

NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT

ORAL HISTORY TRANSCRIPT 5

WILLIAM S. MCARTHUR, JR.
INTERVIEWED BY JENNIFER ROSS-NAZZAL
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ROSS-NAZZAL: Today is June 19th, 2017. This interview with Bill McArthur is being conducted at the Johnson Space Center for the JSC Oral History Project. The interviewer is Jennifer Ross-Nazzal, assisted by Sandra Johnson. It's been a while since we last met.

MCARTHUR: Yes. My apologies.

ROSS-NAZZAL: I was curious what your technical assignments were after your first mission. I don't think we touched on that.

MCARTHUR: Oh, that is pretty interesting. It was a bit unusual. Before my first mission I was a CapCom [Capsule Communicator]. Normally the preference was that a CapCom have previous flight experience. Talking about ignorance is bliss, I CapComed for a while, and thought I did a respectable job. Then I flew, and I came back. One of the things they assigned me to do was be a CapCom again. I was sort of mortified at how abysmally ignorant I had been, doing the job before, and had a better appreciation that you could add, I think, almost a quantifiably better support to the on-orbit crew if you really had the insight into what they did. (I became a CapCom again between STS-58 and 74.)

I had, I think, a couple of other jobs. I was the flight crew equipment rep for the Astronaut Office. Flight crew equipment was a subject that astronauts were very passionate about, very

interested in, and I thought that was [the case] for a couple of reasons. One, everything that adorned your body that made you look like an astronaut came from flight crew equipment: the launch and entry suit. The blue flight suits didn't, but on-orbit clothing, all the personal items that you had on orbit, they all were part of the Flight Crew Equipment Project or managed by the Flight Crew Equipment Office.

It seemed like crew members had more at least immediate passion about those [personal items] than they had collectively about things like the satellites we deployed and the experiments we did. I say collectively, because an individual crew would be very interested in the tasks that comprised the mission. Everyone was interested in the food that they had or whether or not the potty worked well. There was always this little bit of buzz in the system about putting a significant amount of effort into fixing really small things. So I did flight crew equipment as well.

Somewhere in there that involved the Lightweight Seat Project. It was part of an effort to reduce the weight of the Space Shuttles themselves because we knew we wanted to go to higher inclination orbits, to work with the Russians in the Shuttle-Mir Program, and then ultimately start construction of ISS [International Space Station]. The Shuttles just did not have the necessary performance, so we were looking at any little areas we could cut weight, and one of them was to take the mission specialist seats and try to redesign them so that they weighed half as much. I did a little bit of that.

I also remember an interesting thing. The branch I was in also tracked some of the payloads, and I'd just got some little hint from the corner office that made me interested in this docking module that the Russians were building that we were going to fly up to Mir. I volunteered to track that project, and the answer from my branch chief was, "No, I'm going to have you track

a different payload. You don't get a leg up on being assigned to that mission just because you're tracking the payload."

I said, "Okay, thank you anyway." Then when I got assigned to it, as I had heard might happen, "Well, I'll catch up now."

ROSS-NAZZAL: When you were tracking that payload [later] did you have a chance to go over to Russia? What does that involve?

MCARTHUR: I did not track that payload. I didn't actually become involved with it until I was actually assigned to the mission. Then we actually did go over to Russia a couple times and those were my first trips to Russia.

ROSS-NAZZAL: Would you tell us about those trips to Russia?

MCARTHUR: We went and we stayed in what was the Penta Hotel, it's now the Renaissance Hotel. It was called the Penta Hotel because it was right by the big stadium where the Russians were hosting some of the Olympic events, and I think that was '80 Olympics, which we boycotted.

It was interesting. We were told the hotel was—how much of this is true and how much of this is just bold talk—the hotel was German-owned at the time, but we were told it was very safe because it actually was under the control of the Russian Mafia and they didn't allow petty criminals to bother their clientele. True or not true, I don't know, but it was a lot of fun being there. I think very often those stories get a bit exaggerated.

On one of the two trips we went out to Star City [Russia] to do some training out there. The EuroMir '95 crew was training. I know the primary crew consisted of Yuri [P.] Gidzenko, Sergei Avdeyev and Thomas [A.] Reiter. Christer Fuglesang was Thomas's backup. Ken [Kenneth D.] Cameron was the STS-74 commander. He was the first DOR [director of operations] in Russia.

We're having dinner at night, and we all haven't completely gotten over our jet lag, so we're anticipating hopping in the van and going back into the hotel in Moscow [Russia], when the cosmonauts and the ESA [European Space Agency] astronauts invited us to spend the night in Star City. We were a little bit surprised by the invitation, and Ken very quickly whispered to us, "It really would have been rude not to accept the invitation." Christer hosted me in his apartment. I don't think his wife was there at the time. I think she was perhaps back in Sweden. We spent the night, and it was just one of those great experiences. I think they help you grow culturally.

What other interesting things about that trip? I'm sure some other ones will come to mind.

ROSS-NAZZAL: What was training like over there?

MCARTHUR: Mostly it was familiarization. We would go into the Mir mock-ups so we'd be better able to visualize the configuration of the Mir station itself. Also we visited the factory where they were building the docking module, and we saw a lot of the equipment. It helped us understand the module itself, the hardware that was going to interface with the Space Shuttle airlock. A bit of it was touring, a few things like the Energiya Museum. It just was a good field trip to get to understand better the Russian space program and Roscosmos.

ROSS-NAZZAL: The hardware wasn't built yet. How did you train on it here in the States?

MCARTHUR: A lot of it was with simulators. Of course, we very rarely train using flight hardware. It was ironic years later when I was training in the Hydrolab. I saw the Hydrolab mock-ups of the docking module, the one that we had flown. Their water-training mock-up was sitting on the ground outside the Hydrolab. Said, "I recognized that." It was funny. When we designed our patch, all we saw were engineering diagrams of it, so in our patch it's white. The insulating blankets on the outside of it were actually burnt orange; so okay, patch is wrong, too late.

ROSS-NAZZAL: How did you feel about being selected for this mission, having been a military person for so long?

MCARTHUR: All of us on the crew were career military. Ken Cameron, Marine; Jim [James D.] Halsell, Air Force; Jerry [L.] Ross, Air Force; Chris Hadfield, Canadian Air Force; and myself. We were all thrilled to do a mission, and Yuri Gidzenko was Russian Air Force, and Sergei Avdeyev was a civilian cosmonaut, an Energiya cosmonaut, and then Thomas Reiter was with the Luftwaffe. We all enjoyed that post-Cold War opportunity to build a camaraderie with our Russian counterparts.

ROSS-NAZZAL: You mentioned that this was an all-military crew. How did it differ from your first crew, which included a vet [veterinarian]?

MCARTHUR: I would say a bigger difference is that it was an all-male crew and there were no women on it, which is closely related to why, in my opinion, we are so successful working with the Russians. The reason is because we are focused on solving the same problems. These problems are how we cope with the laws of physics, for example. If you calculate orbital velocity required to match up with an orbiting space station, it's not a multiple-choice test. There is a solution. There is *a* velocity you have to achieve. There is *an* orbital plane you have to be in. I think that it takes away in many cases an environment in which you can have a difference of opinion, because the answer to these problems are engineering solutions and they're not soft answers; they're not opinions. I think that helps people focus very well.

I did enjoy, on STS-58 and STS-92, having women on the crew. I don't want to call it a more normal environment, but there is a feeling of—I'll think of a way to describe this that isn't funny. Women bring an additional dimension of strength and harmony on the crew, the absence of which was not a problem on 74, and certainly wasn't a problem for Valery [Tokarev] and me on ISS, but it I think enriches the experience.

ROSS-NAZZAL: That's interesting. Had you worked with any of the other folks on your crew previously?

MCARTHUR: On 74?

ROSS-NAZZAL: Yes.

MCARTHUR: Jim Halsell and I were in the same astronaut class, so of course we'd done a bit of traveling and a good bit of training together.

ROSS-NAZZAL: Anybody else on the crew? Or was this pretty much a new culture for you?

MCARTHUR: I'd been in the Office for five years at this point, so I knew everyone on the crew pretty well.

ROSS-NAZZAL: STS-74 was the first time we had astronauts in the same lab at the same time from the U.S., Russia, ESA, and Canada. Talk about that historic mission.

MCARTHUR: That is interesting. We were the second mission to dock with Mir, and because of the number of nations that were represented we took up a copy of the UN [United Nations] Space Treaty. The Administrator, Dan [Daniel S.] Goldin, was very interested in talking to the crew, at least one person from each country.

Ken and Chris and all the Mir crewmembers were invited to participate in the conversation with Mr. Goldin, and Jim, Jerry, and I were invited to be elsewhere in the spacecraft. I remember the cosmonauts in particular. They loved the number of windows on the Shuttle flight deck, and they expressed a strong preference that the future International Space Station be equipped with a generous number of windows. It took a while, but when the Cupola finally went up in, I think, 2010, that finally happened; unfortunately, I didn't get to enjoy that view.

Another thing, on STS-74 in 1995 we flew during the government shutdown that year.

ROSS-NAZZAL: I wanted to ask about that.

MCARTHUR: That was interesting. It affected us very little. We were asked by management not to query the ground about the government shutdown. We would try to in an indirect way like [asking], “How’s parking today?”

They’re like, “Yes, parking is still real good.”

Otherwise we didn’t see any effect real-time. However, if we didn’t fly the first professional-grade digital camera, it was maybe the second time this Kodak DCS, think it was 460, was flown. We were doing our best to take pictures and downlink them, assuming that they would be a big hit on the ground.

The photo/TV folks in Building 8 were evidently deemed nonessential, so those pictures were not released real-time. For a long time, it was very difficult to find them in the NASA archives. I don’t know if I just wasn’t looking in the right place. Of course when you fall behind it takes a lot of effort and real diligence to then catch up. It was disappointing to get back and find out that those pictures had not been released to the media while there was a little more excitement in the public.

We were docked to Mir for two days. The first day I went over with the digital camera and took a good number of pictures. Our joint crew photo on our montage is one of those pictures. Then the next morning we got a note from the ground, and it said the digital camera had not been certified for use on board Mir, so we couldn’t take it back over the second day.

ROSS-NAZZAL: What was the potential danger there?

MCARTHUR: Who knows? Electromagnetic interference. But it's like, "Okay, we won't do that."

ROSS-NAZZAL: That's a bummer. One of the things that I had read about your mission was that you guys actually decided to create a website, the Utterly Unofficial Website of STS-74. Do you remember that website?

MCARTHUR: I don't remember that at all. That's interesting.

ROSS-NAZZAL: I was curious about that.

MCARTHUR: Here's a slightly different story. They wanted us to bring back frozen biological samples, blood and urine, from the cosmonauts. We had a refrigerator/freezer on the middeck. I went uphill on the middeck and then downhill on the flight deck, so that was my one flight on the middeck.

My job was to keep an eye on the refrigerator/freezer because they would have considered scrubbing the launch if the refrigerator/freezer failed, so they could replace it. We knew that the cosmonauts had been on orbit for three months when we got there. They had just been notified that their mission had been extended, so they were going to be on orbit for another three months. We started planning, and then we folded that in. That influenced our plan on what we could take up to them in the way of something that would boost their morale or mementos.

The freezer was going to go uphill empty. We finally hit on getting ice cream and filling the freezer with ice cream, so then we would share that with the Mir crew while we were up there, and then we would bring their biological samples back in the freezer. I'm not certain that what

I'm about to say is true or I've told it so many times it sounds true. We went to the mission planners and said, "A refrigerator that's empty cycles more, and it works harder." You may have heard this old advice that if there's a hurricane and you lose power, your food will last longer if the freezer is completely filled. Don't open it very much. We said, "If we put thermal mass inside the refrigerator/freezer it'll help keep down the number of cycles and the refrigerator/freezer is less likely to fail." That's our story anyway.

The mission planners said, "We'll go see what might be something good that could go up as thermal mass."

We raised our hands and said, "Ice cream, that way you don't have to bring it back." They did tell us that we had to eat all the ice cream while we were docked, because someone was worried that if we didn't eat all the ice cream the Mir crew would put it in the same freezer that they kept the blood and urine samples, so they were a little concerned about that. We decided when we were up there that these were professionals, and that we could probably trust their judgment as to whether or not it was okay to try to ration their ice cream a little bit more.

A few years ago I got an e-mail from a friend of mine. He said, "I was helping my seventh grade son study Texas history, and this is what we found." He had scanned a page from the seventh grade Texas history book, and it was a picture of us on the middeck of *Atlantis* with little cups of Blue Bell ice cream floating on the middeck. It was part of the story talking about things that were uniquely Texas, and Blue Bell ice cream [was one of those items]. You probably begin to have an inkling that you've been around a while if you're in the history books.

ROSS-NAZZAL: Did Blue Bell step up and offer free ice cream?

MCARTHUR: We did have a very generous supply of Blue Bell ice cream at our postlanding party.

ROSS-NAZZAL: The official ice cream of STS-74?

MCARTHUR: I'm sure they couldn't do anything official, but they seemed very pleased with the opportunity.

ROSS-NAZZAL: Did you spend much time learning Russian for this mission?

MCARTHUR: Not a significant amount, but that's when I began studying Russian. Ironically, as I mentioned, Ken Cameron had been the first DOR. Later Jim Halsell was the DOR. Then I became the DOR for a while, and then Chris Hadfield replaced me as the DOR. Out of the five of us on the crew, four of us served as the DOR.

ROSS-NAZZAL: [Was that a] coincidence?

MCARTHUR: Of course really it wouldn't be a coincidence. I think we all enjoyed our experience of working with the Russian space program and the cosmonauts, really a very collegial group. They're a very welcoming group. Once we were over there and got to experience Russia a little bit, several of us thought it might be good, instead of just dipping our toe in the pool, to go ahead in all the way. Or it could be like the frozen lake in Star City, maybe we were all going to jump through a hole in the ice.

ROSS-NAZZAL: One of the experiments you were working on, just as you had on your previous flight, was the SAREX [Shuttle Amateur Radio Experiment]. Had anything changed since then?

MCARTHUR: Very much so. We had a different radio. Instead of an amateur radio in there we actually had a military radio. Actually it was intended to use a different frequency in the VHF band, but it was also compatible with going in the amateur band, so I used it to make amateur radio calls as well.

I do remember when we went to KSC [Kennedy Space Center, Florida] to look at the payload bay, there was this—it looked like a barber pole shape trash can in the payload bay. “What is that?”

“It’s the VHF antenna.”

“Okay.”

“But we don’t want you to use it. We want you to use the antenna that goes into the commander or pilot’s window because we want to take that off of the vehicle and not use it for subsequent flights. Therefore, we don’t want you to get used to it.”

“Really. Okay, so what if I forget to switch antennas?” I forgot to switch antennas, but it worked just fine.

ROSS-NAZZAL: Any chance you used the SAREX on the Mir?

MCARTHUR: I did not. Or did we? It’s been twenty-two years ago. I think we in fact did use the radio that was on board Mir to talk to the ground. Now that you mention it, I think there’s even a picture of it somewhere. I’ll just have to hunt for it.

ROSS-NAZZAL: I wonder if you could talk about connecting the ODS [Orbiter docking system] to the docking module, take us through that and your participation in that event.

MCARTHUR: I was actually the docking system operator. It was interesting because it was Russian-built hardware, and they tried to implement some of our requirements as far as redundancy. It wasn't completely redundant, so that was interesting.

One of the things we were concerned about was how do we attach the androgynous peripheral docking system on the docking module into its counterpart on top of the airlock. It turned out that the analysis indicated that the RMS, remote manipulator system, the Canadarm, it would be at such a sharp elbow angle, it might not be able to apply enough driving force to get the two mechanisms to engage.

I had the privilege of being the second EVA [extravehicular] crew member, so Jerry Ross and I did a lot of training in the WETF [Weightless Environment Training Facility] over in Building 29 on alternate techniques. What we really trained to do was use straps that we could tighten down with a ratcheting mechanism, and we were going to try to just mechanically pull the complementary mechanisms together. That was a pretty exciting thought. It was exciting to think that we had a pretty high chance that we would have to go do an unplanned EVA. It wasn't in the timeline, but we trained to do it if necessary.

The technique that came into favor was for Chris to put the docking module in position above the airlock and have the two APDS [androgynous peripheral docking systems] mechanisms some slight distance apart. Then we would relax the arm, and Ken would actually fire the thrusters and basically dock with the docking module.

The day before Jerry and I began EVA prep, so we were ready to do the EVA. We depressed the [crew compartment] to 10.2 [psi—pounds per square inch] so that we could go out quickly if necessary. Of course we were disappointed; it worked just fine. Darn, there went my chance to do my first EVA, so I had to wait another mission.

ROSS-NAZZAL: What are your memories of approaching Mir for the first time?

MCARTHUR: I was operating the rendezvous and prox ops [proximity operations] hardware, so I was getting rendezvous radar data into a laptop, and it was providing a lot of information to Ken in addition to his actual visual cues. Of course by then *Star Wars* had been out for a long time, and you're just envisioning approaching the Death Star. It was cool to see. You're coming in, and you see another spaceship. As it gets close and it gets really really big, then you're about to collide with it, that's when you're just hoping everything goes well.

There was an interesting aspect we had. You asked about the docking system. We had two interfaces. There was the interface between the docking module and *Atlantis*, and then there was the interface between the docking module and Mir. There was a switch to change which interface you were controlling. When we installed the docking module onto the external airlock, a switch was in a position to control that one. Once that was completed and it was firmly mated, then you changed the switch to the upper docking system, and that's what you used to control rigidizing the interface between *Atlantis* and Mir.

One of those fears of how can you really mess up, and that is what if we don't change it back to the lower interface. Now when we undock from Mir, instead of undocking and leaving the docking module behind, you take the docking module with you. There are no bonus points for

doing that. It was a bit of a relief as you're looking and we start separating and we're separating at the right separation plane.

ROSS-NAZZAL: I'm guessing there was a checklist for that. Multiple checklists, right?

MCARTHUR: There was a checklist, and there were multiple verifications that we were doing the right thing.

ROSS-NAZZAL: Chris Hadfield said that there was some challenge after you had docked and trying to open that.

MCARTHUR: I'm not sure all the reason. It probably has a lot to do with equalizing the thermal conditions. We encountered that docking Soyuz to ISS as well, and that is that the hatch just sticks. Once you've docked with the Space Station you really would like to go inside at some point.

ROSS-NAZZAL: What are your memories of first entering Mir? Can you describe what you saw and what it smelled like, all those things?

MCARTHUR: I didn't notice any really unpleasant smells. Most of it was very much like going through a relatively narrow tunnel. Until you got into what they called the base block, which was very similar to the service module now on ISS, once you got there it opened up quite a bit, and there was a lot of room to work and socialize. That's where their table was.

It was pretty interesting because they have a long axis, and at the far end they had a number of modules protruding out at ninety degrees. It was pretty interesting to go into the little node where they had multiple modules attached and then come through and actually look around and say, "Now which direction do I want to go?" Because we were there such a short period of time, you didn't reach the point where you instinctively knew where you were going.

STS-71, the module they docked to actually had to be moved to the longitudinal axis, because the docking module wasn't installed yet, and then they had moved that one back. So the module we attached to was perpendicular to the long axis of Mir.

Also [I] had an experiment to do called the Plume Impingement Contamination Experiment. The end of the arm had some little detectors on it, and at one point it required that I elevate the arm above *Atlantis*, so it would be in the right position so that when Mir fired some of their thrusters, any combustion products from their engines would hit the sensors on the end of the arm. Trained that a lot. I remember looking at the TV; I think I was even in single joint mode, just moving the arm up, and then when I physically looked out overhead, it scared the ever-loving daylights out of me because it looked like it was moving toward Mir's solar arrays so rapidly. It was what it was.

We did something interesting on that flight, which in retrospect I didn't do again, and that was we did a lot of individual operations. I did a fair amount of RMS operations just by myself, with no one looking over my shoulder. I thought that always having a second set of eyes, I think, in space is maybe a better approach.

We were also testing the space vision system on this flight, and it consisted generally of a number of white circles with a black dot in the middle, and if you had a sufficient number you could have television camera views, and if everything was calibrated, the geometric relationship

of multiple dots could tell you how far away an object was, what its orientation was. It was very frustrating, because we were in lighting conditions where some of the dots were in sunlight and some were in shadow.

The Space Shuttle cameras just could not handle such a broad range of brightness. Either I could close the iris down and see the dots that were in sunlight and then I couldn't see the dots that were in shadow, or I could see the dots that were in shadow and the ones in sunlight would just be blown out. It was a good data point for the ground.

ROSS-NAZZAL: You mentioned you thought it was really important to have that second set of eyes. Why was that the case that you were doing things generally singly?

MCARTHUR: That's something that I've thought about in retrospect. I think we just had so much to do that it was okay. But I don't think any crew after that [did so]. Later I think that we adopted in the Astronaut Office more [crew] for really critical tasks where you have a prime operator and a backup who's keeping an eye on things, reading procedures, better cockpit resource management.

ROSS-NAZZAL: Do you think that was helpful when you went on Station?

MCARTHUR: On STS-92 it was. On Station not so much, because with just Valery and me there, we tended to rely more on the ground to be your second set of eyes. That worked out pretty well.

ROSS-NAZZAL: You mentioned that Plume Experiment. There was another one, a Risk Mitigation Experiment on the Mir Wireless Network. I was curious if you could talk about that.

MCARTHUR: Eventually ISS had a wireless instrumentation system on it, so again I don't remember much about that. I think we had wireless instrumentation on STS-92. I'm sure we didn't have any on the outside on STS-74, but we may have had some on the inside.

ROSS-NAZZAL: One of the things we didn't talk about are ceremonies. A lot of times when you connect with another spacecraft there's a big welcoming ceremony and gifts are exchanged. Was that the case on that flight?

MCARTHUR: We had a welcoming ceremony. That was more like hugs and a toast with tea or something. Somewhere in the middle we had a gift exchange ceremony, and I can't remember what we gave them other than ice cream, but they gave us some of the clothing that they had on board. Everybody autographed it.

There were eight of us on board. They had eight copies of three different envelopes with stamps on them—that's a big tradition the cosmonauts have. They will have memorabilia like that. They'll autograph them on orbit, and they will take a postage cancelation ink stamp and then cancel the postage. So we had a little memorabilia autographing session where all eight of us signed a total of twenty-four envelopes, they were stamped, and then as part of our gift exchange ceremony all eight of the crew members were given one copy of each envelope. We each got three envelopes. I remember Ken and I looked at the envelopes, and we immediately put them in our crew notebooks that we personally carry on and off. The other crew members did not.

Shortly after we returned Ken and I were asked, “When we destowed the other three crew members’ lockers we found these stamped envelopes, and we have confiscated them. Did you get three envelopes?”

I’m going, “Maybe.”

“Well, don’t do anything with them.”

“Okay.” Finally, they gave the other three crew members their envelopes. But there was an admonition, “While you’re a government employee, these things had better not appear on eBay.” I’m not sure what the collector’s value would be for something like that. For me they really have a lot of sentimental value, and I wouldn’t. Now my children might sell them, but then it won’t matter.

ROSS-NAZZAL: That’ll be years from now. That’s funny how Apollo 15, that’s still impacting the Office.

MCARTHUR: Oh gosh, it does. We came back, and then a few months later we all met in New York City. I think we all got there on a Saturday, and we got there first, then the cosmonauts arrived. Maybe before the cosmonauts got there the five Shuttle astronauts, we were just walking around Manhattan. Walked by the New York Stock Exchange. I can’t remember what night it was.

We’re chatting with security guards out there. “What do you guys do?”

“We’re astronauts.”

“Oh, cool, come on in, let’s just chat a little bit.” We did, and they were having a training exercise for one of their bomb-sniffing dogs, so they explained that to us. They let us walk onto

the floor. It was interesting, quiet. That probably was a Sunday. No, maybe that was Saturday night. That day we were picked up in a van by Tim Zagat. You know the Zagat restaurant guides.

ROSS-NAZZAL: There's actually a person? I didn't realize that.

MCARTHUR: There is. I guess someone from the UN had asked him to just show us around Manhattan. One of the first things he did is gave us all a copy of his guide for New York restaurants. He said, "I will not tell you [what] to eat, but if you tell me what type of food you would like, I'll pick the restaurant."

I'm going, "New York deli."

He goes, "Okay, we'll go to Carnegie Deli." When Tim Zagat goes to a restaurant, they really go out of their way to do their best. The Carnegie Deli, it's closed now; the Carnegie Deli would have been a great place anyway. It is, [the] times I've been back. We went there and just had just a fabulous meal.

Then the owner came by and he said, "Woody Allen is on the way over." Ooh, cool. Woody Allen comes in, and he's just walking just the way you would think Woody Allen would walk. Soon-Yi Previn is right behind him. We're going, "Ooh, oh, good, all the New York scandal." When he left, the owner asked him to briefly stop and say hi to our table, so that was pretty fun. Then we ate, I can't remember the Italian restaurant [where] we ate that night. It was one where some gangster, some Mafia guy, had gotten killed.

It was probably Saturday night that we were walking around a little bit. Then one night we all get together in somebody's hotel room. We're watching a James Bond movie on TV with Pierce Brosnan; it's one in which he steals a Russian tank and is driving, it might be through the

streets of Prague [Czech Republic]. [The movie was *Goldeneye*, and the city was actually St. Petersburg.] We're going, "Oh, the cosmonauts are loving this." Then on Monday we went to the UN, met the secretary-general, Boutros Boutros-Ghali, presented the flown Space Treaty to the UN, had a pretty pleasant little visit. Then we went down to Washington [D.C.], met the President's science adviser, got little boxes of M&M's with Bill [William J.] Clinton's signature on them. It's like, "That's fine."

ROSS-NAZZAL: I understand you also had a chance to visit with Senator John [H.] Glenn.

MCARTHUR: We did.

ROSS-NAZZAL: Can you talk about that? Anything memorable?

MCARTHUR: He's always gracious. We're all just a little sadder now that he's passed away, but he was just very gracious. After STS-58 we were doing our Capitol Hill stuff, and they were more interested in my visiting with members of the North Carolina congressional delegation than Texas, not being a native Texan. So I went to Senator [Jesse] Helms's office and visited with him for a little while. He called the photographer in, had me sit at his desk, and pick up the phone like I was actually doing some business. It was like, "Okay." After Washington I think the cosmonauts went back to Russia, and we came back to Houston.

ROSS-NAZZAL: No trips to Russia for PR [Public Relations]?

MCARTHUR: No.

ROSS-NAZZAL: Kind of a light PR load after that flight, I guess.

MCARTHUR: I don't remember much about it. We did some of the obligatory [events], go to KSC.

ROSS-NAZZAL: I was looking at your biosheet, and it's interesting because there's a period of about five years that doesn't contain much information. You have your flight, then you've got your next mission. Is that when you became DOR? Were you working on some other assignments?

MCARTHUR: Part of it was my second Shuttle mission was in '95 and the third was in 2000. There's a five-year gap there. What happened is I think in 1997, somewhere in there, I think it's because I trained with Jerry [Ross], the master of EVA. Even though we didn't do an EVA on 74, we did a lot of EVA training. I think Jerry endorsed me as someone who ought to be assigned to do a flight with EVAs.

One of the things we did in there became—oh gosh, I think we had a sort of EVA cadre that began to develop. I remember going to Huntsville [Marshall Space Flight Center, Alabama] and evaluating a proposed experiment for STS-87, which was space welding, that we would actually try to do some type of welding in space as a construction technique. Eventually someone said it would be better to take a welder and teach him to do a spacewalk than to take somebody. [I kidded], "I'll practice a lot."

But anyhow, I was doing a little bit of EVA development work. I think there were thirteen of us that they anointed as being the crew members who would do the first Space Station assembly EVAs. I did a bit of training for that. I was still CapComing. I became head of the Flight Support Branch, the Cape Crusaders, the astronauts who went back and forth to KSC, as well as all the CapComs. I was responsible for scheduling them and managing them.

I would guess in '97 at least the mission specialists got assigned to STS-92 because we had a lot of EVA training to do. We started doing a lot of training and technique development. Our flight date was constrained to be after the Russian service module was launched. I think it was [1998], STS-88 flew. The Russian FGB [Functional Cargo Block] was up, and so STS-88 took up Unity, Node 1, with PMA [Pressurized Mating Adaptor]-1 and PMA-2 attached to it. They used exactly the same techniques we had used on STS-74 to hold the PMA-node-PMA complex and attach it to the external airlock and then dock with the FGB.

The Russians kept delaying the service module launch. STS-88 was ISS-2A, and we were going to be ISS-3A. Because the service module kept delaying, we started inserting other Shuttle missions, so after 2A the next mission was 2A.1. Then the service module delayed again, so now we slip in 2A.2, then realize we still have more time, so there's 2A.2a and 2A.2b. On the 3A crew, the STS-92 crew, we referred to those missions as the terrible twos.

We always stayed close enough to our launch date. We could not return to support duties in the office. At some point with, gosh, I'm sure a year to go, we began to approach a point where the training team said, "You're trained to do the EVAs. You have no more required NBL [Neutral Buoyancy Laboratory] training." We argued that EVAs were a physical skill, and you couldn't just study the procedures and be proficient. We needed to continue to have proficiency training. So they dropped us down to about one NBL run for each pair per month. Ultimately we wound

up, I think I figured that our training ratio was we spent seventeen hours in the pool for every hour we [were outside] on orbit, which is way out of kilter if you look at what normally is considered a requirement. For a complex EVA by skilled crewmembers, maybe you would do eight hours for each hour actually outside. Or if you're talking about simpler tasks and more experienced crewmembers it might be five to one. We were seventeen to one. We were just slow learners. We had a lot of time to learn.

ROSS-NAZZAL: Can you talk about some of those techniques that you developed?

MCARTHUR: A lot of [them] were related to how you would hold yourself in location, how you'd manage the different cables that you had to route. We did a lot of very task-specific training because we took up the first truss element and also the third pressurized mating adapter, PMA-3. We spent a lot of time going to all the product groups and evaluating the interfaces that they had for joining the truss segments together.

ROSS-NAZZAL: Sounds like a lot of work.

MCARTHUR: [It] was a lot of fun, that crew training. I think maybe sometime in '98 Brian Duffy and Pam [Pamela A.] Melroy got assigned to the crew, so this crew really bonded well. We'd go to a lot of movies together. We were big fans of Austin Powers, Monty Python.

We even shared some little animated videos, and one of them was a Joe Fish cartoon. It showed a little gerbil, I think, being lowered into a fish tank of piranha—we just called him Joe Fish, he had quite a few comments to make, and we would use those. There was one in which—

as the piranhas are killing the gerbil—he goes, “Hey, real fun hanging out with you,” and then he just mutters under his breath, “You suck.” At the end of an NBL run we’d say something like, “Hey, real fun hanging out with you.” Then we’d just leave the other part. That was just our inside joke. We’re getting into 92 and a little bit away from 74, so maybe we’ll transition to 92 stuff later.

ROSS-NAZZAL: That’s okay. The only other question I had for you about 74 really was landing. You went to the Cape [Canaveral, Florida] this time.

MCARTHUR: We did. That was the only time I landed at the Cape. It was like, “Okay, we’ve been here before. Haven’t landed the Shuttle here.” Had a real nice picture taken on top of one of the buildings at KSC. Actually it looks like it’s slightly above us as we’re just coming down over the landing threshold. It also was a landing that we couldn’t do near the latter part of the Shuttle, because we came over the west coast of North America maybe at southern Canada, very northern part of the U.S., and then we’re in like a bank almost the whole time going in toward Florida. Of course after *Columbia* [STS-107] we tried to minimize overflights of large parts of a populated region just because of a fear that what happened in the *Columbia* tragedy—the vehicle is beginning to break apart. The debris is coming down on land, and it does present a risk to people on the ground.

ROSS-NAZZAL: Any other anecdotes from STS-74 that jump out at you? It’s hard to find information about that flight because of the furlough.

MCARTHUR: It was a short flight; it was like eight days. We didn't have as much time to get in trouble.

I do remember this flurry of activity because we had taken up the cycle ergometer, and I'm trying to remember. Did we have any exercise equipment on 58? We might have. We had the cycle ergometer, and they had one on board Mir. I remember there was a problem with Thomas Reiter's cycling shoes. I think one was lost or something. We said, "If one of our pairs of shoes will fit him we'd like to leave it." It took just about an act of—well, certainly more than Congress—to get permission to leave some Shuttle hardware on board a Russian spacecraft. It's not so much that there was some Cold War implication as it was, "Well, we don't know what it's made of, it's not certified to be over there." "Throw it over. Throw it over."

ROSS-NAZZAL: Oops. They just got lost, misplaced.

MCARTHUR: I don't know where they went.

ROSS-NAZZAL: You had mentioned you were working on these EVAs for multiple years. Between that time a new facility came on board, the Sonny Carter Training Facility. Can you talk about that?

MCARTHUR: It's just a fabulous facility. The WETF was fun, but you could barely get the Shuttle payload bay in the WETF, and I think it was twenty-five feet deep. The training arm would be somewhat out of the water.

I remember doing things that in retrospect we got smarter about because we just had not done that many EVAs up until that point. I had to do a lot of head-down work in the WETF. Part of the EVA culture at the time is you've got to demonstrate toughness. I would be on the end of the arm, and it would be moving me into a position in which I would be head-down to work. You're simulating weightlessness, but you're not weightless. So now the blood is rushing to your head. Your mucous membranes are becoming engorged and swelling. If you've got any drainage, it's going into your sinuses. It can be extremely uncomfortable, and for quite a while after you finish the WETF run, [you had sinus issues] because of spending so much time inverted.

The NBL was great because not only could you train in the Shuttle mock-up, but you could have a pretty reasonably complete Station mock-up to train on. We got smarter on our techniques. We did a lot of arm-based operations, and in this case you'd get established in the arm, and when it would start moving, particularly if it started to turn you into a head-down position, you would come out of the foot restraint. The divers would then tend to you. Once the arm was in position, they would take you to a lower depth, swing you upside down, and put you back into the foot restraint on the end of the arm. That way you didn't spend an excessive amount of time head-down. I remember that was a good thing.

About that time, I realized that my reading vision [worsened]; my arms were continuing to get shorter. Just couldn't hold things quite far enough away. If you're presbyopic, if you need reading glasses, the lensing effect of having the helmet visor with air on one side and denser water on the other side, it creates a concave lens. I found that I could not read things when I was underwater. The cuff checklist, well there's no real equipment, so that's not a problem, but all the cables and where you mated the cables, they were all lettered. Eventually I had to go to the NASA optometrist, and there was a standard fix for it. They would take your regular prescription and

then just change it a couple of diopters across the board, and you'd wear those [glasses for training underwater]. As I was suiting up I'd put them on, and as soon as I put them on I could see the whorls and the patterns in my palm or my fingers from about two inches away, but anything further was fuzzy. Once I was suited up and was lowered into the water it would be like someone was peeling away a smoky film, and everything would be really clear. That helped.

The NBL, it is a remarkable training facility. The people who work out there, they're the best, they're really good folks.

ROSS-NAZZAL: Did you spend much time at Marshall until the NBL came [online]?

MCARTHUR: No. I only had one dive in Marshall, and that was that welding experiment.

ROSS-NAZZAL: Did you help weigh in on the type of needs you might have at the NBL, how it might be designed?

MCARTHUR: No.

ROSS-NAZZAL: Did you help certify the facility once it came online?

MCARTHUR: That's a good question. I don't know. One of our runs may have been associated with that.

ROSS-NAZZAL: It's amazing having spent five years basically preparing for your next flight.

MCARTHUR: It is. Then I spent four and a half years preparing for the one after that. I once remarked most of my astronaut career was almost ideal. What did you do? I trained and flew, trained and flew. I was getting closer to my ISS flight, and I was walking down the hall behind a younger astronaut, and he complained, "I was sitting in meetings all day."

I said, "I really hope someday to have a job in which I sit in meetings all day and drink coffee." Be careful what you ask for.

ROSS-NAZZAL: It must have been nice for your family at that point while you were training for these EVAs because you weren't on travel. You were able to spend more time with your wife and daughters.

MCARTHUR: For the most part. I do remember the time we were in Cocoa Beach at dinner. The phone rings and my wife says, "When are you coming home?"

I said, "Tomorrow."

"Where are you?"

"In Florida."

"Did you tell me you were going to Florida?"

"Uh, maybe not. Did I tell you I was going to Florida?"

"No, you didn't."

"Oh. Sorry. I'll be back tomorrow."

ROSS-NAZZAL: She probably got used to you being around.

MCARTHUR: They did. For 92 we also did a couple of trips to Russia, and they were a lot of fun. By then the cottages had been built, so we actually stayed out in Star City.

ROSS-NAZZAL: Can you tell us about those cottages?

MCARTHUR: They're duplexes. They are three-bedroom, two-and-a-half-bath, got really a westernish kitchen. When I say western, Western European style appliances, wooden floors, a fireplace. I never put a fire in the fireplace. That was too bad, that would have been kind of cozy in the wintertime. By then had pretty reasonable Internet access. Had Kosmos TV, which was a cablevision service. They had several English language channels, so if you really wanted to watch English TV you could.

They each had a basement. Cottages 3 and 4, in the basement of Cottage 3 was Shep's Bar; the basement of Cottage 4—and you could go from one side to the other—was our gym. What was really nice about being there when I was training for ISS is if you were on one of the prime crews, you had a permanently assigned bedroom. Now if you weren't there someone else would stay in it. If you were there that was your bedroom, so you could leave clothes in the closet and in the chest of drawers. It made it pretty convenient going back and forth.

ROSS-NAZZAL: Sounds like a nice place. Was that something that NASA put money in to build? Or was that something that was really Russia's?

MCARTHUR: The story is NASA put money in to build it. I think a Swedish company came in and built them, but they were owned by Star City. NASA paid rent for them.

ROSS-NAZZAL: Sounds pretty nice based on previous accommodations I've heard about.

MCARTHUR: When I first went over as the DOR my wife and I actually stayed in one of the Russian high-rise apartment buildings, and we had a three-bedroom apartment, which was a little bit older than the cottages and I would say not westernized. But it was a great experience. We really enjoyed living there.

ROSS-NAZZAL: [I] wanted to ask about STS-92. I notice that it was the hundredth flight of the Space Shuttle Program.

MCARTHUR: It was.

ROSS-NAZZAL: NASA celebrates all those [anniversaries].

MCARTHUR: They did not celebrate that one.

ROSS-NAZZAL: They didn't?

MCARTHUR: They did not. For some reason the approach was, "Let's not make a big deal out of this one. It's just another Shuttle mission." Really? Okay, fine.

ROSS-NAZZAL: Must have been disappointing to the crew.

MCARTHUR: We were so happy being there. In retrospect, I just scratch my head over it a little bit.

ROSS-NAZZAL: Kind of figured there would have been this big momentous event.

MCARTHUR: In retrospect you go, “I don’t exactly understand the logic there.” Here with this new astronaut class, we really capitalized on the opportunity to draw a lot of attention to that. It seems counterintuitive.

ROSS-NAZZAL: Very much so. Tell me about seeing the International Space Station for the first time as you approached.

MCARTHUR: That was pretty cool, in part because we had trained so much. It seemed big. As a matter of fact, when I went out for my first EVA, I’m going out on my back. I’m looking up, and I see it up there, and I say something like, “Oh, goodness, it’s huge.” In retrospect of course it really wasn’t that big. At that time, it wasn’t as big as Mir. We hadn’t put the Z1 truss on it yet. It was long and skinny with solar arrays on it.

ROSS-NAZZAL: You mentioned going out for your first EVA. Would you talk about that? What were your feelings as you were going out?

MCARTHUR: Really excited. I was the second one out of the hatch then. I'd always wanted to do EVAs, so I was just really thrilled to have the chance. You go out, and it feels good. It's more comfortable than working in the NBL, because you're actually floating inside the suit instead of gravity pulling you to the lowest point of the suit. It was very satisfying.

I did a lot of work attached to the end of the arm. Koichi [Wakata] would move me from worksite to worksite. That was really thrilling because while you're in transit you just look around. You can't turn your whole [body]—you twist around a little bit. Then a few times as he'd be moving the arm around I would be able to see nothing in my field of view, no Earth, no spacecraft, no nothing. That was breathtaking.

ROSS-NAZZAL: Did you have any sort of overwhelming feeling like you might fall as you came out of the Shuttle?

MCARTHUR: No, there is a sense that you're hanging out there, if you will. There was one time in my second EVA. We were left wing down. I'm back in the payload bay. I look out, and I can see the Earth down here and there's the Station out here and the Shuttle is left wing down. I said something like, "It just looks like everything ought to fall out."

ROSS-NAZZAL: It almost seems like you would have that feeling, that gut reaction. Tell us about those EVAs that you participated in.

MCARTHUR: I was really thrilled to be assigned to 92 and to be one of the EVA crew members. I was MS [mission specialist]-2, so I was the flight engineer. I was also the second robotic operator, so I was R2, and then I was the number two EVA crew member, so I was EV2. I don't know if you remember the Austin Powers movie, but Robert Wagner was Number Two. We all had some names. From maybe it was *Life of Brian* or from one of the Monty Python movies we started calling Brian Duffy the Messiah. Pam Melroy was just Peabo.

ROSS-NAZZAL: Peabo?

MCARTHUR: Peabo. Pambo, Peabo. I think Jeff [Peter J.K.] Wisoff was MS-1, and he was Bulldog because he just was tenacious with the details. From the Austin Powers movie, I was MS-2, R2, EV2, so I was just Number Two. I think Leroy [Chiao] was EV3, and we called him Dr. Evil. L-A [Michael E. Lopez-Alegria], I think, was just L-A. Not just, I'm not sure how you improve on L-A.

Leroy was EV1, I was EV2, and we were paired. Jeff Wisoff was EV3 and L-A was EV4, so they were paired. Leroy had done EVAs before, and Jeff had done an EVA before. Those were good teams. It just was very professionally satisfying. We did four EVAs. Each team did two EVAs, but we did them four days in a row. I think in retrospect that was pretty ambitious. That was quite an accomplishment to pull that off.

The EVA training is hard. It's just physically hard, but it was always great to be in the pool, be away from the phone, away from the Office. I didn't live far from the NBL at the time, maybe a couple miles, so if we got finished with NBL training at 2:30 there was no way I was going back on site. Really working closely with all the divers and the test conductors and test

directors out at the NBL, they're just such a remarkable wonderful group of people. It was just very gratifying. Also it was gratifying to do something that was physically demanding. You get a good sense of accomplishment. We trained a lot.

The EVAs themselves, evidently PAO [Public Affairs Office] loved it. I'm just running continuous commentary during the whole EVA, describing what I'm feeling, describing what I'm seeing. I remember once when I had one of those views looking out I said, "Ooh, my toes are curling right up." What I was doing is as I was going around [on the end of the arm] and then couldn't actually see anything—I mentioned that—I just instinctively lifted my toes up just to make sure I couldn't inadvertently come out of the foot restraints. You're looking right at the Space Station, so your world becomes in some respects very very small. By virtue of how we move around, if you're not on the end of the arm, you're always looking face in to a large structure. Your world becomes a large structure. Maybe you can peek around a little bit and see something bigger but there's this really laser focus on what you're doing. Two things, if you make a mistake it really can be costly for the Program, or it can be costly for you personally. It's a pretty intense experience.

ROSS-NAZZAL: Did you have any challenges?

MCARTHUR: Just minor things. I had a tool I was supposed to stow on the outside of one of the toolboxes, and the tolerances were off just a little bit. I couldn't actually get it to engage, and so they had me stow it on my workstation and then go to a canvas bag that was over on the node, [Node 1]. I remember opening it up. When you open it up, it's full of tools or parts, generally tools. They're all tethered to the inside of the bag, but they're all floating inside this bag.

It isn't as if you open it up and say, "I'll now put this one in." You open it up, and it's just—and so in *Monty Python's Holy Grail* they talked about—no. Was that the Cliffs of Insanity? No, that was in *Princess Bride*. That was another movie we liked. That was Cliffs of Insanity. I open it up and everything floats out and I go, "Oh, the Node Bag of Insanity." I'm sure no one on the ground [understood].

It's like, "What's he talking about?" But all the crew knew what it was. There's a scene in there when Cary Elwes is talking to Mandy Patinkin, and Mandy Patinkin is Inigo Montoya, so he's a Spaniard. Inigo tells the farm boy Westley something like, "Westley, I give you my word as a Spaniard."

Westley goes, "No good, I've known too many Spaniards." We would tell that to L-A every once in a while, "Ah, no good, we've known too many Spaniards." It was just a lot of fun scampering around the outside of a spaceship.

On EVA 3 Leroy did the work on the end of the arm, and it was a little more fatiguing than EVA 1. But it still was a good one. I remember I went outside the airlock first. That was cool. You're outside and you look around and it's like, "It's just me. Just me. There's nobody else out here. It's just me out in my little one-person spaceship."

As I'm working to configure some tools, I notice motion out of the corner of my eye, and I knew Leroy had not come out yet, so motion outside is something is not quite right. There was a little metal valve cap about the size of a coffee cup just slowly drifting out of the airlock. Either Leroy or I had kicked it and dislodged it. It had a ring around it attached to a tether, and one of us had kicked it inside the airlock. It had slipped off of the ring, so it came floating out. I'm describing it to the ground because the ground is really interested in some piece of loose debris coming out, and then slowly tumbling along it kisses off of the robotic arm, and starts coming back

in my general direction but not exactly. I'm thinking, "Resist the temptation to leap out and get it. That would be bad." It eventually was gone, and I resisted the temptation without any problem.

ROSS-NAZZAL: I wanted to ask about the SAFER [Simplified Aid For EVA Rescue], which was tested on your flight. Did you get a chance to practice on that?

MCARTHUR: No, because once you activate the SAFER you can't reuse it. Once they had used it we wouldn't have them available for any subsequent EVAs, and since the last EVA was conducted by Jeff and L-A, they got to test the SAFER. They really enjoyed it. I think L-A was the one actually flying it. He had a ball.

ROSS-NAZZAL: Did you get a chance to test it on the ground in case you may have had that opportunity for contingency training?

MCARTHUR: Over in the VR [Virtual Reality] Lab—that's where you do your SAFER training, and it's kind of cool; it's a bit of an adventure. They tell you to close your eyes, and then they virtually propel you away from the Space Station. You're tumbling, and you don't know what direction, you don't know what attitude. Then they tell you to open your eyes and activate it. As soon as you activate it, it nulls all rotational rates. If you're lucky, when it stops, you can see the Station. If you're not lucky, you can't see the Station, and you have to find it. Generally, you're going to start a yaw rate and then when you see the Station you stop it, and then you start flying back in. They're tracking your propellant, and hopefully you don't run out of compressed nitrogen before you get somewhere safe. What's not so good is if it's right above you. Now you can't see

it here or below your feet. You can't see it. You can rotate around, and you still never see it. It's a bit of a video game.

ROSS-NAZZAL: You've mentioned several times the culture of your crew and the interest in movies. This crew, it seems like a special crew. What do you attribute that to?

MCARTHUR: I attribute it in no small part to Brian Duffy's leadership. He's just the kind of person that creates a very positive team environment. There's no pushing people, but he is just so positive himself and has I think such an upbeat approach to everything he does. I think that's infectious.

Also this mission was sufficiently complex. Everyone had a meaningful part of the mission. Fortunately, I didn't encounter that on any of the missions I was on, but sometimes people become so ambitious about doing everything that's fun in the mission that it can generate a little bit of friction. John [E.] Blaha on my first flight was really good about ensuring everyone on the crew had something meaningful for which they had primary responsibility. He wouldn't then begin to turn to a different crew member if he had a question about it, for example. I think Brian's leadership was part of it.

Also, with the exception of Pambo, everyone had flown before. I think we all were just a little more relaxed about what we were going to get out of the mission. Pam being the pilot had a unique role, so her being the sole rookie on the crew really wasn't something that made her feel that she didn't have a positive [contribution]. She clearly had a significant contribution to make by virtue of her position on the crew. Again I think we all had enough to do that was significant that we just all felt good about the mission, about the value of the mission, the complexity of the

mission. I think they just all contributed to being close to the ideal mission, with if not the ideal crew, psychologically very compatible.

After I had my bike accident, my memory is still a little fuzzy, because I was not in good shape at that time. L-A and Leroy came to see me in the hospital, so that was a real pick-me-up to see those guys. I got a nice note from Pam congratulating me on my retirement. See Brian on a regular basis, because his daughter who has two or three children and her husband live in Houston, and their son, he actually was one of the contractors supporting me when I was the Orbiter Project Manager. I think he still works for one of the contractors; I'm just not sure which one.

Tammy and Jeff sadly moved to California, and they both work at Lawrence Livermore National Lab [Livermore, California]. Gosh, Koichi, I saw him when I was in Japan in the fall. Who knows? He may come back and get back in the queue for flying. We got along really really well. Leroy, Jeff, and I were all in the same astronaut class, so that was a good thing.

ROSS-NAZZAL: When I talked with Pam Melroy many years ago, she mentioned how she was the baby on the flight.

MCARTHUR: Yes, I think we all really felt protective. But again it's not that she needed protecting. I remember in particular, and I think I mentioned this before, flying with Shannon [W.] Lucid on my first mission. She was just so gracious about explaining to us how to enjoy being in space.

I enjoyed flying with people who were flying for the first time because you get to vicariously enjoy that discovery of being in space the first time. At one point, if STS-114 had not had its foam anomaly, the Shuttles would have resumed regular launches. When Valery and I got to ISS, Thomas would have been there, and on a subsequent Shuttle mission Sunita [Sunita L.]

Williams would have come up and Thomas Reiter would have gone back. I knew Thomas, gosh, from ten years before when we went to Mir, and Suni is just such a wonderful person. While I really enjoyed the time Valery and I spent by ourselves because we were kings of the castle, it was great, I was disappointed not to have those third crew members along. Especially Suni, because it would have been so much fun flying with her on her first flight.

ROSS-NAZZAL: What advice did you share with Pam Melroy? You had mentioned that Shannon had given you some advice about things.

MCARTHUR: There are just the little habitability techniques. Things as simple as when you open food, don't create extra trash. If you're going to open a container, don't cut the top off, because now you got trash floating around. To things like go spend some time just looking out the window; go get up on the nightside.

Shannon had a technique where we would get along the top circuit breaker panel and get our heads up in the forward windows, and then just be there as you went around the nightside. She said she liked to imagine that she was in an alien spaceship just approaching Earth, or even a nonalien, but on a spaceship approaching a new planet for the first time. Those were all a lot of fun.

ROSS-NAZZAL: What are your memories of going into Space Station for the first time?

MCARTHUR: I'm trying to remember how far we got in. We got in the node, and it was pretty big. It had a large diameter. I think all of us took one night when we slept on board ISS. I decided right then and there that I wanted to be there for a much longer period of time. It was new, pristine.

ROSS-NAZZAL: Had that new car smell.

MCARTHUR: Yes, it did. It did.

ROSS-NAZZAL: So when you came back from the mission did you talk with the chief of the Astronaut Office about that?

MCARTHUR: I'd already been talking to him about that, and I came back. I was already lined up to replace Scott [J.] Kelly as the DOR. Gosh, I'd already been making the arrangements, working with HR [Human Resources], to retire from the Army and convert to civil service. It wasn't a quid pro quo, but it was I'd like to convert to civil service, and they go, "Okay, and would you be willing to go be the DOR?"

I said, "Yes, I'd be willing to do that."

Then there was this, "And maybe Expedition 7 or something, or 8."

I said, "Yes, we'll cross that."

By the time I got to Russia I know I knew I was going to be on Expedition 8, because I had three bosses. I had Charlie [Charles J.] Precourt, chief of the office. I had Mike [Michael A.] Baker, who was the manager for the ISS Program who was located in Moscow, and then Mike [C.

Michael] Foale, who was going to be Expedition 8 commander. All three of them were giving me things to do. I have three bosses. Okay, got it. “So which one of you will I offend today?”

ROSS-NAZZAL: On your last Shuttle mission I noticed that you got delayed for a couple of days. What did you do?

MCARTHUR: I think it was about six days. Ooh, idle hands are the devil’s playground. We got in trouble. We drank a lot of wine, that’s for sure.

ROSS-NAZZAL: You had wine on board the Shuttle?

MCARTHUR: No, while we were waiting in the six-day delay, we drank a lot of wine. I remember that. It was a wine-drinking crew. At the time, because we didn’t understand the risk of the composite overwrapped pressure vessels—I’m going to have to digress.

STS-58, Mike L-A was one of the family escorts, and Bill [William G.] Gregory was the other family escort. We get out to the pad for our first launch attempt. I think this is when we find out. I’m getting in the vehicle, or maybe we were out there a couple days before just inspecting. No, I think it was when we went out for launch. I get there and there’s a note on my seat from my wife that says, “I was here before you.”

ROSS-NAZZAL: How did that work?

MCARTHUR: What? This caused a bit of a stir. Mike was out driving Cindy and Julie Searfoss around. I think they said, "Can we drive by the pad?"

He goes, "Sure." So he drives out to the pad. He drives up to the gate. He said, "These are two of the crew wives. Can we drive up on the pad level?"

"Sure, go ahead, drive up." Drives up.

He goes to the access control person and says, "These are two of the crew wives. Can we go up to the 195-foot level?"

"Sure. Let us get some coveralls." They get some coveralls. I don't think they actually went inside, but they sat on the little access [room, the White Room], where you go in through the side hatch since they took pictures. That got back to the corner office, and it was a bit of a kerfuffle. It caused a bit of consternation, but it seemed like such a good idea. They adopted that as something they offered crew spouses after that.

Now let's fast-forward to STS-92. Before the first launch attempt we go out to the pad with our spouses, and we're climbing all over it. Suddenly we hear this clang clang clang clang clang clang clang. Some significant other has been taking pictures. The bottom of her camera opens up, the batteries fall out, and fell all the way down. Okay, that's not good.

So now we've delayed another day more, or something like that. We don't know when it's going to be. What are we going to do? Let's go back out to the pad, and let's take our kids with us this time. So now we go out to the pad. If they were old enough to have a primary contact badge, then they could go out there. Again we're kind of all over the place.

Now we get in the elevator and we're going back down to the pad level, and just when we get to the bottom, the elevator kind of jolts a little bit. Doors don't open. You look. Here's the

floor here, and here's where the doors are. [Demonstrates] We're actually a couple of inches below the edge of the door. The elevator has gone down a little too far.

We pick up the emergency phone. "Hey, we're stuck in the elevator."

"Who's there?"

"Prime crew." I don't know how many [people were in the cab]. It's a seven-person crew. Maybe we had fifteen people. We had a bunch of people in the elevator. In the pictures you look and it goes maximum capacity eleven people or something. Oh, so we overloaded the elevator.

As we continued to delay I think there was a third let's go out to the pad and look around. I know Leroy took his mom and dad out. I don't know who else. I'm sure my wife went again. We were troublemakers.

ROSS-NAZZAL: What did you do on orbit? You were delayed a couple of days coming back.

MCARTHUR: Oh yes, the return. There's not a lot to do. You're ready to deorbit, you wave off. Got another opportunity, you wave off. When you finally decide that you're not going to come home that day, what you have is you have a spaceship that's designed to be on orbit, and then you reconfigure it for entry. You now have to reconfigure it back, so you've got the payload bay doors closed. Now you've got to quickly open the payload bay doors, get cooling reestablished. Take your suits off.

At some point you've had a pretty full day. Then it's like okay, let's go have a meal. It was an eleven-day mission. We had three meals for seven people for eleven days. What are you going to eat for the next day? We have the pantry food, and that's what it's designed for. This is extra food to eat. You also have the food that you just didn't eat the first time you accessed that

meal. They generally packed way more food than you truly needed. Now you go through, and you say, "Well, I didn't want to eat that before, but looks pretty good. I'll eat it this time." You go through the whole thing, and you wave off again. Now you're looking at the food that you weren't interested in the first time, you passed on the second time, and now it's all that's left.

Leroy and I, it's almost like we're slipping into frat boy mentality. I wasn't in a fraternity, but still you get the idea. They had these hot dogs in the pantry food. They were just awful. They were just terrible hot dogs. Ever eat Vienna sausages?

ROSS-NAZZAL: Yes.

MCARTHUR: Imagine one that's a whole length of hot dog. That's how good it is, but you're hungry. What are we going to eat with it? We took up initially a bag of fresh tortillas, but you only want to eat those for a couple of days because they'll start getting moldy. We look. We also had these tortillas that were two to a package with a little preservative pouch inside. Those things will last a long time. Those are a good space tortilla, and they taste good. But crew had already eaten all those.

We're looking, here we have these moldy tortillas. We go, "They're just moldy around the edge." We took them, and we broke the edges off and put one of those nasty little hot dogs and put enough mustard on it. It's like, "Okay, that's good."

I think somewhere in there they let us talk to our families because our families were in Florida, and we knew that we were going to California and that they weren't going to be able to go to California. They were pretty disappointed. We talked to them, and we too were disappointed they wouldn't be there to greet us.

ROSS-NAZZAL: Any antics over those couple of days? Or any movies? You guys have a chance to watch any?

MCARTHUR: No, we didn't do movies on orbit. It's not like today when you got all your digital movies. I'll tell you about seeing the newest Harry Potter movie on ISS at some point.

ROSS-NAZZAL: Oh yes, I'd love to hear it. I think this might be a good stopping point for us.

[End of interview]