

JOHNSON SPACE CENTER ORAL HISTORY PROJECT

ORAL HISTORY TRANSCRIPT 3

WILLIAM S. MCARTHUR, JR.
INTERVIEWED BY JENNIFER ROSS-NAZZAL
HOUSTON, TEXAS – 17 FEBRUARY 2017

ROSS-NAZZAL: Today is February 17th, 2017. This interview with Bill McArthur is being conducted at Johnson Space Center for the JSC Oral History Project. The interviewer is Jennifer Ross-Nazzal, assisted by Sandra Johnson. Thanks again for having us today.

MCARTHUR: It's a treat having you come in and visit for a while.

ROSS-NAZZAL: It's always a treat for us as well. Last time we talked just very briefly about your work with Emergency Escape and Rescue Working Group. You talked about the pad evacuation exercise you took part in. Were there other things that you were working on with that group, with Steve [Steven R.] Nagel perhaps?

MCARTHUR: I didn't work with Steve very much on that. I remember Bruce [E.] Melnick was one of the Cape Crusaders then, so I worked with him and he was on the Emergency Escape and Rescue Working Group. We did a number of things. We did this pad evacuation exercise and came up with, I think, some suggestions that enhanced the safety of the process. In the armored personnel carriers that were there, plus the bunker, we added more air bottles because initially the idea was the crew would evacuate [at the pad]. Once they ran out of oxygen in their backpacks they would then have to take their helmets off and put on rescue masks. I suggested a better idea

would be to have additional bottles they could plug into and never have to remove their helmets. That way if there were any toxic gases in the area they wouldn't be exposed to those.

It was really kind of neat. There was a Shuttle cockpit mockup at the Cape [Canaveral, Florida], and they would move that. The KSC [Kennedy Space Center, Florida] rescue team would move it to a remote location maybe just off the SLF [Shuttle Landing Facility], and we'd practice evacuating people out of that. That was a good exercise. As I mentioned I also got involved with the design and implementation of the suit facility there.

The manager of the Astronaut Crew Quarters at the time was a lady named Nancy [L.] Gunter. You know how you sometimes just develop a special relationship with someone. Nancy had a reputation of being really stern and protective in this area, and she really didn't welcome interference in her area of responsibility, which had a very well defined geographic boundary. I don't know what I did, but for the entire time that I knew her she treated me like her favorite son. There was nothing that I needed help on in that area that she didn't just move mountains to get it done. It made me look much more effective than I really was.

ROSS-NAZZAL: That's great. We talked a little bit about the phone call that you got from Don [Donald R.] Puddy and how you took your daughters out of school and washing the car. What did you think about becoming a mission specialist after having been an Army aviator for so long? What were your thoughts?

MCARTHUR: Those were the rules. I was qualified to be a mission specialist. At that time the division of duties, especially on orbit, were very clearly defined. We didn't want the commander and the pilot to do spacewalks because of the risks. We've been fortunate. We've never had

anyone really injured to any degree to speak of doing a spacewalk, but it is a high risk activity. It's probably the riskiest thing that we do. The commander and the pilot never had the time to train for spacewalks, and then the concern was if somehow one of them on a spacewalk became disabled then you would have an impact of the entry, descent, and landing.

The same thing with robotics. Very rarely did the pilot or the commander get to be the robotics operator. On a Shuttle mission there was a lot to do, so each crewmember had specific duties. There was some—I don't want to say overlap. We wanted to have backups. When at all possible it was better to have two astronauts performing a task just to reduce the chance of making errors. On all my flights I was very busy. I thought I had the opportunity to make meaningful contributions to the missions. Again, I was qualified to be a mission specialist, and I was thrilled to be selected as one.

ROSS-NAZZAL: All flights are good flights, right? I was just curious about that because your biosheet—I think it says you've flown forty-one different types of aircraft, and you have nine thousand hours of flight time. That seemed like an awful lot.

MCARTHUR: That's air- and spacecraft, about half those hours are on Space Station. But that background sheds some light on why I enjoyed flying on the Russian Soyuz so much. I may have mentioned this earlier. As you're probably aware, there are three seats in the Soyuz. The center seat is the Soyuz commander. The Russians normally call the left-seater the бортинженер (bort-inzhener) or the flight engineer, and the right seat was initially the космолт исследователь (kosmonavt-issledovatel). That was the cosmonaut researcher. If you look at the controls, the center seat and the left-seater have I would say 98% of the controls. The right seat has three fan

switches for the ventilation fans for the suits and near its feet has a pump to transfer condensate that gets taken out of the air that circulates in the cabin. Other than that, the right-seater has essentially no responsibilities and no capability to operate any of the spacecraft systems.

The Soyuz commander has the optical sight between his knees, and that's used to orient the vehicle over the ground or it's used for the final rendezvous and docking, has the two manual flight controls, and has a display. It was a monochrome display and edge keys to make inputs to the display. The left-seater has a color display, same edge keys. Then there are a number of direct commanding push buttons. Then there are some environmental control and pressurization valves and some other controls over to the left of the бортинженер (bort-inzhener).

When the Russians started flying nonprofessional astronauts or cosmonauts in the right seat, they started calling that person the УКП (УКehPeh,) Участник Космического Полёта (uchastnik kosmicheskogo polyota), spaceflight participant. The point is the center-seater and the left-seater are the ones that really fly the vehicle, or operate the vehicle, let me put it that way.

I had the opportunity to become qualified in the left seat, which also meant I had to be trained and qualified to fly in the center seat if the Soyuz commander was disabled. Just by being the right place at the right time and the way the right seat assignments worked out, when I flew to Station I became the first American to do both ascent and entry in the left seat. The Soyuz, just like many spacecraft, the majority of the things that the spacecraft does are automated. Most of the commanding to the computers to initiate the automated activities were done by the left seat, and so again I was just very fortunate. That was really, no kidding, a mission where I had the opportunity to do a lot of the spacecraft flying tasks. I did enjoy that.

ROSS-NAZZAL: Yes, that's pretty cool. A number of folks who came here, who weren't selected as pilots, but had jet pilot experience had a chance to fly the T-38s and keep their hours up. Were you one of those folks?

MCARTHUR: Just like all the mission specialists starting in our class, I flew in the backseat.

ROSS-NAZZAL: Why was that the case?

MCARTHUR: I can only guess. I would only be speculating.

ROSS-NAZZAL: Would you tell us about your class, the class of 1990? You had some interesting folks in there.

MCARTHUR: Sure. There were twenty-three of us. It was really unusual. See if I can remember the numbers correctly. We had seven pilots and sixteen mission specialists. Three of us were from the Army. That was the first time more than one Army astronaut was selected and I think, if I remember correctly, the only time three were selected. We were surprised in that there was only one naval officer in the class, Dan [Daniel W.] Bursch. Like I said we had seven pilots. Terry [Terrence W.] Wilcutt was our one Marine. Ken [Kenneth D.] Cockrell was at that time a civilian. He was former Navy. Does that really mean that we had five Air Force pilots? We had Charlie [Charles J.] Precourt, Rick [Richard A.] Searfoss, Jim [James D.] Halsell, Eileen [M.] Collins [and William G. Gregory].

Had a couple of doctors who were working at NASA at the time, Dave [David A.] Wolf and Bernard [A.] Harris. Retired Lieutenant General Susan [J.] Helms was a mission specialist. Carl [E.] Walz, Air Force. I mentioned Dan Bursch, Navy. Ron [Ronald M.] Sega. Rich [Michael Richard Clifford], Nancy [J. Currie], and me. Jim [James H.] Newman. I think Jim had come to us from Rice [University, Houston, Texas]. Don [Donald A.] Thomas, another civilian. Jeff [Peter J.K.] Wisoff, who later married Tammy [Tamara E.] Jernigan.

We always got along really well. Oh, Janice [E.] Voss was in the class, may she rest in peace. She passed away a few years ago. That was really sad. I guess it was the biggest class since the 1978 group. I figure that probably worked to my advantage that it was a big class. I was probably number twenty-three on the list, so if it had been twenty-two, I wouldn't have gotten selected. Then I would have taken my girls out of school so they could comfort me.

ROSS-NAZZAL: I highly doubt that. Did you get a lot of media attention having three Army folks? Was there a lot of coverage from the Army and interest there?

MCARTHUR: Ooh, it is raining, isn't it?

ROSS-NAZZAL: Yes, it looks like it.

MCARTHUR: It's hard to say. I think what we in particular started trying to do is really—especially as I became the more senior Army guy, I tried to really maintain a close connection with both the Army and with West Point [United States Military Academy, New York] to try to really leverage our potential to be a positive image for the Army, not as much outside the Army, but within the

Army. I went up to West Point generally once a year to lecture. A West Point classmate of mine, Bill Fox, was on the permanent faculty in the math department. I would go up and give a lecture to the sophomores taking probability and statistics and talk about how we used tools like that to assess the risk of flying in space.

We would go to the Association of the United States Army annual convention and have a little booth there where we would sign autographs for servicemen and women or children that would come visit. We would do the same thing with the Army Aviation Association of America annual convention. We tried to be pretty visible within the Army family.

ROSS-NAZZAL: One of the questions I like to ask people is to talk about that first Monday morning meeting in the Astronaut Office. Can you talk about that and your memories?

MCARTHUR: Gosh, I think it just blends in with every other Monday morning meeting. We always were in awe listening to whatever John [W.] Young had to say. What I remember during that time is just how happy I was to come to work every day. That was for the first year, and then you started becoming anxious because you were waiting for your first flight assignment.

ROSS-NAZZAL: Would you talk to us a bit about your training? All the classes participate in training.

MCARTHUR: Generally we would have a morning with lectures. It was an attempt to have an integrated training session so we would have someone from Engineering come and brief us on a system, and then we would have someone from then MOD [Mission Operations Directorate], a

flight controller, come in and talk about and also share in giving us a lecture on physically what the system was, how it operated. Then we would have a more senior astronaut come in and talk about [the system] from an operator's point of view. In the afternoon you'd certainly be trying to get out to Ellington [Field, Houston, TX] to fly or be studying and going through workbooks. It got into a sort of an academic type routine, if you will. We of course had several trips where we visited the other NASA Centers and NASA Headquarters [Washington, DC].

Believe it or not, during my Army career I never drank coffee. I just did not drink coffee. Then when I went to Navy Test Pilot School, Navy Test Pilot School actually was similar in that you'd have a half day of class and then a half day flying, and then a half day writing reports. Those were long days. In college I never pulled an all-nighter. I never stayed up all night studying. I did stay up all night a few times in test pilot school writing reports. Oh, God, that was hard. To stay awake in class at test pilot school I started drinking coffee. When I came to the VITT [Vehicle Integration Test] Office here I stopped drinking coffee. When I started AsCan [astronaut candidate] training I very quickly started drinking coffee again.

ROSS-NAZZAL: Long days.

MCARTHUR: Wasn't so much long days. Sometimes the lectures were just a tad dry.

ROSS-NAZZAL: Did you have much of an opportunity to spend time with your family? Or were you guys pretty busy all the time?

MCARTHUR: Oh, no, those were good family times, not a lot of travel. I traveled a lot, of course, when I was training for Space Station flight. As a matter of fact I spent more time overseas the first two years I was a NASA civilian than I did in twenty-eight years in the military. Just the way it worked.

ROSS-NAZZAL: That was early Station too. It required a lot of training from what I've heard.

MCARTHUR: When I was the director of Operations in Star City, that was six months in Star City and I came back to the States, I think, for about a week and a half in that timeframe. That was a nice long stretch. Then after that I probably spent in the neighborhood of four to five months a year in Russia. It would be anywhere from two to six weeks in Russia and then four to six weeks back here.

ROSS-NAZZAL: Tough schedule.

MCARTHUR: It was a lot of travel. I'm trying to remember what my rule of thumb was. I think it was I didn't want to be in Russia three weeks or less. If you went over there for just a very very short period of time, you were always battling jet lag. But if you went over there for four weeks or longer you would get there and really settle in, you would get shifted. You would also have time on the weekends to explore and go sightsee in Russia or go to Moscow and go to a real restaurant. There were no real restaurants in Star City. There were some things that wanted to be restaurants. They were fun, they were an adventure, but they were Spartan. They were very rudimentary.

That was partly because the Russian economy was still in the throes of changing from the communist era, from the days of the Soviet Union, to trying to become more entrepreneurial, to have a little more of a little taste of capitalism, which was working great in Moscow. I mean, it was working great in Moscow. You go like ten miles outside Moscow. I mean, there were exceptions. Some of the larger outlying cities or large towns, they were doing okay. After all, Shchyolkovo had a McDonald's, but that was not within walking distance of Star City.

ROSS-NAZZAL: That'd be quite the hike.

MCARTHUR: Now I admit I occasionally went to McDonald's in Russia, but why go to an American fast food restaurant? It's always nice, a little taste of home. The Russian drivers that transported us around, they loved it. They loved for us to go there. We'd maybe buy them an обед с Биг Маком (obed s Big Makom [or lunch with Big Mac]). It's a Big Mac [value meal]. That's like a number one on the menu or whatever it is. It was a lot more fun to go to see something that was more Russian, traditional. Although I'm not sure that we really saw Russian traditional so much as something that tried to be a little more western with Russian food—I'm not sure there is Russian cuisine, but whatever cuisine that they brought in from the republics.

ROSS-NAZZAL: Nothing like borscht or something like that?

MCARTHUR: Oh, borscht, sure. The borscht on board Space Station was just outstanding; it was really good. I remember as a kid seeing some cartoon. The implication was that borscht was awful, and it's not. It's really good.

ROSS-NAZZAL: Yes, well, it's cabbage I guess.

MCARTHUR: Cabbage and they generally have some pork or some meat in it. It's well seasoned—well, it's seasoned.

ROSS-NAZZAL: One of the things astronauts do is they get assigned technical assignments. What was your first technical assignment after you became an astronaut?

MCARTHUR: This is great. My first technical assignment was the Motor Mother.

ROSS-NAZZAL: The Motor Mother?

MCARTHUR: The Motor Mother. I basically was the Office representative for all the solid rocket motor projects at Marshall [Space Flight Center, Huntsville, Alabama]. At the time there were two and a half. The Shuttle Program consisted of several projects. You had the Orbiter Project, the SSME [Space Shuttle Main Engine] Project, the External Tank Project, the SRB [Solid Rocket Booster] Project, and then ground ops and vehicle processing at KSC really was very similar to another project.

Part of the Solid Rocket [Booster] Project, it was not just the booster, but it was the solid rocket motor. The motor is the thing they built in Utah. They would put a pointy end on the top, and they would put auxiliary power, an aft skirt on it, and electronics in it. When they put it all

together, that was the solid rocket booster. I was our interface with that group plus another one, the Advanced Solid Rocket Motor Project.

Because the *Challenger* accident [STS-51L] was the result of a failure of the solid rocket motor—NASA went down two paths to recover. One was to redesign the solid rocket motor. That was the RSRM, the redesigned solid rocket motor. Later we changed the name to the reusable solid rocket motor. I think it's because we wanted to forget that we had to redesign it. But, we did.

Then at the same time, Aerojet and I think Lockheed partnered to develop the advanced solid rocket motor. What they did is they went to an abandoned Tennessee Valley Authority nuclear site in I think it's called Yellow Creek. It's outside of Iuka, Mississippi. They started to build a new solid rocket motor manufacturing facility. The idea being that if Thiokol couldn't fix the problems with their solid rocket motor then we would go to this other vendor and replace the Thiokol motor.

Why Iuka, Mississippi? The chairman of the House Appropriations Committee I think at the time was a gentleman named Jamie [L.] Whitten and that was his district. He had been in Congress since either the week before or the week after Pearl Harbor. He'd been in Congress for a very long time. He was a bit senior. He had a lot of influence. We were going to build this new advanced solid rocket motor.

There were some neat things about it, one of which was that it promised to be able to deliver twelve thousand pounds more payload to orbit, which became really important when we decided to build the International Space Station. I was also the office representative on that.

It was interesting. Trying to remember what group it was. National Academy of Engineering? I can't remember. There was an organization at that time that was doing an

assessment of the Advanced Solid Rocket Motor Project to give Congress an estimate of whether they thought it would be successful. I got to go along as the token astronaut who got to go around with that group of people.

Out of that though, when I left the Astronaut Office and went to the Shuttle Program Office, the SRB project manager I think at the time was Steve [Stephen F.] Cash. When Robert [M.] Lightfoot left the Shuttle Program—Robert Lightfoot was the deputy program manager for the propulsion elements at Marshall. When he left, Steve became the Shuttle deputy program manager. As soon as I got there and then I saw Steve again, we realized that we had worked together on the Advanced Solid Rocket Motor Project starting in 1991, so we then worked very closely throughout the rest of the Shuttle Program. When the Shuttle Program ended I became the S&MA [Safety and Mission Assurance] director here in Houston, and he became the S&MA director at Marshall. It just was really a wonderful time.

After doing that for a year I became a CapCom [Capsule Communicator]. It was a little bit unusual. Normally CapComs have flown in space [previously], so they have a little more insight into how best to help the crew on orbit. But for some reason they decided that it made sense for me to be a CapCom. I started doing that. I really enjoyed it. I thought it was a really good job. You stayed very engaged in the missions.

After I flew my first mission in 1993, I came back and I became a CapCom again, and I was just stunned the second time at how lucky I'd been the first time I'd been a CapCom not to really mess things up. It was two things. One is having been a CapCom, I thought it helped me a lot on orbit, because I really understood more about the pace and the flight data file that you had on orbit, how to use it, and how the procedures integrated with the schedule that you had on orbit.

That helped me out. Having been a CapCom helped me on my first flight. Then my first flight really helped me become I think much more effective as a CapCom.

ROSS-NAZZAL: What was the first mission you CapCommed on?

MCARTHUR: I think it was STS-50.

ROSS-NAZZAL: Anything notable during that flight? Were you on the planning [shift], on orbit [shift]?

MCARTHUR: I may have been. I remember doing [STS]-46, 47, 50. I'm just trying to remember if we had them out of sequence at that time. I think it was STS-50 because I'm pretty sure that Dick [Richard N.] Richards was the CDR [commander]. Let me see. There's no telling. I do remember there was some issue about the potty on board. Gap [Granville] Pennington was the flight director. Dick Richards, he got really annoyed with me because I asked the crew some question about the trouble they were having with the potty, and he thought that was not the kind of thing that should have been.

ROSS-NAZZAL: On air-to-ground.

MCARTHUR: That should [not] have been on air-to-ground radio.

ROSS-NAZZAL: You were able to obviously get that fixed, and everything went fine.

MCARTHUR: I don't know [if] we ever had a Shuttle mission which the toilet completely broke. On my first mission we had a lot of problems with it for the first couple days. But there are backup supplies. I think it would just make your time on orbit very unpleasant.

ROSS-NAZZAL: We've heard from several members of the crew of [STS]-41D who used bags and socks. It doesn't sound [like] something that I would want to do.

MCARTHUR: If we put a crew on EM [Exploration Mission]-1, if we can't develop a potty in time to do that, I just said, "Well, carry up a lot of diapers and Apollo bags."

ROSS-NAZZAL: They still make those Apollo bags?

MCARTHUR: I'm sure someone would be happy to start making them again.

ROSS-NAZZAL: I believe you were also a Cape Crusader at one point.

MCARTHUR: No, I was not. I was not, they worked for me. I think it was called the Flight Support Branch. I was the Flight Support Branch Chief. The CapComs and the Cape Crusaders worked for me. I coordinated their activities.

ROSS-NAZZAL: I was looking at your biosheet, and it said you were in prelaunch Shuttle processing and launch and landing operations. So I assumed that was code for Cape Crusader.

MCARTHUR: That was during the VITT Office.

ROSS-NAZZAL: That was during the VITT.

MCARTHUR: I sometimes thought I never got to be a Cape Crusader because they looked and they said, “Well, you did that as a VITT person, so we want you to do other things to broaden your [experience].” Once I became a CapCom—I had a few crews come back, and they were just very positive about the work I did as a CapCom. I always thought it was because I spoke slowly with a distinct Southern accent. It gave me credibility. They figure someone who speaks like that can’t be smart enough to deceive us.

ROSS-NAZZAL: Would you tell us about finding out you were assigned finally to a flight?

MCARTHUR: I think I was on a PR [Public Relations trip] somewhere. I can’t remember where. Dan [Daniel C.] Brandenstein called me and said he wanted to talk about a flight assignment. So I was really happy. He said, “Are you willing to participate in medical experiments?”

I said, “I will be happy to do anything.”

He goes, “No, wait a minute. Don’t volunteer for everything.” He assigned me to the second Spacelab Life Sciences mission, SLS-2, which was STS-58. It was doing physiological research on the crewmembers, and we had forty-eight rats in the Research Animal Holding Facility racks back in the Spacelab. I was MS [mission specialist]-2. As the flight engineer, it turned out

they were almost as protective of me as they were of the CDR and the pilot. Since I was the flight engineer for ascent and entry, I avoided some of the more intrusive medical experiments.

I do remember having to do, I think, glucometry every day. To measure the blood glucose level I had to—and this was a fourteen-day mission, so I eventually had to prick every single finger at least once. Eventually my fingertips were sensitive and painful. It was not so good.

I remember another experiment I did was the lower body negative pressure device [LBNP]. Matter of fact, I was just visiting with John [B.] Charles earlier this week. I guess he was the principal investigator in the LBNP. We happened to start talking about it. He said, “I apologize for that one.” It may help. The Russians have a device called Chibis. They do very much a similar thing of having you wear something with a waist seal, and they’re able to draw a partial vacuum on your lower extremities to try to induce blood to transition back from your upper body down back into your lower body, to try to simulate the cardiovascular effects of gravity. What I found with LBNP though is—and I did it every third day—every third night I would go through fluid shifting again. I would have spent some time in the bag, it would pull the blood into my lower extremities, and that night it would transition back up into my upper extremities. Then I would get to deal with the head fullness and stuffiness again.

I wound up, just from a very personal standpoint, not being a big fan of the concept. But, I certainly would have to defer to the researchers as to the efficacy of that process. I know the Russians are big believers in it. Our crewmembers are starting to use Chibis before coming back, but I declined the opportunity when I was on Space Station.

ROSS-NAZZAL: It just looks a little painful to me. Sounds a little painful.

MCARTHUR: It was what it was. It was more painful doing it on the ground than it was doing it in space.

ROSS-NAZZAL: We only have a few minutes. I wonder if you want to talk about the crew of STS-58, a very diverse group.

MCARTHUR: Oh gosh. Yes, it was. John [E.] Blaha, the commander, was very very experienced. In his astronaut technical assignments, he had done a lot of runs in the simulator doing engine out scenarios. He had this uncanny insight of knowing during a sim [simulation] if we had an engine failure, for example, whether it was survivable at all. There were certain areas in the Shuttle ascent profile called black zones, and if you had an engine failure or heaven forbid a second engine failure in a black zone, it didn't matter what you did. You were not going to survive. It was really nice having somebody with John's experience. Also John was very conscientious about ensuring that every member of the crew had areas of unique responsibility so that everyone got a sense of fulfillment, that each crewmember made a meaningful contribution to mission success. He did that really well.

Pilot was Rick Searfoss, one of my astronaut classmates. Golly, he relished the Earth obs [observation] stuff. As a matter of fact, he set his sleep restraint up on the flight deck with his face right by the overhead window and he had cameras right beside him. If he woke up in the middle of the night, he was ready to keep taking pictures and did a great job of Earth obs photo documentation.

[M.] Rhea Seddon was a payload commander. What a true lady; she just was so smart and just really did a good job ensuring that the primary payload work in the Spacelab was well done.

I remember while we were training, NASA leased a small business jet, a Citation II, Cessna Citation. I was one of a half dozen astronauts who got checked out in it, so we got to do a couple of crew trips in the Citation, and that was kind of fun.

Shannon [W.] Lucid, another crewmate—and I'll talk more about Shannon in a second—got checked out as the second in command in the Citation so she and I could take the airplane out. During one of our training events Rhea injured her ankle, so pretty late in our training flow she was not able to fly in a T-38. We had to go to the Cape [Canaveral, Florida] to evaluate hardware. I think it may have been the Crew Equipment Interface Test. It was one of those big things that everybody needed to go down for. We got in the Citation, and Rhea went with us in the Citation. Rhea's husband is Hoot [Robert L.] Gibson. Either she laid the law down, or Hoot had a lot of confidence in us that he let Rhea get into this business jet with two mission specialists flying it.

Dave Wolf, another one of my classmates, was doing a lot of the research, was really deeply engaged in a lot of the experiments that we were doing. We'll have to come back and talk about this mission some more next time. He and Shannon were trained, if we had a contingency EVA [Extravehicular Activity], they would have done it. This gets back to this sharing responsibilities that John put a lot of emphasis on.

We all wanted to be the contingency EVA crewmembers, but John's point was—I was MS-2, I was flight engineer, and that was my golden nugget. So to share the wealth, he wasn't going to entertain the thought that I would also get to do EVA training. I had to respect that, and I did.

Shannon Lucid, gosh, I love Shannon more than I can put into words. I'll get back to Shannon in just a second. Dr. Marty [Martin J.] Fettman was the payload specialist who flew with us. The other two payload specialists were Larry Young, a professor from MIT [Massachusetts

Institute of Technology, Cambridge], and Jay [C.] Buckey, a medical doctor. Marty is a doctor of veterinary medicine.

But anyhow, because there were nine of us, that was too many people to put in a single crew office, and John again was concerned having one payload specialist who actually got selected to fly and two who were going to do all the training and participate a lot with us but were going to be the outsiders if you will. Because we couldn't all fit in [a single] office, I would say the obvious thing might be to put all the career astronauts in one office and the payload specialists in another office. John I think recognized that that just really wasn't going to promote bonding with the team.

Shannon, Marty, and I got put in a small office, and right next to us were the other six members of the crew. All my training up until that point and most of the formal training was really how to operate equipment in space, how to operate a spacecraft, how to operate the equipment you were going to have in space. When sharing an office with Shannon, Shannon taught us all how to live in space. She taught us all how to really turn your time in space into a personal and memorable experience. Where is my dove? Maybe it's not in the office here. It should be. I have a little porcelain dove that's in a shell—oh, here it is. We just became such close friends that Shannon gave me this when the mission was over.

ROSS-NAZZAL: Oh, how nice. She's such a thoughtful person.

MCARTHUR: Oh, she is. She taught me about having lemon drops out on the launch pad because it just helps for some reason; it's nice to suck on a lemon drop at launch. When I got to Space Station I found lemon drops up there. I think also when she got to Mir for some reason she found lemon drops there as well.

Marty, oh gosh. John's daughter was Carolyn Blaha. Somewhere during training I don't know if she'd graduated from college yet, but she was college age. She and Marty started dating. On Marty's desk is a picture of him and John's daughter. It took forever for John to notice. Oh, it was so funny. It was so funny. But I tell you what, my daughters were far too young, but if they had been old enough, no, I like my sons-in-law. My daughters married exactly the right people. But if I'd had a third daughter and she were old enough, I wouldn't have objected to her and Marty becoming interested in each other. Nice guy. He was good, the whole crew was good; we were really good on orbit.

ROSS-NAZZAL: We look forward to hearing more about STS-58 when we come back next time.

[End of interview]