

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

EILEEN M. COLLINS
INTERVIEWED BY JENNIFER ROSS-NAZZAL
HOUSTON, TEXAS – FEBRUARY 19, 2013

ROSS-NAZZAL: Today is February 19th, 2013. This interview with Eileen Collins is being conducted for the JSC Oral History Project in Houston, Texas. The interviewer is Jennifer Ross-Nazzal, assisted by Rebecca Wright. Thanks again for taking some time today out of your busy schedule, coming in from San Antonio to meet with us. We certainly appreciate it.

COLLINS: Thank you, it's good to be here.

ROSS-NAZZAL: I wanted to start by asking you about your application. I understand that you had applied originally to be an astronaut as a mission specialist, but you were selected as the first female pilot astronaut. Can you talk about that?

COLLINS: Yes. In 1989 I applied as both a pilot and a mission specialist. I had to apply to the Air Force, because as an active duty military officer, you have to apply to your service first. Because I was a student in the Air Force Test Pilot School at the time of the application, the Air Force selected me as a mission specialist. The Air Force would not select me as a pilot until I had graduated from the school, and I was six months away from graduation. The Air Force forwarded my name to NASA as a mission specialist. I interviewed as a mission specialist. During the interview, I was asked, "Would you rather be a pilot?"

I explained to them how I had applied for pilot, and they understood how the military services screen applicants. They understood that, but they still asked me, “Would you rather be a pilot?” I said I would love to be both, pilot or mission specialist, either one.

They asked me at least five times in that interview if I would rather be a pilot. I stuck with my original answer, because that’s how I really felt. But looking back, now that the interview and my career is past history, they made the right decision, because I was better qualified as a pilot. I had been flying airplanes my entire professional life. I was close to graduating from the Air Force Test Pilot School. I was just better qualified as a pilot.

It turned out that the Shuttle Program had never selected a woman as a pilot. Because of the timing, I became the first woman pilot. You may not ask me this question, but the call that you get from the board once you’ve been selected happened on January 16th of 1990. The reason they called that day was January 16th is the anniversary of the class of 1978 getting the call, and several board members were from the class of 1978, so they wanted our anniversary to be the same as theirs, which I thought was cute.

I was out flying an A-37 aircraft when the call came in, doing spins. There’s something like 12 different spins that you can put the airplane into and recover. I came back, I was pretty wrung out. I was solo, and I had somebody chasing me, so it was a pretty busy flight. I came back and I walked in the squadron, and one of those yellow government phone slips was posted on the bulletin board. Nobody told me about it. I just happened to look. “Major Collins, call Duane [L.] Ross at NASA.”

My heart started beating, and I was the only one in the room other than the secretary. She was an enlisted gal, a wonderful person, and her name was Denise, I can’t remember her last name. “You know what this is.”

“Yeah.”

I called, and Teresa Gomez answered the phone, and she was one of the assistants to Duane Ross. “Oh, Major Collins, let me get you Duane Ross.”

Duane Ross gets on the phone. “Hello, Major Collins, let me get you Don [Donald R.] Puddy,” who was the chairman of the selection panel.

He gets on the phone and says, “Oh, Major Collins, let me get you John [W.] Young.” I had been handed off through all these people, and my heart is beating.

John Young gets on the phone and says, “How would you like to come to Johnson Space Center?” That’s the way he told me.

“I would love to do that.”

ROSS-NAZZAL: How exciting.

COLLINS: Then John Young went on to talk about, “You wouldn’t believe all the great programs we have here. We fly T-38s. We have the simulators. We have the Weightless Environment Training Facility.” He’s going on and on. He must have gone on for five minutes. Then he said, “Well, do you have any questions?”

I said, “Am I going to be a pilot or a mission specialist?”

“Pilot. You’re going to be the first woman pilot.”

I knew that that was the right thing for me. I didn’t get that big euphoric happy feeling that everyone thinks they might get. I felt a huge sense of relief. I think the gal that was in the room with me knew what was going on, but I went back in the squadron and I didn’t tell anybody.

They told me to keep it quiet until the announcement went out, and I went home and told my husband. I just was very happy. For me it was a dream come true, and who knows what the future is going to hold? But I was happy to come here and spent 16 years. That's enough. There wasn't even a question and I told you a story.

ROSS-NAZZAL: That's the way oral history works. That's great. That must have been really exciting for you, given your interest in space, though, having John Young talk to you on the phone.

COLLINS: Right. I'd been interested in space pretty much as an amateur since I was probably about 21 years old. I started getting interested in astronomy, which I did not study in school. I was interested in human spaceflight since fourth grade. I had wanted to be an astronaut since fourth grade. But I really started getting a true intellectual interest in astronomy at about age 21, and about age 22 I bought a telescope. At the time I was living in Oklahoma, where there are dark skies. I lived on the edge of a wheat field, so there was plenty of opportunity to put the telescope out and really learn about the constellations, the stars, and the planets. I read a lot about cosmology. Back then I think the huge interest I had in my early 20s was because I had no schooling in astronomy. I was a double major in college, so I spent all of my semesters studying required courses and didn't really have much of a chance to study astronomy.

But yes, I did have, and I still do have a huge interest in space. I think now that I'm older, looking at books on the shelf here, I'm very interested in space history, human spaceflight history, which parallels my life. I was born at the end of 1956. NASA I believe was established

in 1958 if I remember correctly. My life parallels space history, and I hope I'm blessed with a long life so I can tell these stories in the future.

ROSS-NAZZAL: You'll have to write your autobiography.

COLLINS: No time.

ROSS-NAZZAL: I did want to ask if you could compare and contrast your reception—of course you were one of the first female pilots in the Air Force as well—at the Air Force with the reception you received here at Johnson when you came.

COLLINS: There was a huge difference. I think a lot of it had to do with the timing, and a lot of it had to do with the history of the organization and the culture of the organization I was going into. I was in the first class of women pilots at Vance Air Force Base in Enid, Oklahoma, and we started in August of 1978. The class actually started in September of '78, but there were four women. Back then every class had 40 students, so we were four women in a class of 40. There were over 500 pilots on the base, other instructors, other classes, but we were the first class of women at this base.

A footnote here—there were several classes of women who had already gone through pilot training at Williams Air Force Base in Phoenix, Arizona. I think they had at least two classes. Columbus Air Force Base in Mississippi had at least one class. Stephanie Wells was an instructor there, and she was a T-38 instructor pilot out at Ellington [Field, Houston, Texas] for

many years. She'd be a good one to interview, if you want that side. In fact she's the only woman that I am aware of that flew as a pilot out at Ellington: Stephanie Wells.

ROSS-NAZZAL: She sounds interesting.

COLLINS: Going into Vance Air Force Base in 1978, a place that had been training pilots since 1944, there's a culture there that didn't really understand women. There's many stories. I actually have a speech that begins with 10 minutes' worth of funny stories at Enid, which I know is not what we're doing here. But I'll tell you one of them.

I wore a green flight suit walking into the commissary. They'd never seen a woman in a flight suit, and we were very self-conscious walking around on the base. I'm checking out, and I knew that there was some resistance to women coming into pilot training. Most of the men were very accepting of us, but there were some men that just were old school and didn't want the women there. I don't fault them for that. It takes a little bit to change people.

As I checked out, the lady behind the cash register said to me, "The wives don't want you here." I was surprised, because I thought some of the men don't want us here, but the wives don't want us here either? That bothered me.

I said, "Why?"

She said, "They don't want you going cross country with their husbands."

I said, "Thank you for telling me that." I decided I was going to get to know the wives. It was important for me to let people know that I was there to be a pilot, and I wanted to be the best pilot I could be. I wasn't trying to steal anybody's husband. I wasn't looking for a boyfriend. People wonder what your motives are. I wanted to fly.

I did get to know the wives. Our first class party, the majority of the men in our class were recently married, right out of college, right out of the Air Force Academy. I go to this party. There were four girls in my class. The other three didn't go, so I was there by myself. I walked into the party. All the guys were on one side of the room talking about the T-37 and the boldface and procedures and what the tests are like and what flying is like and what the instructors are like, all the stuff I needed to know. All the wives were on the other side of the room talking about the curtains in their house, and the friends that they had—because it seemed like they all knew each other.

I didn't really fit in that group of wives. I needed to get over there with the guys. I remember standing there, and I went over to the wives. I spent the whole party with them, trying to get to know them. Then there were the instructors' wives.

I was so mad at my female classmates that didn't go to the party. Why didn't you come to this party? So I think by the time we all graduated, I think it was understood that we were there to learn how to fly. Of the four of us, one of them washed out (did not graduate), one washed back (delayed) to another-class. The other gal flunked all six of her check rides. I did okay. I wasn't the top graduate in my class. I did okay; the point here is that no one was giving the women any special treatment! It was hard for the women. I'm not faulting any of them. The classes at Williams, there were some mistakes made there with the first class of women. The Air Force higher-ups said, "Every one of them," there were 10, "will graduate, period. Make them graduate, and make them graduate on time."

A couple of these girls struggled. If they were guys, they probably would have washed out. The Air Force pushed all 10 of them through, and that was a mistake, because it doesn't

help the women to have a second standard. Lesson learned by the time my class went through, although we were at a different base, we were set to the same standard as the men.

I think it was very fair, and that was good, and I think by the time we graduated, we were accepted. But it was a very difficult year. I say we were accepted. It wasn't really that important to me to be accepted into the culture. It was important for me to graduate and become a pilot.

But for many of the women it was difficult. Contrast that with NASA, I came to NASA Johnson Space Center in 1990 and fit right in. I cannot even think of one story where there was any discrimination, rude comments, a feeling that because I'm a woman people would set a different standard or expect something different. I credit that to the women who were flight controllers and engineers. I credit the women who were mission specialists before me. They came into Johnson Space Center and did a fabulous job, and so my experience was smooth. We, the following groups to include women, were able to focus on the mission.

I was very pleased. The other comment in that area is the history of NASA--it's a very relatively young organization compared to the military. There wasn't quite as much of the cultural attitude, "This is the way it is here," I think. What are we talking about--NASA was established in 1958? That does seem like there is some history there. But it wasn't quite as ingrained as it was in the Air Force. NASA was very nice, very easy. I have no complaints.

ROSS-NAZZAL: That's interesting.

COLLINS: You may have heard stories from the other women, but let me say after being in the Air Force, I was hardened to it. I think a lot of it bounced off of me, and I laughed. There might

have been a little comment here or there that another woman might have taken as insulting. I would try to bring some humor into a situation if I thought maybe somebody's making a comment. I just made sure that people knew that I was there because I wanted this mission to succeed. All this little social stuff, hey, it's really not all that important. The important thing is that the mission is safe and successful. I found if you focus on a safe mission, successful mission, then the team that you're working with will come to respect you without you having to say anything about it directly.

ROSS-NAZZAL: Did you get a chance when you were at Vance Air Force Base to meet any of the women who'd been selected in '78? You were both there around the same time.

COLLINS: I did not meet any of them, but they were there when I was there. In fact they came in to do the parachute training in the altitude chamber in the summer/fall timeframe of 1978. They were in the local papers. They were in the local news. I heard about them, read about them, but I didn't cross paths with them. That was when the reality hit me that I could apply to this program someday.

I knew back then that I wanted to be a Shuttle pilot. I thought we would have had many women Shuttle pilots before me, because I was only 21 years old when I crossed paths with the women. Sorry I didn't get a chance to meet them at that time. I eventually got to meet them. I don't know if you really have to meet somebody to be inspired by them. Just the fact that I knew they were out there doing what they were doing was all I needed.

ROSS-NAZZAL: When you came into the office, I understand that sometimes women threw a reception for some of the other women astronauts. Was that your experience when you came?

COLLINS: Yes. We did have a reception. I don't have any outstanding memories of anything that was said. I was happy to know that we were very welcome, and I do remember people being very busy, because we were flying missions quite routinely back then. I came in the summer of 1990, and we didn't have much time with the women who were already in the office, because we were Ascans [Astronaut candidates] and I think we started out with a lot of trips, survival training, a lot of things early on. But I felt very welcomed by the women that were already there.

ROSS-NAZZAL: I read something that I thought was interesting I wanted to ask you about. Your class was called the Hairballs. I understand that you also had a nickname of "Mom." I was curious how that nickname stuck.

COLLINS: I think I got the nickname—I remember Jeff [Peter J. K.] Wisoff, who was in my class, was walking down the stairs, and it was raining out. He was getting ready to leave the building. I said, "Jeff, where's your umbrella?" I said something else and then, "Well, drive careful." I just made some comment to him.

He's like "Okay, Mom." I would occasionally make comments to people. "Eat healthy or wear your seatbelt." I wasn't even a mother at the time. They started calling me Mom with this long drawn out accent. Jeff Wisoff, Leroy Chiao and Charlie [Charles J.] Precourt were the three that called me Mom all the time, and Rich [Michael R.] Clifford. We called them the BABAs, the Bad Attitude Boy Astronauts.

Time went on, and we did several training events together and field trips together, and they started calling us the WAWAs, the Whining Association of Women Astronauts. It was all in fun. We'd pick on each other and have a good time. You only can be in training so long. When you take test pilots and engineers and doctors and put them in a training class together, after a while we all wanted to go to work. We wanted real jobs. It gets pretty tough being in training with a group for a long period of time, when you want to get to work and start doing something substantial and making a contribution versus sitting in a classroom and going on field trips. We had our fun. I don't know what to say about the Hairballs. You could probably interview Susan [J.] Helms. She's a three-star general in the Air Force now, just a wonderful success. I'm really happy for her.

I don't even know if you care about this, but she was one of the people behind the name. We wanted to name the class—because we were Group 13—some of us wanted to call the class the Black Cats. We made up a patch with a black cat on it, and the number 13, which is unlucky. You think of what's unlucky, the number 13 we began with, and then we went to the black cat. Kathy [Kathryn D.] Sullivan told us that there once was an STS-13 which didn't fly that way because NASA changed the flight numbering system. But the STS-13 mission put a black cat on their patch and apparently it was not approved. I don't know if it went to [NASA] Headquarters [Washington, DC] or if it didn't get beyond Johnson Space Center. You could ask somebody else, but apparently it wasn't approved. She told us, "Don't even bother; it's not going to be approved."

Our class made two patches. We had the black cat patch with the Hairballs on it, and then we had the official patch that had the Earth, the Moon and Mars on it. That's all I'm going to say about the Hairballs.

ROSS-NAZZAL: Not a problem. You were assigned to be the first pilot for a Shuttle-Mir mission, which was a rendezvous mission to the Space Station Mir. Can you talk about being selected for that mission and what it meant to you?

COLLINS: It meant a lot. That doesn't do it justice. Obviously getting called into the boss's office and told you're assigned to a flight, and this is the flight is a pretty exciting time. Jim [James D.] Wetherbee, the commander, I was very fortunate to fly with him. He had a great reputation, very knowledgeable on Shuttle systems and Shuttle flying. He was an experienced commander.

Mike [C. Michael] Foale, Bernard [A.] Harris, Janice [E.] Voss, and Vladimir [Georgievich] Titov, who was one of the first two Russians to fly on the Shuttle, made up the remaining crew. Titov came to the United States in 1993 to train, and he ended up assigned to our flight. He had very little English initially but he picked up the language very very fast for an adult.

The six of us trained, and we had a very long delay. We were assigned in September of '93. Within a couple of weeks, the flight delayed. I don't remember all the dates, but I think we were scheduled to fly in May of '94, so we had only seven months to train for this flight when we were assigned to it. Management told us that it was probably going to be delayed, but to go ahead and start training. We did. The flight delayed nine months to January of 1995. It was very hard for a first time astronaut to see their flight get delayed nine months. We hopped over five other missions.

The mission stayed scheduled for January of '95. We ended up with a little delay, and we launched in February of '95. I just kept focusing on my mission and learned as much as I could about the Shuttle. We all know that what we know could save our lives someday, so you want to know the systems; you want to be able to run the procedures correctly, quickly, understand why you're doing each step.

I memorized several time-critical procedures that were ascent-related. For example main propulsion system helium leak, APU [auxiliary power unit] shutdown, fuel cell shutdown, and what was the other one? Bus tie possibly, but I memorized four procedures. You don't run the procedures by memory, but if you have them memorized, it's much easier to read the checklist and work quickly and efficiently through it. That's what I did for the long delay period, and it worked.

I was a little bit rusty when I started training. I felt that my simulator ability was very rusty, because I had been down at Kennedy Space Center [Florida, KSC] for over a year, maybe 15 months, as an astronaut support person, so I had been out of the sim [simulator] for a long period of time. I came back here and I was very rusty in the sim. I was slow. This is not me. I'm going to get back up to speed. That's what I did for the next 16 months. That's what all pilots do, just training on the systems and get ready for the first flight.

We were the first Americans to see Mir. We pretty much—I want to say we, but the community and the team developed the rendezvous procedures with Mir, which was huge – how we were going to do not only all the programmed burns from a distance, but how we were going to hand-fly it once we got within 1,000 feet. Jim Wetherbee did the hand-flying, but I backed him up and I also trained for that.

We started using these laptop computers; 386s is what we called them. The 386, I think it might have been IBM. I can't remember who made it. The software was very primitive, but it was enough to tell us what our closure rate was and the distance.

We were able to feed the radar data, which also had range and range rate, into that laptop computer to give us a prediction of where we were going to be in the future if we do a certain burn. It was very helpful in saving us gas. That's what I remember as one of the most substantial things that we did on the mission: develop the Mir rendezvous procedures.

Obviously we'd been doing rendezvous with the Shuttle and satellites for many years. But this is the first time we were 100 tons rendezvousing with another 100-ton spacecraft. We were concerned with how the navigation system is going to work, how the flying qualities of the Shuttle are going to be when we're close to a space station that has solar arrays, how the communication system is going to work with the Russian system on the Mir Space Station.

Another very interesting story is how we negotiated with the Russians. This was back in the early days. I don't remember the name of the Russian flight director. It was Viktor—.

WRIGHT: Blagov?

COLLINS: Viktor Blagov. Very good. It was the summer of '94. Sometime in the summer of '94, our whole crew went over to Russia and did quite a bit of training. Most of it was getting to know the Russians, working with them, developing trust for each other. I was the right-hand person to Jim Wetherbee. We went into the mission control in Star City [Russia]. We met Viktor Blagov, and we started speaking to him through an interpreter about how we were going to do this rendezvous.

At that point in time, we were only approved to go to 1,000 feet of Mir, and we believed that that wasn't close enough to get the kind of data that we needed. We thought certainly we can go in closer than 1,000 feet. How about 300 feet? Of course Viktor Blagov, who was a very good negotiator, speaking fast Russian, he was speaking too fast for me to understand him, but the interpreter was doing her best.

We had to justify to him why it was safe for us to go in to 300 feet. We had some engineers with us. Obviously we weren't making any decisions there, but it was important for us to build a relationship where he could trust what we were saying.

They eventually agreed to let us go in to 300 feet, not in that meeting but at some point in the future, at which point we thought, "Why should we stop at 300 feet? Why don't we go to 100 feet?" We're not in Russia anymore; we're back here and worked the system. Jim Wetherbee was really the leader in all this, so I credit him. I was more of an observer as a pilot, supporting him. We got both the Russians and the American leadership to agree to 100 feet.

Then we thought, "Why should we stop at 100 feet? Why don't we just go to 30 feet?" I don't remember where all these numbers came from, but there was a rationale behind all the numbers. Mike Foale might remember that. Very close to the mission, we were approved to go to 30 feet. That was close enough for us. Two interesting things I can tell you about the rendezvous to within 30 feet.

The first one was on launch day right after main engine cutoff, we had three jets fail. I forgot the type of failure of the other two, but the third jet was R1 upper. It was failed leak, and it really was a leak. These failures happened at main engine cutoff. The master alarms are going off, and that's where your training kicks in.

We looked out the window after everyone had gotten out of their seat, and we could see R1 upper leaking. If you look out the back window, right at the payload bay, that jet was leaking straight up away from the payload bay, right in the same direction that Mir was going to be on our rendezvous. It's spewing all this oxidizer. We just thought they're never going to let us do that rendezvous to 30 feet, because it's going to contaminate Mir's solar arrays, which would affect their power.

Mike Foale got on the radio and said "It looks like a geyser." I thought, "Oh, they're never going to let us rendezvous." Sure enough, the rendezvous was temporarily at least canceled. It was scheduled for flight day four.

We eventually did it on flight day four, because over the next couple of days we ran these procedures called a staged repress. We turned the Shuttle toward the Sun. Maybe the Sun could bake it out. We did several little tricks that the guys at Mission Control [Houston] came up with, and we finally got the leak down to almost nothing, and they let us do the rendezvous.

The second story I'll tell you about the rendezvous. You can pull the pictures. We used film back in those days, and Bernard Harris was taking the pictures. He got this amazing picture of Valeri Polyakov in the window of Mir. Mir was actually in a different attitude when we went in, because we weren't docking, so we got to see their big window, and Polyakov was in the window. Elena Kondakova was up there. They had a little puppet up there that they had in the window.

We were talking to them on the radio. Bernard Harris was down in the Spacehab, got this amazing picture of Polyakov in the window with the Sun at this angle where it just lit up his face. It made the cover of *Aviation Week*. Usually they say credit NASA. This said credit Bernard Harris. You can pull it. It's February of '95 or March of '95.

After the mission I went into the photo lab, and I'm like, "Let's take a look at these pictures." There were a bunch of out of focus pictures, then this beautiful picture of Polyakov and Mir. He got that one picture, and it was lucky that he got it. He obviously knew what he was doing. He got a great picture, but we almost didn't get that. That was a pretty amazing time, very, I would say—not coming up with the word.

ROSS-NAZZAL: Momentous?

COLLINS: Yeah, that's true. That wasn't the word I was looking for, but I agree with it. I agree with what you're saying, because it was very successful. That's not the word, but a very successful time. While we were at 30 feet, Jim Wetherbee had written on a piece of paper, handwritten while in quarantine before the flight, the speech he was going to make while we were at 30 feet. It was something like we are coming together as our nations are coming together. Mike Foale and I are like, "Stop reading that message and fly!"

Mike Foale is yelling, "We're getting too close. We're at 29 feet." Mike Foale had previously calculated two masses are going to attract each other if there's no other force working. Mike Foale said, "If we don't be careful we're going to dock." We wouldn't have docked because we didn't have the attitude or hardware. We didn't even have a docking mechanism on our Space Shuttle (*Discovery*) that we were flying. But there were a lot of jokes around that, Newton's law of universal gravitation—gravitational constant times the two masses divided by the radii between the two gives you the force of attraction. All that was worked out, and we had a good time with it.

That was a joke by the way, the part about we're going to dock if we don't pay attention here. Jim Wetherbee is reading this speech. We had a good time. It was all in fun. Obviously we knew what we were doing was a pretty big deal, not just the technical part of it but the part about two nations that were enemies during the Cold War now working together. We knew what we were doing at the time, but I don't think the significance of it really comes to your mind until many years have gone by and you think back.

My second mission, my commander was Charlie Precourt, who used to fly F-15s in Germany. The commander of Mir was Vasili Tsibliev, and Charlie and Vasili, in one of their conversations, realized that they were stationed on opposite sides of Germany back in the '80s. Potential enemies, and now they're flying in space together. As the years go by, we look back at that. I just think it's just a huge transition in our relations with former Soviet Union, now Russia, and seeing all these changes take place. I think we worked very well together.

At the worker bee level, astronauts, flight directors, engineers, we did very well. In hindsight, I think we did very well, considering the potential conflicts. We really learned to work together. I think NASA and the Russian Space Agency have a lot to be proud of, that they really got with the program and followed the nations' direction for us to get together and work in space. It's been good for us. I don't even remember what your question was. I imagine I'm getting off the subject.

ROSS-NAZZAL: No, no, like I said, this is the way oral history works, you start talking to someone, and things just progress.

I did want to ask you, since you were the first female Shuttle commander, about the fact that you were going to be getting all this publicity. The announcement was made at the White

House. It was a big deal. [First Lady] Hillary [Rodham] Clinton made this announcement. Sally [K.] Ride was at the event.

COLLINS: She was.

ROSS-NAZZAL: Can you talk about being named? Did anyone at NASA talk to you about the ramifications of all this?

COLLINS: It was the spring of 1998, late February, early March. Jim Wetherbee was the Chief of Flight Crew Operations [Directorate], FCOD. He called me up and told me, "You are going to be assigned to STS-93. You're going to be the first woman commander. We have total confidence in you." The stuff that they always say. George [W. S.] Abbey was the Center Director at the time. He said, "Let's go up and talk to Mr. Abbey. He'd like to say a few words to you before you go up to Washington."

We went up to the ninth floor. We sat around the table. There was a fourth person there. Right now I'm just not remembering who it was. We had a nice talk, and I frankly don't have a lot of memories of the details or the exact words that were said, but it was about the mission and about going up to the White House. It was all really positive.

I had to prepare a couple of remarks, which I did, and headed up there. Bill Clinton was the President, and Hillary Clinton was the First Lady at the time. My husband went with me, and I have a cousin that lived there, so I invited my cousin Mary Kay Morin, because they said, "Invite any relatives." She was all excited to meet the President. We go into the Oval Office, and there were several people in there: [NASA Administrator] Dan [Daniel S.] Goldin, and a

few other managers from NASA. We met President Clinton, and he shook hands with all of us, and then he started talking about Stephen Hawking [theoretical physicist]. For the next 10 minutes he talked about Stephen Hawking, because he had just met him recently, and he was just amazed by Stephen Hawking.

Then okay, it's time for us to go across the hallway. You got the Oval Office, and then there's a hallway. Oh, by the way, before I went into the Oval Office, I met Sally Ride in the hallway. That was the first time I met her. I didn't even know she was going to be there. Wow, Sally Ride! We had talked on the phone several times before that, but we had never met. I never asked her why she was there. I thought, "Did she come up here just for me, or is she up here on other business?"

It was great to meet her. She was very supportive, and she talked about all the media stuff, and, "Hey, if you ever want any help with that, give me a call. You're not going to have any problem, but you'll get through it," kind of advice.

Fast-forward to we met the President. We crossed into the hallway between the Oval Office and the Roosevelt Room, and I was fine up to this point. But I looked into the Roosevelt Room, and I saw Sam Donaldson [ABC News anchor] in there and all these cameras in the back, all these people, and the room was completely packed. Really I think for the second time in my life, I had this panicked feeling, which I never get. The other time was when there was some creep trying to break into the house, but that was when I was 13. I got that same, "What am I going to do now," sweat, just looking in that room.

My husband was with me, and the President was with me, and Mrs. Clinton was with me, and I got this what am I going to do now feeling. I recovered from it rather quickly. I just said,

“Eileen, just be the woman commander. That’s a different person. Just go into that role. You’ll be out of it before you know it. Just do your speech.”

I actually had a speech prepared. We walked in, and the President talked, the First Lady talked. There were a couple of other speeches. I can’t remember if Dan Goldin talked or not. I went up and gave my little spiel. Sally Ride was in the front row. There were several people there that I recognized, but a lot of it was just a blur.

Eileen Hawley had helped me. If you remember, she was with public affairs here. She was wonderful. Her husband was on the flight, Steve [Steven A.] Hawley. She had helped me a little bit with the speech. She didn’t write it for me but she said, “You need to have a theme, something that people can grab on to, relate to.”

We came up with it was a dream. I started my speech with it was just a dream that I had, and now dreams do come true. That was the theme of my speech. We thought it would be important to inspire young people to not just be an astronaut someday but to study math and science and set their goals high. Set it above what you think you can do. I was hoping that was the message I would get across. That day I thought I just want to give this speech and get out of here and get back to Johnson Space Center and start training for a mission that I was really really excited about.

At the time at least, I didn’t consider myself much of a smooth operator with public media type things. I did feel like my talents were flying, and even running procedures, and analyzing failures, and trying to figure out how to get a system working again, or if you got a lot of failures what order do you work them in. This logic, a big puzzle, that’s what I like doing. I didn’t really care for the media stuff that much.

I got back into training. Steve Hawley, Cady [Catherine G.] Coleman, Michel Tognini, and Jeff [Jeffrey S.] Ashby, the five of us, we really nurtured a great team. Fabulous training team led by Lisa [M.] Reed. Fabulous flight control team, all of Mission Control. The payload officer was David [A.] Brady. The flight director was Bryan [P.] Austin. We still keep in touch. We really developed a great team.

The Chandra X-ray Observatory was AXAF, the Advanced X-ray Astrophysics Facility. It was named Chandra through a contest, I believe, with schools. People would put in their ideas, and it was named after [Subrahmanyan] Chandrasekhar, an Indian astrophysicist who had been up at University of Chicago [Illinois]. We got to learn a lot about him, and we met the teams that built the telescope. It was just a dream mission.

It wasn't the rendezvous [International] Space Station build, which was the focus at the time, but it was such an important mission really to the science community and to NASA that we just put all of our heart and soul into it. There were a lot of delays. NASA had had the problem with the Hubble Space Telescope, which we didn't discover in 1990 till it was deployed. We were not going to allow that to happen to Chandra, so a lot of little delays at the end to fix things, do more testing, get the end-to-end testing very thoroughly completed.

We did a lot of work with the Chandra Control Center, which is up near Boston [Massachusetts]. We traveled up there. We traveled all over, to the factories. Chandra was built by TRW, so we made several trips to southern California. It was just a really great experience. I think the fact that that mission had the first woman commander on it was—I don't know if that really made that much difference to me, because I wanted our mission to be safe and successful.

We had this woman commander thing going on, which to me—it was a sidenote. This is important to say. Our day-to-day operations, we were a team. Man or woman, who cares what

you look like, what race you are, what age you are, whether you're man or woman, it was all about getting that observatory deployed. I'm pausing here because I want to get the words right. It was all about safely deploying the observatory and successfully deploying it. I didn't even mention we had an IUS, which is an inertial upper stage built by Boeing. That was a whole other part of training that we had to go through with its own issues.

As we got close to the launch, there was a lot of this, "Time for you to go talk to the media." We very much controlled the timing on that, so I really don't have any stories or any things to say, other than we did the standard crew press conference. We did the standard commander interviews, interviews with commander and pilot. I think we had a bigger turnout because people were curious as to what is the woman commander like. The media folks that normally cover space knew me, people like Todd Halvorson, those folks knew me. But there was a whole new group of media people that came in that just didn't know that much about space, and they wanted to know if I was Danica Patrick [auto racing driver], or am I like James Bond, or what is she like. I think they learned that I'm just a normal person.

I really learned, when it came to talking with the media, that I can't shy away from them, because I was a spokesperson for the space program, and that is a responsibility that the astronauts have. Shying away from that or walking away from the media was walking away from my responsibility. I worked at speaking with the media. How did I do that? I learned their names. I learned who they worked for. I was never intimidated by them. I saw them as people. The American people, people around the world want to learn about the space program. Yes, they asked silly questions. I never belittled them for asking silly questions. I would tell myself that they are projecting themselves into what the American people want to know about a woman

commander, the Space Shuttle, the Chandra Observatory, what it's like to be in space. I respected all the questions that they asked, and I thought that was very important.

I didn't run away from them or shy away from them, which is what I did earlier in my career. When I was in the Air Force, I shied away from the media because I thought it really irritated the guys that I worked with, and it did. It irritated them for several reasons. They thought it was a distraction to them. They thought the women got special attention. Some of them were jealous of the women for getting their names in the paper, whatever. They all had different reasons.

It wasn't like that here at NASA. I thought the astronauts were very much a family. One time I was misquoted. It was rare for me to be misquoted. Back in the Air Force I was misquoted all the time. I couldn't believe it. But here at NASA I was just very very surprised that I was rarely misquoted.

One time I was, and I mentioned it to one of the other women, it might have been Ellen [S.] Baker or Marsha [S.] Ivins, somebody from the class of '84. They said to me, "Oh, well, all of us here in the Astronaut Office know that we never get misquoted," sarcastically. I realized that there was a lot of empathy for other astronauts. I finally learned that when you read something in the paper that someone said, it's not always what they really said. That was good because I felt like I was much more accepted by my peers at NASA in the Astronaut Office. I was accepted by my peers despite the fact that there was this flood of attention. Who really wants it? But some people want publicity for themselves. Interesting. Some people don't want it. I always believed that there's a balance.

The reason we need to be out there is not for personal reasons, but we need to be out there promoting the mission, why it is so important for a country like the United States, a very

strong leader in the world, to continue being the leader in space exploration, particularly human exploration. It's very important that we continue to do that. I thought that as a Shuttle commander, that was a sounding board for me to get that message out. That was a big responsibility. I really stopped shying away from any media.

The other thing that changed me while I was assigned to the STS-93 flight was a trip to Kennedy Space Center where I was walking through one of the work areas with my crew, and a woman came up to me and said, "Thank you for doing what you're doing. Because of you, we are more respected by the guys down here." Pow! I never saw it that way. I still remember her saying that, and how important it was for me to hear that, because that was another experience I had that made me realize that I had a responsibility to get out there and talk about human spaceflight.

I'm not perfect at it. I've made my share of mistakes, but I was very grateful that we had the media coverage that was there. I would deflect it from myself. The "non-space" media asked silly questions. I tried to respectfully answer the question but then tag onto that silly question something about the Chandra Observatory or something about some of the secondary experiments that we were doing on the flight that were very interesting.

ROSS-NAZZAL: I have to ask. What were some of the silly questions that they asked you about being a female commander?

COLLINS: I don't remember. Things that don't make any sense to me, I just don't really remember them very well. It's funny. When I hear people having little fights and little spats and disagreements, I never seem to remember that stuff very well, because it just doesn't make any

sense. I'm very good at remembering numbers, because I'm either right-brained or left-brained, I don't know which one it is. I'm very good at remembering concrete very objective things.

What are some of the questions? There was a reporter that asked Jeff Ashby an embarrassing question in the crew press conference. It was something about, "You have two women on the mission, and how are you going to get them out of the bathroom so you can use the bathroom." You can look it up. It was some silly question. I don't remember exactly what it was. Jeff made a joke about it. We laughed at it.

When the press conference was over, this woman reporter—she's a good reporter, but she came up to me, and said, "Why do you put up with that? That is very demeaning." She asked me this in the hallway.

I was very surprised. I said, "You just got to laugh at some of this stuff once in a while because there's a lot of stress in this job. I just want to keep my energy focused where it needs to be." But out of respect for her, I had to try to understand her position. Maybe what had transpired was bad for the image of women. Maybe, possibly, I didn't really see it that way. I tried to learn from that.

I talked to Jeff about it. We laughed about it. We both agreed that we shouldn't do that again in the future, make a joke like that in a crew press conference. I'd have to go back. I've got the tapes of all the press conferences. I never look at them, but it was some joke. I've always laughed at Jeff's jokes. I had to realize that maybe there'd be people that were offended by that.

I really don't remember a lot of the questions. You're going to probably talk to me about [STS-]114, but STS-93 to STS-114, when it came to the media, totally different, totally different. STS-93 was a lot of what's it like to be a woman in space, what's it like to be a woman

commander, all the woman commander questions, which were very low intensity silly questions. [STS-]114, there was none of that. It was all about safety, because we were the first flight after the accident [STS-107, Space Shuttle *Columbia*]. It was all very serious, no kidding, are we going to fly the Shuttle again ever, and how are we going to fix these problems.

I needed to speak technically but not too technically. After the accident, Kent [V.] Rominger, who was the Chief of the Astronaut Office, asked me if I would be a spokesperson for the office with the media. He had picked about five people to do that, and I was one of them. Bob [Robert L.] Curbeam was another. There was a group of us that were representing different sections in the office, like commander, pilot, EVA [extravehicular activity], robotics, safety. We were a diverse group that went out.

I did months and months and months of media after the accident, and then again, when the Return to Flight mission flew, we did much much more media than I had ever done. That was when I felt we had a strong responsibility to talk about it because of the seriousness of the accident and getting the Shuttle flying again.

I actually enjoyed that a lot more than the STS-93 media, because it was important that we do that. I'm getting ahead of myself here.

ROSS-NAZZAL: When did you know that you were going to be the Return to Flight commander? You obviously were going to fly before *Columbia* occurred. But at what point did someone in the office or FCOD approach you?

COLLINS: I don't remember. I was assigned to 114 back in 2001—it was supposed to fly in 2003. I was assigned I think sometime in 2001. Four Shuttle crew members, three Space Station

crew members going up, and three Space Station crew members coming down. The accident happened in February of '03, and Headquarters told us to continue training. But I couldn't, because my Space Station crew was sent to Russia for a Soyuz launch, and there were four Shuttle crew members left, and two of them were CACOs, casualty assistance calls officers. Jim [James M.] Kelly was assigned to Laurel [Blair Salton] Clark's family. This was all previous. They had agreed to do this before the flight. Then they were called up when the accident happened. Steve [Stephen K.] Robinson was assigned to Mike [Michael P.] Anderson's family, so I lost both of them.

It was myself and Soichi Noguchi, and we couldn't do much training. I worked the Return to Flight; I did mostly media stuff. I was pretty much on my own. I was a free spirit in that postaccident time period and went up and helped out up there in East Texas doing the search. That's a whole other story. I won't go into that.

We traveled to a lot of factories. I went to the ET [external tank] factory, went down to KSC, went out to the main engine shop out there, and Rocketdyne out there in California. I went up to Utah where they make the boosters. I did a lot of traveling around and factory visits and PR [Public Relations]. Somewhere in there, I was asked to stay on. I don't remember.

ROSS-NAZZAL: Was there a lot of competition for that flight? Did a lot of people want to command it?

COLLINS: I don't know. I don't know. I would say the best person to talk to would be Kent Rominger. He was the chief of the office. It was different after *Challenger* because all the crews were deassigned after *Challenger*. I wasn't here. That's just what I was told. They were all

deassigned. Then as they went through the Return to Flight period they reassigned crews. Rick [Frederick H.] Hauck's crew was Return to Flight [STS-26] after *Challenger*. His crew was actually put together from scratch after the *Challenger* accident. My crew, the original four Shuttle astronauts stayed on. There really wasn't a reason to break us up. But the mission was changed from a crew exchange to just a Shuttle test flight about a year after the accident. Was it a year? No, it was October of '03.

At that point we were assigned. Andy [Andrew S. W.] Thomas, Wendy [B.] Lawrence and Charlie [Charles J.] Camarda. I actually worked with Kent Rominger in getting those crew members assigned to the flight. It was his decision. He had pretty much selected the available crew members and who was skilled, had the training to do the robotics and the space walks and the other tasks that needed to be done.

We really picked our crew members based on the skills that they had and their availability. As far as any talk about changing the four original, if there was any talk about changing—I'm sure there was, there should have been—I was not involved in that. But I would think that they should have discussed it because hey, is this crew the four that we're going to fly after almost a completely different mission pre-accident, now we've got this Return to Flight mission, are they the right people?

We were all kept on the flight, so I can't really answer that question for you. Kent Rominger is probably the right person to talk to, and anybody else in the chain of command above that would have been.

ROSS-NAZZAL: You mentioned you did a lot of media for NASA after the accident. One of the things that I remember from that time period is a poster of you and your daughter and something like are we ready to go safely or something like that. Was that your idea?

COLLINS: That poster was made in 1999 right after the Chandra flight.

ROSS-NAZZAL: Oh, I didn't realize it was that old.

COLLINS: Yes, and my daughter was three and a half in that picture. She's 17 now. In fact I saw that poster this morning. I was at her old school dropping off some things. They've still got the poster hanging up in the school lobby. They're really proud of the fact that the little toddler in a poster attended school there for 11 years. It's a side thought.

The way that poster happened, I was in the postflight period from STS-93. It would have been the fall of 1999. I got a phone call from a woman out in California. Gosh, it used to be Rockwell. Then I don't know what company it was, but it used to be Rockwell. She called me up and said, "Your poster is great, I love it," and started telling me all about the poster.

"What are you talking about?" I had no idea.

She e-mailed me a picture of it. I looked at it, and I was shocked. I never would have given permission for my daughter to be on a poster, ever. I would use my image, because that's NASA, public information, but I never would have agreed to my daughter on a poster. But it was too late because they were already in print. I can't imagine I would have ever approved it. In hindsight I'm glad they did it, because it turned out to be pretty popular. I found it hanging up in many offices at Kennedy Space Center, and I think it adds really a human side to the

astronauts. For the people that actually work on the Shuttle, I think it's good for them to see that the astronauts have families. It was just a cute poster.

The picture was taken after I landed from the Chandra mission. It was the morning after landing day. We landed at Kennedy Space Center, by the way. I was getting on the Gulfstream II Shuttle training aircraft to fly from Kennedy Space Center back home to Johnson Space Center. I can't remember who the photographer was, but I was walking up the stairs with my daughter on my hip, and he said, "Turn around," and took a picture of me. That was it. That's the story behind it. It's a long story behind the poster.

ROSS-NAZZAL: I love that poster, so I was always curious about that.

COLLINS: They did three of them. Don [Donald A.] Thomas and his son, and Greg [Gregory J.] Harbaugh and his child.

ROSS-NAZZAL: I've never seen those other two. I've only seen yours. I thought it was a Return to Flight effort.

COLLINS: It was 1999 poster, and it's still out there. I don't even look like that anymore.

WRIGHT: She doesn't either.

COLLINS: Oh my gosh, 14 years ago.

ROSS-NAZZAL: Long time. One of the changes that came about after *Columbia* was the fact that you had to do that [rendezvous] pitch maneuver for STS-114. You were the first person who got to fly that maneuver. Can you talk about training for that and what input you may have had in terms of developing that technique?

COLLINS: I could talk about it for quite some time, but maybe there's just two things I'll focus on. This is a tribute to the change in the culture at NASA after the accident. Part of the blame of the accident went to the NASA culture. An engineer in the rendezvous section came up with that idea. It was not my idea.

I was in a meeting over there in Building 1 when I first heard about it. I listened, and I was very interested in it. There was somebody in the meeting that said, "You can't do that because there's a flight rule that says the crew has to maintain visual contact with the Station inside of X number of miles." I don't remember the number. This pitch-around was supposed to happen at 600 feet. You're way inside of this flight rule limit.

Some people said, "You can't do it because of that."

But I remember thinking, "That is such a good idea. Why didn't anybody think of that before? In hindsight it makes so much sense. Why didn't I think of it?" I was a little bit brutal on myself. I asked myself, "Why don't you think out of the box like this guy does? People need to start thinking this way. It's very important that we start being more creative. It's important that we are more creative in the way we think."

We started talking about the idea. I liked it. Although I was skeptical at first, I liked it, and it was developed with crew input. It wasn't just my crew, but there were people in the Astronaut Office that were assigned to rendezvous, and they did a lot of the development work.

I thought it was very well done. They all deserve awards, I think. We as a crew were involved as much as we could be.

We looked at the procedures. They brought procedures to me that were in a draft form when I first saw it, so we helped make inputs. We flew in the dome sim over there, I think it was in Building 16. We made a couple tweaks here and there. The engineers would come over. We had flight controllers there. We had the instructors there. Just a classic test pilot type creativity and development, and final execution was so successful that they did it on every single flight after that to the Space Station.

The second thing I want to say about that is the actual maneuver itself, the actual pitch-around portion, is flown with the autopilot connected. We were pretty much just monitoring during the actual pitch-around. The difficult part about that maneuver was flying to the start point of the pitch-around. There are six degrees of freedom, which are your XYZ location, which are your up, down, your right, left, and your fore, aft. Then you had to hit a very specific spot in space 600 feet directly below the Space Station, not out of plane at all. You have to be exactly zero in the Y plane. Then you also had to have a very specific closure rate in the X direction, a specific closure rate in the fore-aft, and no movement in the Y plane. Not only in location, but no movement. So six degrees of freedom.

We had to hit all six of those, and it was difficult to do that. It was very difficult, and it was all hand-flown. Over the year or so that we practiced this, we had to figure it out, with the help of all the flight controllers of course. We give them credit because they dedicated every day five days a week to figuring out how to do this thing.

It was very difficult for the pilots to hit those parameters, but we learned how to do it, and it went outstanding on the flight. I flew it, yes, but Jim Kelly was running the checklist. Charlie

Camarda and Wendy Lawrence were running the laptop computer. Wendy had the handheld laser pointer. We had this laser in the payload bay that was feeding continuous data into the laptop computer, and we could look at that. It would tell us, "If you make this input in this direction then you're going to go this way." It has little predictors that will tell you where you're going to be in a minute, two minutes, three minutes. All of that made the maneuver very fuel-efficient, because you can fly it without the laptop computer, but having that makes it very fuel-efficient.

I think the point I'm trying to make here is the difficult task for the pilot was flying the rendezvous to the 600-foot point, meeting all six of those parameters, and when you engaged the autopilot you could go hands off, and it would fly the 360. All you had to do is monitor. When you came out of the 360, you see the Space Station. You would then take manual control and you would fly a quarter fly-around up to the V-bar. The V-bar is the plane that parallels the surface of the Earth. Everything was hand-flown from that point on. From the point that you came out of the RPM maneuver, rendezvous pitch-around maneuver, everything was hand-flown. But the flip itself was not hand-flown.

Is that important? Because people have asked me that question over and over again, I felt that maybe I should describe it here, because in the future someone's probably going to be interested.

ROSS-NAZZAL: Oh, absolutely.

COLLINS: Any difficult maneuver, if you train it enough and practice it enough, it becomes easy. I don't know if I'd ever say it was easy, but it was much much much easier by the time we flew

it on a real flight. I was extremely happy with the way all of it went. I wouldn't have changed any of it, including that first RPM maneuver. The Space Station astronauts photographed our heat shield during this 6 minute maneuver. The photos showed two protruding "gap fillers" between the tiles. We actually performed an emergency spacewalk on Flight Day 9, where Steve Robinson removed these gap fillers in an effort to prevent any damage to the orbiter on Entry Day. We were over Switzerland by the way. When the maneuver happened we were over Switzerland, I was told.

ROSS-NAZZAL: You were a little busy at that point.

COLLINS: I wasn't paying attention to where we were. There was land below us.

ROSS-NAZZAL: What was your most memorable event from that mission?

COLLINS: Actually I have to think about that for a minute. My most memorable event from that mission. There were so many of them, it's hard to just pick one. I would have to go with after wheelstop. We landed at Edwards [Air Force Base, California] just before sunrise. It was a nighttime landing. After wheelstop, we ran a few checklists. The Kennedy Space Center technicians approached the orbiter after all clear. I looked out the window and I saw them down there, and they were emotional. They waved at us. You could see the emotion in their face. They must have just felt great, getting the orbiter flying again.

Obviously we felt wonderful about it also, but it's a very intense time, the landing. You're just so focused on what you're doing, you don't really think about the big picture. But

once we were stopped and had much of the checklist completed, and I saw them, it hit me. Yeah, we did it. We're back flying again. So, maybe that's the most memorable.

Not to mention the fact that gravity is hugely overwhelming. We were up for 15 days, so after 15 days in space, you feel pretty bad. Physically you feel pretty bad. Your helmet is heavy, your suit is heavy, your parachute is heavy. You're down in your seat. You start readapting to Earth's gravity, so you're physically challenged at that time period too. It's pretty overwhelming. I drank a six-pack of Dr Pepper, and I ate something like three or four sandwiches.

ROSS-NAZZAL: Whoa!

COLLINS: Then they weighed me, and I still had lost weight on the mission.

ROSS-NAZZAL: Oh my goodness.

COLLINS: Not much though. I think I only lost a pound or two.

I knew I wasn't going to fly again. It was a little bit sad. Just before strapping in and doing the deorbit burn, I knew I was not going to be coming back. It's goodbye to space.

ROSS-NAZZAL: Rick Hauck has said of that moment, after he landed STS-26, that that was the proudest moment of his life. Would you agree with that?

COLLINS: You're going to relate to this. My children being born were the proudest moment. But I'm a woman, so I have a little different point of view. I'm sure Rick is very proud of his children.

We lost foam on our flight. I wasn't too happy about that. I don't know if you all remember. I am not faulting anybody for that in particular, because I personally agreed to not fixing the PAL ramp. The PAL ramp is the protuberance air loads, which is a ramp that runs down the starboard side of the fuel tank.

Go back six months after the accident. On one of our trips to Lockheed Martin Michoud [Assembly] Facility over there near New Orleans [Louisiana], we're crawling around on the tank. It was this particular tank, I think it was ET-120. It was in the horizontal. We were looking at where the foam fell off of *Columbia*. It turns out that some of the geometry is difficult, so the technicians hand-spray the foam. If it's a smooth area, it's automatically sprayed.

The automatically sprayed areas typically didn't separate on launch. But the parts that were hand-sprayed, which is the difficult geometry, are more likely to fall off, because of they're manually sprayed.

I remember looking at the PAL ramp, and I said to the technician, "What are we doing with this?" He explained. He had a bunch of technical things. I think I said, "Why don't we just take it off? Why do we need to fly with this PAL ramp?"

He explained we have to fly with the PAL ramp because of the way the airflow comes around the tank, the PAL ramp protects these high pressure fuel lines. If you don't have the PAL ramp to protect them, that high pressure could put the fuel lines into a flutter mode, and it could break apart, and you'd have a big boom.

Okay, I understand that. We talked about it a little bit longer. I talked about it a little bit with NASA management, and the decision was made not to remove the PAL ramp. I don't remember how much of it was manually sprayed and how much was auto-sprayed, but I agreed to fly with the PAL ramp.

So we launched with the PAL ramp, and foam fell off of it. It was seen on the video camera. The foam was about the same size as what had fallen off of *Columbia*. It went right underneath our right wing. It did not hit us.

While we were up in space we were informed of this as soon as they could inform us, as soon as they knew, they told us about it. We did the Sunday morning shows, *Face the Nation*, *Meet the Press*. Every single one of them asked us. I think the only reason they wanted to interview us was because foam fell off. We candidly and honestly answered the questions without being disrespectful, but we pretty much said, "This needs to be fixed." Obviously it needed to be fixed.

The Shuttle was grounded for another year. We flew in July of 2005, and the Shuttle didn't fly again till July of 2006. It was determined that we could launch the Shuttle without the PAL ramp. It was removed, and it never flew again. As far as I know, we never had any large foam losses after that.

I wasn't very proud of the fact that we lost foam on launch, so I can't honestly say it was the proudest moment of my life, because we had made some mistakes.

I think it's important to say this. One of the things I learned in the Return to Flight period and in my training is even the most intelligent people make mistakes. We developed a four-step process for dealing with mistakes. The first thing you do is you admit it. You acknowledge that you made a mistake. You don't have to be blatant about it. You just have to face it. The second

thing is you fix the mistake that you made. The third thing is you need to put a procedure or a policy or something in place to make sure it doesn't happen again to somebody else. The fourth thing is you move on, and you don't dwell on it, and you don't let it get in the way of your future decisions or your ability to do the mission. You just move on.

I like this. The reason I still remember it is that four-step process even applies to your daily life and your family and anything that you do. I've taught it to my children. I'm really trying to teach my children to grow up with a sense of humility. All these philosophies I have I learned in the postaccident period of how to be a really really good listener. Yes, passively, but also actively going out and seeking out ideas and what people think. Making decisions, the person running the program is the ultimate decision maker, and you live with that decision that you made, you've got to take your team members' opinions into account and let them know that you did.

Then the other thing I learned is not to be an intimidating type person where people are afraid to speak up around you because you're going to squash their idea. That type of thinking helps people be more creative, and they're more willing to come out with these ideas. All of that, although I knew it before, I truly learned it in the postaccident period. I think the way I approached commander for STS-114 was by changing my leadership style from STS-93 where I thought the commander makes the decision and we all follow. In 114 it was more of a team effort, I didn't feel like I had to prove that a woman commander can be a commander. There is a lot of that that goes on, I think, whether you're the first black person doing something or the first woman doing something. You feel like you have to prove yourself. There's a little more hands-on directing type of leadership style, for me in STS-93.

In 114 it was more collaborative. Some people might see that as weakness, but it's not, because in the end if it's your decision, make the decision, and you've got to live with it. You've got to be confident, and you have to let all the people that work with you know that I believe that this is the right decision, I am confident, and this is what we're doing.

But after you let everybody have their say, with respect, and not just squashing somebody's idea because oh, it wasn't my idea, and just not listening to them. You'll see that with some bosses that are insecure. You will see that attitude where I don't want to hear what anybody has to say. I don't have time for that. That's not good. You don't want that kind of leadership style in a risky business like the space program.

I'm getting off the subject here, but this is a whole separate talk. I share it with groups that are interested in learning the lessons learned from the *Columbia* accident. It's important I think that we continue to pass on those thoughts. Okay, I'm done with that question, because it's almost 4:30. Have we covered your questions?

ROSS-NAZZAL: Oh, I always come up with more questions than we'll ever have time to cover. I think maybe this might be a good stopping point.

COLLINS: There's one thing I would like to say. I think it's important for me and the other women pilots, Pam [Pamela A.] Melroy, Susan [L.] Kilrain to say—and I don't want to feel like I'm speaking for them—but speaking for myself, it's important to say that the women mission specialists that came here to NASA before us did a fabulous job. They made it easier for us to come in here and be pilots and be commanders, because they were so well respected. They were

dedicated to the mission. They are intelligent, dedicated, really believed in the mission. Because of them, it was easier for us. I think it's important that I say that.

Before I came over here, I was thinking about what I wanted to say. That's the first thing in my mind as far as talking about the women here at Johnson Space Center. Those women mission specialists really made it easier for us.

In the same light, I would think that all the women who worked here at Johnson Space Center, back in the 1960s, that were dedicated to the mission, that were intelligent, that were very successful, they made it easier for the future generation of women and the Shuttle astronauts when they came in. As opposed to what I said when I first came here about going into the Air Force. There were no women at that base at all except for a couple of secretaries, and there weren't that many women secretaries. There were just a couple. There weren't that many women there at all.

You come in, and you're like an immediate jump. Whereas at NASA, it was nice and gradual in bringing women into the Center. I think it's important to say that. No matter what those gals did, whether they were being a secretary or a photo lab, or working in the clinic, whatever they did, they all contributed to women being gradually and fully accepted into the program here. Big thanks to them. Okay, I'm done.

ROSS-NAZZAL: That's a great point. That's a good ending.

[End of interview]