, from an emotional point of view, dealing with all of that, I think that was important. I think we did the right things to get us back to flying again. I feel very badly that it had to happen, but I don't think we could have done it better than we did on the recovery and return to flight and how we dealt with the families. I think that was all done extremely well. I'm very proud to have been a part of that.

I'm proud of how all the missions went while I was chief of the Astronaut Office. That was an awesome three years. We did a lot.

ROSS-NAZZAL: Yes, there was quite a few missions under your belt there.

CABANA: A lot of things went well, but I had a great team supporting me.

ROSS-NAZZAL: You've had quite a long career.

CABANA: Yes. I'm not dead yet. I got a few good years left. Few more things to accomplish.

ROSS-NAZZAL: I'm sure you do. People at Kennedy want you to keep going and keep doing the great job you're doing. Going to ask Rebecca if she's got any questions for you.

WRIGHT: So much of your life has been with astronauts, and of course you've gone through that yourself. In listening through the conversations with you this time and the time before, if you could sum it up or just take a few minutes and describe what is an astronaut. When we were growing up they were test pilots that became heroes.

CABANA: I don't know if I said this last time. International Space Station, couldn't have built it without the Shuttle. Look at all the things that the Shuttle did for 30 years. I think one of the greatest contributions of the Shuttle is that it brought diversity to America's space program. You look at that first group in '78, and you had men, women, black, white, Hispanic, Asian. A very very diverse astronaut corps as opposed to a bunch of white military test pilots with a few white scientists thrown in at the end. I think that's really special.

Astronauts are no different than anybody else. We're just very fortunate to have gotten to do what we did. We're passionate about what we do. My passion has always been flying. That's all I ever wanted to do. One thing led to another. Being a pilot led to being a test pilot, [which] allowed me to be an astronaut. I never dreamed I could be an astronaut. I held those guys in such high esteem when I was growing up, watching them on TV. Got to see Apollo 13 launch when I was a midshipman. The Physics Honor Society took a trip down to the Cape. I

remember being in the Vehicle Assembly Building seeing Saturn V rockets stacked up to go to the Moon. Jim [James A.] Lovell, Naval Academy graduate, was commanding Apollo 13.

I thought that was really cool. I thought wow, I'd really like to do that, but I didn't see that I actually could do it. I know a lot of those guys now. I've got to interface with them a lot through the Astronaut Scholarship Foundation, through various events. They're all just good guys. They just worked really hard, but they're all human. Having sat on a lot of Astronaut Selection Boards and been chief of the office, they're no different from anybody else. They do dumb things too. I think what they do all have is a passion for human spaceflight, for gaining knowledge, for expanding boundaries, for going beyond. They have persistence. They don't give up. They handle difficult situations. I think they're all passionate about what they do.

WRIGHT: They continue on. So many of your former classmates and even those prior and since then are in leadership positions in related industry work with space. So you still all share that.

CABANA: They made a whole lot more money than I did. That's okay, I get to tell them what to do.

WRIGHT: I was about to say you've got this. Can you talk a little bit about how that relationship still continues today?

CABANA: It's no different than working with the Russians. A lot of my astronaut buddies are senior managers, VPs [vice-presidents] within the space industry now. So we still work together, but we have a relationship. We have established trust. Frank Culbertson, a classmate from the

Naval Academy, we were test pilots together, astronauts together, even though he got selected a year ahead of me, I beat him to space. There's a trust. He's working for Orbital ATK now. We're getting ready to return the Cygnus to flight here on December 3rd on an Atlas V. Just being at the flight readiness review, knowing Frank, knowing his experience and what he's doing, there's a trust that's there.

No different than working with the Russians. You establish your relationship. You establish trust. You work together. Kent Rominger is one of my closest friends, dearest friends, working for Orbital ATK out in Utah. Rommel is an awesome pilot. I love flying with him. We used to go up and do formation aerobatics together in a T-38. That was a hoot. I took him up in my Decathlon when he was in Florida here a couple weeks ago. We went flying.

WRIGHT: Just a little while ago there was an announcement that there's going to be yet one more class, or another class of astronauts, this selection.

CABANA: I'm glad I got selected when I did. These guys today, they're so smart, and they have so many advanced degrees. They've done all these things to make them more qualified to be selected. I always say if you just work hard and do the right thing it'll all work out.

WRIGHT: Just have to be one of the few that get chosen now.

CABANA: This last class there were like 6,800 applicants, and they picked 8. During the Shuttle Program we had so many, at least there was a little more opportunity to get selected. I don't

know what it was the year I got selected. I looked into it the year I didn't get selected. They had 3,600 applicants, and they picked 17. A little better odds.

WRIGHT: Where do you see the role of an astronaut in the next years as NASA continues its journey?

CABANA: I think it's going to be the same role it's always been. It's going to be helping with the design and development of the vehicle, providing that crew perspective. We're going to continue to have astronauts with collateral duties being part of the space program, supporting other people flying. Then there's going to be that preparation for the flight itself and the actual flying of the vehicle. With the longer duration missions a lot is asked. Going to Mars is going to be a challenge. We need folks that are adaptable. So many today, people in general, I think are a little less tolerant of having other than very nice conditions to be in. I think we need folks that are going to be a little more accepting of less than perfect conditions.

I always had a test that I put things to when I was in the Astronaut Office. Is this better than living in a tent in Korea in the middle of the winter? Yep, because I've been there. I know what that's like. I look from an exploration point of view. I think Shackleton's voyage to Antarctica 1914 to '17 when the *Endurance* got locked in the ice down there and crushed from underneath the crew. He brought everybody home. Unbelievable conditions, [but he] didn't lose a person.

We need folks that are able to deal with something like that. It's like the book *The Martian*. What a great read; what a great movie. Very plausible, some of it, how he survived. We need folks that can deal with situations like that and survive, that have that will to survive,

that will to adapt, that ability to think, to be resourceful. I think that's going to be very important for future astronauts, and the ability—and this hasn't changed a bit—to get along with others, to be a team player. That's really important. It's not about me, it's about the team. We really need that to be successful on a long duration spaceflight on an exploration mission. Everybody's got a role to play, and you got to play your role and be part of the team.

WRIGHT: Thanks, I appreciate that.

CABANA: I'm about talked out. There's more. I think back, and things just keep popping up.

ROSS-NAZZAL: There's plenty more.

[End of interview]