

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

TERRENCE W. WILCUTT
INTERVIEWED BY JENNIFER ROSS-NAZZAL
HOUSTON, TEXAS – JULY 1, 2015

ROSS-NAZZAL: Today is July 1st, 2015. This interview with Terry Wilcutt is being conducted in Houston, Texas, for the JSC Oral History Project and for JSC's Knowledge Management Office. The interviewer is Jennifer Ross-Nazzal, assisted by Sandra Johnson. Thanks again for taking some time to meet with us today and talk about your career.

WILCUTT: My pleasure.

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

WILCUTT: Frankly, I don't remember a time when I wasn't interested in aviation. When I was really young they were starting to break the sound barrier publicly. Many times when we were playing baseball, standing out in the outfield, we'd hear a boom and look up and see a silver jet streaking across the sky leaving a contrail. I used to think that must be the most exciting job in the world. That bug was planted in me then, I think, because I really don't remember a time where I didn't think that that would be something that would just be the most fun job in the world. I just didn't know any pilots, had never been next to an airplane outside of seeing one flying. That was it.

Then eventually I was lucky enough to have one of my younger brothers join the Marine Corps and send me a note back. I graduated with a math degree and was teaching math in

Louisville, Kentucky, and Kevin my brother sent me a note saying, “Hey, Terry, the Marines have got this guaranteed aviation program. So if you join the Marine Corps with this contract they’ll send you to flight school. If you flunk out they’ll give you a rifle and send you to the woods. But if you make it then you’ll fly.”

That was all I needed. I left teaching and took my chance, and fortunately it worked out. When they flew me to Memphis [Tennessee] to take the flight physical for indoc [indoctrination] into the Marine Corps in this program, that was the first time I’d been in an airplane. I used to joke that that commercial flight worked out okay, so I thought I would do well in flight school. Like I said, it all worked out just fine.

ROSS-NAZZAL: So was there a base near where you grew up?

WILCUTT: Fort Knox [Kentucky]. It wasn’t really near. They used to fly out of Fort Knox at the time. I think now there’s helicopters there, but there used to be some fixed-wings that went in and out of there. But that was it. My only introduction was looking up and seeing that streak across the sky. So that was it.

ROSS-NAZZAL: Did you have any interest in the space program?

WILCUTT: None. Of course we, like everybody else my age, we watched the Apollo landings and were fascinated by that. But that came afterwards when I was working as a test pilot. My desire was to get back into what we called a gun squadron or fighter fleet, [McDonnell Douglas] F-18 [Hornet] squadron. The Marine Corps wanted to send me for a one-year unaccompanied

tour to Okinawa as the Assistant Admin [Administrative] Officer, because I'd done nothing but fly in the Marine Corps, and it was my turn to push paper. I disagreed with that, and that friend of mine that was already in the Astronaut Office, another marine fighter pilot, he talked to me and said, "Hey, Terry, instead of getting out of the Marine Corps, why don't you consider putting in an application at NASA?"

Once I spent some time thinking about how great that would be—because when you work as a test pilot you're working with some really really sharp engineers and I was going to miss that. I thought gosh, you would do the same thing with not just exceptionally sharp engineers, but scientists, project managers. That seemed pretty attractive to me. So I did put in that application and was fortunate enough to be selected.

ROSS-NAZZAL: Was that Bryan [D.] O'Connor?

WILCUTT: No, it was Andy [Andrew M.] Allen. Of course I met Bryan later in the Office. But I think he got busy doing management jobs soon after I came to the office.

ROSS-NAZZAL: I was looking in your bio. Fairly quickly you were accepted into TOPGUN [training]. Can you talk about that opportunity?

WILCUTT: The squadron that I was sent to after learning how to fly [McDonnell Douglas] F-4s [Phantoms] was VMFA-235 [Marine Fighter Attack Squadron 235] in Hawaii. I think they had lost something like 21 pilots and backseaters, naval flight officers. They'd come back from a cruise and now they had a huge turnover in experience.

So our skipper, Jed [Jeremiah] Pearson, and the OPSO [Operations Officer] were interested in getting as much experience for us new guys as possible. Fortunately I did well enough for them to put my name in the hat when they got a TOPGUN slot to send me there. If you perform well and they get an opportunity to send someone, then you'll be on that short list. I was fortunate enough to get selected along with another guy. We sent two pilots and two backseaters through TOPGUN at the same time, and it's as much fun as what you would think, you're getting to daily go against the very very best, and it's quite an education.

ROSS-NAZZAL: And then you went into test pilot school later on. Can you talk about why you decided to move in that direction?

WILCUTT: After flying the F-4, I converted to the F-18 in California as part of the training squadron as one of the instructors. A couple of naval officers that were interested in test pilot school were discussing it in the office with me, and I knew I was qualified because of my math degree. It sounded like a really exciting tour. It was just as simple as that. They knew a lot more about it than I did. Once they finished talking to me about it and I spent some time thinking about what it would be like to be a test pilot, and knowing I was qualified, it was just a matter of turning in the application.

It was an extraordinary thing to do really. It's a pretty demanding and risky tour. But along with that comes a tremendous sense of accomplishment and it's a very rewarding tour to make. Plus, your understanding of how and why airplanes fly and do the things that they do just grows by leaps and bounds while you're there. I was lucky to be selected and I'm very very appreciative of everything that I learned there.

Of course that opened the door to eventually coming to NASA. It was pretty fortuitous to have done that. But I would have to thank those two gents in my office for spending the time to talk to me about it, because I never would have done it. Again my ultimate goal was to get back into the fleet. That was a detour from that for certain. But it was a worthwhile one.

ROSS-NAZZAL: Talk to us about applying for that 1990 [astronaut] class. Was that the first time that you had applied?

WILCUTT: Yes. I was enjoying my test pilot tour, and a lot of that has to do with timing. If you're there when there's a lot of test work, then it's a very enjoyable thing. If you're not then you wouldn't have as exciting a tour as I had as a test pilot.

Again my goal had always been to get back into the Fleet Marine Force. After talking with Andy Allen who I just mentioned and thinking about flying the [Space] Shuttle, I thought gosh, this would be worth trying to do. It would definitely be a career change, because usually when marines came to NASA they didn't go back to the Marine Corps, so I knew I'd be giving up that part of it. But it seemed to me that it would be worth it based on what you'd get to contribute.

It's interesting. In the Marines, I think you contribute to world peace and stability, but in a threatening way, because if you represent a threat to us or others, a lot of times the Marines are sent in to correct that bad behavior. At NASA you contribute to the common good and world peace and stability by doing phenomenal things that inspire the world to turn their attention toward accomplishing great things instead of bad behavior. So once you think about things like that, then it became pretty easy to put in an application and choose one over the other.

Of course I didn't leave the Marine Corps. I was assigned to NASA as a Marine and stayed in the Marines for 28 and a half years until I retired from the Marines and just became a civil servant.

ROSS-NAZZAL: Tell us about being called for that interview and coming down here. What did you think about JSC when you came down?

WILCUTT: Don [Donald R.] Puddy was head of FCOD [Flight Control Operations Directorate] and I think we came down in July.

ROSS-NAZZAL: The worst time to come down.

WILCUTT: No, maybe it was August, something like that. They'd had some freakish cool front come in and it was cool and dry. He assured us that Houston was always like that.

It was an honor. Coming down was just incredible. I met people I'd only heard about, read about, flown astronauts. Literally the whole time I was down here it was almost overwhelming, the sense of history and the people that I met that were so accomplished. It was a wonderful week.

Even though they did those strange medical experiments on you, even the docs, they were all so competent and welcoming. It was quite an experience. All good, nothing bad at all. Of course I met the others in my interview class. Some of them were just phenomenal too, the things they'd done. One gentleman had led an expedition up Mount Everest to look at the limits of endurance for the human heart. When you're in an interview group with folks like that, it

gives you a sense of what's at stake, the kind of folks you'll be working with. It was a wonderful week. Every one of them were fun people to spend time with and listen to what their background was and what they'd done.

ROSS-NAZZAL: Were you surprised to get that phone call offering you a position?

WILCUTT: It seemed like everything went well. So actually I didn't spend any time worrying about it at all. The Marine Corps changed their mind about my orders to Okinawa and were offering me a seat in a gun squadron, which is what I wanted. I would have been happy either way. One was again to go back to the Fleet Marine Force and the other one was to go fly Space Shuttles. It's not a bad deal either way. But I enjoyed that week and to this day I think about it as a pleasant memory. So regardless of what would have happened, I would have been okay.

I'm glad things turned out the way they did, but I have to assume the other one would have been equally fun or just about equally fun.

ROSS-NAZZAL: You had a fairly large class and you guys came up with the nickname the Hairballs.

WILCUTT: Not all of us came up with that. The more vocal group thought that would be it. The rest of us didn't care.

ROSS-NAZZAL: Can you tell us the history behind that?

WILCUTT: No, I actually can't. I don't know. There were worse ones. That was the most acceptable of the ones they came up with. So I don't know. You ask enough members of my class, somebody'll probably be able to tell you what that was.

ROSS-NAZZAL: Tell us about some of the training that you had to participate in when you first came down as an ASCAN [Astronaut Candidate].

WILCUTT: They started right off with training in the Shuttle systems and orbital mechanics, the basic academics that you would need if you're going to fly the Shuttle. You need to understand the systems and how it works. The other things, gosh, that first year was so great. There was lots of enrichment lectures. They had planetary scientists, oceanographers, you name a technical discipline or scientific field, and they brought folks in to give us lectures on what was going on in that field. It was just wonderful.

Imagine if you had your pick of all those topics of some of the world's best leading experts in those fields and they came in and talked to you about what they had done and what they hoped to do. That's what that was like. It's almost like being a kid in a candy store. There was no lecture that we had that wasn't fascinating and interesting. It was wonderful.

As a matter of fact to this day I try to include that type of lecture in my staff meetings for my office sometimes because my office at [NASA] Headquarters [Washington, DC], they deserve to know what's going on. I think it makes them better employees if they keep their eyes looking up about what NASA is trying to do in each of these fields. Gosh, if you've got a planetary scientist come in and tell you why they're so interested in Mars or what we might learn

from exoplanets and things like that, that would be fascinating to you even though that's not your field. It's the same thing for every one of those other fields.

A lot of the things they talk about, climate change now, those folks, the folks on the leading edge of those concerns, way back in 1990 and '91, they would come in to our class and give us lectures about what they thought was going to happen with all this if we didn't do something different. Again so many of those things you've seen come to pass, at least now they're out in the public instead of just in a handful of scientists that were worried about it. Just great things.

And then the other thing, of course you had to learn how to fly the [Northrop] T-38 [Talon]. The Air Force people had flown that as a trainer and had some background in it in test pilot school. You fly it for about six months. Getting back in that was fun.

It was a busy time, no doubt. You're flying, you're in training, you're training for systems and trying to learn about the space business and why we go to space. It was busy, but a tremendous amount of fun.

ROSS-NAZZAL: How was your group received by the rest of the astronaut corps at that first Monday morning meeting for instance?

WILCUTT: The class immediately before us, there was a sense of relief because all the parties and things like that have to be set up by the junior class until the next junior class shows up, so they were glad to have us on board. It's the same way we perceived as we became the more experienced people. You welcome them, they're handpicked, so it's fresh faces, fresh ideas. It's a good thing. It's a wonderful thing to get a new class in.

ROSS-NAZZAL: What were those first astronaut meetings like that you have on Monday morning? You had been working in the military. But now you came to a civilian agency. Was there a difference that you noticed?

WILCUTT: Not really. There's a lot of military people in the office anyway. But it's the same thing. They got reports from the various branches and it was a sharing of information, concerns, what they were doing, anything and everything the Astronaut Office was involved in, they would share that information. And there was free dialogue. It's not a quiet group. You would expect this, because there's a bunch of experts in the Astronaut Office on various areas. If they were talking about something then someone with some expertise in that would question them or provide other information or gosh, make sure you look at this or that. It was a very healthy thing.

That Monday morning meeting was wonderful. Plus John [W.] Young was in there. When he was talking about concerns or things to watch out for, then of course everybody should be listening to that, and a bunch of other folks like John, senior people, lots of experience. I think all of us were sponges trying to absorb everything that he said. Again, if he said there was a concern, then we took that as gospel.

ROSS-NAZZAL: What were some of the concerns that you remember when you first came in?

WILCUTT: Gosh, it's been so long ago. A lot of things happened over time. Since we got there, those first landings were all out at Edwards [Air Force Base, California], and now they were

going to bring it to [NASA] KSC [Kennedy Space Center, Florida]. I'm sure John had some comments about landing at a runway where there's really no underrun. You can't just land on the dry lakebed, so if you wind up with a little less energy than desired for landing to make the runway a little too nice you still have lots of dry lakebed to land on. Going into KSC, if you didn't make it, you were in trouble. There's a lot of things wrapped up in that, brakes, tires, not just making the runway but being able to stop without having an accident once you land there. So John paid attention to all that. I can't begin to tell you how much knowledge he had on the Space Shuttle, including how much energy the brakes could absorb and what had been tested and what hadn't. It was almost endless.

There were other people that had various expertise in different systems and concerns. So all those things would be talked about. It was a great meeting. I'm sure they still are. I don't go over there to them now of course. But gosh, that's where the real concerns of the office and then what they're going to take forward and who's going to work with who to get them resolved.

ROSS-NAZZAL: I understand that you were working on SSME [Space Shuttle main engine] and ET [external tank] issues at the time.

WILCUTT: My first job was the Space Shuttle main engine, the solid rocket motors, and boosters, and external tank. It was great, especially for a pilot to be working on the things that provide the thrust. That was my introduction to the real rocket scientists at NASA. These folks, most of them worked out at [NASA] Marshall [Space Flight Center, Huntsville, Alabama]. I did spend a lot of time at Marshall Space Flight Center, Michoud [Assembly Facility, New Orleans,

Louisiana], where they make the external tank, and then out at Rocketdyne where they actually made the engine.

Gosh, what a collection of geniuses really. They were brilliant people. They could explain things in a way that a math major could understand. That was a wonderful job. There were some jobs that as a pilot you hoped to get, and that was right at the top of the list for me, those propulsion elements. I was fortunate enough to get it. It's a great thing to learn about those.

ROSS-NAZZAL: Were there any significant issues when you were in that position that you were working?

WILCUTT: There were some. But they were working, they had hoped to develop an alternate turbopump. They had some problems with the high-pressure turbopump and they were going to try to produce an alternate turbopump, and that was going to be made by Pratt and Whitney at West Palm Beach [Florida], which is a different contractor than Rocketdyne. But of course Rocketdyne helped them out in the development of that. So that was one.

You never really leave that. You meet so many people in those fields when you work a job like that that you really never leave it. Over time we went to a lightweight tank and a super lightweight tank to increase the upmass so we could build the [International] Space Station. Those issues came up but it probably wasn't while I was assigned that job, but it would have been done during my time in the office.

Running the engines at 109 percent in case you lost an engine and you didn't want to dump it in the ocean, you wanted to have enough thrust to make it to Spain to do an emergency

landing or France. So that would have been done during that time, my time in the office again. Those years all run together.

ROSS-NAZZAL: Oh, I'm sure they do.

WILCUTT: Those are just some. Another job that I had was landing and rollout. I think all of us were involved in trying to put a drag chute on the Shuttle, what would be acceptable handling qualities and what should be the limitations. Another one was trying to see if we could increase the crosswind limits of the Shuttle during landing; that was a project that we did for the program. That's about all I can think of right now.

Those things are never ending. You're always looking to see if you can increase either launch opportunities or landing opportunities coming back from space. It's not a good thing to wave off. Of course it's a better thing than come in when you shouldn't, to wave off. But if you can through some test program increase the likelihood that you'll be able to deorbit and land on the day you pick, then that would be a good thing for the program.

I'm sure they're doing it today looking at the restrictions that would be in place on these capsules coming back and whether they can do anything that would decrease the restrictions and increase the likelihood that you'll come back when you want.

ROSS-NAZZAL: Were you involved at all in the design of the drag chute or testing or some of the crosswind tests?

WILCUTT: I think most of us, certainly all the pilots, did some of the work in the simulator out at [NASA] Ames [Research Center, Moffett Field, California] on that. I think Jim [James D.] Wetherbee ran that project. I could be wrong about that but that's who I remember as running the project. Then we would go out and do runs to see what would be acceptable crosswind limits and procedures on it. I would be pretty confident saying that probably every pilot participated in those test runs. Every single one of our former test pilots, they were used to determining acceptable handling qualities. I would have been one of those.

ROSS-NAZZAL: Did you ever get a chance to go out to [NASA] Stennis [Space Center, Mississippi] when they were testing any of the engines?

WILCUTT: Oh, you bet. Matter of fact, our class did while we were still ASCANS in that first year. They took us out to Stennis to watch an SSME fire. Very impressive. It made you appreciate the engineers that designed the thing, because the amount of thrust on that, and to think that you're going to sit on top of it, like I said, it was impressive.

ROSS-NAZZAL: I've never seen one, but from the videos it's just amazing.

WILCUTT: I hope you do, because you don't just see it, you feel it. Of course the acoustics coming out of there, it vibrates your chest, everything around. It's an experience.

ROSS-NAZZAL: One of the other things I noticed you did is you worked as a Cape Crusader out in Florida. Can you talk about that and when you got involved?

WILCUTT: Another great job, I don't remember the years, because I did that a couple times. But you work at KSC to help with the processing of the Shuttle and getting it ready for launch. That is a wonderful job for an astronaut because you're inside the actual Shuttle a lot. That's different than being in the simulators over here, to be inside the actual hardware.

Frankly, when you fly in space, you're already used to the Shuttle being in the vertical. That can be disorienting a little bit for new guys that have never spent any time in the actual Shuttle. But you're perfectly at home in the Shuttle. You know where things are. You don't have any being disoriented due to attitude. You get used to throwing switches on the real hardware. I just think that's a great job. Plus, you strap in the crews. When some of your friends are getting in, you're the last person in there. You strap them in, close the hatch, get them on their way. It's a wonderful job, lots of responsibility, because there's 2,000 switches, circuit breakers inside the Shuttle. You are the team, with the folks at KSC of course, making sure that every one of those goes in the right position before you launch your pals on their mission. It's another good job for anyone, particularly a pilot.

ROSS-NAZZAL: I think I read somewhere that it's the next best thing to flying in space, someone said.

WILCUTT: I don't know about that. It's good.

ROSS-NAZZAL: Doesn't come close, huh?

WILCUTT: It's good. It's something, because when you're sitting in there in the middle of the night setting up the cockpit, you can't help but be filled with a sense you're sitting in a national asset and an actual spaceship. Once you put the crew in a day later or a few hours later, they're going to be launching in it.

I was never in there that I wasn't appreciative of the fact that I was sitting in a spaceship and a national asset. It's a great job. Of course the folks at KSC, we used to say that they were the largest team. Probably on the surface. You got a basketball team, football team. KSC, they functioned as a team. A lot of folks would say, "Gosh, I would never have the nerve to get in a Space Shuttle. How do you do that?" Really it's because KSC, they treated every astronaut like they were a member of their family when they did their job on the Shuttle, when they processed it and quality-checked the work. They checked that just like a member of their immediate family was going to get in there. We never lost a Shuttle due to anything that a person at KSC did. What a wonderful group of people. We love those folks down at KSC. Again, they took care of the Shuttles and us just like we were part of the same family.

ROSS-NAZZAL: You had general training on the Shuttle and its various systems. How did you train to be a Cape Crusader? Was there someone that you shadowed for a time?

WILCUTT: One of the experienced Cape Crusaders. When you came down there we had the Vehicle Integration Team [VIT], which worked in support of the Astronaut Office. They were very experienced. And you had senior Cape Crusaders. Between the two of them, they would step you through all that before they would turn you loose on your own.

We used to tell people headed to the Cape [Canaveral, Florida] that the most important thing to do was to contact the VIT and whatever information they gave you, you need to take that as gospel. As long as you listen to the VIT and the senior Cape Crusaders, you're going to be okay. Obviously the opportunity is down there to break something on a real national asset; you didn't want to do that. Or if you messed up a procedure you may make the folks at KSC do hours of rework to back out of whatever you did and then have it done correctly. You didn't want to do that.

Most of the folks in the office are smart enough to listen to that kind of advice, and it worked out well. But those are the people that would keep you from making a mistake until you had the experience you needed to function on your own.

ROSS-NAZZAL: What was your responsibility once the crew landed?

WILCUTT: We go inside the spaceship, make sure they're in good shape, help them unstrap. Then we take over for the commander. There's still some switches that have to be thrown post landing for cooling and power-down. The sooner we got in, the sooner the commander and the crew could get out, because we would take over those functions. If any of them needed anything then we would take care of that. They're your friends, we're all part of the Astronaut Office. We would just get in there to provide whatever assistance would be required and to relieve them so they could get out and start the postlanding things that astronauts have to do, medical things.

ROSS-NAZZAL: Great job. How many days would you be out there before they would land?

WILCUTT: Oh, day before, something like that. There wasn't any reason to be out there earlier. The folks at either place, they know what they're doing. If they were going to come in tomorrow then we'd fly out there sometime today to get ready, participate in the prebriefs where you go over everyone's role, and then get ready for the landing. It was well orchestrated. Again Edwards and KSC, they both knew what they were supposed to do, knew how to do it well.

ROSS-NAZZAL: Sounds like a great job.

WILCUTT: Gosh, it's wonderful. Again, it's real hardware and those are your friends on board. It's nice to get in there and see they're all okay, relieve them of the burden of throwing the switches, and let them get out and start getting comfortable.

ROSS-NAZZAL: I imagine after so many days in space they're ready to stretch their legs so to speak.

WILCUTT: They are. I think it's a mixed bag. Space is a very fun place to be and you're up there doing the nation's business and the space program's business. It's worthwhile and fun being up there. But it's nice to come home to your family and get back down to Earth. One of the guys who spent six months on [Russian Space Station] Mir, somebody asked him, a reporter I think asked him while he was still in space if he was looking forward to getting back down to Earth or would he miss space. This is my recollection of what he said. He said that he understood that on Earth you could make a phone call and in 30 minutes somebody would bring

a hot pizza to your door. He said, "I understand you can stop at a gas station and get gourmet coffee." He was just talking about the little things that we all take for granted.

When another astronaut came back from Mir, that astronaut when they came out of the Shuttle, there's a short walkway to the crew recovery van. They stopped for a second and everyone wondered if they were okay. The astronaut said they just wanted to feel the Sun on their face and the warm air through their hair. There's a lot of things like that of course you don't get while you're up there. It's a mixed bag coming back. You want to have all those things. Life really happens down here. But while you're in space of course you're doing a world of good. It's a very rewarding job as you would imagine. But it is great to come back.

ROSS-NAZZAL: It sounds like a great job, especially for someone who was going to pilot and command the Shuttle. You really got to know the vehicles quite well down there in Florida I would think.

WILCUTT: Being a Cape Crusader, yes. It's a huge benefit, becoming that familiar with the Space Shuttle. We encouraged all the pilots to do that job at some time, hopefully before they flew, because of that familiarity with the Shuttle and its systems and the ground ops [operations] down at KSC. That was a good thing. I was fortunate to have that job.

ROSS-NAZZAL: I also read that you were handling technical issues for the Astronaut Office operations. That seemed vague. I was curious. What did that entail? What did that involve?

WILCUTT: I don't remember. Operations, that's just the Shuttle, the Cape Crusaders belonged to me, that other job, the propulsion elements, belonged to me. Landing and rollout belonged to me. Those were all operational areas. They work under a division chief in the Astronaut Office and I was that division chief. So now the Cape Crusaders worked for me. The people doing the propulsion elements worked for me. That's all that was. There were tons of issues. Part of my job was making sure the right people were looking into each of those for the Astronaut Office. That's what that was.

ROSS-NAZZAL: How did you make those assignments? Was that something that you were making? Or was that with the Chief of the Astronaut Office or Head of FCOD?

WILCUTT: I made it based on who was available. As they were picked up for crews and went into training, then usually that meant that someone was coming off of a mission, and they were ready for reassignment. The Chief of the Office, he would tell you who was going to what. Some of those in the Shuttle Branch, they would be assigned to me, and then we would select a job for them, wherever we needed a hole plugged, based on their background and experience. I guess you could say you worked with the chief, but really you took what he or she gave you, and you made it work. Some people had to double up for a while until a crew finished their postflight experience and then they became available.

One thing you could be certain of is that the personnel were going to change over time based on the flight schedule and assignments. That part never ends. Really you took who they gave you. The office is full of sharp folks, it wasn't like you worried about the talent you were getting. You just had to make it work based on what they'd done and what they wanted to do

and where you had a hole that needed to be filled. Any manager in the world would tell you the same thing. You make those kind of things work. That was it.

ROSS-NAZZAL: Any volunteers for any jobs?

WILCUTT: Oh yes, absolutely, because some of those, like that Cape Crusader job, that's a wonderful job. You're working with real hardware and the good folks down at KSC. You would have people that—some you thought well, this would benefit them, and you'd send them down there. Others, they were experienced, you needed experience because maybe your experienced people had been picked up for another flight. There were maybe a dozen different things that went into job assignments and where they were going.

You had an upcoming project in landing and rollout, then you wanted someone experienced to go run that project and run all the pilots through and get the data and deliver a report. Just the usual things.

ROSS-NAZZAL: Any jobs that people weren't particularly thrilled with when you would make those assignments, SAIL [Shuttle Avionics Integration Laboratory] for instance?

WILCUTT: Sure. That was one because that's a lot of night work in that. You tried to limit the time that any one person had to do those kind of things. When you had a burden like that it's nice to share the burden. Plus, that was another. Gosh, that was a wealth of experience to be gained from working in the SAIL. If you had a new one, or you had someone that could benefit from that kind of training, then you'd put them in there for a while. There's no bad deal in there.

It's a good thing. The only thing that would perhaps make it a bad deal would be schedule. But it's such an honor to do any of those jobs that you really don't have any problem with it.

Everyone understands that that kind of burden has to be shared. You can't leave somebody on something like that forever. But when I say burden, the burden is minor compared to the training that you get from working a job like SAIL. It was definitely worthwhile.

ROSS-NAZZAL: Did you spend time in SAIL yourself?

WILCUTT: Sure. Even as chief of that section of the office. It's only fair. Why shouldn't I do nights occasionally? Again, it's a great thing.

ROSS-NAZZAL: I'm looking at the clock. I wanted to talk to you a little bit about your time in Russia over at the Gagarin Training Center. But I wasn't sure if you wanted to stop here and pick up next time.

WILCUTT: It's up to you. How many questions do you have?

JOHNSON: You have a long career.

ROSS-NAZZAL: It'll take us a while to get through all of what we have. Plus you have four missions too. I don't know if you just want to stop here. We can pick up next time.

WILCUTT: There's more than 10 minutes' worth of time in Russia.

ROSS-NAZZAL: That's what I was thinking. I don't want to rush that. I'm sure that was a fascinating experience living over there.

WILCUTT: It was great, absolutely fascinating, especially coming from the Marine Corps. Some of the Russians I met, the Russian cosmonauts, served in Russian aviation squadrons. We used to talk about—it's easily conceivable that we would have met in the air someplace if the world wound up at war again or something. But gosh, they were great people. I always believe that their government was the evil empire, that that doesn't apply to the people over there. They're warm and generous, want the same things that we want, security, better life for their kids, stability. I told people when I got back that they would give you the coat off their back in the winter if they thought you needed it. That's how generous and warm the people are over there, just great folks. And accomplished. You look at their space program, wildly successful, and we learned a lot from them.

The Russians knew that we were going to learn a lot from them when we showed up over there when we started that Shuttle-Mir Program. We thought well, we'll be teaching them a bunch of things. My goodness, they were thinking we'll be giving away a lot of things. We had a Shuttle mindset, and you can stand on your head for two weeks as long as you know there's an end. If you're going to live in space for six months or a year, that takes a different mentality altogether.

They paid a lot of attention to the psychological makeup of their crew members. We didn't pay that much attention to it because we didn't have to, because hey, you guys are going to get along for two weeks or work together. You can take that. If you say you're going to live

and get along for six months or a year, then you need to make sure there's not someone in there that isn't capable of doing that, or falling into depression, falling apart in space.

One of my missions—matter of fact, my first to Mir, we got the hatch open, exchanged hugs, handshakes. We said, “Okay, let's get to work.” The Russian commander said, “Nyet, nyet.” He wouldn't have anything to do with it. Told us to follow him. We sat around the table and talked and conversed and enjoyed each other's company and the reunion, because we had seen them in training. Then after a while, after we had socialized and talked and caught up, he said, “Okay, now let's talk about work.”

That kind of attitude really pointed out the difference to me between our space program and theirs. They knew they were there for the long term. That social interaction was as important as all the other stuff. We learned that and of course we use that now. We know all about it now because we have the International Space Station. Our guys go through the same stuff. You're not going to go up there and as soon as you get there get busy and then work nonstop for six months. It's just not going to work. You'd have a rebellion.

We learned all about long-duration spaceflight from the Russians I think. They knew that going in, that we'd learn a lot about that, and made us welcome.

ROSS-NAZZAL: Well, we look forward to hearing more about that and your Shuttle-Mir missions and other flights.

WILCUTT: I'll try to recall them.

[End of interview]