

# JOHNSON SPACE CENTER ORAL HISTORY PROJECT

## EDITED ORAL HISTORY TRANSCRIPT

TERRENCE W. WILCUTT  
INTERVIEWED BY SANDRA JOHNSON  
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JOHNSON: Today is October 19<sup>th</sup>, 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. Interviewer is Sandra Johnson. I want to thank you for joining us again today.

WILCUTT: My pleasure.

JOHNSON: We're going to talk today about your first mission if you don't mind. Your first assignment was as the pilot for STS-68 in 1994. When did you first learn about that assignment and how did that come about?

WILCUTT: I probably learned about it the night before they were going to announce it. That's usually what they did. The Chief of the Office at the time I think was Dan [Daniel C.] Brandenstein. I don't remember when he came in and asked me if I would do the mission. That's what they do, they come in, and basically what I got for all my missions was the same thing. "We're going to announce the crew the next day, we've selected you as the pilot." It's like right out of the movies. "Are you willing to accept the mission? Are you willing to do that?" Of course no one that I ever heard of ever refused one of those. We're all thrilled.

Then of course the next thing you want to know is, "Who am I flying with and what are we doing?" They give you that, then the next day they make the announcement.

JOHNSON: Did you have a feeling before that, who you'd be flying with, before they said?

WILCUTT: No. I think some of the folks in my class tracked mission by mission and looked at how many seats might be available. But frankly there were so many different combinations and possibilities, I never worried about that. I was happy that I'd been in the [Astronaut] Office about four years—by the time we flew it was four years. That was much better than some of the classes in front of us where the manifest had been slow enough that there was a long time before people flew their first flight. My particular class was pretty lucky about that. The manifest got us into space earlier than normal, which is a good thing.

JOHNSON: This was a Mission to Planet Earth flight. Talk about the training because of the Earth observation and the amount of photography that you were going to be doing on that flight. You also were splitting your time, it was running 24 hours, so you could do [the Earth observations]. If you want to talk about that training and how much you knew about that, because [Mission to Planet Earth] flew earlier that year, the first mission.

WILCUTT: STS-59 flew a few months earlier than us. Gosh, it was busy, but it was just a great flight. The training was magnificent. A lot of Earth observations, a lot of camerawork. I don't remember the total, but 15,000 sticks in my mind. We took an incredible amount of photos. One of the things that everybody enjoys when they go to space is looking out the window. We were being paid to do that. It was just wonderful. Plus, our altitude was lower. I think we were about 115 miles up from Earth. You'd have to check that, but it's pretty close to that. The Space

Station missions are up around 200, Hubble around 300. Being that close, there was a lot more detail available. It was just great.

I met just some of the most dedicated Earth observations scientists that you could imagine. It was a thrill getting to know them. Those people I've respected and loved my entire career since I met them. They were just so knowledgeable. It was important that we be able to recognize certain sites on the ground. We just went through thousands and thousands of photos that had been taken from space to recognize these critical points where they had people on the ground to take measurements to serve as truth data later on after we finished. It was great.

Training was busy. The other thing about being on split shifts when we got to space, all we had was the Orbiter. We didn't have a lab to go with. Being on split shifts, usually there were only three of you up at a time, except for the little overlap period between the shifts. That meant just three people to share all the room in the Shuttle instead of six or seven, which is a lot of elbows and knees and feet floating around. It was just great.

Training was great, the mission was great, and the people I got to fly with were great too. Good thing.

JOHNSON: Those experts that you were talking about, did they come here to train you? Or did you go to different sites to train where they were?

WILCUTT: They came here to show us the pictures, and then we went off to different sites too. We made a trip to the Sierras [Sierra Nevada Mountains, California] during the winter, up to Mammoth Mountain, to Death Valley, where they would explain what they were looking for for science. It was just fascinating. I don't think anyone could go through that training or work with

those people or listen to them talk about the science without becoming an Earth obs fan and scholar. It was just great.

JOHNSON: Were they trying to compare from that previous mission, STS-59, because it was different times of the year too? So were you looking for different things?

WILCUTT: Some of it, that's right, the radar could tell you a lot of things about what was going on in the Earth. It could determine the moisture content in the snowpack to predict how much water Southern California would have or anyplace else in the world that depended on snowmelt. The moisture content in crops, moisture content in the soil, so you could predict crop yields. See below the surface of the Earth if it's particularly dry sand, look for earthquake fault zones. I think originally they had hoped to get a spring measurement in [STS-]59 and then we were going to take a fall measurement on 68. Then they would compare it and see if you could determine any differences using the [Space] Radar Lab [SRL-2] of the state of the plants.

JOHNSON: You were talking about the photography. Did they train you on specific types of cameras? Or was it the normal cameras that the Shuttle always carried? Or were there some specific things that you did?

WILCUTT: I think a couple of them they normally carried. Gosh, I don't remember the name, it's been so long, the really large [format Linhof] camera that we mounted in the window. Then we would position to catch the shot of the ground. Then we used a regular Hasselblad and then a

35-millimeter also. Mostly the 35-millimeter was for in-cabin shots. With Earth obs it would be the Hasselblad and then the large format camera.

JOHNSON: In '94 this was all film, correct?

WILCUTT: Yes, all of it.

JOHNSON: That's a lot of film to take up with you and bring down.

WILCUTT: It was. If you've got it, we felt we should burn it up. I'd be surprised if we left any film that was left unexposed.

JOHNSON: Had you been interested in photography before that? Or was that something that was new?

WILCUTT: Just the usual family shots. Certainly I hadn't been interested in photography from space, but the photographers we had, they were great teachers themselves. They certainly impressed upon us to take a lot of pictures and that you don't get to go back and redo it, so take a lot. You learn how to take pictures so the ones you bring back are good, because that's what you're going to remember on all your missions was the good time you had with your friends and whatever you took a picture of. Plus, the scientists were depending on us to take good photos of the Earth. It was good training and I think all of us took it to heart.

JOHNSON: Were those the NASA photographers that were teaching you?

WILCUTT: Yes.

JOHNSON: Do you remember who any of those might have been?

WILCUTT: One of them, Don [C.] Carico. He was one of the instructors. I can picture the other ones, but I can't think of their names right now.

JOHNSON: Was there anything about that mission other than it was your first mission and you were the pilot? Anything specific about that mission that stood out in your mind about any of the experiences? Maybe that first time actually finally getting to space.

WILCUTT: All of it was something. I think we were the last pad abort that they had, on that mission. The main engines lit and then they light six seconds before liftoff to give the onboard computers time to make sure they're working perfectly before they let the solid rockets light. Our main engines lit, and then less than two seconds before liftoff the onboard software detected a problem with one of the engines and shut it down, so we got to experience a pad abort. Once you light the engines they have to be removed and cleaned up, prepped for reinstallation, or you have to take someone else's engines to put in. I think that's what they did for us was they took the engines from the next mission while they refurbished ours to give to them. We launched a few weeks after the original planned launch date.

Of course the ride to space was pretty phenomenal. That was just like you would expect it to be with over 7 million pounds of thrust. The simulators can only do so much to make it seem like you're in that environment. The Orbiter during solid rocket flight, the first two minutes, there was a lot of vibration, more than you would think. You're just so happy to be there that it was just one of those "Wow, feel that!"

Then after two minutes of course the solids are finished, they're kicked off. Then three main engines the rest of the way. That was smooth as glass. Inside the Astronaut Office we talked to each other about what surprised us. Jim [James D.] Halsell in my class had flown just before me. He had come down to my class, and he said, "Here's the things that surprised me." Frankly, it was just as he described it, every single one of those things. Including the 3-Gs [force of gravity] through the chest the last 30 seconds, what that was like, and then when the engines cut off and now you're weightless, what that felt like, and then some other things during the mission. He did me a big favor, but the office always takes care of each other like that, so it was a good thing.

JOHNSON: Did you have any problem with weightlessness or any problems feeling ill?

WILCUTT: No. I'm one of the fortunate people that I don't get ill when I go to space or when I come back. It's not anything you can take credit for. You're either born with that or you're not. Again I'm one of the lucky ones that didn't.

JOHNSON: Talk about those teams and who you were on the team with and how you all split up the work and maybe passed on information from one team to the next.

WILCUTT: They build in turnover, you have presleep and they have postsleep. You go through those activities. At the same time there's of course allocated time to turn over, hey, here's where we are, this is what's coming up next, this is what happened today. That worked well. We worked two shifts. My shiftmates were the commander, Mike [Michael A.] Baker and Jeff [K.] Wisoff, and then the other crew was Steve [Steven L.] Smith and Tom [Thomas D.] Jones and Dan [Daniel W.] Bursch. The crew was just filled with people that are just some of the nicest folks in the office, so it was a lot of fun. Very dedicated professional crew. It was truly enjoyable.

It was busy though. I think during the sims [simulations] when we were simming crew shifts, the other folks would be around there getting the benefit of what we were doing in the sims. When you're up there and there really is only three of you and you've got to take care of the Orbiter plus do maneuvers plus run the cameras, then it was busier than what I thought it would be. Maybe that was just being in space. It was just different. But we kept up with it and were glad to do it.

JOHNSON: You landed in California, didn't you, at Edwards [Air Force Base]?

WILCUTT: Yes. We weren't supposed to. Bad weather at KSC [Kennedy Space Center, Florida]. I think low clouds. They took us into California. Of course we didn't care. Somebody was there to greet us and take us back to Houston. That was it.

JOHNSON: Whether it was a lake bed or a runway didn't matter to you.



WILCUTT: It was pretty.

JOHNSON: It is pretty out there. Is there anything else about that mission you can think about or anything specific that you remember?

WILCUTT: Not really. We had some other things that were good experiments. MAPS, Measurement of Air Pollution from Satellites, that measured carbon monoxide around the atmosphere, so you could determine the source of it. It doesn't do you any good to sign treaties that say, "Hey, we won't put any more carbon in the atmosphere than this," if you can't measure it and see whether they're violating the treaty or not. That was a success.

I think we had a protein crystal growth experiment, which was a big thing at the time, structure-based drug design. Most flights I think had that payload on there, it was a nice thing to be a part of. Then we had a small plant growth experiment on there. Then Steve Smith and I had an experiment, something to do with balance or motion sickness in space that we attached a lot of electrical leads to ourselves and looked at different targets or moving things to see what that would do to us.

JOHNSON: So you tried to make yourself have motion sickness?

WILCUTT: As I remember, it did, but it didn't bother either one of us like that. If you do it after you adapt, I think it would probably have less effect than if you did it as soon as you got up

there. The people that do have problems with that, that seems after the first day most of that is gone and they're okay.

Then there was a balance experiment where they put you in something like a phone booth and the floor tilts or jerks and you're blindfolded to see if you can maintain your balance. You do that pre flight and then post flight to see how your balance has been affected when you come back from space. That was another interesting experiment.

I heard something on the radio today where they were looking at—I think it was one of the researchers on that experiment has developed a scale that you stand on and it can detect the fine movements you make to maintain your balance, and it gives you a score. If you get a poor score, you don't seem to have as much balance. Say you're an elderly person with balance problems, then that might be the day that you want to take a cane with you or use some other device to keep your balance. It cuts down your likelihood of taking a spill and perhaps breaking a hip.

JOHNSON: Something you would have every day that you could test yourself on.

WILCUTT: That's a fallout from that lady's work here at JSC on that balance experiment. It was pretty interesting to hear that just this morning driving to work.

JOHNSON: It is interesting. It does make you feel, I would imagine, like the work you're doing and that NASA is doing in space does have applications on Earth, even though sometimes people don't realize exactly how it affects their lives.

WILCUTT: I think you see that all the time. It just takes so long to get those things to market. But it does, almost everything we do up there has some benefit down here on the planet. It's a good thing.

But the mission was a tremendous amount of fun. We did good work. I'm just happy that in my career I got to do an Earth science mission, because of course the other ones were to *Mir* [Russian Space Station] and to [the International] Space Station. I feel good about doing that.

JOHNSON: Even though you had that math background, Earth science was important to you.

WILCUTT: Yes. Like I said, they make you a believer. They're so dedicated. Gosh, the Earth is so beautiful up there. To spend a whole mission looking at it, trying to take data for scientists and engineers was very rewarding.

JOHNSON: I would imagine you're getting paid to actually take pictures from up there, that would be pretty good.

WILCUTT: Yes.

JOHNSON: I don't want to keep you. It's a little after 2:00. If you want to we can stop and then we can let you get on with what you were going to do today.

WILCUTT: That works.

JOHNSON: Then we'll talk again soon.

[End of interview]