

**JOHNSON SPACE CENTER ORAL HISTORY PROJECT  
EDITED ORAL HISTORY TRANSCRIPT**

ROBERT D. CABANA  
INTERVIEWED BY JENNIFER ROSS-NAZZAL  
HOUSTON, TEXAS – 15 JULY 2015

ROSS-NAZZAL: Today is July 15, 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 spending some time with us, today.

CABANA: Absolutely.

ROSS-NAZZAL: Appreciate it. I wanted to ask you about your interest in aviation as a child.

CABANA: I love telling that story. All I ever wanted to do, since I was five years old, was fly airplanes. When I was five years old, my mom and I took a train trip from Minneapolis [Minnesota] to see her sister, who was married to an Army officer stationed at Fort Holabird, in Baltimore, Maryland. So we took the train to Baltimore, and while we were there, we went to Washington [DC]. Things I distinctly remember—I remember going to Mount Vernon [Virginia] and seeing George Washington's house and walking on the grounds in front of it, on the grass down by the Potomac, and just seeing that. And I thought, "That was so cool." I remember going to the top of the Washington Monument and looking out the windows and seeing DC. I remember the Lincoln Memorial. I remember going up the steps of the Capitol, into the rotunda, back when it was open. So those things I distinctly remember, and then I remember going to the Smithsonian. At that time, it was in the old Smithsonian building. You

walked in and hanging from the ceiling was the *Wright Flyer* and the *Spirit of St. Louis*, and I'll never forget that. I said, "I want to fly."

Minnesota was the home of Charles [A.] Lindbergh. My mom's parents had a farm in Minnesota, and I used to spend all my summers working on the farm. We'd drive up at Christmas and different holidays, [from] the cities up to northern Minnesota; we went through Little Falls, Minnesota. That's where Charles Lindbergh grew up. They had a statue of him in the center of the city. At the time, I read *We*, and it was about his flight across the Atlantic, and then, later on, I read his autobiography—he won the Pulitzer for it in '53 or '54—but his autobiography is actually named *The Spirit of St. Louis* after his airplane. When you go back and read it, to me, it was like, "I can relate to that." Because his life on a farm, it wasn't that much different from mine, even though it was a lot more primitive. His career in aviation and flying across the Atlantic solo, in 1927—just phenomenal.

So I read all the books I could about flying and aviation and the test pilots of the fifties and sixties, and I just thought, "This is what I want to do." Then, I got it in my mind that I wanted to be a naval aviator. I wanted to take off and land on aircraft carriers. Minneapolis-St. Paul International Airport—when I was growing up—was called Wold-Chamberlain Field and on the field was a Naval Air Station. It's a Reserve Air Force base now, where the Naval Air Station used to be, and they flew P-2 Neptunes and A-4 C's in and out of there. I used to ride my bike out to the airport. There was a road that went around one runway, and it was a hill up to the runway, and it was right there. I'd sit there, and these planes would come in right over my head, and I'd watch them land. I thought, "Wow, that's so cool." That's what I want to do.

So I applied for the United States Naval Academy [Annapolis, Maryland] and was fortunate enough to get in. I remember watching all the Mercury and Gemini flights [as a small

boy], and I truly never dreamed that I could be an astronaut. I held those guys in such high esteem, and I thought, “Wow, that is really neat. Wouldn’t that be cool?” But my goal was to fly. While I was at the Naval Academy, in April of 1970, the physics honor society took a field trip down to the Kennedy Space Center [Florida] to see Apollo-13 launch. We got a tour before the launch, and I remember being in the transfer aisle of the Vehicle Assembly Building, seeing Saturn V rockets stacked up to go to the Moon. Jim [James A.] Lovell was a Naval Academy graduate who commanded the mission, and I thought, “Wow, he was a Navy test pilot, and he’s an astronaut. Maybe I could do that.” I think that’s where it started, but I still wasn’t working towards being an astronaut. I was working towards graduating and being a naval aviator.

After I graduated, I majored in mathematics and had a lot of engineering, I chose a commission in the Marine Corps instead of the Navy. The Marine Corps is part of the naval service, and they allow a percentage of the Naval Academy graduates to be Marines. I don’t know if it’s the best reason, but at the time I was graduating, flight training was really backed up down at [Naval Air Station] Pensacola [Florida]. The Vietnam War was at its peak, [and for] everybody in my class that was going naval aviation, they said, “You’re all going to sea for a year, before you go to flight school.” I said, “A year on a destroyer or six months in Quantico [Virginia].” Plus, I had a really close friend that was going into the Marine Corps, and he influenced me, to a certain extent. So I chose a commission in the Marine Corps, went off to basic school, [and] had a guaranteed aviation contract. As soon as I graduated from basic school, I was off to Pensacola, and I got down to Pensacola in February of ’72. They had just brought in a bunch of folks and given them pink slips, sent them off. If they weren’t Naval Academy graduates, they let them off the hook totally—no commitment—because they had more pilots than they knew what to do with.

I flunked my eye test. They got me on a technicality. I was absolutely crushed. I don't think I've ever been so down. I went back the next day. They said, "The refractive area in your right eye is too great. You're going to need glasses one day." They were just looking for ways to weed people out, so I said, "Can I be a naval flight officer?" "Yes, you qualify for that." So I went through the headquarters of the Marine Corps, got [my assignment] changed, and earned my wings as an NFO and went on to fly A-6 Intruders as an A-6 bombardier navigator. Every year, I passed my annual flight physical with 20/20 vision. So after a year as a BN, I said, "I want to be a pilot." So I put in all the paperwork to the headquarters of the Marine Corps to be a pilot, and they said, "Well, we don't believe you can see." So I got a whole bunch of eye tests, and they said, "Okay, we believe you've got good vision, but we're too short of BNs (bombardier navigators). We can't approve this. Go overseas and apply again."

So I went off on an unaccompanied tour to Japan, submitted all the paperwork again, and I was waiting to hear back on whether or not I could be a pilot. I called back to headquarters of the Marine Corps, and I got this Marine colonel—Colonel Thomas—he was on the board that was reviewing all this stuff, and he said, "Jeez, I'm really sorry Bob, but we are so short on BNs. We really need you to go back to the training squadron and be an instructor." I said, "Colonel, you don't understand." I explained my whole story and what I want to do, and he says, "Look. I won't mail the rejection back. I'll hold it." He said, "You need to request mast with the commanding general." It's something you can do. I'd worked hard when I was overseas, and I was the first Marine aircraft wing Company Grade Officer of the Month one month, and I had dinner with the [commanding] general in the general's mess. It was Lieutenant General Norm [Norman W.] Gourley. I'll never forget, after dinner he slaps me [on the back and says], "Bob, you ever need anything, just come see me." This is about four months later. I submitted the

paperwork to my squadron, up through the group to the wing, and truthfully, I never even got to see the general. The paperwork went up to him, and he just got my orders changed. And within two weeks, instead of going back to [Marine Corps Air Station] Cherry Point [North Carolina] to be an instructor, I was going to Pensacola to learn how to be a pilot.

I got down to Pensacola—this is a really long story. Are you sure you want to hear all of this?

ROSS-NAZZAL: Absolutely.

CABANA: So I got down to Pensacola, and the Marine major that was the operations officer for the Marine Air Training support group there—he says, “Well Bob, do you want to go over to NAMI (the Naval Air Medical Institute) and take a [flight] physical?” I said, “Well, not if I don’t have to. It’s the only place in the world I’ve ever flunked an eye test.” He said, “Yes, they can be real sticklers over there. Go over to the dispensary and get an up-chit. They’ll think you’re going to be an instructor out at VT-86, where they train all the naval flight officers.” So I went and got an up-chit and went out [to Saufley Field] and started flying. I went through a primary, got my wings as a pilot in [Naval Air Station Chase Field] Beeville, Texas, flew T-2s and A-4s there, and did really well, and went back to Cherry Point. I chose to go back into A-6s. I knew the airplane. I knew the community. They knew me. I loved the mission. I had my choice of anything I wanted, and I chose to go back to A-6s.

So I got back to Cherry Point and just absolutely loved it, excelled at being a pilot. That was my dream. That was my goal. I said, “I’d really like to be a test pilot and use all that math and engineering that I had in school, along with flying.” So as soon as I had 1,000 hours of pilot

time, I applied for Navy Test Pilot School. Unfortunately, they didn't need any A-6 pilots, but then, six months later, I got picked up for Navy Test Pilot School. I was in the class that started in 1980 and graduated in 1981. At that point, I said, "Hey, I could be an astronaut." They took the first group of Shuttle astronauts in '78. They took the next group in 1980, and then, in 1984, they took the next group. In 1984, I had completed test pilot school. I had been a test pilot for a while.

I remember John [W.] Young and Dan [Daniel C.] Brandenstein coming up to [Naval Air Station] Pax [Patuxent] River, and they said, "We want you guys to apply. They [were] recruiting astronaut applicants." I said, "Well, dang—I'm going to apply." So I applied for the astronaut program and made it through the Marine selection, got through all the cuts, [and] got an interview. I spent a week down here, and I said, "This is what I want to do. This is awesome." I'll never forget—my daughter was—that was 1984. She was seven years old, and she said, "I sure hope my dad gets picked to be an astronaut, because then I'll be hot stuff."

I was just waiting for that call to come. The call came, and it was PJ [Paul J.] Weitz, who was the deputy chief of the Astronaut Office, and he says, "Jeez Bob, I'm really sorry, but you didn't make it." Oh man, I was crushed. He said, "But we're going to take some more next year. We'd like you to try again." "Yes sir." Not only was I not going to Houston to be an astronaut, but my tour at Pax River was over, and I was going back to Japan for another unaccompanied year overseas. So I packed up, moved to Japan, and then, as soon as the call came up for the next group, I reapplied, went through the whole process again, and then was fortunate enough to get the call that time from George [W.S.] Abbey, asking me if I still wanted to come down and be an astronaut. I couldn't wait.

I got back from Japan, picked up my family in Maryland, and moved to Houston. I've been blessed. So when I talk to kids, I tell them a couple of things. I say, "First off, do what you're passionate about. Find your passion, because if you're passionate about it, you're going to excel at it and do well at it. Then, work's not work, it's fun. Set a goal for yourself, and if you don't get it on the first try, don't give up. Try again. When you achieve that goal, set a new one and work toward it. Eventually, you can maybe get to where you want to be, but don't set your goal so far out that it's not attainable. You've got to pick intermediate goals and work toward it." And one thing leads to another. The last job I applied for was to be an astronaut—in 1985. Every job I've had since then, I've just done what I've been asked to go do. That's the other thing I tell them. "Don't ever say, 'No,' to an assignment, even if you don't want to do it. Just say, 'Okay.' Your boss has a reason for asking you to go do it. Go do your best at it. You might learn something, and things have a way of working out." So like I say, I've been blessed ever since then.

ROSS-NAZZAL: All good lessons learned, to pass on. Would you talk about your AsCan [Astronaut Candidate] training, when you came down here?

CABANA: That was so neat. First off, I thought, "Astronaut training. This is going to be really hard." It wasn't as hard as test pilot school. When it came to time management and actually working hard, I have never worked so hard in my life as I did that year I was [at Naval School]. We had a four-bedroom house, and the fourth bedroom was my office and study. It had hardwood floors, and we had carpeting in the hallway, but the bedroom I was in was hardwood, so you had that little metal strip between the carpet and the floor. My daughter—I'm going

through test pilot school, so she's all of four years old. I'd come home. I'd have dinner, and I'd go study. She knew if I was in there studying, she couldn't come in. After I graduated, I was in at my desk working one day, and the door was open. She walks up to the line, and she looks at me, and she says, "Daddy, is it okay if I cross the line, now?" "Sarah, come on." Sunday afternoons were the only time I took off, not Sunday night. We went to church, and I took Sunday [afternoon] off, and then Sunday night, I'd study again.

Astronaut candidate training, it was challenging, but what was so neat about it was you got to take so many great, short courses, and you're in a class with experts in their field. You've got PhDs in physics, Earth, space sciences—you name it—and to be able to talk to them, to ask them questions. We took a short course in geology from Bill [William R.] Muehlberger. Bill has since passed, but [he was a] PhD geologist at UT [University of Texas, Austin] who taught the Apollo astronauts geology. You're taking classroom work with him, and then we go off on a field trip. We're touring New Mexico, seeing all this stuff firsthand. It was absolutely awesome. Oceanography from Paul [D.] Scully-Power, space science—you name it. You had all these great, short courses learning all this really neat stuff, and I thought that was just really enjoyable. Then, of course, you had all the technical stuff, learning all the systems about the Space Shuttle and flying in space. So it was a challenge, but it was fun. It was just really enjoyable to learn all that stuff and be in such a neat group of folks, working together to learn what we had to learn.

ROSS-NAZZAL: Did you have more time with your family?

CABANA: I did, yes. Weekends were free, except when I took a cross-country to go fly somewhere.

ROSS-NAZZAL: Had you flown in the T-38 before?

CABANA: I did, at Pax River. That was another interesting thing. So here I am, I'm a test pilot at Pax River. I'm in test pilot school, right? We got two flights in the airplane with an instructor, then a check ride, and then we were cleared to take the airplane anywhere and do anything with it—any weather, any time we checked out an airplane. Then, I get to NASA, and I flew the T-38. I've flown it before. "Now, we're going to do it the NASA way." There's this 24-flight syllabus and all this stuff you've got to go through. It was okay, but they made sure that everybody knew [the rules]. For every NASA rule, somebody had done something at some time, that they had put the rule in place. It was great flying the T-38. I've probably got over 3,000 hours in the T-38, neat little jet. I continued to fly the T-38 all the way up until I left JSC. Even when I was the deputy director at JSC, I was still flying the T-38.

ROSS-NAZZAL: You were keeping up your hours—was it 15 or 30 hours you had to have?

CABANA: Oh, I got those easy. If I didn't fly 200 hours a year, I wasn't flying. I just flew at night and on weekends. I'm a pilot. That was one of the hardest things about leaving JSC to go be the director of the Stennis Space Center [Mississippi], was I had to give up T-38s. It was so good. You learn so much putting on a flight suit and going out and talking to folks on the hangar floor out at Ellington [Field, Texas], than you do sitting in a coat and tie in a corner office. You've got to get out of the office and talk to folks and see folks, so that was very important.

On a side note—when I got to Kennedy Space Center [Florida], after I'd been there just about a year, I said, "I can't take this anymore. It has been almost two years, and I haven't [flown]." I managed to fly some friends' airplanes every now and then, but "I've got to fly." So one Sunday, after church, I went to Merritt Island Airport, and I went down to the FBO [Fixed Based Operator], and I said, "Hey, have you got an instructor and an airplane? I want to go flying." "Oh, we don't have any instructors, but we can set up an appointment with you. Here's one of our instructors. You can call him on Wednesday." So the next Sunday, I went—I had made an appointment—and the cheapest thing they had to fly was a Cessna 152. It was \$85 an hour, and they had three of them. Two were out flying, and one was broken—the one I was supposed to fly in. So I said, "Well, what's the next cheapest thing you've got?" It was a Piper Cherokee.

So we went up in the Cherokee, and we flew for an hour and a half. Next Sunday, we went up in a Cessna 152 and flew for about an hour and a half. He said, "Okay," and he signed off my biennial flight review, and he said, "You're now qualified in those two airplanes, and you can fly them all you want." So I just started renting airplanes to fly, and I was trying to decide what it was I wanted. I wanted to buy an airplane, so I rented for about three years, and two years ago, I bought an aerobatic aircraft. So I've got a 1978 Super Decathlon and folks know it's me, now. Sunday after church, or Saturday morning, I'll be out over the Banana River, in this little red and white airplane, doing aerobatics. It's all I ever wanted to do. I can't give that up.

WRIGHT: No, you cannot.

CABANA: So yes, it was really cool. At the end of astronaut candidate training, you've got to throw a party. We were the very first class to throw a party at Frenchie's Villa Capri, and I'll never forget that. That was a neat night, and we got our silver astronaut pins.

ROSS-NAZZAL: Am I correct in saying you also have to put on a skit at that party?

CABANA: Oh, we did all kinds of skits. Once you're an AsCan, any time there's entertainment—until there's a new AsCan class—you're in charge of the Christmas party. You're in charge of everything. I'll never forget. One of the skits we did—Brian Duffy and I and Linda [M.] Godwin and Tammy [Tamara E.] Jernigan—have you ever heard of a short man skit?

ROSS-NAZZAL: I don't think so.

CABANA: Basically, what you do is—you've got a sheet with slits in it and a table, and you're behind it. So you are through the slit in the sheet; your arms are the legs, and you've got shoes on [your hands]. You're standing in front of this table, so you're like this. [Demonstrates] You're the feet, and then somebody behind you is the arms coming up through the hole. They can't see you, and you can do all kinds of stuff. You can bring your feet up in the air.

We did a couple of skits. One of them, we pretended we were George and somebody else. We had Hawaiian shirts on, and it was kind of crazy. One of them—it was two astronaut candidates going flying. We had flight suits, and we were doing all this crazy stuff in the

airplane. They're a hoot. If you've never seen one, Google "short man skits" or something, and something will come up.

ROSS-NAZZAL: All right. A lot of the mission specialists come in, and they haven't flown before. Would you talk about training some of your classmates?

CABANA: Oh yes, absolutely. And that's the great thing about the T-38. A lot of them, they may have flown, but they've never flown a high-performance aircraft. So I think one of the best things about the T-38 is putting folks into the environment and learning how to be crew members. For a lot of folks, if you've never worn a G-suit—well, we didn't wear G-suits—but torso harness, oxygen mask, all that stuff, and being able to adapt to that environment, it can be challenging. I taught a lot of mission specialists who have never flown to be very good pilots in the backseat, flying a T-38, and talking them through stuff and how to make corrections. Yes, I think it was absolutely great—and it's great for the pilots, too, because you can train in a simulator all you want, [but it's not like the real thing]. If you screw up in a simulator, they just reset it, and you go again. In a T-38, you have to deal with real weather, emergencies, and so on. It's important. It's a great, great training tool.

ROSS-NAZZAL: When you first came to JSC, you had been in the military for so many years. Was it a shock to come to a civilian agency? How was it different for you?

CABANA: No, because half the astronaut office was active-duty military. And then, of course, NASA reimbursed DoD [Department of Defense] for our pay and allowances, so in many ways it

was still like being in a squadron. We converted all the civilians over to more of a military mindset, anyway.

ROSS-NAZZAL: Had you worked with a lot of women, prior to coming to NASA? There were female astronauts—not a lot of them.

CABANA: Yes. Not that many female Marines in the jobs that I had, and a lot has changed since then. Again, it gets back to that diversity that I was talking about previously. It's an absolutely great group. Tammy Jernigan and Linda Godwin were in my class, and they're both fantastic. When I was chief of the Astronaut Office, Tammy was my deputy for a while. I'll never forget. There was one quote I use all the time. She said, "Bobby, just remember, you have to have a mind in order to change it." "Okay, Dr. Jernigan." No, she's one of my dearest friends.

ROSS-NAZZAL: Let's talk about some of your technical assignments. You were the Space Shuttle flight software coordinator. What was that?

CABANA: Basically, there were always changes being made to the Space Shuttle software, so you had to evaluate the changes and look at the impact to the crew, to the procedures, to make sure they were being done right, and, of course, testing, and how they got integrated. So yes, that was one of my first jobs, being the Shuttle representative to the software control board and making crew input to the changes that were being made. You'd look at how they impacted the procedures and so on, then, eventually, the changes would be made, and then it had to be tested. Of course, that was done over at the Shuttle Avionics and Integration Lab, where I ended up later

on, SAIL. Actually SAIL was really neat, because here you've got this iron bird—if you will—mock-up of the Space Shuttle. We used to do everything that was done on a mission in SAIL, to test all the software before they'd release the new software. You had to be familiar with all the procedures and know how to work them, so that they could actually test it over there and be successful. So you were the crew in the cockpit testing the software. So that was great to be able to take what you learned in the simulator and apply it.

ROSS-NAZZAL: Not fairly soon, but soon after you became an astronaut, we had the *Challenger* accident [STS-51L]. Would you talk about the impact of that [accident]?

CABANA: I will, and it's really different. Your perspective changes. So at the time we lost *Challenger*, I was in a single-systems trainer, learning the OMS/RCS [Orbital Maneuvering System/Reaction Control] System with Steve [Stephen D.] Thorne, who was later killed in a private airplane accident, one of my classmates. We couldn't believe it happened. We said, "Oh, no—the crew's okay. The Orbiter was lost." It was very, very hard to believe. I had only been at NASA for a little over seven months and while I was at Pax River, there were three accidents that all resulted in fatalities. I lost friends in the Marine Corps in squadrons training.

My office was right next door to the *Challenger* crews'. I'll never forget—as an astronaut candidate, I was coming in one Saturday morning. I was walking up the stairs to the third floor, and El [Ellison S.] Onizuka was coming out of the mailroom. AsCans are lower than dirt, and here, a guy that's going to be flying in six months—assigned crew—said, "Hey, Bob." We got talking. "I know it's hard, when you get here. You need any tools to work on your car or anything—I've got everything. Just come on over to my house, and we'll fix it in the garage."

Just one of the nicest guys, and Lorna is still one of my dearest friends. I knew the crew. Some of them were my friends. I had dinner with Frank [L.] Culbertson and Judy [Judith A.] Resnik. Judy was awesome, funny, bright. Then, to lose them, it hurt, but I said, “Well, it’s like test flying. This is to be expected.” You can’t accept that. Looking back on it, you always learn, but I had a totally different perspective when we lost *Columbia* [STS-107]. That was really hard on me. That’s another story we can talk about later.

So all of a sudden, we’re not flying. Now, it’s Return to Flight [STS-26], and I remember every Monday morning meeting. John [W.] Young was chief of the Astronaut Office, and we went through, “Okay, this is what’s going on on Return to Flight.” We all had collateral duties. Mine weren’t directly related to Return to Flight, but Steve [Stephen S.] Oswald was working with Hooter [Robert L. Gibson] on the solid rocket motor redesign, and we’d get briefings every week on all that was going on. It was a real focus to get us flying again and have astronaut involvement in everything that was going on, so that we were getting our voice heard in the changes that were being made. I’d gotten a new job at that point. George asked me to go out and be the deputy chief of Aircraft Operations. Actually, that was about a year and a half after *Challenger* that I went out there—ended up staying out there for two and a half years, working for Joe [Joseph S.] Algranti.

I’d spend all day out at Aircraft Ops, and I didn’t want to fall behind my class, so I’d schedule sims [simulations] after work, at night, so I’d be in a simulator until eleven o’clock or so, so I could keep up with everybody, because I wanted a flight assignment. I didn’t want to get behind. It all worked out. So we returned to flight, and we’re flying the Shuttle now. I never got to see a Shuttle launch until I flew, except on TV. Joe always flew to the Cape [Canaveral,

Florida] to support the launch, and he'd leave me behind to run Aircraft Operations while he was gone.

One more thing about *Challenger*. Any time you have an aircraft accident, you recover the pieces and lay it out, to track what happened. And I'd seen aircraft laid out on hangar floors before. Jim [James P.] Bagian [and I], we were trying to figure out what the crew was doing. How had everything transpired? We flew a T-38 down to the cape—and this is after they had recovered the debris, and it was laid out down there. I remember the cockpit panels were all laid out. They had the crew compartment off to the side, away from everything else, and we were looking at the switches to see what actions the crew might have taken to help try and figure things out. That was a tough way to see an Orbiter.

I'm sorry. You had a question.

ROSS-NAZZAL: Would you talk about the impact of the accident on the Astronaut Corps? What did you see?

CABANA: I think [it was tough], especially on those folks that had a very close relationship [with the crew]. They were classmates in their astronaut classes. They were former crewmates. There was a significant feeling of loss, but I think—to a person—everybody was, “We need to get this right and get flying again.” There was a real desire to correct the problem, to get things right, to make the vehicle safer, and to get back to flying in space.

ROSS-NAZZAL: How did the Center leadership help boost morale? Or within the Agency, how was that achieved?

CABANA: Well, there were a lot of changes to leadership after *Challenger*. I think it was having a purpose, laying out a course, seeing what needed to get done, and focusing your resources to help make that happen. In the Astronaut Corps, we had great morale, because you've got a bunch of folks that are driven. We had a bunch of pranksters, too.

I remember one of the things we did. We had a sock hop at Walter Hall Pavilion down in League City [Texas], before it burned down. It was awesome. Here's this wood gymnasium floor and this outdoor pavilion. We had a cookout. We had barbeque. "Sonny" [Manley Lanier] Carter had his collection of 45s that was unreal, and he was the disc jockey. Bill [William M.] Shepherd and Mark [C.] Lee did the Blues Brothers. We had all kinds of skits. I think that's when we did the skit where Duffy and I wore Hawaiian shirts, and we were pretending to be George and somebody else. I can't remember the whole background, but it was just a fun evening. We were getting together, and we were doing stuff. We were a family, and we all just pulled together to get things done and move forward.

ROSS-NAZZAL: I have to ask: were you on Mr. Abbey's softball team?

CABANA: I played second base. I don't know if it was his softball team, but I was on the astronaut softball team.

ROSS-NAZZAL: Well, that probably was it. We hear about that one every once in a while.

CABANA: Yes, I was second baseman. Brian Duffy played ball at the Air Force Academy [Colorado Springs, Colorado]. He was center fielder. Brian, he could cover some range out there. I was never a long ball hitter. Brian could put it over the fence, and I just went for base hits, but I was a good glove. That was a lot of fun, and I continued play softball for a long time.

ROSS-NAZZAL: Tell us about working at Aircraft Ops. I understand that's one of the coveted positions within the office.

CABANA: Well, I don't know if it's coveted or not, but I really enjoyed it. I was the deputy chief. Joe took care of everything technical. If it had to do with people or facilities, then it was my problem. I got a number of facilities remodeled and upgraded while I was out there. I got to fly a lot. Got to hire some good people, and I really enjoyed my time while I was out there. I remember one time, I was down in the locker room, and I had been out there a long time. It was slow after the loss of *Challenger*, getting back to flying again. I was just thinking, "Dang, I came here to fly Space Shuttles, and here I am, doing stuff I did in the Marine Corps."

Joe Algranti, what a great guy. Interesting man, very smart, flew SBDs [dive-bombers] in the Navy, was a test pilot, flew in World War II—"Cabana, I'm going to tell you what I told Pete [Charles] Conrad when he had your job." He basically said, "You just keep doing good like you're doing. You're going to fly before you know it." And I did. It all worked out.

ROSS-NAZZAL: Were you involved at all in the discussions to purchase a new Shuttle Carrier Aircraft? Was that something you were working on?

CABANA: It was something that—I wasn't involved in the discussions—but that happened while I was there. I remember going through all the modifications and getting that aircraft. It was a Japanese 747, JAL 747SP. I remember when we worked all that, did the briefings and acquired it, and then had to do the modifications.

ROSS-NAZZAL: An interesting bird in itself.

CABANA: Yes, very much so. I know the folks at JSC are really disappointed there's not a Shuttle here, but I think that display with the 747 and the mockup on top of it—they've done a great job upgrading the mockup to make it more flight-like. I think that is really cool in the way it's being displayed here and utilized at Space Center Houston.

ROSS-NAZZAL: Yes, it's quite a sight when you drive over the bridge.

CABANA: Yes, I think it's awesome.

ROSS-NAZZAL: Yes, it's cool.

CABANA: Unfortunately, every airplane and spaceship I've flown is on a pedestal somewhere. I go out to Ellington, and the KC-135 is sitting there on pedestals. They've got T-38s on pedestals. Even the F-18 I flew is on pedestals.

ROSS-NAZZAL: They're just historic artifacts these days.

CABANA: That's okay. I'm not on a pedestal. That's important. I've still got a few good years left. I'm not dead yet.

ROSS-NAZZAL: There you go. Your bio sheet also said that you were chief of Astronaut Appearances at one time.

CABANA: Yes, that was one of my tacky little jobs—every astronaut had to go out [and give talks, and we had an astronaut in charge]. I'll never forget John Young. When we completed our media training, John Young said—and I use this today. He says, “I don't care what they tell you to come out and talk about. You just tell them what we want them to hear.” “Okay, John.” No, it was my responsibility. Every astronaut had to do two appearances a month. We had some guys in the office that that's all they'd do, if you let them, and there were other guys that didn't want to do any. So first off, it was my job to approve the appearances, whether it was something that was worth sending an astronaut to or not, and then it was to ensure that everybody was doing their fair share and not doing too many or not enough. So I did that for, I don't know, six months or so.

ROSS-NAZZAL: Any odd requests that came through that you thought, “Unbelievable.”

CABANA: Oh, there's always odd requests, but none that I can remember. Then sometimes, you got feedback that an astronaut may not have done as well, or something happened, so you've got to deal with that, too. Always interesting, never dull in the Astronaut Office.

ROSS-NAZZAL: I imagine.

CABANA: I think one of the most fun jobs I had as an astronaut was being CapCom [Capsule Communicator]. I loved working in Mission Control, because whether you were working a real flight or doing a simulation, you're actively involved in a mission, and you're totally up to speed on all the procedures. You're there to make sure that the crew is successful on orbit, and I really enjoyed that. You're verifying procedures. You're doing validation runs in the simulator. You're working with the control team. You're directly involved, working closely with the flight director, and I thought that was just a great job. I had that job after my first flight; in October of '90, I was the pilot on *Discovery*. Dick [Richard N.] Richards was our commander, and we deployed Ulysses into polar orbit around the Sun. When I came back after my postflights, then I got to work in Mission Control as a CapCom until I got assigned to my second flight.

ROSS-NAZZAL: Well, tell us about finding out you had been finally assigned to a mission, something that you had been working so hard for.

CABANA: Oh, it was great. I was off on recurrent water survival training, and Don [Donald R.] Puddy was then director of Flight Crew Operations. I remember getting that call. I was just elated, absolutely. I ended up being the first pilot in my class to fly. October of 1990, that was the summer of the hydrogen leak on the vehicles, and we delayed a lot of flights. Our flight couldn't delay, because we had a planetary window with Ulysses, so I jumped ahead of a couple of guys in the '84 class. Frank Culbertson, my classmate from the Naval Academy—I got to test

pilot school before Frank, so I was there and welcomed him to test pilot school and had the family over for dinner. And then, dang, he got selected to be an astronaut in '84, and I didn't, so he beat me to Houston. I don't rib him about it, but it was neat that I got into space before he did.

ROSS-NAZZAL: Yes, little rivalry there. That was one thing I wanted to ask you about. There were those hydrogen leaks on some of the vehicles. *Discovery* didn't have those issues.

CABANA: Yes, yes, they got it figured out.

ROSS-NAZZAL: Yes, but there was also an issue with the Hubble Space Telescope. Did you feel like there was some pressure on your mission to get it right and succeed?

CABANA: No, you know, that whole thing with Hubble, I look back on that and even with the flawed lens that it had, it was like 30 times better than any telescope on Earth. That was so cool, when we actually did do the servicing mission to correct it. What a phenomenal, phenomenal telescope that has been. Look at what it has given us. That's a whole other story.

But no, we were just doing our job. It was a very junior crew. It was Dick's first command. He had only flown once before as pilot. It was my first flight as pilot. Bill Shepherd was our flight engineer. He had flown once before. Both Bruce [E.] Melnick and Tom [Thomas D.] Akers, it was their first flight. It was a European Space Agency joint project, deploying Ulysses—big important payload, planetary—and we executed it flawlessly. Dick's first commander was Brewster [H.] Shaw and your commander trains you. Brewster's first

commander was John Young, so I have John Young heritage, because John trained Brewster. Brewster trained Dick, and Dick trained me. Dick was very demanding, and it was good. I love him dearly. Dick's a good man, but we were ready.

I'll never forget—Dick didn't give us a lot of praise. Praise came hard from Dick, and we had a reputation for doing really well in the simulator. That last sim, you're in your flight suits. We're walking down the hall in Building 5. We've just gotten out of the simulator. It just went perfect. This is it. We're going to get our pumped up speech, "You guys did great. Let's go to the Cape and go fly." We're walking down the hall, and Dick says, "You know, if we could have just had one more ascent." I'll never forget that.

In my second flight, I flew with Dave [David M.] Walker. Dave, he's like my big brother. I miss him dearly, and he was just the totally opposite of R-squared. It was so different. So I got to see both ends of the spectrum on being a commander, and I hope I ended up somewhere in the middle. I was probably a little more closer to Dick.

ROSS-NAZZAL: Talk about training in the STA [Shuttle Training Aircraft].

CABANA: I loved it. What a great airplane. The first time I landed the Space Shuttle, I felt like I'd done it a thousand times before, and I had in the Shuttle Training Aircraft. I loved flying the STA, and we had so many great instructors and flight engineers. What a great team! When I left being chief of the Astronaut Office, the only person that had more dives in the STA than me was John Young. The three years that I was chief of the office, I never delegated. It was really bad. I did all the ascent and entry weather flights in the STA. You know, we scrub, and that's okay. I

stayed. I was living in Florida. For three years, I spent half of those in Florida. I'm convinced of it. I loved flying the STA; what an amazing vehicle.

ROSS-NAZZAL: Your family didn't see much of you at that time, did they?

CABANA: Well, they did. Maybe not as much.

ROSS-NAZZAL: Did you travel to Europe or go out to California and learn more about the payload?

CABANA: Yes. For Ulysses, we went to ESA [European Space Agency] in Noordwijk, in the Netherlands. I think that's the other neat thing about being an astronaut, yes, you're assigned here, at the Johnson Space Center, but we'd go out to Edwards [Air Force Base, California] and fly the Shuttle Training Aircraft. We'd go out to Ames [Research Center, Moffett Field, California], and we'd fly the vertical motion simulator out there. We'd go up to Huntsville [Marshall Space Flight Center, Alabama] and train on payloads up there. You got all over NASA to see everything and have relationship with folks at other Centers, and I think that was really good. So yes, on [STS]-41, got to go to Europe. That was for the reviews on Ulysses. And California, it was just flying the Shuttle Training Aircraft. I think we went out to JPL [Jet Propulsion Laboratory, Pasadena], too.

ROSS-NAZZAL: How much did you have to know about Ulysses as the pilot?

CABANA: I knew that there were 11 experiments onboard to study our Earth's Sun from the polar regions, that when we launched it on that Inertial Upper Stage built by Boeing, it went out to Jupiter's north pole. Jupiter['s gravity] flung it out of the ecliptic plane, back to the south pole of the Sun, and around the north pole of the Sun. It was supposed to last for one pass around the Sun, and it ended up lasting 18 years. And what was really cool—it was in a five-year orbit going out—the closest it ever got to the Sun was Earth, when we launched it. It went out to Jupiter and was in this five-year orbit around the Sun. What was cool was it ended up seeing the north and south pole of the Sun both at a solar minimum and a solar maximum, so that they could compare the data between the two, and then it continued to work for another 13 years beyond that. It studied the Sun's magnetosphere—I can't remember what all 11 experiments were, but a very successful experiment.

As the pilot, I had to know about the Inertial Upper Stage, but my real job during the deploy—I was in the commander's seat. I maneuvered the Space Shuttle to attitude for the deploy and made sure that we were in the right attitude, and I had my deploy checklist. Tom Akers was the one that actually deployed Ulysses, and he was back on payload station on the aft flight deck, moving all the switches to actually deploy the vehicle. Dick was overseeing the whole thing as the commander and making sure that we all did the right thing.

ROSS-NAZZAL: What are your memories of that deployment?

CABANA: I didn't see a whole lot.

ROSS-NAZZAL: Not from the commander's seat? Okay.

CABANA: Because I was sitting in the commander's sit. Payload was out back in the payload bay, and I was in the commander's seat, looking at our attitude and watching the Earth go by.

WRIGHT: You were working.

CABANA: I got to see the pictures afterwards, but I remember looking back in the payload bay, seeing the tilt table elevated for the deploy. When it deployed, I remember looking out and seeing it just go slowly past the aft windows, out the overhead windows, and off into its position. So then we did a burn after that, to move away from Ulysses when it did its ignition of its upper stage—[so] that we were out of the way.

ROSS-NAZZAL: One of the things I often like to ask people, just because everyone's memories are different, is to talk about that day of launch, from the time that you wake up. I imagine that you've got so many memories until main engine cutoff.

CABANA: I will never forget that first launch. I will repeat [the story] I tell when I [go out] and give talks. Breakfast, first off, they bring in the media, and you're sitting there in your crew shirts at the table there, in the dining room in crew quarters, and you're all just smiling, and the cake's out in front of you, and they take their pictures, and then they go away. Then, you actually eat breakfast. I don't get airsick. I didn't get sick in a zero-G aircraft, but I heard there's zero correlation between how you do there and space sickness. I was concerned. We probably didn't know as much about it then as we do now, and I did not want to get sick in

space. I'm addicted to coffee, so I'm having a toasted English muffin with a little butter and jam and a cup of coffee. Bruce Melnick, he's having steak and eggs and home fries, and he's putting hot sauce on. Dick Richards looks over at him, and he says, "Ah, going for color and distance, I see." Bruce didn't get sick. I did, not bad, I got nauseous.

I remember, I was down on the middeck, and Shep's trying to get me out of my suit, and it was really hard in a zero-G environment. I got my head through the neck ring. He's got me unzipped, and he's trying to pull the suit off and get me out the back of it. I'm inside this hot, sweaty, stinky suit, and I'm tumbling. I've got no references to where I am in my brain. I said, "I think I'm going to get sick." I'm thinking, "I don't want to get sick inside my suit. I've got to wear this home." I'm holding it, and I had a barf bag ready in my pocket in my suit. As soon as I got my head out, I used it, and that's the only time I got sick. The amazing thing is, your brain remembers going to space and coming home, and the more times you fly, the quicker you adapt to zero-G and 1 G. My next flight, I got to orbit, and the main engines cut off, and I was like, "Oh, I'm back in space. Cool."

We had practiced taking shots of Phenergan. Dick wouldn't let anybody that was feeling queasy have any medicine, because it made you sleepy, until we went to bed that night. I was doing fine, but I said, "You know, I still feel a little queasy." I knew it would knock me out, and I'd sleep really well. So I took a shot of Phenergan, went to sleep that night, slept like a baby, woke up the next morning, 100 percent ready to go.

So you have breakfast, and then you go get suited up. And that was pretty cool, going through all the checks in the suit room. I remember walking out to the Astrovan and all those folks cheering and clapping. You're waving, you get in the Astrovan, and you're riding out to the launch pad. I remember Dick saying, "Hey, I bet this is the first time that you've seen the

flashing lights in front of you instead of in your rearview mirror,” because we got a police escort going out to the pad. Dan Brandenstein was chief of the office at the time, and we’re about halfway out to the pad, and Dick says, “Well, Dan, did you forget? Aren’t you going to lead us in the Astronaut’s Prayer?” Dan said, “Oh, yes, yes, I’m sorry. Everybody, take a knee.” So we all take a knee, and we’re gathered in a group there, and we’ve got our heads down. Dan is going to lead us in this prayer. Dan says, “Lord help you if you screw this up.” Dick starts laughing. So we all sit back again. Then [Dan Brandenstein got off first] to fly the Shuttle Training Aircraft, and then Don Puddy got out and went to the Launch Control Center, to the firing room, and we continued on out to the pad.

I remember, we got out to the pad, and it’s four o’clock in the morning or something. You’ve got all these xenon lights shining on the Orbiter, and the RSS [Rotating Service Structure] is rolled back, and you’re the only ones out there. Normally, the pad is just a flurry activity, and it’s you and the suit techs and a couple of guys doing the ice watch. You ride the elevator up the 195-foot level. I’ll never forget. The mosquitoes in Minnesota are bad, but I could not believe how many mosquitoes were trapped in that elevator as we went up. You’re swatting mosquitoes, and then you get up and there’s a little breeze. You’re on the 195-foot level, looking at this vehicle, and it’s venting. It’s creaking. It’s like it’s alive. I said, “I can’t believe that I’m going to be inside that, blasting off into space in three and a half hours or so.”

I’ve often had folks say, “Were you scared?” I was never scared. I always knew God was going to take care of me and my family, one way or another. But I have to admit with each flight I became more apprehensive when I was up there, looking at it, to get in. Once inside, total peace. I knew I was really good at what I do, and I had the best team on the ground supporting me and just total peace about what I was going to go off and do. But I remember,

with each flight, there was a little more apprehension, looking at it, knowing the risk. When I got back off my fourth flight, my daughter said, “All right Dad, that’s it. Four flights are enough for anybody. You’re done.” The hardest thing that I’ve ever done, I think, as an astronaut is being a family escort, standing on the roof of the LCC [Launch Control Center], holding a two-year-old next to one of your best friends’ wife, watching five to seven of your closest friends on this ball of flame, going off into space. My heart’s going like this. [Demonstrates] I’ve got tears running down my eyes. That is hard. It’s easy to fly it, piece of cake.

So you got to the launch pad, and then, I’ll never forget. The simulators, they don’t prepare you for launch. We came out of the five-minute hold, and we started the APUs [Auxiliary Power Units]. We counted down to 31 seconds, and we held. We had a long hold for weather. We had a big launch window, and we held for weather [earlier]. Then, we got the go. We came out of the 20-minute hold, counted down to five, held, got the go, got the APUs going, and we stopped at 31 seconds. There was a [failure of the] nitrogen purge into the payload bay. Ulysses had to have a nitrogen purge to keep it in a good environment before it got to space, and they had a failure. So they’re talking about this failed purge, and everybody’s arguing back and forth.

Bob [Robert B.] Sieck was our launch director on that flight. Finally, Bob comes up on the line, and he says, “Just remember, in 31 seconds, there isn’t going to be a purge anymore.” All of a sudden, everybody’s, “Oh, yes.” Sanity prevailed. They got together, and we came out of that 31-second hold. Thirty-one seconds, your brain, it’s like, “Okay, we’re coming out of the hold.” Now, you’ve got to get caught up. You’re used to the simulator, and all of a sudden, now, 31 seconds, and everything that has to happen.

So the main engines start, and it pushes that whole stack forward. It creaks back to vertical, and then the solids light. You're sitting at 195-foot level and [makes creaking sound] forward in your seat, and [makes creaking sound], and then, bam. I'm just watching the main engines. I'm not looking out the window. All the really hard systems are over on the pilot's side. The commander has got all the easy stuff. I'm just making sure all my systems are working, and I'm watching the main engines come up. Everything's doing good, and then, bam. The solids light. You're pushed back in your seat, and all those pops and crackles that you hear when you're watching it—you hear those in the cockpit, too. Gauges are shaking like this [demonstrates], and you're trying to read everything. I just remember the sense of speed and acceleration. The Shuttle just gets up and goes.

And then, max Q, the main engines throttle back, to keep from exceeding the 3-G limit on the Orbiter, where you do structural damage to the vehicle. You don't feel them throttle back. They throttle back to 72 percent. It depends on the bucket and then they throttle up to 104 percent. When they throttle up to 104 percent, it's like, "Whoa," and you're pushed back in your seat a little bit more. The solids burn for about two minutes five seconds, to get you through the thickest part of the atmosphere. You're doing about Mach 5 when the solids come off, and it feels like you slowed down, but you're just not accelerating as fast. The thrust tails off, and then there's this bang, and flash in the front windows, and it's the sep motors pushing the solids away. The solids fly away, and it's just as smooth as can be on those three main engines. It's just slow, steady acceleration, just a quiet hum. It's like electric drive [makes sound], and you just keep going.

And then, about seven and a half minutes into the flight, you hit that 3-G limit again, and the throttles start coming back to keep from exceeding the 3-G limit, and you're being pushed

back in your seat. At main engine cutoff, it feels like you stopped when the engines shut off, but you just stopped accelerating. You come forward in your straps. Checklists float if they're not Velcro-ed down. Then, there's another big bang, and it's the bolts—the sep bolts on the external tank. And then, the jets fire to push, translate you away from the tank. There's no air in space to carry the sound, but when the forward RCS jets fire—the 800-pound thrusters—they vibrate through the structure of the vehicle, and you hear them in the cockpit. They're like cannons going off. It's like, boom boom, and the whole vehicle shakes. You translate away from the tank. Tom Akers was down on the middeck, and he thought we actually re-contacted the tank from the sound. I'll never forget. Dick said, “Welcome to space, guys.” That was cool—the start of an awesome mission.

ROSS-NAZZAL: Yes, memorable moment.

CABANA: Yes. And then you look out. At that point, you're about 65 miles above the Earth. You continue to coast. We were 160 nautical miles circular on that flight, so you continue to coast out to your apogee at 160 miles, and then you fire the OMS engines to circularize your orbit. I was on a DoD flight that was higher than that. The Space Station is at 51.7. We were at 57 degrees on STS-53. It's really funny. On my first flight, we're at 28-degree inclination, so we see everything from 28 north to 28 south.

After that flight, I was at the [National] Air and Space Museum [Washington, DC], and the IMAX movie *The Blue Planet* had just come out. I went and saw the movie, and when I saw it on the big IMAX screen, I said, “That's it. That's what it [looks like]—no, it looks better than that.” Nothing can capture what you see with the eyes God gave you. It's just so much better. I

remember [on STS-41] that was *The Blue Planet*. It was the blue of the oceans. It was this tropical green. It was a [tropical] zone that we were in that was just the blue planet.

My next flight, STS-53, we were high inclination. It was in the winter in the northern hemisphere. The way our flight was set up, we were close to the terminator a lot; we were between light and dark, and our daylight periods were over the northern hemisphere. And I just remember it was like a totally different planet I was over. It was like some barren, frozen, mountainous, uninhabited place, compared to my first flight. It was amazing, the different perspective between the two.

When I was chief of the Astronaut Office, I told all the rookies—I still do now—“Make a memory. Stick your nose up to the window and make a memory. Time on orbit is so expensive. You’ve got no free time at all. Don’t take a picture, because you’re going to be disappointed when you get home and see the picture. Just make a memory, you know? It’s not going to fade over time. It’s your’s forever, and I’ve got a memory from every one of my flights—more than one.” What a special view of the Earth from up there. On the Space Station flight, we were up about 220 nautical miles above the Earth, and just awesome, just so many neat memories.

ROSS-NAZZAL: I wonder if you would share with us how your crew handled things like food and sleeping arrangements in the vehicle.

CABANA: Sure, absolutely. It varied between crews. You’d better not get caught eating food with somebody else’s dot [on it], you know? The commander has red dots, and the pilot has yellow dots, and that’s theirs. MS [Mission Specialist]-2 is green dots. MS-1 is blue dots [and so on].

ROSS-NAZZAL: Did you learn this from experience?

CABANA: In a simulator. I never took anybody else's food, but it was really funny. There's extra food that has no dots on it. Up over the lockers, there's this pantry. It's a long, narrow panel that opens up, and it's full of all kinds of good snacks, like mixed nuts and peanut M&Ms and cookies and crackers. Most of the time, we didn't actually sit down and have a crew meal. We were so busy. We just ate on our own. [At] mealtime, you'd just fix your own meal or ask somebody to throw something in for you.

Food's good. It's packaged different. Some of it is thermally stabilized; in fact, some of them are "meals ready to eat" that the military uses. Some is freeze-dried that you have to rehydrate before you heat it and eat it. For breakfast—especially if I think back to when I was commander on my first command, STS-65, that was IML [International Microgravity Laboratory]-2. We set the record for the longest Shuttle mission that later got broken. I'd get up in the morning and get cleaned up, and I'd have a Sara Lee Danish and [instant] oatmeal with brown sugar. I'm addicted to coffee. I normally drink it black, but I got Kona coffee with cream and sugar. Instead of eight ounces of water, I put four ounces in, so it was like a mini cappuccino. I'd fix two of them, and they'd get cold. I'd grab the morning mail and the plan of the day. I'd go up in the commander's seat and strap myself in, so I didn't float up, and I'd take my Sara Lee Danish and my oatmeal. There's a light right over the commander's head, and I stuck a piece of Velcro up there, and I'd turn the light full bright. I took the second coffee, and I Velcro-ed it on the light, so the light would keep it warm. I'd read the news and the mail and the plan of the day and have my breakfast and then get to work.

For lunch, you might take a tortilla and a thermally stabilized irradiated chicken breast and heat it up and throw it on there with a little mayonnaise, make a sandwich. Food's good, and we got together for some meals. We'd have [time] where we'd all get together and eat. And of course, everybody plays with their food. All the things that you tell your kids not to do, you do just because it's fun.

You do stupid astronaut tricks. They don't always get taped. Jerry [L.] Ross liked to run around the middeck. Start on the floor, and if he could, make it where he'd run up the wall, across the ceiling, down the other wall, and back to the floor. If you do it just right, you can get enough motion—centrifugal force—that you can keep your feet on the wall. I had Tom Akers take me on my first flight and lay me out lengthwise on the middeck, as stiff as I could, and then spin my feet, so I was just twirling. Then I'd stick my arms and legs out like a speed skater, and you'd go from going really fast to really slow. And then, you'd pull back in and spin real fast again, go back out, and spin real slow again. Fun stuff.

ROSS-NAZZAL: Were there any crew pranks or any jokes that you guys played on each other on your first flight?

CABANA: Oh yes. I remember, it was STS-53. We were the Dog Crew. That's a whole other story. We had this dog mask, and Jim [James S.] Voss taped this thing. He had it in a locker with a flight jacket, and it looked like he was actually pulling a dog out of a locker with a flight jacket on. We put it in our crew movie, and afterwards, this lady came [up and told us], "I can't believe you did that to a dog." "Ma'am, ma'am, that wasn't a real dog."

ROSS-NAZZAL: You're lucky PETA [People for the Ethical Treatment of Animals] didn't call you.

CABANA: Those were the rats on my first flight. I was in charge of the rats, to make sure they were doing okay.

ROSS-NAZZAL: Would you tell us about that experiment?

CABANA: I'd open up the locker and pull it out, and it had Plexiglas so you could see if they were [alive and getting] food and water. By flight day four, I couldn't even see the rats any more, hardly. It was covered with a mess. They've got better animal enclosure facilities now, I think. It worked.

ROSS-NAZZAL: Were there other experiments that you worked on for that mission?

CABANA: On 41? You know—jeez, I can't remember. I just remember being in charge of the rats. The other thing that we did on 41 was the first space-basics educational movie. Bill Shepherd was our director. That's another thing I'll never forget. Bill was also a classmate of mine from the Naval Academy, and he had storyboarded the whole thing on the ground. He had this whole thing set up, and it really turned out to be a great video, if you've ever seen it.

ROSS-NAZZAL: I don't think so.

CABANA: It's awesome. I will never forget—we're doing takes. We filmed some of it on the ground. We filmed some of it on orbit, and Bill has got the camera. He's going through it. And the only thing I remember is, "That was really good, but," and we'd tape it again. He got enough good takes on all the things that we did to pull together a good movie.

ROSS-NAZZAL: Did you face any challenges on that first mission, or do you think you were prepared really well because of training?

CABANA: Oh no, we were prepared. We were very well prepared, and I can't think of anything that happened that was so off-nominal that it was a concern.

ROSS-NAZZAL: Talk about that landing. You said you wouldn't even forget that first launch. What about landing—same way?

CABANA: Well, landing was okay. Dick got to land it. I was just the pilot. All I had to do was lower the landing gear. Arm the gear. Push this button at 400 feet. That's very important. I got the landing gear down twice, so they let me be the commander on my third flight. If you don't get the landing gear down, that's career limiting. You're probably not going to get to command. So I got the landing gear down twice.

ROSS-NAZZAL: Usually, after your first flight, you have a bunch of PRs [Public Relations], and you go to your hometown.

CABANA: Yes, it was awesome. I'll never forget this, too. You can't win. So you're going out and giving these talks, right? Once you become an astronaut candidate and get through your media training, you're an astronaut, but you've never flown in space. They bless you to go out and give all these talks. So you're out giving talks about the space program, and first [question], "Have you flown in space?" "Well, no, I haven't gotten to fly yet." "Oh, okay." So this is it. I've flown in space. "Have you flown in space?" "Yes, I have flown in space." "Well, how many times?" "Well, just once." So then you go out, and you've flown two or three times. "Have you flown?" "Yes, I've flown in space three times." "Well, have you been to the Moon?" "No." You can't win. You just can't win.

ROSS-NAZZAL: I don't know. I'm pretty impressed. I did hear that, I think, when we went to a Sally [K.] Ride Science event, and someone asked that.

CABANA: It's one more. "Well, have you been to the Moon? Well, have you been to Mars?" I'd go though. I'm volunteering, because I'm physically fit. I can pass the physical. I'm old enough that the radiation doesn't matter a bit, and I'll do anything to get out of going to any more meetings. If I had two years on Mars on a Martian mission, that's okay.

ROSS-NAZZAL: Would you volunteer for Mars One?

CABANA: No. That's dumb. A one-way trip to Mars, no. We're going to do it right. We're going to send folks to Mars and bring them home. Have you read the book *The Martian*?

ROSS-NAZZAL: I did, yes.

CABANA: It's awesome. You've got to read it.

ROSS-NAZZAL: It's really good, yes.

CABANA: It's *Robinson Crusoe* on Mars. It's very well done. Andy Weir did a great job researching it. He took a little license with the storm that set up the whole thing, but everything in it is very plausible. Very, very well done story. That's what exploring is about. We need to be able to do that.

ROSS-NAZZAL: Yes, I think it's a reading list requirement by [Center Director] Ellen [Ochoa]. It's being stocked now, actually, at the Gilruth. You can pick it up when you're at the gym.

CABANA: And it's going to be a great movie, if you've looked at the trailers.

ROSS-NAZZAL: Yes, I'm definitely looking forward to that. So once you're finished with your PRs, what did you do until you got assigned to STS-53?

CABANA: I was a CapCom. We talked about that.

ROSS-NAZZAL: Okay. Yes, we did talk about that.

CABANA: Yes, it was great. Then 53, that was a great flight. DoD-1, can't tell you about it. It's still classified. It all went flawlessly. We had some experiments, too. We had some fluids experiments down on the middeck. We did an experiment where we had a fire in space. It was all contained, but looking at how flames propagate in a micro-gravity environment. That was cool.

ROSS-NAZZAL: Yes, those were neat.

CABANA: Fifty-three, that was just—it was a great flight, again. I really enjoyed flying with all those guys. It was awesome. The training, going through again a second time, just reinforcing everything I'd learned. There's stuff I'd tell you, but I'm not going to tell it to a recording.

ROSS-NAZZAL: That's okay. I've got some open-ended questions that you could probably answer. How did training differ from working on partially classified flight to a very open mission? How do things change for you?

CABANA: Actually, the training was exactly the same. I CapComed for DoD missions, and we had two control rooms. What is now the historic Mission Control room over in Mission Control, the one on the second floor—the one above the ISS [International Space Station] control room. Of course, both those control rooms were used during Apollo, right? They were both identical, except one had green consoles, and one had blue consoles. The green consoles up on the upper one that's now historic Mission Control, that's where we did all the DoD flights from. That was the classified control room. A control team, they couldn't tell the difference between a sim or

on-orbit. You're talking to the crew. Communications don't get out. It's just classified communications, so even when you were over in the simulator, that was a secure environment. When you were in the control room, that was a secure environment, and they controlled who had access.

Our classified mission was a little different than some, because it was a classified mission in an open environment. We did a lot more PAO [Public Affairs Office] media-type stuff while we were on orbit. We just had to keep the back windows blocked, so you couldn't see into the payload bay while we were on the flight deck. And we were careful with what we did and showed, so really not a whole lot of difference, from a training point of view.

ROSS-NAZZAL: Can you tell us more about Dave Walker? I've heard he's a real character. You called him your "big brother."

CABANA: Dave is one of the nicest guys I've ever known. He was a good pilot, great hands, good stick. When my daughter graduated from college, he came to her graduation in Austin [Texas]. I'll never forget when his house burned down. Oh, that was sad. He was living over south of Kemah, a little house on the bay. When the fire department showed up, they actually had to keep away from it, because he had guns and ammunition, and the ammunition started cooking off. So the fire department wouldn't get up close. It burned totally to the ground. I remember going over, Rich [Michael R.] Clifford and Jim Voss and I. This was after our mission. We're sorting through the ashes, finding his [medals and] his distinguished flying cross. The ribbons burned off, but the medal is still there, and just sorting through stuff. Dave just took it all in stride.

My favorite story about that is—so I'm CapCom-ing with Story Musgrave and telling him about the fire and Dave's house burning down. Story says, "That's why when I go on travel, I unplug everything but the refrigerator." I said, "Story, the fire started in the refrigerator," and it did. He just goes, "Oh, I'll have to think about that." That was sad, but it all worked out.

I remember one time, we were in the simulator. Dave did something that wasn't quite right, and we died. I said, "Dave, why did you do that?" He said, "Well, I felt like it." I said, "Well, don't feel like that again." Dave was a good guy. He enjoyed having a good time. He worked hard, and he played hard.

ROSS-NAZZAL: You mentioned that you were the Dog Crew; can you talk about that?

CABANA: Yes, this needs to be documented. We got assigned to STS-53, and we're in the simulator. Training team nine was training us, and Rob [Robert D.] Banfield was the team lead for training team nine. They all had dog names, and he said, "You guys need dog names." "Why?" "Well, because you do. We all got dog names, you need dog names." I don't know why they had dog names. He never told us. So I turned to Dave, and I said, "How are we going to get dog names?" This was when the movie *The Field of Dreams* was on. Dave turns to me, and he says, "If we build them, they will come."

Dave was Red Dog, and Dave had really bright hair. His call sign prior to that was Red Flash. When he was a test pilot at Pax River, streaking was in, Dave streaked a 7-Eleven in Lexington Park, Maryland. After that, he was known as the Red Flash. I shouldn't say that. So Dave became Red Dog. Jim Voss was a former Army infantry guy before he got his master's in aero and became an astronaut, so he was Dog Face, because that's what Army infantry guys were

called, dogfaces. Let's see, who else was on that crew? Rich Clifford, it was Rich's first flight, so he was Puppy Dog. For some reason, Guy [Guion S. Bluford] didn't show up to half of our training events, or he was late. Guy was just never there, so Guy was Doggone. I had a good reputation from 41 and did well in the sims. I was Mighty Dog. So that was the first dog crew.

It was a classified DoD mission, and we were the Dogs of War. Dave played it to the hilt. Dave had this old station wagon that he'd gotten from somebody for next to nothing, and it got painted flat black. We got a whole bunch of Shuttle cue cards made up for it, so we christened it the Dog Mobile. We were over at Jim Voss's, and Jim Voss was building his Long-EZ [homebuilt aircraft] at the time, in his garage. We'd gotten a wingtip off a T-38 from a pilot who will remain nameless who was flying on his lead going into [Washington] Dulles [International] Airport [Virginia]. He got a little bit of wing wash, it caused him to roll a little bit, and he dinged the wingtip on the runway before he touched down, so they had to replace the wingtip. So we got that wingtip, and we mounted on the top of the Dog Mobile as a vertical stabilizer.

Voss had gone off somewhere. We got some angle iron, and we drilled into the roof of the Dog Mobile and used the holes where the wingtip mounted to the T-38. An airplane has a lot of holes close together where its screws go, and I didn't want it coming apart, so I made sure that we had one in every hole. Jim turned us loose in his garage, and I used all these expensive stainless steel bolts that he had for his airplane. He was a little upset when he got home.

We took it out on Bay Area Boulevard, and we had to do a flutter test. We're test pilots. You don't want flutter to cause a problem, so we got the rear window rolled down. Dave's driving, and I got my hands on the roof and my head up. "Faster Dave, it's going good." Had to

do a flight test to make sure there was no flutter. So that was our test flight of the Dog Mobile with its vertical stabilizer.

It had a PA system in it. We'd be riding around onsite, and Dave would be woofing at all the pretty girls on the PA system. Charlie [Charles J.] Precourt was over in Russia as a DOR [Director of Operations], and he left Scott [J.] Horowitz in charge of his Long-EZ out at Ellington Field. Scott went out to do an engine run on it one day, and it jumped the chocks and went into a fence. He was out turning the prop. So we got the spinner off of Charlie's airplane, and we mounted that on the nose of the Dog Mobile. Let's see—we got a drag chute door off an Orbiter after it had landed, and we mounted that on the back. We got a bent up HPU [Hydraulic Power Unit] vent off a solid rocket motor that was recovered that was damaged. We mounted that on it.

It was quite a vehicle. It was awesome, and we drove it everywhere as a crew. We drove it out to Ellington. After we got done with our sim, we all got in the Dog Mobile and rode out and parked it out at Ellington, got in our jets, and flew to the Cape. So that was the first Dog Crew, the Dogs of War.

Dave ended up on STS-69, and Jim Voss was with Dave on 69. He said, "Dave, we need another Dog Crew," because they had Red Dog and Dog Face. Dave said, "Absolutely," because it's a great morale-building team thing. Ken [Kenneth D.] Cockrell was his pilot. He was Cujo. Mike [Michael L.] Gernhardt was a diver before he became an astronaut, so he was Underdog. Jim [James H.] Newman was on that flight. Jim's one of my closest friends; Jim got selected on his fifth or sixth try to be an astronaut, really smart guy. Jim's dog name was Pluto, and it's not after Disney's Pluto. It's after the planet Pluto, because Jim's in an orbit all his own. So they were the Dogs of Summer, and they had fun with that.

Then, on my last flight, STS-88, Pluto says, “Mighty Dog, we’ve got to have another dog crew,” because he and I were on that flight. I said, “Jim, I don’t want to detract from the first Space Station Assembly mission with a bunch of dog stuff.” He really wanted it, and I thought, “Well, okay.” So we were the Stealth Dog crew, and we even had a patch. I was Mighty Dog, the commander. Rick [Frederick W.] Sturckow—it was his first flight. Rick was a Marine, so he was Devil Dog, because that’s what Marines were called. We had Pluto, of course. Jerry Ross—if you’ve ever seen the movie *Turner & Hooch*—Jerry was Hooch. And Nancy [J.] Currie was Laika—you know, first female dog in space. She didn’t want to be Laika. She wanted to be Strelka, because Strelka came home and had puppies. Laika never came home. But you don’t get to choose your dog name, so Nancy Currie was Laika. Then Sergei [K.] Krikalev got added to our crew, so Sergei was Spotnik.

ROSS-NAZZAL: That’s cute.

CABANA: And Dave had willed the Dog Mobile to me.

ROSS-NAZZAL: I was wondering about that.

CABANA: On the Dogs of Summer, instead of being flat black, they painted it like a T-38. It was white with blue stripes. It was really nice, looked awesome, still had all the flight hardware on it. So we tow it down to Rick’s little ranch in Santa Fe [Texas], and we got it parked down there, and we’re rebuilding the Dog Mobile. It doesn’t run anymore. It is in sad shape. It had just rusted away and wasn’t going to run, and we’re getting it going in our spare time, which is nil. I

go down there one night to work on it, and it looks totally different. “Wow, Rick, you’ve really been working hard.” Well, he was driving home one night, and he saw this 1978 Buick station wagon. The Dog Mobile was a Pontiac but the same year. You can’t tell the difference between a Pontiac and a Buick. He had bought it for like \$600, so we took all the flight hardware off of the old Dog Mobile, and we mounted it on the new one. It was really nice. It ran good, painted it again white with blue stripes, just like a T-38, and that was it.

Then, after that, I thought, “What’s going to happen to the Dog Mobile?” Well, Rick pulled all the stuff off, patched all the holes, repainted it, and sold it, because it was registered to him now, and the other Dog Mobile just ended up getting junked. I’ve got to go find those pictures somewhere.

ROSS-NAZZAL: Absolutely.

CABANA: So that’s the story of the three Dog Mobiles and the three Dog Crews, or the one Dog Mobile and three Dog Crews.

ROSS-NAZZAL: What did you guys do with all that flight hardware?

CABANA: I don’t know what happened to it, but it’s somewhere. I’d have to track Rick down and ask him, because there’s a wingtip, a drag chute door, an HPU vent. We had flight data file checklists inside, just like the Orbiter, Velcro-ed in place.

ROSS-NAZZAL: Were they specific to your mission?

CABANA: Yes, yes, it was some unique stuff, as I recall. I'd like to get a hold of that and look at it again.

ROSS-NAZZAL: Absolutely. That'd be great. We could send it over to the Air and Space Museum, like your whole mission in the Dog Crews. Yes, that'd be great.

CABANA: It was fun, so I credit Dave Walker. Dave was the one that got the Dog Mobile and kept all that alive. It was a good time.

ROSS-NAZZAL: Yes, what a hoot. So Guy Bluford told me that you guys actually got to ride the crawler out for a day, take the Orbiter out there.

CABANA: Oh, we did. When 53 rolled out to the pad, we flew down, and we rode on the crawler with *Discovery* partway out to the pad. That was awesome. I was looking at the tail of the Orbiter, and it sets up a frequency. Since then, they roll slower to the pad because of it. The tail was doing this [demonstrates] all the way out. I said, "That can't be good, having all that flutter on the tail like that." It was really interesting.

When I got assigned to be a director at KSC, the last six missions that we flew out, I went out. One o'clock in the morning, I went out and rolled out with every vehicle. When I first got there, I was the only one out there. It was me and the guys doing it. The last three flights, there were a ton of people. To me, when the Orbiter clears the VAB [Vehicle Assembly Building] doors, and it rolls out in the xenon lights, that is the beginning of a trip to space. That's almost

as emotional as a launch. You're on the mobile launcher on top of the crawler. The Orbiter—it's just awesome. It rolls past those doors, you're on that crawler-way, and the lights are shining, and that's special. Pretty cool.

ROSS-NAZZAL: Yes, it's pretty unique. Not many people have gotten to ride in that crawler.

CABANA: So all six [of the final missions] I did that. It's like being on a ship. The mobile launch platform and the crawler, it's painted navy gray. It smells like diesel fuel. The diesels are running. There's a hum to it. It has got knee-knockers and watertight doors and ladders and hatches. It is just like being at sea, except there's not as much motion.

WRIGHT: Wow, interesting.

ROSS-NAZZAL: Yes, that is interesting. One of the things I read is that your crew sent greetings for participants to the Army-Navy game. Do you remember that?

CABANA: Oh jeez.

ROSS-NAZZAL: It must have been a big deal.

CABANA: This is bad. I cannot be in space during an Army-Navy game. I had two December missions, STS-53 and STS-88. I took Beat Army stickers with me on both of them. On STS-53, it made the *USA Today*. I've still got the article. I'm walking out with the rest of the crew, and I

didn't tell Jim Voss, because he's in the Army. So as we walk out, I pull up this Beat Army sticker, and I got pictures showing it. I took it to space. I got pictures of me in space wearing a Naval Academy sweatshirt with a Beat Army sticker, and we lost both of those games. We were winning the one. They're giving us updates throughout the game, and I'm giving Voss a hard time, because Navy's killing Army. And dang, they came back and won by a field goal in the last seconds of the game, and we lost but that was fun. We did a little inflight spirit video that we sent down to be played during the Army-Navy game. That was fun.

ROSS-NAZZAL: That's neat. So this mission was scheduled to land at Edwards, but it ended up landing at KSC.

CABANA: No, actually, it was scheduled to land at KSC, and we landed at Edwards. My first two flights both landed at Edwards Air Force Base.

ROSS-NAZZAL: I must have dyslexia, sorry.

CABANA: Now, when I landed the Orbiter, I landed at KSC both times, like I was supposed to. STS-41 was scheduled to land at Edwards, but STS-53 was supposed to land at the Cape, and we ended up landing at Edwards. The weather was bad, and the weather wasn't that great at Edwards. We actually couldn't see the runway because of a cloud. We broke out at about 4,000 feet and landed. That was really interesting. That flight was also supposed to do auto-land. We trained for it, and then they said, "No, you're not doing that," which was interesting.

As we were coming back, it was this huge descending right turn, all the way into Edwards; we came over Walla Walla, Washington. Walla Walla has the same TACAN [Tactical Air Navigation Units] station as Edwards, 111 X. [Our] TACANS locked onto Walla Walla, Washington, and we couldn't take TACAN data. This is before the Orbiter had GPS [Global Positioning System]. We ended up with a bad nav [navigation] state, a little bit. We finally got the TACANS locked on and updated, and to make a long story short, we ended up with HAC shrink, where the heading alignment cone gets really small, the circle, and it tightens you up to get you in. We were low energy. It worried folks, but it was okay. Dave was flying, and he let me fly. Energy got better while I was flying, and then Dave took over and landed it. So we landed at Edwards.

ROSS-NAZZAL: But your family was at the Cape.

CABANA: Yes, they were. Now, I'm trying to remember. Were they—or did they get them out there to Edwards in time? Was it a wave off? Yes. Yes, we had no family there. That was okay. The family was there on STS-41.

ROSS-NAZZAL: Kind of subdued reentry then, without the family there.

CABANA: No, I was happy to just be home. It was okay. We got to see them soon.

ROSS-NAZZAL: What did you do once you finished your PRs and debriefs?

CABANA: My first flight, I remembered giving my wife a hug, and I almost knocked her tooth out with my neck ring.

ROSS-NAZZAL: Oh, ouch.

CABANA: Hon, careful. Yes, what else? From 53, there was probably more.

ROSS-NAZZAL: I'm sure there is. I'm just not sure what you can talk about.

CABANA: Yes, I'm letting a lot of that stuff go. I'll tell you afterwards. Somehow, I'm going to have to record it for somebody somewhere. I think some of that stuff needs to be saved.

ROSS-NAZZAL: I think so. Well, maybe write a book, be like Mike [Robert M.] Mullane.

CABANA: Maybe. No, it won't be like Mike Mullane's. One of the most fun things that the commander and the pilot do—and we take mission specialists with us sometimes, but sometimes we're just by ourselves—was going out to Edwards to fly the Shuttle Training Aircraft, taking a weekend. You'd be scheduled to fly on a Sunday morning or a Saturday. Dick and I had this routine, because we trained out at Edwards and at the Cape and at White Sands [Space Harbor, New Mexico], of course. Once a quarter, they'd have a weekend where the assigned crews would go out and fly at Edwards Air Force Base. And it had to be on the weekend, to not interfere with the work out at Edwards.

I remember we'd fly out there Saturday night, Saturday afternoon. We'd get up early Sunday morning, fly the Shuttle Training Aircraft, and then we'd stop in El Paso [Forward Operating Location and T-38 Depot, Texas] for gas on the way back to Houston. We hadn't had breakfast yet, and we'd get the rental car there or GSA [General Services Administration] car while they were filling the jets with gas. We'd drive out to Whataburger, and we'd get taquitos and coffee— potato and egg, awesome—and have breakfast. It was fun, flying out to Edwards with Dave, too. I just love flying.

WRIGHT: While you're on the subject of the commanders, you mentioned earlier that there were two different types of commanders, but you learned a lot from each one. Can you share some of the things that you learned that you used for your own?

CABANA: I think Dave was a little less rigid than Dick was in some ways. I learned that you've got to be a little more adaptable to some things, too. You can work hard and still have fun. That's not saying anything against Dick, because on my first flight, I was just like Dick. It's never really about fun, but it is fun. I wanted to make sure that we did things absolutely perfect, that we didn't make any mistakes, that we did everything right. My whole focus was making sure that we did it right.

ROSS-NAZZAL: That's important, yes. I'm trying to remember who told us. I think it was Dave [David C.] Leestma. When he went out for his first EVA, "Don't screw this up." That was his motto.

CABANA: Yes, yes. So STS-65, my first command, that was awesome. What a great flight, great crew. Jim [James D.] Halsell was my pilot. It was his first flight, and great guy, flew SR-71s in the Air Force, great test pilot, nice guy. Rick [Richard J.] Hieb was the payload commander. Leroy Chiao, Don [Donald A.] Thomas—Carl [E.] Walz was my flight engineer, and we worked 24 [hour] ops, 12 on, 12 off. Carl was in charge of the blue shift. I was in charge of the red shift. And also Chiaki Mukai, a Japanese payload specialist—first female Japanese to fly in space, nice lady, medical doctor. That was just a great flight. We had 83 experiments from around the world, and it set the stage for how we do science on the Space Station. We were training at the Marshall Space Flight Center. The POC [Payload Operations Center] up there was in charge of our payloads and our operations. It was just a great flight. I really, really enjoyed it.

I remember I didn't sleep a whole lot. I had a couple of experiments that I was in charge of, and then all the normal housekeeping stuff and being in charge of the Orbiter. I took it upon myself to do video editing and downlink a summary of the day's activities every day for [PAO] use. So I'd take all the video that we'd [made during the day and using] two camcorders, I'd stay up [late and] edit and cut and splice [them]. I condensed everything into just a nice video that could tell a story about what we did that day and then downlink it. I remember one night, I didn't even know what time it was. I was way into the second shift, and Carl says to me, "Are you ever going to go to bed and let me be in charge?" "Okay, Carl." That flight went extremely well.

I'll never forget landing. I was so pumped. I had so much adrenaline going. We landed on runway 33 at KSC in the daytime. STS-88, we landed on 15 at night. We had a detailed test objective, this is STS-65. We're well into the Shuttle program, and we're still doing test

objectives to get data to better define the Orbiter aerodynamics. So at approach and land transition at 10,000 feet, I had to do a roll doublet and a yaw doublet. Essentially, it's a precise displacement of the rudder pedals and the roll to get a certain displacement and a certain rate. I nailed it. It felt good, and they got the data that they needed, and then I nailed the landing. That was good, too. That was right where I wanted to be. I told them I was going to touch down at 200 knots, between 1.5 and 2.5 feet per second sink rate. And I touched down at 202 knots at 2.2 foot per second.

ROSS-NAZZAL: So many people think the role of the commander of a Space Shuttle is basically to land the Orbiter, but there's so much more than that. Would you talk, for instance, about building that team? You've got build that culture.

CABANA: Well, that's what you're in charge of. You're in charge of the success of the mission. When you're on orbit, the flight director is in charge, but you have the ability to override him if you don't agree, but you better be right. You're in charge. You always have the option to do what you think is right for the safety of the crew or whatever, but you're in charge of the success of the mission. You build the team. You work with everybody. You've got to make sure everybody is doing their job on the Orbiter. You've got to make sure nobody is sick.

It's like a family, you know? And there are a lot of dysfunctional families. There are dysfunctional crews, too. Nobody is perfect. No crew is perfect. No family is perfect. You work through it. You're assigned for a whole year, training together. Things aren't perfect all the time, and you've got to work through issues, make sure things are right. The main thing is,

you want it to be an enjoyable experience for everyone, and you want to be successful. And you're responsible for making it all happen.

ROSS-NAZZAL: Your previous commander has used the Dog Crew to build that camaraderie with the crew. What did you decide to do to build that family togetherness?

CABANA: Oh, we always had family get-togethers, and every crew does that. You get a cookout or go over to somebody's house for dinner, or something like that. I didn't really pick any one thing. I just tried to make sure that we were all enjoying ourselves and having fun, that we got together on a regular basis for relaxation, did things together as a crew. I think the most important thing I did on that first flight was—I did what my commander did to me, and his did to him, and that was during our training I assigned lessons to everybody that they had to teach. The way that you learn something is not by doing it, it's by teaching it. If you can teach it, then you know it.

Halsell hated me for it, but Dick made me do it, so I made him do it. He had to give a class on every system that he was responsible for, so he gave a class on the main engines, the reaction control system, the orbital maneuvering system, the auxiliary power units, the electrical system. You put a lot of work into preparing it. Even though you're trained in all this stuff, you give a class on your system to the rest of the crew. They get to ask questions, and you have to explain why things are the way they are and everything. I don't know if Jim made his first pilot do that or not. He flew with Susan [L. Still] Kilrain on his first command. Then I had the other folks give classes on systems they were responsible for, and as a commander I gave a class on the computer system, on the environmental control system.

ROSS-NAZZAL: You made your crew work.

CABANA: I don't know if that builds camaraderie, but it built competence.

ROSS-NAZZAL: Yes, that's for sure. You also would work with the flight activities officer, the flight director, probably the Space Shuttle Program Office. Can you talk about all this?

CABANA: Sure, to put the flight plan together we worked together. There's so many things, I've got to think back on all this stuff. There are so many meetings that you go to. You track all the changes that are being made to crew procedures, you modify things, you look at payloads and how they're being done, you make your input to help make the procedures better, make sure they're successful, and you work with a lot of payload folks to help ensure the success of their experiment on orbit. They may have procedures, but you can say, "Have you thought about doing this?" And even though there are astronauts that have probably PV'd a lot of this stuff—procedure verification on the ground—sometimes you might want to suggest a change. You help put the flight plan together, and make decisions with the flight director on how things are going to get done.

No flight goes as planned. There's always changes that get made, so you've got to implement those changes on orbit. On STS-65, we're on orbit, and June Lockhart came to Mission Control. Of course June was from *Lost In Space*, and she's a real space nut, all right. She was also Timmy's mom on *Lassie*. So she's at Mission Control, and Milt [J. Milton] Heflin's our lead flight director, and Milt says, "Well, you want to talk to the crew?" I'm talking

to June Lockhart from space, and she is just absolutely loving it. She adopted me after that, as her own personal astronaut. That was fun. There's always fun things that pop up. I got to meet the queen of England when I was a CapCom. She came to Mission Control with her husband, and that was pretty cool.

ROSS-NAZZAL: You get to do a lot of cool stuff when you're an astronaut.

CABANA: It happens. Just happened to be in the right place at the right time.

ROSS-NAZZAL: Yes. You said you were in charge of one of the crews on orbit, and it seems to be kind of unusual to me. Most of the missions that were going 24 hours, it seemed like the commander would float between the two shifts and not necessarily work one or the other, so would you talk about that a little bit, that decision?

CABANA: Well, I was awake a lot during the second shift. I was awake for all of my shift and a lot of the second. But I let Carl be in charge. I just was there watching.

ROSS-NAZZAL: Were you concerned about your bird?

CABANA: No, it's in good hands. Even on a single shift flight, at some point everybody on the crew's sleeping, and Mission Control's watching over everything, and so you've got to trust [their judgement]. We have awesome teams at NASA. Flying in space is such a small part of an astronaut's job. This is 2015—it's 30 years this month that I've been with NASA. I flew in

space four times, so that's four years out of 30 that I trained and flew in space. The rest of the time I've been supporting other folks flying in space. I think that's what's so neat about being in NASA: it's being part of this team.

NASA consistently ranks number one in the last four years that they've done this employee viewpoint survey, number one amongst all the federal agencies. Why is that? First off, I think it's because we have a meaningful mission. You can take pride in what you do. I don't care who you are at NASA, you are involved in enabling us to explore and be in space, and that's really important; everybody has a role to play in making that happen. How many people can go home and say, "I made a difference, not just in my job but for humanity." Having that meaningful mission, I think that helps us be number one.

I really believe in the NASA family. We do look out for one another. It is just a great environment to work in. So being part of that team, that's what makes it fun to come to work every day. I love coming to work every day at NASA. Well, I must, or I'd have gone off and done something else. I've got a lot of friends who've gone off and done other things and made a lot of money, but I don't know what I'm going to do when I can't be part of this team anymore. I love what I do, and it's important. It's critical to our future. So I'm happy to do it. Being an astronaut's cool, but being a part of this team, that's what it's really about, and that's mostly what astronauts do. I just love being part of the team. I had great jobs in the office, my collateral duties. Every one of them, I learned something and had fun doing it.

ROSS-NAZZAL: There's lots of interesting jobs, based on all the different astronauts that we've talked to over the years. From what I understand, you can always ask to do something different that you have an interest in. Going back to your first mission that you commanded, was that a

pretty clean mission, or did you have some challenges during the flight that you had to deal with, [where] you had to improvise?

CABANA: Actually, it was a pretty clean flight. We had some minor malfunctions. We had an experiment that we had trouble with that we tried to make work, had to do with fluids flowing and they weren't flowing properly, and we were trying to prime the pump and get it to go. I had a camera that broke that we tried to fix. But the malfunctions that we had, they were all minor.

You know how you get rock chips in your window? The Orbiter gets those on every flight from micrometeorites. That one had the biggest one I've ever seen. It was over on the pilot's side. I didn't worry about it; it was his window. It had this big starburst that was about the size of a half dollar from something that hit it, and that window had to get replaced when we got home. There's three window panes in every window: there's a center pressure pane, there's an inner protective pane, and then there's an outer thermal pane. They're all about an inch thick, but when you look through it, it's just perfect glass. They're built by Corning in New York, in Corning, New York. They're perfect. You look through it, and it looks like you're looking through a quarter-inch piece of glass here, maybe even better. So it was no big deal.

My first flight, we got home and we were walking around the Orbiter, and right at the wing root on the starboard wing, right behind the RCC [Reinforced Carbon-Carbon] carrier panel, there was a tile that had been hit with a piece of debris and chipped badly. You could see the aluminum underneath; the heat had actually slumped the aluminum. We just said, "Wow! That's not good. They're going to have to fix that before it flies again." Different thoughts. My last flight, there was a piece of foam that came off the intertank flange that was bigger than the piece of foam that hit *Columbia*. It just missed the wing. Never thought about it.

ROSS-NAZZAL: So what were some of your other assignments in between these missions? I want to hold off on the ISS Assembly mission.

CABANA: I'm trying to think what ones I haven't talked about.

ROSS-NAZZAL: I know you mentioned you were a family escort for some of the missions.

CABANA: Yes, I did that on a couple of flight. Frank Culbertson was the hardest one to get airborne. I don't know how many trips I made. You know, Jim Newman had to marry Mary Lee, because it wasn't fair for her to keep paying her own way down to the Cape to see him launch, as many trips as he made.

WRIGHT: That's a new reason.

CABANA: Oh, this is really embarrassing. Mike [Michael L.] Coats is one of my dearest friends. I'm escorting the STS-39 crew, I got Diane and the whole gang, and I missed a turn. It was dark at night, going back from the beach house. I missed a turn, and we ended up way the heck south of Patrick Air Force Base [Florida]. I'm on this bridge going back, and then we've got to drive all the way back north again to get to Cape Canaveral, and the Cape Winds condo where they were staying. I was so embarrassed. I said, "Don't tell anybody." They didn't mind. We bonded. I was close with all those wives. They were good to me. Guy Bluford was on that flight, and Linda Bluford, she is a hoot. So on STS-53, Linda, jerkin' Guy's chain, sends a note

up to him and says, “Guy, I’m remodeling the kitchen. I just gutted everything, and I’m buying new appliances.”

ROSS-NAZZAL: Good timing.

CABANA: I don’t think she really was. She was just jerking his chain.

WRIGHT: During that time that we’re talking about, Shuttle-Mir was kicking off. The negotiations had started.

CABANA: Yes, well, that was when I was chief of the Astronaut Office. When I got back that was probably the most challenging job I had. After STS-65, I got back from that flight, and David Leestma asked me to be chief of the Astronaut Office and relieve Hoot. Hoot went to train full-time for the Shuttle-Mir docking on STS-71, the first docking with the *Atlantis*. We had about 113 astronauts at the time, US and foreign. It’s like having 113 teenagers working for you, only you’ve got more control over your own kid. It’s like a bunch of type-A personalities that are going to go off and do what they want to do. You’re corralling them. It was great. I think that’s the hardest I worked. I was at work before seven o’clock every morning. I didn’t go home until seven o’clock at night. I had an open-door policy, so anybody could walk in and talk to me anytime. I worked weekends [to catch up on the paperwork].

Like I said, I spent half my time at the Cape. We were flying eight to nine missions a year. There was one 12-month period between two years where we flew 11 flights in 12 months. Then I get back to Houston, and I have to get caught up on all the paperwork that I had to do that

I wasn't doing down in Florida. That was a great job. That was very rewarding, to be able to assign the crews, recommend the crews to Dave Leestma, to recommend to George Abbey, the Center Director, that was pretty neat. Very, very rewarding.

ROSS-NAZZAL: Can you talk about how you selected crews? What went into that decision-making process?

CABANA: Oh, it was very fair. First off, not every astronaut's perfect. There is a skill mix in the Astronaut Office, and you can't put all your [best] people on the same flight, so you've got to spread the wealth. You had to have experienced crew and inexperienced crew, and you had to look at the skills that were required for that particular mission, depending on EVA [Extravehicular Activity] or science or whatever. I looked at who flew, when they flew. I've still got it at home somewhere; it's this long spreadsheet that I put together [with] pencil. I'd keep track of who flew when, and how I'd assign. I had penciled in names, and then I'd [make] changes.

So then I'd take the crews to Dave Leestma, and I'd explain why I picked. Dave would agree, and then we'd go see George. I had them on a sheet of paper, and Dave would take them. He'd slide them across the table to George. Either two things would happen: George would pick up that five-by-seven sheet of paper and he'd fold it in half and stick it in his pocket, or he'd sit there and all of a sudden it would come back across the table to Dave. Then the meeting would be over, we'd leave, and that crew wouldn't be accepted. So I'd sit down and I'd say to Dave, "Okay, Dave, so this is why I picked these people. This is why this is the right crew." "Yes, I agree," and we'd talk some more. I wouldn't change it, because if you changed it going back to

George, it was, “Well, if you weren’t right the first time, what makes you think you’re right the second time?” So we’d come back with the same list and give it to George. I’d say, “George, this is why.” Eventually, every time I convinced him. George would accept it, and he’d take it.

...

WRIGHT: [The Shuttle-Mir program] was such an interesting time for American astronauts.

CABANA: Well, it was hard. First off, not many people know the US paid for both the Priroda and the Spektr modules on the *Mir* Space Station. They were paid for with US funds, and it was part of our agreement in allowing [our] folks to fly on the *Mir* Space Station, the seven folks that we sent over. I assigned all of them, but I didn’t pick Norm [Norman E. Thagard]. Bonnie [J. Dunbar] was his backup; I didn’t pick Bonnie to be his backup. Bonnie ended up not flying at all, Norm flew, and then Norm was followed by Shannon [W.] Lucid, [and John E. Blaha] was third. I didn’t pick Norm, John, or Shannon, but the four that came after them were folks that I selected to fly.

So I picked Scott [E.] Parazynski. Scott really wanted to do it, and it looked like he met the requirements for height. This is before the TMA [Soyuz spacecraft] and the TM [Soyuz spacecraft] had tighter restrictions than the TMA. We actually paid for modifications to the Soyuz, essentially; they moved the instrument panel up and back a little bit to accommodate longer knee length. There are different measurements to fly on *Mir*. Of course, you’re in your custom Kayuta, the seat liner that goes in the seat. It’s butt-to-knee length, butt-to-head height, sitting height. All things worked into it: total height and weight.

Anyway, I assigned Scott. Scott wanted to do it. He got over there. He went and got measured, and he was too tall. I said, “Dang, I’ll fix that.” Wendy [B.] Lawrence wanted to do it, so I assigned Wendy Lawrence. Wendy got over there, and dang, she was too small. You have to have a certain weight and height; when it lands, there are rockets that cushion it, but there’s also a stroke in the seat that collapses, and if you don’t weigh enough it won’t collapse and absorb the shock. So Scott was too tall, and Wendy was too small. So I ended up assigning—I think that was the increment that Dave Wolf ended up on. I said, “You guys wanted to go to *Mir*, I’m sending you to *Mir*.” I assigned them both on the Shuttle mission to *Mir* to take the crew up [STS-86], and while they were up there—I’ve still got it—they took a picture of themselves on the *Mir* Space Station together. When they got back they blew it up and signed it and sent it to me, and it said, “To Bob, from Too Tall and Too Small.”

WRIGHT: Did you have any reservations of assigning your American astronauts to go work on the Russian Space Station?

CABANA: No. We’d established a relationship. It was a very robust, reliable vehicle. Again, the Russians don’t do things better or worse than us; they just do it different from us. Part of it is establishing that trust and relationships, to understand. We still have a hard time getting data from them. There’s a certain amount of trust, but with this recent failure that they had on the Progress, it’s been challenging getting all the data to see why and what happened. That Progress that was lost, it was a different rocket, had a different upper stage from the one that flies crew, so they’ll go figure that out, too.

Were there concerns? Yes. Did we try and learn as much as we could? Absolutely. So we worked closely with the Shuttle-*Mir* program. During that timeframe, I'm chief of the Astronaut Office; we've got Jerry [M.] Linenger up there with a fire; Mike [C. Michael] Foale up there with a collision. What a zoo that was, going through all that, trying to get information, make sure the crews are safe. That was a very, very interesting time. I can't remember which module, whether it was Spektr or Priroda that ended up being evacuated and sealed off because of the collision. We had all the American experiments and stuff in it, and we ended up going back inside there. They actually did an internal EVA to recover stuff and go back in there. Andy [Andrew S.W.] Thomas, Dave Wolf, Mike Foale, Jerry Linenger, guys I asked to go do that, and they wanted to.

The one that got really hosed was Jim Voss, because Jim Voss was Andy Thomas's backup. He trained and never got to fly. I asked him to do it because I wanted to assign him to a Space Station mission. I actually wanted him to be on the first Space Station mission, but then it ended up being Shep instead, and Jim got pushed to the second mission. So not only did he train for that whole *Mir* increment that he didn't get to fly, but then he had to wait all through Shep's training for Shep to fly before he got to fly. So he was in training a long time, traveling back and forth to Russia. He's still my friend, though.

He's like my brother. You bond with everybody on one of your flights. My first flight was Tom Akers, and Tom's like a brother to me. Jim Voss on my second flight, and I'd have to probably say Rick Hieb on my third flight but I got close to Jim Halsell, too, my PLT [pilot]. Jim's a really good guy. Close to all of them. The last flight I was close to everybody, or separate, I don't know. Close to them all.

WRIGHT: They were yours, your kids.

CABANA: Yes, my crew. So back to Shuttle-*Mir*.

WRIGHT: As chief of the Astronaut Office, you knew that there was going to be a lot of time away from their families. Were procedures starting to change to help the family members deal with the fact that their crew members were gone?

CABANA: Well, yes, there was the something support group. I can't remember what it was called. Working with the life sciences folks, the behavioral folks, we put together a group to help support the folks that were away and their families and for the long-duration flights, working on that. You know, I got really—yes—really close to everybody.

WRIGHT: Yes, I bet your phone number was in their speed dial if they needed it. It would've been for me.

CABANA: Hardest was losing the *Columbia* crew. When I came back and I was the director of Flight Crew Operations, that was my first crew. When I was chief of the Astronaut Office, I would've gladly traded places with any of them. It was hard, riding out to the launch pad with every crew, knowing what could happen. I would have gladly traded places rather than send other people to do it. But, they all went off, and they all came home. And then *Columbia*, and that was really hard.

I remember the crew had a private medical conference. I haven't thought about this in a long time; it just came to me now, when we were talking about behavioral stuff. Smith [L.] Johnson was their flight doc. Smith used to invite people over. The commander has this private crew medical conference with the flight surgeon at the end of each day to see how everybody's doing, and Smith would invite secret guests over. He'd have the secret guest, and I was disguising my voice and harassing Rick [D. Husband] on orbit, and Rick was trying to guess who it is. He says, "Is this Cabana Bob?" That's [what he called me] when we were training for STS-88.

Kent [V.] Rominger was commanding STS-92, which was the next ISS flight, and Rick was his pilot, and we all traveled to Russia together, both crews. We went over to see the FGB [Functional Cargo Block] and learn the systems, and they were over there training with us, because they were going to be the next flight to ISS. Ellen Ochoa was his flight engineer, and I can't remember who else was on that crew now. That whole crew, they were just really good folks, really good folks. [And I got to know Rick.]

There's a picture I have right before they left the suit room. Rick got the whole crew together. They gathered in a circle and bowed their heads. They all got together and prayed. I rode out to the launch pad with them, and that was the last time I saw them. I was out at midfield, waiting for them to come home, and they didn't come home. And I had to tell their families, and I don't ever want to have to do that again. That was really hard.

So I did something down at the Cape. That was an emotional weekend, but we've got a new exhibit in *Atlantis's* facility, and it's called "Forever Remembered."

WRIGHT: I've seen that. I'd like to see it in person.

CABANA: It's something I wanted to do, and I kept it secret for four years. When *Discovery* got inducted into the Air and Space Museum—that was in 2012—I briefed Charlie on it and got his approval. We got the sidewall of *Challenger* out of the silo that had the American flag on it, and we got the windows of *Columbia*. We got a display for each crew member. Thursday night, before it opened, I took the *Challenger* family through, and then I took the *Columbia* families through separately. I was so worried what they would think. We worked with the families to do this, and to a person, they all just absolutely loved it. It was really special. Then we had dinner with them the next night. We opened it on a Saturday. It just was an emotional rollercoaster for me, but I feel I have some closure that I didn't have. I know it was [nearly] 15 years ago, but that's something that's eaten at me for a long time, and I feel better about it after having done that and shared it with the families.

And for the team at the Cape, the vehicles were part of the family, too. It wasn't just the people. Losing the people was hard, but losing the vehicles was hard, too, and it's special. It turned out really well. I couldn't have asked for it to be better.

WRIGHT: And now it can be shared with hundreds of others that are coming through there.

CABANA: Yes, I don't want them to forget the crews, I don't want them to forget what we learned from that, and that we rose above it, that both times we returned to flight and we were better.

ROSS-NAZZAL: I'm sure the families appreciated that, as well, that they're not forgotten.

CABANA: Oh, especially the *Challenger* families, because *Challenger* got handled different than *Columbia*, and it meant so much to them. Kathie, Scobee's daughter [Kathie Scobee Fulghum], she said, "Can we have an overnight? Can we just have a sleepover here?" And Lorna Onizuka was just so thankful and pleased, they all were. Jane Smith is a close friend. They're all close friends. I got to know all of them long before this, and they're all special people, and their husbands and spouses were, also.

WRIGHT: It's a nice gift.

CABANA: I've got a lot of memories of all those folks, the crews. Kalpana [Chawla], I remember teasing her at the astronaut gym before she went down to the Cape to fly right—she'd just gone into quarantine. She was always over at the gym. I'd run into her all the time over there. "Kalpana, I'm going to have a pull-up contest with you while you're in space." Yes, lot of good memories.

ROSS-NAZZAL: So you even fostered that family when you were chief with the Astronaut Office—

CABANA: Oh, absolutely.

ROSS-NAZZAL: —not just the crews.

CABANA: Absolutely. We always did stuff together, yes. I give a lot of leadership classes, and I really believe in servant leadership, in always putting the welfare of the people that work for you above your own. Take care of the people and they'll take care of you, put them first.

ROSS-NAZZAL: So we just talked with Beak [Jefferson D. Howell], and I'm curious, because he teaches leadership classes, as well: is that something that is Marine heritage, or part of your training?

CABANA: No, I learned a lot about leadership at the Naval Academy and in the Marine Corps, but I think that has a lot to do with what I've learned over the years. Everybody can learn to be a better leader. There's no such thing as a born leader. Some folks are a little more charismatic than others, but we can all learn to be better leaders.

ROSS-NAZZAL: Are there a few tips that you can share with us?

CABANA: I was the most shy, naïve person when I left Minnesota to go off to the Naval Academy. I grew up a lot there. I learned a lot. I've learned a lot over the years. So what can I share with you? Integrity is really important. If you don't have integrity, you can't establish trust. And if you don't have trust, you're never going to be able to lead a team. It's difficult to gain trust, and it's very easy to lose, but integrity is very important.

Having a vision for the future and clearly communicating it to your team. One of my favorite Yogi Berra quotes: "If you don't know where you're going, you're certainly going to end up somewhere else." The team's got to know where it's going. They've got to buy into the

vision, and they have to own it. Very important to have a clear, communicated vision to the team.

Communications is key. You can't communicate enough. Every problem that I have seen comes down to a failure of communication. I don't care if it's a technical or a personnel problem: somebody didn't communicate something properly, and it's really important to communicate clearly, concisely, be understood, make sure that folks understand, use every means possible. As a Center Director, I have a blog. I send out emails. I have all hands. I get out of my office and just go talk to folks, and it's really, really important.

If you haven't been good at what you do at one point, people aren't going to follow somebody that's not good at what they do, that doesn't have technical credibility in the field that they're in. But, I think, most important, it's taking care of the people, genuinely caring and taking care of them, and getting to know them. You've got to know the people that work for you. You've got to know their families. You've got to know when they're having problems. You've got to be willing to listen, genuinely caring. There's more, but that's enough for starters. If you just took NASA's core values to heart and applied them—safety, integrity, teamwork, which is people, technical excellence—all those would suit you well.

ROSS-NAZZAL: I wonder if you would talk about your leadership as chief of the Astronaut Office.

CABANA: I could go back and be such a much better leader now. We all learn from experience. I look back on that, and I was okay. I cared. I took care of them. I made sure things were fair. I made sure folks got assigned the flights because of ability, spread the wealth, and didn't play

favorites. I tried to take care of them and make sure that things were right, but I know a lot more now.

There's a lot of things I could do better in my life if I could go back. I'd probably be a better father, although my kids turned out okay. I've got one that's a Marine pilot. He's commanding a squadron in North Carolina. I've got one that's a science teacher, math teacher here, lives in League City, and I've got a daughter that was a teacher. She's an awesome mom, three great kids, living in Katy [Texas]. Her husband works for ConocoPhillips and makes way more money than I do, but that's good. It's not hard, either, to make more money than we make, right? I was shocked when I got asked to be chief of the Astronaut Office. I said holy mackerel, what responsibility, and why me. It's one of the best jobs I had at NASA. I worked my tail off, and I think I did an okay job. I got to be on an astronaut selection board that picked a bunch of great folks—I don't know, what do the folks that you interview say about me?

ROSS-NAZZAL: All good things. Would you talk about that? Because it's my understanding that you are chair of the selection when you were chief of the Astronaut Office. Is that true?

CABANA: No, actually, the director of Flight Crew Operations was the chair of the board. So I chaired one astronaut selection board when I was the director of Flight Crew Operations, and I was just a member of the board on the others. Dave [Leestma] was really nice. When George was chair of the board, George called all the folks that got selected, and John [Young] and PJ [Weitz] had to call the folks that didn't get selected. Dave allowed me to call the pilots, he called the mission specialists that got selected, and then we let other people on the board call the folks that didn't get selected. I did the same when I was the director of Flight Crew Operations.

That was fun, calling folks to tell them they got selected to be an astronaut. I picked Kent Rominger to be chief of the Astronaut Office when I was the director of Flight Crew Ops. Kent was just a great pilot, technically proficient, and a nice guy that cared about people. I wanted somebody that cared. If I look back, God puts you in a place for a reason. I look at how things got handled after *Columbia*, and I wouldn't ever want to go through that again, but it worked out. It worked out okay. Ellen Ochoa was my deputy, and Kent was chief of the office. That was a tough time for the three of us, working through all of that, and taking care of the families, getting us to where we could move forward and fly again. It was hard.

ROSS-NAZZAL: And you were all fairly new, from what I remember, in those positions.

CABANA: Oh yes, we were all brand new to the job. After being chief of the Astronaut Office I was so looking forward to being director of Flight Crew Ops and being with the crews again down at the Cape, after coming from Russia and being away, even though I was involved in everything. Then that was the very first flight. It was hard, but it all worked out.

ROSS-NAZZAL: You had a tough job that morning.

CABANA: All worked out. Never forget that, telling the families that they weren't coming home. I could not believe it, out there at the middle of the runway with the convoy commander, and it's like, no sonic booms. Where are they? And then you realized, there's no way. They're not coming. This is it. Then seeing the video clips of those pieces of the Orbiter reentering.

Wright: Did you make the decision on when to tell the families?

CABANA: Yes, got them all together, and I told them. That was hard. Then we got them on a plane, got them out of there. I got on a plane and headed back.

ROSS-NAZZAL: At what point did you know for sure the crew wasn't coming back, and you had to inform the families? Was that something you talked with [NASA Administrator Sean] O'Keefe about?

CABANA: As soon as I got back to crew quarters I told them. It was obvious, based on the data that I had and what I saw. So it was in the time it took to get them from the end of the runway back to crew quarters, and for me to get from midfield back there. Bad Saturday morning. Eight o'clock in the morning, beautiful blue sky. It was a great day to bring an Orbiter home, and they didn't come home.

ROSS-NAZZAL: And Ellen was back here in Houston. What were you sharing with her from the Cape?

CABANA: You know, I don't even remember talking to Ellen. She was in Mission Control. She knew what was going on. I remember—well, we were flying back, getting Jim [James D.] Wetherbee in a car headed up to East Texas, to start putting a recovery effort together. It started that quick. I look at everything that we went through, figuring things out, and all that we did to make the Orbiter better after that. One of the things I tell folks is don't ever be afraid to ask

questions. You've got to ask questions. If something's bugging you, make sure you ask it. I don't care how new you are. What's going on. Don't take people's word. Ask the question.

ROSS-NAZZAL: Would you talk about those days and weeks following the accident? What were your days like? What sort of issues were you grappling with?

CABANA: I was just getting all the recovery efforts together, just getting folks involved, and pulling it all together, taking care of the families, making sure they knew what was going on. I had great casualty assistance officers. They were all doing really well, taking care of the families. We met with them regularly. I don't know if I've chosen not to think about it, but there's a lot. I used to get a lot more emotional talking about it. The other weekend, I was choked up a lot, but I'll tell you, after getting together with the families three or four weeks ago and doing all that and being through it, I got a lot of healing out of that that I didn't have. It really helped to be together with them again, 14 years later, and to have that "Forever Remembered," it just really helped. Helped me.

ROSS-NAZZAL: That was a nice idea of yours.

WRIGHT: And now it's a good place to gather in circumstances like a family reunion, instead of for a reason. So that'll be good. When you were talking about the *Columbia* recovery efforts, we did an oral history project for that, and some of the astronauts that we talked to said they were wanting to do so much more, but it was a difficult time for them to try to figure out where they could go or what they could do.

CABANA: Well, it was really hard. Everybody wanted to go out and do something, and you can't just have people running willy-nilly. We had to set up somebody in charge. Jim spearheaded pulling the team together and the recovery efforts. I'm sure you've heard this: the hardest part was having to deal with the physical remains. And the astronauts that worked with all of that, that was really hard. Really hard. Have you talked to Nancy Currie?

WRIGHT: Not yet.

CABANA: Talk to Nancy. The whole recovery effort was just phenomenal. When you think of the team and the area of ground that they covered, and how much of *Columbia* was recovered, and how we were able to piece together what happened, just absolutely phenomenal.

WRIGHT: While the answer wasn't one you wanted to hear, it certainly saved the Orbiters' future issues.

CABANA: Oh, yes, what we learned was critical to the future. Allowed us to complete the program and complete the Space Station.

WRIGHT: And those are good things.

CABANA: Yes. It was a great thing.

ROSS-NAZZAL: Did you get to spend any time up in East Texas?

CABANA: I did. Great folks. I went up and saw the team a number of times, just to see how my astronauts were doing, see how folks were doing.

WRIGHT: And they were so well-received in the neighborhood, they did such a good job.

CABANA: Oh, it was awesome. People were so nice. People up there are just absolutely wonderful.

ROSS-NAZZAL: When did your days return to normal after *Columbia*? Did it take a few months? You had other things to do.

CABANA: Yes, we got back into the return to flight mode. Once we figured out what the problem was, “Yes, this is it; all right, so how do we fix it?” Then it was an engineering return to work mode. I still had crews on the International Space Station. We still had to assign crews. We had crews in training. We had to work to get crews up there. We had to take care of them. It wasn’t like we weren’t flying in space; we were still doing space ops on ISS, so you had to take care of them. It was hard on Don [Donald R.] Pettit and [Kenneth D.] Bowersox, being on orbit and losing a crew. They had to deal with that up there.

ROSS-NAZZAL: And, of course, all the regular, day-to-day things that you had to deal with.

CABANA: Yes, we still did all of that, yes. Life goes on.

ROSS-NAZZAL: That all managed to get done.

CABANA: Yes.

ROSS-NAZZAL: Well, I think this might be a good time for us to stop.

CABANA: I think so. I'll have to tell you about STS-88 another time.

ROSS-NAZZAL: Absolutely. I wanted to save that.

CABANA: That's a whole 'nother story. That's a fun story.

ROSS-NAZZAL: Yes, we'd love that.

WRIGHT: We'll start out with that one next time you come back.

[End of interview]