The New Mexico Museum of Space History (NMMSH), a branch of the Department of Cultural Affairs of the State of New Mexico, was founded in 1976 as the International Space Hall of Fame.

Publisher’s Note:

The New Mexico Museum of Space History is pleased to announce publication of Curation Paper Ten, edited by Assistant Curator Jim Mayberry. It is an oral history of Colonel Eileen Collins, the first woman to pilot, as well as command, a space shuttle mission. Also in this issue are the NASA profile of Colonel Collins and other features.

The oral history interview was conducted in 2001 for the New Mexico Museum of Space History by Lt. Col. Wayne O. Mattson (USAF, Ret.) and Victoria Davis. In July 2005, Colonel Collins (USAF, Ret.) returned to space as the commander of STS-114 aboard Discovery. NASA called that mission the ‘Return to Flight,’ as it was the first Space Shuttle launch after the loss of the Columbia on February 1, 2003. Eileen Collins retired from the Air Force in 2005 and NASA in 2006.

The New Mexico Museum of Space History includes the Clyde W. Tombaugh IMAX Dome Theater and Planetarium; the International Space Hall of Fame; the John P. Stapp Air and Space Park; and the Hubbard Space Science Building, which houses the NMMSH’s Archives and Research Center. All are located on the slopes of the Sacramento Mountains, overlooking Alamogordo, White Sands National Monument, and much of the rest of the Tularosa Basin.

The museum is charged by the state to educate residents and visitors to New Mexico about the history of the exploration of space, with a special emphasis on the role New Mexico has played in those efforts. The International Space Hall of Fame was established to honor those who have helped advance humanity’s understanding of the Universe. The museum houses invaluable artifacts and informative exhibits of the remarkable achievements of humanity’s exploration of space.

The Archives and Research Center of the New Mexico Museum of Space History is home to the museum’s archival and artifact collections, as well as a library and research and curatorial offices. The John P. Stapp Air and Space Park, located outside of the museum, contains large artifacts such as missiles, Little Joe II (the largest rocket ever launched in New Mexico), the Sonic Wind I rocket sled ridden by Colonel (Dr.) Stapp, and other historic items. The IMAX Dome Theater and Planetarium, an Alamogordo fixture since 1980, offers first-run IMAX movies and special presentations, most of it associated with space history and public education.

All ten Curation Papers are available at http://nmspacemuseum.org, the website of the New Mexico Museum of Space History.

Publisher’s note: All photographs in this issue are courtesy of NASA, unless otherwise noted.
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Colonel Eileen Collins, prior to STS-114, July 2005
COLONEL EILEEN MARIE COLLINS (USAF, RET.)
NASA ASTRONAUT (FORMER)


EDUCATION: Graduated from Elmira Free Academy, Elmira, New York, in 1974; received an Associate in Science degree in Mathematics/Science from Corning Community College in 1976; a Bachelor of Arts degree in Mathematics and Economics from Syracuse University in 1978; a Master of Science degree in Operations Research from Stanford University in 1986; and a Master of Arts degree in Space Systems Management from Webster University in 1989.


EXPERIENCE: Collins graduated in 1979 from Air Force Undergraduate Pilot Training at Vance Air Force Base (AFB), Oklahoma, where she was a T-38 instructor pilot until 1982. From 1983 to 1985, she was a C-141 aircraft commander and instructor pilot at Travis AFB, California. She spent the following year as a student with the Air Force Institute of Technology. From 1986 to 1989, she was assigned to the U.S. Air Force Academy in Colorado, where she was an assistant professor in mathematics and a T-41 instructor pilot. She was selected for the astronaut program while attending the Air Force Test Pilot School at Edwards AFB, California, from which she graduated in 1990. She has logged over 6,751 hours in 30 different types of aircraft. Collins retired from the Air Force in January 2005.

NASA EXPERIENCE: Selected by NASA in January 1990, Collins became an astronaut in July 1991. Initially assigned to Orbiter engineering support, Collins has also served on the astronaut support team responsible for Orbiter prelaunch checkout, final launch configuration, crew ingress/egress, landing/recovery, worked in Mission Control as a spacecraft communicator (CAPCOM), served as the Astronaut Office Spacecraft Systems Branch Chief, Chief Information Officer, Shuttle Branch Chief, and Astronaut Safety Branch Chief. Collins served as pilot on STS-63 (February 3 to 11, 1995) and STS-84 (May 15 to 24, 1997), and was the commander on STS-93 (July 22 to 27, 1999) and STS-114 (July 26 to August 9, 2005). A veteran of four space flights, Collins has logged over 872 hours in space. Eileen Collins retired from NASA in May 2006.

SPACE FLIGHT EXPERIENCE:
STS-63 *Discovery* (February 3 to 11, 1995) was the first flight of the new joint Russian-American Space Program. Mission highlights included the rendezvous with the Russian Space Station Mir, operation of Spacehab, the deployment and retrieval of an astronomy satellite, and a spacewalk. Collins was the first woman pilot of a Space Shuttle.

STS-84 *Atlantis* (May 15 to 24, 1997) was NASA’s sixth Shuttle mission to rendezvous and dock with the Russian Space Station Mir. During the flight, the crew conducted a number of secondary experiments and transferred nearly four tons of supplies and experiment equipment between *Atlantis* and the Mir station. Collins served as pilot on this mission.
STS-93 Columbia (July 23 to 27, 1999) was the first Shuttle mission to be commanded by a woman. STS-93 highlighted the deployment of the Chandra X-Ray Observatory. Designed to conduct comprehensive studies of the universe, the telescope has enabled scientists to study exotic phenomena such as exploding stars, quasars, and black holes. On STS-93, Collins was the first woman Shuttle Commander.

STS-114 Discovery (July 26 to August 9, 2005) was the ‘Return to Flight’ [Editor’s note: Following the loss of the Columbia]. During this mission, the Shuttle docked with the International Space Station and the crew tested and evaluated new procedures for flight safety and Shuttle inspection and repair techniques. After a two-week, 5.8-million mile journey in space, the orbiter and its crew of seven astronauts returned to land at Edwards Air Force Base in California. Eileen Collins was the Commander of STS-114 Discovery.

MAY 2006
MATTSON: Thank you for allowing us to interview you. To start off with, we will go into a little bit of your background. When and where you were born? Who were your parents? What were their occupations? And so on.

COLLINS: Alright. Well, good afternoon Wayne. It is good to be talking to you today. I was born in Elmira, New York, in 1956, November 19th, 1956. My parents are James Edward Collins and Rose Marie Collins. Her maiden name is O’Hara.

Their occupations, well, my father started out as a surveyor in Elmira, New York, which kind of, maybe, got me interested in math as a child, because he showed me his work. He would lay roads and parking lots and [he] had the plans for building to get those things started. And when I was about nine years old, my father changed careers and worked for the U. S. Post Office where he was a mail handler and a supervisor, for a while, in a large Sectional Center. In fact, he worked until he was 75. He just retired this year as a matter of fact. He is a worker, kind of the way I am - he enjoys working and being with people.

My mother stayed home with us kids until I was nine years old. Then she went to work as a secretary, and [as] an assistant in a large State Prison in Elmira, New York, the Elmira Correctional Facility. And her job was to out process the, they called them inmates in those days. She would out process them when they went on parole. And get their personal effects back to them, and get them on a bus back to wherever they lived.

In that job, she worked for the State of New York for at least twenty years. After that, she went to work at the Elmira Police Department. Her job there was to create records when the police officers did their reports she would document those and keep them on file. So my mother had a lot of friends in the law enforcement field. And it was nice knowing all of the policemen in our hometown.

MATTSON: It also made you very careful.

COLLINS: Now my parent’s educations - both of them were high school graduates, but did not go on to college. In - back in those days, especially in my hometown of Elmira, it was the exception rather than the rule to go away to college. There were four of us children, and both of my parents supported sending all of us off to college.

Unfortunately they couldn’t afford the college education for the four of us. But in spirit they supported us getting back to school. And for the most part we, in fact, I can probably say with almost 100% certainty all of us children funded our own college education. And there were ways for us to do that. And of course my parents supported us in getting us the education that they were not able to get back in their days.

MATTSON: What college did you go to?
COLLINS: For me, I attended actually four different colleges, but it was - I did get a degree from each of those schools. After I graduated from Elmira Free Academy High School in 1974, I went on to a community college. The reason I went to a community college my first two years was I was really needed at home to help out with the family.

At Corning Community College I got a degree, an associate degree, in math and science. And that was in 1976. Then I transferred to Syracuse University [where I] went my last two years. [I] graduated in 1978 with a degree in math and economics, and from there I went on into the military. But as a lover of education, I continued with my schooling.

I got a graduate degree. The Air Force actually sent me to Stanford University, and I received a Master’s degree there in 1986 from the School of Engineering. And that was in Operations Research. And then in 1989 I received a degree from Webster University in, it was a Master of Arts in Space Systems management. And that degree I earned by going to school in the evening for two years.

MATTSON: When you went through Syracuse University were you part of ROTC?

COLLINS: Yes. In fact one of the reasons I selected Syracuse, other than the fact it was a very good school was that they had a ROTC program. I was looking for that, because I knew during my sophomore year in college that I wanted to go into the military. And I wasn’t really sure what I specifically wanted to do.

I just wanted to join the military. And the ROTC, at that time, was the way for me to go. The military academies were not accepting women back in those days. So a military academy was not an option for me. And that pretty much left ROTC. And I was very happy with the ROTC program. It offered exactly what I wanted.

MATTSON: Isn’t Elmira the home of a sailplane school, or a glider school - something like that?

COLLINS: That is right. Elmira is a very interesting little town. When I grew up, it was a population of 40,000. It is down from that now. But the National Soaring Museum is in, is on Harris Hill which is just on the outskirts of Elmira, New York. When I was a child it was the ‘Soaring Capital of the World’. It is now the ‘Soaring Capital of America’.

MATTSON: It is not!

COLLINS: I am not sure who is now claiming to be the soaring capital of the world, but Elmira still has Harris Hill and a museum, and they have a summer
camp up there. And it is really quite an inspirational place to live. Because in the summer you see the gliders flying, and it is quite a, I would say one of the things that inspired me was that I attended summer camp for six years in a row up on Harris Hill. Not associated with the soaring, but just the fact that we were near it was inspiring.

MATTSON: Did you get to fly any of the sailplanes during your summer camp?

COLLINS: No, I did not fly in anything until I was 19 years old. The first flight I ever took was on a commercial airliner with my mother when I was 19. I started flying the following summer at age 20, in a little Cessna 150. I took lessons, because I just said, “You know, this is what I want to do.” So, I just saved up my money and at the Elmira – Corning Regional Airport I visited their flight operations school and signed up for classes and that is kind of how I got started.

MATTSON: Did you have [a] private ticket before you went into the military?

COLLINS: I was very close to getting my private ticket. In fact I took, the summer I was 20 years old, I took flying lessons as much as I could with the amount of money that I had saved up. But I didn’t quite get my license that summer, so the following summer I picked back up, trying to get my license. But I remember trying to get that last cross-country, it seemed like, as a solo cross-country, my instructor would not let me go because of the fog. Really, it was against the rules for anyone to fly. So, as the last couple of weeks of that summer clipped on by I did get my final cross-country but I never took my check ride.

The Air Force called me two weeks early. And I went off to the Air Force just one check ride short of getting my private pilot’s license. But after I graduated from pilot’s training I took that check ride, and finally got my private FAA ticket.

MATTSON: Did you have to go through pre-flight at Lackland [Air Force Base]? Or right into flying training?

COLLINS: Yes. I did, for those students going to Air Force Pilot training. If you did not have a private pilot’s license you had to go through a screening program. So it turned out that it was really sort of in my favor that I didn’t have my pilot’s license, because I was sent to a screening program, which at the time was at Hondo, which was a small airfield just outside of San Antonio, Texas. And it was a very, very good training program in preparation for pilot training.

MATTSON: It used to be a navigator - training base in World War II.

COLLINS: Really? I think we flew about fourteen flights in a Cessna 172. And this was back in the days when we had Iranian students learning to fly here in the U. S. So we got to fly and learn almost side by side with the Iranian students. They were in a different ‘flight’.

My ‘flight’, we called ourselves “the guard and the girls.” We had four women and ten men. The four women were going on to active duty, but the ten
men were all preparing to go through pilot training, and then go back to their guard units. So we call ourselves “the guards and the girls.” Then there were two other ‘flights’ with Iranian students.

MATTSON: From Hondo where did you go for the rest of your training?

COLLINS: After Hondo, now this would be August, or September 1978, I went to Vance Air Force Base. I was one of the first four women to ever go through pilot training at Vance Air Force Base. And that was at Enid, Oklahoma.

Now I should say that there were several classes, at least three classes of women that had previously gone through, in the previous two years, had gone through training at Williams Air Force Base in Arizona. But the program was getting expanded. The women were not just going to attend classes at Williams, but now they were going to attend all the training bases that the Air Force had. So I was one of the four women that started at Vance.

Air Force Base because nobody knew what to expect with these women flying. But I would have to say that we pretty much flew very similar to the guys. And that was over twenty years ago now. And, you know, women have been flying in the military ever since.

MATTSON: Did they ever bother to tell you that because of your different physical size and weight that you might get killed using the ejection seat?

COLLINS: Well, the Air Force, before going into pilot training, they have height requirements, both the standing height and a sitting height. And I was right at the minimum on the sitting height; although I was several inches above minimum on the standing height. And it was important that the pilot could hold the brake during the engine run up just prior to take off. And it was important that you could fit into the ejection seat and safely eject.

I really didn’t have any problems with any of those, you know, as far as sitting in the airplane and flying the airplane. We did have some gals that were right at the minimum, and they did have problems holding the brakes. And what you had to do was to discover a technique to pump up the brakes, maybe lift yourself up out of the seat and use your toes and press very hard. So, in many ways you could work around it.

I also found it was difficult to lower the canopy if you were facing into the wind. So I learned a little technique for putting my elbow up against my waist and pushing the lever that way. And it took a while but I learned little tricks for flying the airplane.
MATTSON: I know what you mean, because I am short and I had some problems.

COLLINS: By the way, this was in a T-38 that I was talking about. The T-37 canopy is electric, and you just push a switch. But the T-38 canopy is a lever that you use to manually lower it.

MATTSON: Okay. Did you get your wings at Vance?

COLLINS: Right. I got my Air Force wings in September 1979 with Class 7908 at Vance Air Force Base. And I am just very proud of the fact that I went through pilot training at Vance with a great group of people. There was a lot of camaraderie. It was in a relatively small town. So I found that people got to be, I would say more like a family, and got to know each other pretty well. And that was a nice atmosphere to be in.

And I liked it so much that I volunteered to come back after graduation as an instructor at Vance. And I was fortunate enough that I was assigned as a T-38 instructor pilot to the 25th Flight Training Squadron. And I stayed there for another, well almost three years as an instructor pilot and a check pilot.

MATTSON: Did they have a special school where they sent you to learn to be an IP?

COLLINS: Yes. Randolph Air Force Base is the Pilot Instructor Training, which we called Pit, PIT. That was about four months. My very first day at PIT was the day that the hostages were taken in Iran - do you remember that? It was November 1979. I don’t remember the exact day. But I remember watching that on the news and following through that as I was going through my training at Randolph.

MATTSON: The reason I asked the question about PIT, back in the ’50s it used to be at Craig Air Force Base. I was wondering where they had moved it to.

COLLINS: Okay. Well, I think they still do it at Randolph, even now. But instead of back when I went through it was just the T-37 and T-38. And now they have a new airplane the T-1 that they are flying in.

MATTSON: Oh it is a regular Beech job.

COLLINS: It’s a Beech. It is a part of the dual track training that those pilots that are going on to fly the heavier aircraft will fly the T-1. And if you are going to fly a fighter you will fly the T-38. I was fortunate that I was able to fly the T-38. Back in the 19-70s, well the early 1980s, women could not fly fighters, or bombers, or any aircraft that could be considered a combat aircraft.

MATTSON: Right.

COLLINS: Therefore I was limited ---

MATTSON: To continue, you were flying as an instructor in T-38s at Vance. Where did you go from Vance?

COLLINS: Okay. I want to say one more thing about Vance. The three years I was there, I was the only woman who was an instructor in the Squadron, which I found pretty interesting because we had, well, I won’t go into that, but we had three women who did become
instructors in the T-37 Squadron. And the month that I left permanently was the month that the second woman instructor came along. So there just really weren’t that many women, so you just kind of stood out.

The years I was there I was very careful that I did a good job so I could really leave a good impression for the women to follow. I didn’t want the women to have a hard time of it. I wanted to make it as easy for them as I could. Now when I left Vance, that was December 1982, I went to Altus for three months of training in the C-141, followed by an almost three-year tour at Travis Air Force Base in California.

MATTSON: I think back to 1966 I was flying a C-141 in Texas.

COLLINS: It is a great airplane. I just loved the C-141. They are phasing them out now. But I was a co-pilot, Aircraft Commander and an Instructor Pilot in the C-141. It is interesting that it was not my first choice. I had asked to fly fighters. I wanted to fly the F-15 and the F-106, which was getting ready to be phased out at that point in time. Obviously I couldn’t do because of the -

MATTSON: - Restriction on combat.

COLLINS: - Restriction on women in combat. But I got sent to the C-141. It was a wonderful job. I absolutely, looking back, it was one of the best jobs I’ve had, an opportunity to fly with a crew around the world. And with the mission I have been to some very interesting places. I’ve got to see how people live in countries around the world.

I was able to fly in the, part of the Grenada operation in 1983 and returned some of the civilians that were medical students that were held hostage by the soldiers. And we brought them back to Charleston. That was, got to be the most important mission that I have flown in my career as a military pilot.

MATTSON: Did you ever get to fly a C-130?

COLLINS: I flew a C-130 when I was at test pilot school. We practiced the assault landings also which were pretty challenging.

DAVIS: Could I ask you when you were an instructor and you were first woman pilot to be an instructor, did you receive a lot of resistance?

MATTSON: Okay, the question was while you were a woman instructor pilot did you have a lot of resentment from the other instructors or the students?

COLLINS: Okay. - Any resistance from the students?

DAVIS: - From the male students, students that you were instructing?
COLLINS: Right. Let me say that in the T-38 there was one woman who was an instructor prior to me in the T-38. She was at a different base. I was the second T-38 woman instructor in the Air Force, but the first at Vance Air Force Base. I only remember resistance, one occasion of resistance, but before I say what that was let me say that the vast majority of the students were just great.

I think once you get in there and you start actually doing your job, and you start working, you show them that you love what you are doing, you really know your job very well, and the instructors’ goal is to make their students the best possible pilots that they can be. You tell them that. “I want to make you the best pilot that you can possibly be.” It becomes a team.

That was the attitude that I had. I found that I had very good relationship with my students, even the students that I just flew with on a one-time basis. There was one time that I had resistance and it was very obvious. When I was a check pilot, in my last year at Vance, the only thing I did was give check rides to students. And we had a student from Saudi Arabia that was scheduled to fly with me on a check ride. I was going to give him a check ride, and give him grade at the end of the check ride, which was a big deal.

And when I saw his name on the schedule I told my scheduler, “Please don’t fly me with him, because they do not, they prefer not to fly with women because of their culture.” My scheduler said, “Eileen, this is the USA and we are going to do it this way, and I don’t have anyone else I can fly him with.” Well, when the student saw his name on the schedule, he was actually flight commander, he asked to be changed and it got changed. I have no hard feelings about this.

By the way, the student did not do well on his check ride. He had to take it over again, after he had flown with this other instructor. I guess that isn’t important. I think what was important was that, you know, I am not overly sensitive to people’s feelings about whom they fly with. I just focus on the mission. I do the best job that I can. And I have found that people will come around. They really will.

MATTSON: I remember one of the guys from my outfit when they were first allowing women to entering flying training came unglued. He wanted nothing to do with a woman flying his wing. He is long retired now.

COLLINS: One time I had a Colonel who I just happened to be on a team with him down at Randolph Air Force Base when I was a First Lieutenant at the time. And after we were done working together that week he said to me “You can fly on my wing any time.” And I will never forget that he said that.

I looked at him and I almost said, “Well, you can fly on my wing, too.” But because he was a Colonel I didn’t say that. I will have to say that we were taking baby steps back then getting into flying. I didn’t want to make a great big statement. I didn’t want to go in there and change anything. I just wanted to fly.

That’s all I wanted to do. I was very mission-oriented. I loved teaching. I
loved being with people. And more than anything I loved flying. And I think I just did my job. I hope that, in 1993, when this country finally lifted the ban on women flying combat aircraft, although I didn’t have the opportunity to turn around and go fly those missions, I feel like I had something that I did that helped that barrier come down. And I feel very thankful that I was able to help in regard.

Now that doesn’t mean that every woman is going to be forced to go into combat. What it does mean is that women who want to fly and want to go into combat and are really good at it, can do it if they want. It is a very small number of women that are flying in combat aircraft right now, but at least they have the chance.

MATTSON: After you got done flying the C-141 what did you do then?

COLLINS: I very much wanted to go to test pilot school, and I was looking for another job that would help get me in a good position to go to test pilot school. I wanted to get a degree in Engineering so I could better serve my job. And I found the opportunity to teach at the Air Force Academy.

So I applied for this position, and the Math department at the Air Force Academy hired me. And they have a program where they send you to school to get your Master’s degree. So they sent me out to Stanford for one year, well actually I could have done it in eighteen months, but I did it in twelve months, [or] eleven months, because I was very anxious to get back to flying. So I doubled up my courses, got my degree at Stanford and taught at the Air Force Academy for three years.

I taught all the calculus courses: differential calculus, integral calculus, [and] multivariate statistics. I taught linear algebra. And I also taught one semester in Aeronautical Engineering Department. I also flew the T-41, which is a Cessna 172 in the screening program at the Academy for cadets. And that was three years. And while I was at the Academy I was applying to the Air Force Test Pilot School. And just as a side note, I had to apply three times to get in.

The Air Force Academy Chapel

The first time I applied, they wouldn’t let me meet the board because I hadn’t spent two years’ time on station at the Academy. So I applied again the following year. And they called and said I couldn’t meet the board because I was on a three year directed duty assignment. So I finally, the very next year I said, “Well if I wait another year I am going to be too old.”

Well, they gave me a waiver so we could go over ten years, I think it was ten years and three months’ time in service you are too old. They gave me a waiver for
that. I only needed like a one-month waiver. So I got the waiver. I did get accepted into the test pilot school. And I started in June of 1989. I was a Major. I became the class leader because I was the senior ranking officer. It was myself, 23 guys, and one other gal. She was a civilian engineer.

In my opinion, it was a very big challenge, being the class leader with all these guys. I was kind of wondering how it was going to go, but it turned to be a great year. And we had a great team. I thought we did a good job. Everybody graduated and went on to their jobs. I graduated in June in 1990.

An interesting note, you are probably are going to asking about the astronaut program, but I had applied to the Air Force Test Pilot School and the astronaut program at the same time. This was in like late 1988, early 1989. The acceptance process for the test pilot school went rather quickly. But the astronaut takes a while, the astronaut selection process.

My second month in test pilot school, it was September 1989; NASA called me and said, “We want to interview you.” They go through the interview process every two years. So I had to go to my operations officer and my school commandant to ask permission to miss a week of school so I could go to NASA and interview for the astronaut program. And they were wonderful. They let me go. I had to promise to make up all that work, and which I did.

So the first week in October in 1989 I went to Johnson Space Center and interviewed for the Astronaut class of 1990. And then on January sixteenth of 1990 NASA called me. I was out flying the A-37 on a spin ride when the call came in. I came back from my flight and there was a note on the board to call NASA. And I thought, “Well this is it. They are going to tell me I’m in or I’m out.”

So I called NASA, and the secretary connected me with Duane Ross who is the administrative lead for the astronaut board. He connected me with Don Puddy who at the time was the director of Flight Crew Operations, and he was the president of the board. And then Don Puddy connected me with John Young who is as you know is a famous astronaut. And I thought, “Well this is leading to something.”

And John Young said to me “Well, Eileen, do you still want to come and work for us”? I said, “Yes, I would.” And so he said, “Well, we want you to come down in June, no, July; we want you to come down in July. You are going to be in the class of 1990.” And of course I don’t remember anything he said to me after that. I thought, “Well, I finally made. It was like a dream come true.”

But at the end of the phone call he asked me if I had any questions. Now I had applied both as a pilot and as a mission specialist. So I said, “Well, am I going to be a pilot or a mission specialist”? He said, “You are going to be a pilot. You are going to be our first woman pilot.” So [that’s] another challenge that I had to face, but I remember that was just a little bit past half-way my test pilot school. And of course I was highly motivated to finish the course. We graduated on June eighth of 1990. And I reported in at NASA on July sixteenth of
1990. So the timing worked out. Throughout my career my timing never worked. But that was the one time in my career where my timing was good.

MATTSON: So you went into the astronaut training. And where was that conducted?

COLLINS: Yes. The astronaut training program was twelve months; actually it turned out to be about nine months, because we went a little bit quicker through it. There were 23 of us in the class. It was at Johnson Space Center.

We started July sixteenth of 1990. We did space shuttle training. We flew the T-38. We did, obviously, classroom, simulators and travel to every NASA site to learn our mission. And we had what they called enrichment training, which included survival training, a trip up here to New Mexico on a geology field trip. We had speakers come in to Johnson Space Center to talk to us about the history of the space program, former astronauts, flight directors, [and so on]. We had many, many classes on Earth observation, and just a variety of ---

MATTSON: It is bound to work some time. When you went down to NASA to interview did you fly into Ellington [Air Force Base]?

COLLINS: I flew commercial into Houston Hobby. The school was very tight on letting us fly airplanes out of Edwards Air Force Base, for good reason, so I flew - I drove to Los Angeles International Airport and flew from there.

MATTSON: Not like back in the ‘60s.

COLLINS: Things have changed a little bit. We are very careful, when government aircraft are used it has to be in relation to your training it seems, or it has to be in relation to your mission.

We did full time training for nine months, probably 90 percent of that was learning the Space Shuttle, and learning the mission of the Space Shuttle and the duties, the responsibilities in your particular position. And then at the nine-month point we picked up jobs. All the astronauts, if you are not training or flying your mission, you have a support job where you help the other group get ready for their flight. So before your first flight and in between flights we do that. And we picked up our jobs at the nine-month point. And we also became available to do speaking engagements. And that is when we got very busy.

But I can tell you this may be a good point in time to tell you the various jobs that I have had in the office between my
flights. My first job was in Space Shuttle engineering. And I worked with the full time engineers and flight controllers on the Shuttle system. And I did that for about a year. Actually I did that from April of ’91 until February of ’92.

And then in February of ’92 I became a, well the slang we use for this job is “Cape Crusader” - where astronauts that fly to the Cape [Kennedy] and support the people down at the Cape. Get the orbiters ready to fly. We do testing down there. And we also support the crews that are going up next. We check out the space suits for them. We strap them in pre-launch. When they come back and land, we go in and get them out of the orbiter. It was just a super job because I got to work in the actual Space Shuttle itself. I did that job for fifteen months.

And then I became the Capcom. The Capcom is the astronaut in Mission Control who actually talks on the radio to the crew in space. I only did that job for about three months, or maybe from three to five months. And then in September of ‘93 I got assigned to my first flight.

I can tell you about my flights later, but my first flight was STS-63 where our crew rendezvoused with the Russian Space Station Mir. And the six of us [on the] crew - actually five of us were Americans. We were [the] first Americans to see the Russian Space Station. We didn’t dock, but we did a close approach rendezvous to 30 feet. Tested out the shuttles, navigation, communication, and flying systems to make sure that the subsequent flight, which would be the first docking would be ready to go.

So I flew that mission. That was in February 1995. When I came back from that job, I went back to the Capcom job. And I did that job until I was assigned to STS-84. And that was the sixth shuttle mission to dock, actually dock with the Space Station Mir. That mission flew in May of 1997. And we actually, I can tell you about this mission later if you care to hear more about it. But we were the shuttle crew that docked with Mir in between the two major accidents that they had.

In March of ‘97 they had a fire, and in June of ‘97 they had a collision with a Progress vehicle. So we were up there in between those two and we got to be really friends and co-workers with that Russian crew in space. I came back from that flight and became the chief of the space hardware branch in the Astronaut office, which included the Space Station and Space Shuttle.
And in this point in time, the Space Station was really starting to be a major, it was really growing in the development phase. But the work was picking up and we had many astronauts supporting all aspects of Space Station development. My branch was pretty much the hardware development. I did that job for about a year, actually for ten months. And then in March in 1998 I was assigned to STS-93, which was a mission to take up the largest and most powerful X-ray telescope that had ever been launched in space.

MATTSON: Is that the Chandra, I think they called it? [Editor’s note: named for Subrahmanyan Chandrasekhar].

COLLINS: Well, initially, it was called AXAF, which is [for] ‘Advanced X-ray Astrophysics Facility.’ Later it was named Chandra, the Chandra X-ray Observatory. And I was so proud to have the opportunity to be part of this mission.

I was the Commander. We had a crew of five. And our job was to actually safely deliver this telescope to space. And the mission had many delays. Because there were always, it seems that whenever we found something that just wasn’t perfect the decision was made to fix it, which was the right decision. It turned out that the Chandra X-ray Observatory was almost one and a half billion dollars. And we didn’t want to make a mistake. Any potential problem that could have happened was fixed.

MATTSON: And this particular mission was where you were the first female Commander of the Space Shuttle?

COLLINS: That is right. And if you would like to know about being the first female Commander, I can tell you about that. But this mission actually flew in July of 1999. It was a tremendous amount of publicity around this mission because of the first woman Commander, both before and after the mission.

Colonel Collins aboard STS-93

After the flight I traveled to places and met people that I never dreamed that I would have a chance to meet. But that was my last flight. And that was two and a half years ago now. And since then I had my second child. I didn’t mention I had my first child in between my first and second flight. Then I had my second child in between my second and third flight. I am sorry, after my third flight. I didn’t have any children between my second and third flight.

So, you know, it has been a while since I have last flown, but we have a very, very large office right now. And there is a much longer waiting time between flights. I am going up on my fourth flight. Right now it is scheduled for next year in November of 2002; although that mission most likely will delay a couple of months to early 2003. And that will be a docking with the International Space Station (ISS).
The ISS, December 2002

And we will take up the Expedition 7 crew, which is the seventh crew to live and work aboard the Space Station. And we will bring back Expedition 6 with all their logistics and their Science Operations. And that is where I am right now. So if you want me to go back any details I could talk about ---

MATTSON: Talk about the various missions and what it was like.

COLLINS: Yeah. I pretty much talked about - I think I kind of hit the high points. My first mission, I was the first woman pilot of the Shuttle. And I would have to say, people often ask me what that was like. And I would have to say that it was probably like flying as the pilot on any other mission as far as the training and my day-to-day activities.

I really didn’t feel like I was singled out, or that there was anything different because I was going to be the first woman. But within my mind I knew I wanted to set a good precedent for the women that followed me which was the way I had felt my entire career. But it was a little bit easier at NASA. There were women specialists - that flew in space before me. And they are such professionals and they had all done such good jobs, they paved an easy road for me.

So I would have to say that within NASA you do your day-to-day job you don’t go around thinking, “I am a woman, and I am different than the majority here.” It is not that way. Everybody is so mission oriented that you are always focused on the mission. You don’t care, “What does this person look like that I am working with”? So it was really not a whole lot to say.

MATTSON: This is [the town of] Orogrande up here. [Note: Orogrande is en route from El Paso to Alamogordo].

COLLINS: Oh, Okay. Thank you. Now when I flew my second flight there was much less publicity, and much less requests - to speak and travel after the flight.

MATTSON: You were the first pioneer. That is reason why you were asked to speak.

COLLINS: Now on my third flight, just to give an idea, the first woman Commander was probably the amount of, I would have to say, media attention around this was probably three times greater than when I flew as the first woman Pilot.

The mission was announced at the White House. I actually flew to the White House. And I went into the Oval Office with my husband - you know I brought my cousin with me too. And we met the President and the First Lady, and the NASA Administrator, Dan Goldin, was with us. We had a meeting in the White House. Then we went into the Roosevelt Room where the announcement was going to be made.
The First Lady spoke. The Administrator spoke. Then I spoke and the President spoke. The room was packed. There were reporters out there that I had seen on TV my whole life. There were famous women. Sally Ride was there. And I remember the feeling that I had when I peeked into that room, before I walked in to speak. I peeked into that room and I thought, “There is no way that I am going to be able to do this.”

And I thought, “These people are here for me.” Then I just stopped myself, and I said, “No, they are not here for you, Eileen. They are here for the first woman Commander. Just go in there and be the first woman Commander.” And I went and I made my speech, and everything was fine. And then I went home.

I am not the kind of person that seeks out publicity. But on the other I don’t shy away from it. I feel like I have a sense of duty to do some of these things. Well, after that ceremony, the next day I went back to Houston, and got into training. And training went just fine, but after the mission was over, by the way the mission was extremely successful.

The flight went off, basically, without a hitch. We had a few small things that broke on our mission. We had to fix a camera. And we had to fix an experiment that was overheating. But for the most part the flight went really, really well. We came back after five days. We came back on - actually it was a six-day flight. We came back on the sixth day.

And as we flew across the state of Texas at about 10 PM in the evening we left a streak across the sky, people still talk about this. There is a plasma [field] that builds up around the orbiter that as we slam back into the atmosphere - obviously due to the air molecules that were hitting the shuttle and as heat is building up with the friction, and the orbiter jets are firing and it leaves a plasma [trail] which if the conditions are just right it will light up the sky. [And] it did.

STS-135 landing; note plasma trail

We came in, and we landed. And of course I was very conscious of the fact that I was going to be the first woman that was going to land the Shuttle. And the women pilots across the country were always reminding me that they were really looking forward to me making a great landing, nothing like pressure, but we came in and I did what I was trained to do.

We landed and I got out of the orbiter, and I had no idea what I was going to be facing. Probably four to five months after that I did events like, I did ‘The Jay Leno Show.’ We did ‘[The] Oprah Winfrey [Show]’. We did ‘The Regis and Kathy Lee Show.’ We went to the World Series. I got to ring the opening bell on the New York Stock Exchange. I
can’t even think of half the events that I did.

I went to Manhattan seven times for events that were unbelievable. It was difficult for me having a child at home, you know, doing all of this traveling. But I knew it was going to last for only a couple of months. And I knew it was an opportunity for me to talk about the space program. And to get people refocused back on the space program and what we were doing, in the fact we were getting ready to build a Space Station.

Eventually, some day we are going to get people back to the Moon. Some day we are going to get people on Mars. This was the message that I had. Also, getting young people, both boys and girls, interested in doing well in school, studying math and science, and preparing themselves to be part of the space program someday. Those were the messages that I wanted to take out.

Collins talks to the press after STS-93

And to me it was a great opportunity to get those messages out to young people. And I really took advantage of that. And then probably six months after that mission I became pregnant with my second child. And I had to slow down and stay home. And most of my activity, you know, again working a full time job in the Astronaut Office, I had to turn down all speaking requests, but I still, to this day, accept all of the requests for interviews on the Johnson Space Center, and even our telephone interviews. I still do all of those. Again, mainly, trying to reach young people and get the message out how exciting the space program is and things they can do and have a career in the space program.

MATTSON: Aside here, did you ever join the ‘99s’ [Editor’s note: The Organization of Women Pilots].

COLLINS: I am a member of the ‘99s.’ That is right.

MATTSON: So is my sister.

COLLINS: In fact I was a member back when I was an instructor pilot in Oklahoma. I went to several of the meetings. And I flew light aircraft back then. And then I let my membership lapse when I moved. But I rejoined when I came to Houston. I really don’t have the time to spend, now that I have two kids and a job that requires me to travel a lot, I don’t have the time to spend as I did back then. But I look forward to retirement and I will be getting back into these things someday.

MATTSON: About your two children, boy or girl - or what?

COLLINS: I have a five year old girl, and an almost one year old boy that are just my, you know, they are my pride and joy. They are my number one - and I am a mom. I am a mom just like all other moms. I think being a mom is really great job.
MATTSON: When you were out at test pilot school did you by any chance get to meet Pancho Barnes?

COLLINS: No. I never did meet her. But I know of her. She is a very famous aviator.

MATTSON: Okay... You are a typical mom. What does your five-year old think about you flying in space?

COLLINS: Well, the last time I flew in space my five year old was three and a half. And I don’t know that she was. I know she was very aware that I went up on the Space Shuttle and she knows where I sit on the Shuttle. She knew what clothes I wore and what food I ate. She knew I took her picture with me. But I think that her attitude was that everybody’s mother flies on the Space Shuttle. She didn’t realize that it was something different.

Well, my next flight she will be seven. We will see. She is going to have a much different perspective of the mission. Of course, my boy will be only two for the next flight. It is kind of a difficult thing to say goodbye to your kids. I remember saying goodbye to Brigitte when she was three and a half. I knew I wasn’t going to see her for twelve days. I had seven days of quarantine. Well, actually it would be thirteen days. I had seven days of quarantine and then six days on the flight. But because we had a three-day delay it stretched out for sixteen days.

So it is tough being away from your kids for so long. But parents go through that all the time, being separated from the kids for whatever reason. And I think it really, at that time strengthened our relationship when I came back. It was just really neat being back with her again, and I took a little bit time off and spent some time with her.

MATTSON: Does NASA apply the rules that if you don’t fly within 45 days you are non-current?

COLLINS: That is pretty good that you remember that. That applies to the T-38. It doesn’t apply to the Shuttle. We have a training aircraft for the Space Shuttle. It’s a Shuttle Training Aircraft.

A Gulfstream II used in shuttle training

It is a G-II [Gulfstream II]. It has been modified to dive at the ground with the same performance characteristics as the Shuttle. And the flying qualities have been modified in the software. So what you feel as you fly, or make input to the control stick is the same as what you feel as you fly the Shuttle. And we even fly the airplane suited up in our launch and entry suit.

MATTSON: Oh!

COLLINS: So before, as you train for a flight, there are different rules for how many flights you need to have. And right now I need to fly once a month.
But when I get within six months of the launch I will fly every two weeks. And then at three months from the launch you have to fly once a week. In quarantine you can fly every day if you want, three, or even four days before your launch.

MATTSON: When you fly these simulated approaches are you using a side arm controller like the Shuttle has?

COLLINS: No. It is the center stick controller. And there is a speed brake. Obviously we only have engines on launch, so the speed brake lever operates as a throttle on launch. And to control our energy on entry with no engine feed it is speed brake. We have a speed brake lever on the left side. And you have a control stick in the center. And the Commander and the Pilot each have to have those controls. The Pilot is there to back up normally.

In fact, every Shuttle flight to date the Commander has flown and made the landing manually with the Pilot backing up the Commander. The Pilot’s job is to put the gear down and to deploy the drag chute, and various other things. If you are having problems, the Pilot can work the speed brake. The Pilot also makes the calls, the standard mandatory calls as you fly down the heading alignment as we call it, the final approach in landing. And the Commander’s job is to put the ‘airplane’ where it needs to be and land it.

We don’t have a, well we do have an auto land system in the Shuttle but it is not very good, so it is not used. So we really made the decision not to upgrade the auto land system and make it any better. Because what we have right now with, with the human in the loop so to speak, seems to be working just fine.

MATTSON: Now, hypothetically, let us say you got your crew aboard, the mission; well, both Pilots got food poisoning, could any of the Mission Specialists bring the Shuttle back?

COLLINS: Well, what you could do in a case like that. This is all conjecture, of course. The Shuttle could come back and land automatically. We have the capability to do that. With the exception that certain things need to be typed into the display.

To do the orbit burn you need to type into the displays. And as you approach the runway you need to select, in the software, you need to type and select which runway you are going to land. The gear needs to be lowered by a person. The drag chute needs to be out by a person. One of the [Mission] Specialists could do that. But the Mission Specialists do not train to land the shuttle.

So if there was ever a case for the Commander or the Pilot, the Commander and Pilot couldn’t land what would you do, I would say, to attempt an auto land. The auto land system is not very good, but it could get you down safely. And you would land at either at White Sands [Missile Range] here at what we call the Northrup Strip or at Edwards Air Force Base on the lakebed.

MATTSON: When you do a de-orbit burn how long do your engines operate?

COLLINS: It depends on your altitude. Normally it is somewhere between two
and three minutes. You turn the Shuttle around backward, so the Shuttle is facing into the velocity vector. And you light your - what we call the OMS engines, ‘O-M-S,’ Orbital Maneuvering System engines. And you will fire, like I say, I have seen burns as low as two minutes.

If you are down to a low altitude like our last flight we were [at one] hundred and fifty miles deploying the Chandra Observatory, or, you can be up at 350 miles with the Hubble Space Telescope, in those cases you can have a burn as long as three minutes.

When the orbiter goes subsonic, which is about 60,000 feet, the Commander will take over manual control and fly around in a circle, which we call a heading alignment cone. It is not really a circle, but if you looked at it on a map it would appear to be a circle from anywhere between, well it would be a half circle of 180 degrees, or a full circle of 360 degrees, or anywhere in between. And we usually fly that thing to help us manage our energy. If you are too fast you can fly a bigger circle. And if you are too slow you can fly a smaller circle, to insure that you hit the runway at the right spot.

MATTSON: Just like controlling your ETA at a certain point.

COLLINS: True, very true. You don’t have as much room to vary your speed. If you get too fast you can exceed what we call the maximum dynamic pressure. And if you get too slow you could exceed your angle of attack. In both cases you are flying outside of the envelope and it could be dangerous to do that. So we manage our ground track so to speak to keep (?) energy. Do I see if there is anything that we ---? It looks like we answered all of those.

MATTSON: Yeah. Okay. Have you had any strange experiences up there - humorous experiences that you would care to talk about?

COLLINS: I have had a lot of really neat experiences in space. I have to say
that the most, well there were a couple, I guess you could say, they are not really strange but your body is adapting to zero gravity. And it starts immediately. When the main engines cut off at eight and one half minutes things start floating.

Colonel Collins aboard STS-114

You can take your pencil out and you hold it front of you and let go of it and its floating and you think, “oh, my gosh, there really is no gravity up here, like they told me my whole life.” And then you look out the window and you watch the sun come up and it is just breathtaking, the colors and looking down at the Earth. It is just an experience I just can’t describe in words.

You feel, back to the human side of it, you feel your face is very fat. It is like - we call it fluid shift. Your legs get skinny. Eventually, and you are going to feel this immediately, your helmet is floating off, your suit is floating up on you. You get out of your seat and you float downstairs, you take your suit off and you put on your short-sleeved type clothes. And the first thing you feel in space is clumsiness. You are going to bump into things. You are going to feel a little bit disoriented you are going to see your crewmembers floating by you upside down. And it takes a little while to get used to this.

I found, on my first flight, it took me three days to get to the point to where I was able to zip around and work as efficiently as I can on Earth. It is almost like getting on roller skates and trying to do work around the house on roller skates. You are just having some problems until you get good at it.

MATTSON: You are used to living in an environment where up is up. In space what is up?

COLLINS: Well, what everybody does in space, you know the Orbiter is configured you just stay in that same orientation. You know, when you were training on Earth where the ceiling was the ceiling is still the ceiling, and where the floor was is still the floor. Although you really, as you get more experienced up there in space, you can start using the volume in different ways.

For example I slept; I discovered that the best place for me to sleep was on the ceiling. And I tried sleeping on the ceiling with my face facing the ceiling and with my face facing the floor, or laying on my side, so to speak. So I always tied my sleeping bag to the ceiling in the mid-deck and sleep there.

The Shuttle cockpit, flight deck and mid-deck look very small when you walk in the trainer on Earth, but really when you get up in space you have more volume than you think you would, because you can walk on the ceiling, for example.

MATTSON: That sounds strange to hear someone say, “Yeah, walk on the ceiling.”
COLLINS: You know when people ask me about being in space I tell them the two things that really are the human side of space is just physically being in space, maneuvering and operating and working in zero gravity, and the second thing is the view out the window. There is just, as I look back and look at these mountains over here, to me they are beautiful.

It is hard to describe that to someone that has never seen it. You could say, ‘Well, you know, they are brown, you can see the geological formations in the blue sky’. It is difficult to explain the views as you look down on the Earth. It is, to me, beautiful, breathtaking.

The most stunning view I can remember is the Middle East. On my second flight, we had a pass over the Middle East and I actually had time off where I could look out the window for about fifteen or twenty minutes. We flew over – well, the Sun came up over Greece. We were flying over Europe, and I looked down and you could see Europe was nighttime, and you could see the coastline because you could see all those city lights.

And then the Mediterranean Sea was dark, and Africa was mostly all dark. So you couldn’t really make out the coastline of Africa. But as we flew over Greece and we were flying kind of towards the east and towards the southeast you could see what we call the terminator, which was the line between the darkness and the light. And you could see where sunrise was taking place on Earth.

And then we flew down over Israel and the Sinai Peninsula, Egypt, you could see the Red Sea, the Gulf of Aqaba, the Gulf of Suez, you could see the Suez Canal, the Persian Gulf, Iran, Iraq, just looking down at this area it was a stunning contrast between the tan desert and the blue, very, very blue water.

The Middle East, from the Space Shuttle

And thinking about all of the history that took place, you know where Jesus was born and lived. And you think about all of the Biblical history and the wars that were fought and all of the people that lived there. It was just incredible. And then we flew down over the Himalayan Mountains over India, down across the Indian Ocean and over Australia before I had to go back to work. And I remember that scene so well. I hope I get a chance to see that again, I would like to film it, on one of my future flights.

The other thing about looking at the Earth; you know there are little islands that are like little gems. Many, many of these little, small islands in the Pacific Ocean that are just so pretty, and the coral reefs. The Pacific Ocean is absolutely huge. I don’t think you ever realize how big it was. You maybe tried to cross it yourself. But you realize the Earth is very much is a water planet. There are a lot of deserts out there, and
there are a lot of mountains out there. Things you don’t really think about in your everyday life. Are we going to keep going?

MATTSON: You are the first person that I have talked to that has given me a good description of what it is like looking at the Earth. It is very interesting.

COLLINS: Well, I could tell you more. Is the tape still going?

MATTSON: It is still going.

COLLINS: Oh, okay. Do you have any more specific questions? Maybe something you might be interested in?

COLLINS: You can see the Pyramids from space, or you can see the Great Wall of China from space. I have never been able to see them, even looking for them. But if you get a camera with a large lens, something where you can just zoom in, or even a pair of binoculars you may be able to see the Pyramids if the sun is at a low angle and casting a shadow.

Can you see man-made objects in space? In a way, yes - you can see agricultural patterns. Sometimes, for example the country of Israel, on the southern border, you can see it is darker. And there is a straight line that shows on the northern side. On the northern side you have agriculture, and on the southern side you have desert. You can actually see borders between countries.

MATTSON: The fire you mentioned in South America - that is a burn and slash type of fire?

COLLINS: Well, you can see fires looking down on Earth. These are probably area fires. We know there is burning going on in the rain forests and in various parts of the world for development.

I will also say, the Island of Madagascar, which is off the east coast of Africa, has been almost totally, I don’t want to say it totally cleared, but when you look down on it you see all kinds of erosion. And the rivers are not clear water, or you know, maybe, water from space will look kind of a grayish color, but if there is erosion it will be brown, maybe a light brown.

And the rivers in Madagascar, for example there is a Betsiboka River delta, which is very brown from space. You can see all of this sediment that is being brought down from the mountains. When it rains, because the forests have been burned away, when it rains the sediment comes down and you see a lot of erosion taking place on that island, which is really a shame.

Betsiboka River delta, from STS-93
On my second flight I photographed the entire island on several passes we had made. And my goal was to have these pictures available to scientists, who were trying to document what was taking place in the environment there. You could see the same thing in South America, which, obviously, is much bigger.

It would be hard to photograph the entire thing from close range. But if you take pictures of various regions from the Skylab program back in the 1970s and compare them to pictures of today you could see there is so much jungle that has been cleared away. You could also during the day you could see the smoke from the fires. At night you could see the bright lights. Any time you are up there, there are going to be fires.

These are areas of concern. What we can do as astronauts is we can document that. Before we fly, the Earth scientists, geologists, meteorologists, oceanographers will tell us here are areas we want you to photograph, and this is in particular what we are interested in. And they can show us slides of previous pictures. And then during the mission we will get a message uplink, every day we will have dozens of sites on Earth and the time we will be over them and ask us to take pictures of this particular, with what kind of camera and what kind of lens, and even with what light settings.

Oh, another thing I should mention, at night, at any time of the year, if you are over the equator, at night there will be thunderstorms, and they are just beautiful. Those lights flashing! And you look down on those thunderstorms and it just quite a lovely sight to see. Even if you watch NASA Select TV you can see, do live downlink from the cameras in shuttle payload bay on what is going on on the Earth at any point in time.

MATTSON: And auroras?

COLLINS: I only saw auroras on my first flight. I didn’t see any on my second and third. Conditions have to be just right with the solar winds, and you have to be at a high enough inclinations to see them. Hello -

[Editor’s note: At this point, the vehicle Colonel Collins is in approached the U.S. Border Patrol Station in Orogrande, New Mexico].

BORDER PATROL AGENT: Are you a citizen of the U. S.?

COLLINS: Yes Sir.

MATTSON: [This] is a temporary inspection station - the real one will be farther north. … Anything you care to talk about?

COLLINS: I could probably talk for a long time. Probably say something about the Shuttle-Mir program, which I know is going to hold a special place in history. The program started really before the first flight, the first flight started in 1995.

In February of 1995, my crew, I was the pilot on that mission that did a close flyby to Mir. We rendezvous at thirty feet. Our job was to test out all the equipment and the procedures. That paved the way for the first docking flight, which took place in June of ’95.

And after the first docking flight, we flew several more missions. And we took astronauts up to Mir that spent
anywhere between three and six months on the Mir space station. And the reason we did this program was, you know, the Mir space station was up there, an opportunity for our astronauts.

And NASA as an agency had to get experience at long duration space flights to help us get the International Space Station program started using real experience. And I am so glad that we went to the Mir program because it made us so much better prepared for the International Space Station.

Looking back, I have to say that the Shuttle-Mir program was a tremendous success. Despite the fact there was so much controversy going on. You know, people outside of NASA saying we should not send our astronauts to Mir because it was unsafe. There were leaks aboard Mir. The space station was old.

They actually had a fire. They actually had a Progress re-supply vehicle that collided with the Mir space station. In that collision there was depressurization. We actually completely lost the Specter Module because all of the air leaked out it. It took a while for the astronauts, the cosmonauts to isolate the Specter to get the hatch up there to prevent the loss of all the air from Mir - pretty much two close calls and old, aging space ship.

It was easy for people to say, “Let’s pull our Americans out of this program, because we are going to hurt somebody. We are going to kill somebody.” But NASA looked very, very closely. We had several independent groups to take a look at what we were doing with the Russians, what the Russians were doing with their Mir space station.

‘Technically, where is Mir? Is it really technically safe to be there?’ And technically the decision was made to continue the program. And we were able to do so safely. And in that program we built a working relationship with Russians, which has lasted successfully to this date. Not without its bumps and bruises but in the end has been successful.

MATTSON: But most people don’t realize that even if you have a failure you learn something from it.

COLLINS: Exactly! And let me say something about my flight, STS-63, which was on Discovery, launched on February the third, ’95.

The STS-63 crew

[It was] the first time we were really - well, since Apollo-Soyuz we had really worked with the Russians in the space program. I think it was in ’75 we had Apollo-Soyuz. So it had been 20 years. After we had main engine cutoff we had three jets fail. One of those jets was leaking, but two of the jets just failed off. But one of the jets failed because it was leaking oxidizer into space.

And the jet was on the right OMS pod and it was facing in an up direction. In the Z direction, it was facing up. Now when we approached the Mir space
station we approached from the same direction that this jet was leaking. And the Russians were afraid that these particles were going to attach to their space station, and even, worse, attach to the solar arrays and degrade the potential of their solar arrays, the energy potential of their solar arrays. I don’t blame them for being concerned about it.

And so after our first day in space we got a message that there was chance we wouldn’t do our rendezvous. That was something we had been training for a year and working with the Russians for a year. Well, the work went on, on the ground. And of course we were up in space and talking to the cosmonauts on Mir on our radio.

But on the ground, our managers were talking about the pluses and minuses that could be done. We had gone through several cycles on the jet. We were closing the manifold, aiming the jet toward the Sun, trying to fake it out to get it to stop leaking. Well by day four, which was our rendezvous, the leak had been slowed to a point where it was just minuscule if any leak at all. And the Russians agreed to let us go in, and do the close approach and rendezvous.

And we actually found out early, because the cosmonauts on the Mir called us on the VHF radio and said “Hey, their manager just told them we were now cleared to do the approach and rendezvous.” And then a couple hours later Houston called us and said “Hey, you are now cleared to do the approach and rendezvous.” [And we said.] ‘Yeah, well the Russians have already told us. So they beat you to it.’

So I would say that was one of the great successes of my flight was not the fact that we did the rendezvous and everything worked. But the fact we had a failure and we were able to work with the Russians to overcome this failure and make the mission happen anyway.

MATTSON: What did Mission Control say when you told them, “Yeah, we already know?”

COLLINS: I don’t remember - probably nothing. You know another interesting thing that I should mention which goes back a year before the launch was when our management at NASA and the Russian management agreed to even do this mission. The original plan was that we would go to 1,000 feet - I can’t remember how many meters. The Russians were talking in meters and we were talking in feet.

But this gradually kept getting changed. We would negotiate with the Russians to go in closer. Well, we were really glad that we agreed to a thousand feet, but we really not going to learn that much by going to a thousand feet. We got to get in closer. So we negotiated for a long time.

And I remember the talks in Mission Control with Victor Blagoff, who was the flight director on the Russian side of the mission. Our commander, Jim Wetherbee, would be talking with him and there would be a translator. And they wouldn’t agree right away. But eventually we talked them down to 100 feet. We need to go to a hundred feet. If we are really going to test, you know our, we had a radar, we had a TCS, our trajectory control system which is a laser.
And these are our navigation aids - we had a hand held laser. We want to test our navigation instruments and we really need to get in closer. We want to test our Com system. We need to get in closer. We need to spend more time. So we agreed to a hundred feet. Well, then as the months went by, you know we really need to get in closer. ‘Let’s get somewhere closer than a hundred feet.’ And Russia would say, ‘No, no, no, we don’t want to do that.’ Of course they are concerned about their space station.

Well, you know if we are going to go in and do this docking mission we really need to go in closer on the rendezvous mission. So we eventually talked them down to 30 feet. Because you know we wanted to see if the Shuttle handling qualities were going to be any different when you got in close. Of course, there really wasn’t any difference between being at 100 feet or at 30 feet, but it gave us opportunity to practice the procedures up to 30 feet.

MATTSON: You don’t have a flow field problem around the two vehicles.

COLLINS: That is right. Although there was some question as to, ‘When the Shuttle jets fire could that cause any contamination on the Russian space station?’ So what we did is we went to a mode that Flight Control called low Z which would not fire any jets in the Z direction which happened to be, it was a minus Z direction. But that would be straight at the Russian space station - So none of those jets were fired - so to slow down we fired our X jets which actually fire in a fore and aft direction from the shuttle. But they are canted just a little bit in the direction where you get some braking out of them.

MATTSON: So you got one vector that will give you brake.

COLLINS: Right - I would have to show a picture to really describe it, but we used a low Z mode on the jets. And these procedures were developed on Mir. And then we came to this space station program and heck we pretty much used the same procedures on the station that we had used on our rendezvous with the Mir, with some differences. But we had fewer unknowns.

MATTSON: Well, I guess we had better cut this off. We are almost there.

COLLINS: Okay.

DAVIS: We are just about out of tape by now.

COLLINS: If I keep talking, I am not going to be able to do much talking the rest of the day. I am running out of words.

MATTSON: [This ends our] Oral History Interview with Eileen Collins. Thank you very much for allowing us to record all of this history. I really enjoyed talking with you.

COLLINS: Okay. Thank you very much.

Transcribed on January 18, 2006 by Howard Hallmark.
Eileen Collins, at Johnson Space Center, 2006
EILEEN COLLINS, PRIOR TO THE STS-63 MISSION