JOHNSON SPACE CENTER ORAL HISTORY PROJECT
EDITED ORAL HISTORY TRANSCRIPT

PEGGY WHITSON
INTERVIEWED BY JENNIFER ROSS-NAZZAL
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ROSS-NAZZAL: Today is October 7, 2015. This interview with Dr. Peggy Whitson is being conducted for the JSC Oral History Project in Houston, Texas. The interview is Jennifer Ross-Nazzal. Thanks again for taking some time—

WHITSON: No problem.

ROSS-NAZZAL: —to talk about Expedition 50 today and 51. I wanted to ask you when you learned that you would be assigned to a new increment.

WHITSON: I don't remember the exact date. I think it was last August; it was in August of 2014. The training team assessed my level of knowledge, how much I remembered from before in October. I didn't start training until April of 2015. The mission is planned to launch in mid-November of 2016.

ROSS-NAZZAL: Seems so long ago, right? I thought it was interesting, because when I was out on your Tumblr page there was a timeline. Someone put that it was announced February 9th. What a great birthday present.

WHITSON: Actually, the official announcement was on February 9th. There's always a delay between your assignment and the official announcement; it has to be coordinated internationally. It takes time, so that's what the delay was. It coincidentally happened to be announced on my birthday, so I did get officially announced then.

ROSS-NAZZAL: I was wondering about that.

WHITSON: And so it was a nice birthday present.

ROSS-NAZZAL: Yes, that's very nice.

WHITSON: Not as good as the Columbus module I received on one of my birthday presents.

ROSS-NAZZAL: Still, very memorable. You'll never forget that.

WHITSON: Yes.

ROSS-NAZZAL: It's been about eight years since you've launched and gone to the ISS [International Space Station]. Are you preparing or approaching this mission any differently than you were the last time?

WHITSON: I think we talked a little bit about training as an evolution [last time we spoke]. We have changed our training plans and our training flows since the beginning of the International

Space Station in the 16 years we've been flying. So, as part of the training flow, my responsibilities [and] the details of my training have changed over that time. In addition, I also have probably a little bit more say, because I have some experience about what I do or don't need more or less of. From my perspective of having lived up there a year, I can say, "You know, I don't really need any more of that training. That's sufficient. I feel comfortable. I feel refreshed on that. I don't need any more."

Usually it's a discussion with the instructors about, "These connectors are complex; I'd like to have a little bit more training on this," and they'll find the time in the schedule to do that, just as a refresher. They have a definitive plan that they want to follow, but they do individualize it to some degree based on previous experience and your own comfort level. I think that the biggest advantage of having flown before is that I know what to worry about and what not to worry about. As a rookie, I was always worrying, "I have to know everything," and now it's "Yes, I'll be okay without any more training on that, because I'll be able to do it from the procedure. It'll be fine." That perspective is very different. It's a little more relaxed. You don't have to get quite so stressed about what you don't know.

ROSS-NAZZAL: So what are you focusing on, or what are your concerns as you get ready?

WHITSON: Oh, this time around?

ROSS-NAZZAL: Yes.

WHITSON: Just getting refreshed on different systems, and new things that are up there that have arrived since I've been there. We're doing the visiting vehicle captures using the Station robotic arm. Although I've used the Station robotic arm many times, I've never done a free-flyer capture, so that's one area and the teamwork involved in making that process happen. In training sessions with my crews we discuss roles and responsibilities. It's planned to change those roles and responsibilities for different vehicles arriving during our increment, so we have to know what the expected role and responsibility is for each of the positions, because we want to share the activities with everybody on the crew.

ROSS-NAZZAL: Since you mentioned it, you'll be expecting a Dragon and a Cygnus to come up there. How is it going to be different, accepting those capsules and that cargo from, say, preparing for a Shuttle crew?

WHITSON: Well, the biggest difference is the volume. The cargo that they're bringing up is a fraction of what a Shuttle could bring up. We spent weeks prepacking for a Shuttle to get enough cargo to take back home. For Cygnus, of course, we're just burning it up, so we're just collecting trash. For SpaceX, it's the only vehicle that can actually return things in addition to a very small volume in the Soyuz that the crew members return in. Those are the only two vehicles we currently have that we can get things home in. So for those vehicles, we have to plan specifically. The ground team's obviously prioritizing everything that needs to go into those vehicles and pack for that, but it's still a fraction of what the Orbiter could take home, so I'm imagining that that will be much less of an ordeal.

It really was a couple-week process to pre-pack for a Shuttle arrival. We'd have everything packed into bags and ready to go, all labeled up so we'd know where to take them and put them on board the Shuttle. It was this choreography of unpacking the Shuttle, getting it temp-stowed or stowed in its permanent location on the Station, then taking the pre-pack and putting it in the Orbiter so that in 10 days, when it departed, everything was packed and ready for reentry and arrival. So that was a lot more complex. This is simpler. SpaceX has some of that complexity, because obviously we're not burning it up, so we have to have it all in the right configuration.

ROSS-NAZZAL: Right. Yes, you can't just chuck it in.

WHITSON: Even with the HTV [H-II Transfer Vehicle] and the Cygnus, you can't chuck it in, because you could throw off the center of gravity.

ROSS-NAZZAL: Oh, really?

WHITSON: Yes, the ground team will even tell us how to pack the trash, based on its assumed mass, so that you will not mess with the center of gravity too much, and when the vehicle fires its thrusters it will go the direction that the ground team wants it to go, which we also want it to do as well.

ROSS-NAZZAL: That's important, yes.

WHITSON: So it's still complex, but not nearly the level of detail that was required on the Orbiter.

ROSS-NAZZAL: So I have to ask: do you have to weigh the trash?

WHITSON: We can't really weigh it, but it's all known.

ROSS-NAZZAL: Oh, yes, that makes sense.

WHITSON: It's all known because the ground team sent it up. We even get told onboard the Station, when you're discarding a piece of hardware, "Okay, store this barcode in this particular trash bag, and then this piece of hardware that's broken or whatever, put it into a different trash bag." That keeps us from having to re-sort the bags prior to packing them in the vehicle, because they'll know how much mass each bag has, and how to balance it. They figure that whole plan out here on the ground. It's just amazingly complex; all the thought that has to go into even just burning up our trash.

ROSS-NAZZAL: Yes, I had no idea.

WHITSON: Yes.

ROSS-NAZZAL: So what else is new that you'll be doing on that mission?

WHITSON: Well, the Columbus module arrived when I was there, but the JEM [Japanese Experiment Module] module hadn't arrived yet. The JLP [Japanese Logistics Module], which is the Japanese closet, which attaches to their huge module—it's the largest single module onboard the Station—hadn't arrived. So we had it temp stowed on Node 2, and now it's out on the JEM module. Then, of course, there is the exposed facility where we have external experiments, including launching little payloads out of launchers out there. So there's lots of interesting things that I haven't had the experience of doing before associated with the JEM and the exposed facility. I think that'll be interesting, as well.

We are anticipating—it hasn't been defined for sure—that we'll probably be replacing the batteries on one of the IEAs, Integrated [Equipment Assembly], with the new version of batteries. Each battery pair is serially combined. We'll be removing six batteries, installing three new batteries, each fitting in the location of one of the old versions, and then adapter plates on the empty slots. The new batteries are so much smaller and more efficient that we should be able to have two in the spot of one, so that choreography is being designed now. They're developing the EVA [Extravehicular Activity] plans now. Of course, when these EVAs are performed will depend on when the HTV shows up, whether or not that will be something that we do during the mission, and because it's not planned yet there hasn't been a definitive decision on who would do the EVAs. I don't even know that I would necessarily do them, but that will be something going on during the mission, we hope. I always tell everyone, the only thing for sure is change, so you can't count on anything.

ROSS-NAZZAL: Well, that was something I was curious about. Of course, when you flew Shuttle there was a specific flight plan, but of course it changed regularly.

WHITSON: All the time.

ROSS-NAZZAL: You know, depending on whether or not you launched and trajectories, all of those things. Is there a definite flight plan for each of these expeditions, or is it just kind of we're long duration?

WHITSON: We have a definitive overall 6 month increment plan. It's written down in the IDRD [Increment Definition and Requirements Document]. The program office develops that plan, and then once vehicles shift or move in or out, then they shift and move things from one increment to another, depending on whether something arrived late, and then moving these other tasks from the next increment into this one. They have a very detailed plan of what they want to accomplish in each increment, but then, of course, it's all subject to change in real-time.

ROSS-NAZZAL: Do they do the same thing that they did with Shuttle crews, which is they pretty much had a sheet where every five minutes of your day it was spread out, this is when you're going to exercise, eat breakfast, these experiments? Is that the case for Station, or is it different?

WHITSON: That's a good question. For Station, our timeline is on the computer. They plan it down to about—5-minute blocks. But on the Station, unlike on the Shuttle, we can do many things in any order. They'll color code them a special color if they have to be done at a certain time. The end result with this time of planning is that the crew has a lot more flexibility. Over the 16 years of working on the Station program, one of the things we found is that it is important

to have that flexibility. The crew can be much more efficient if you give them the flexibility to plan their day. And our crews, I think, over the years have gotten much, much more efficient because of that. There's just too many things the ground can't compensate for and understand as a part of daily life, living up there, whereas the crew onboard can accommodate things. While I'm waiting 15 minutes on something to load here I can go start on the next task, and get it to another point, come back, finish this task, and then finish the other one later. We can do things much more efficiently with that flexibility.

I think we have to go one step further when we start doing exploration missions. Maybe instead of every day having a timeline, they will send up, "This month you need to get these things done. Figure out a plan, and here's a recommendation, or not. You guys figure out how you want to get all that stuff done." I think that's going to be a much more efficient that way. The com [communication] delays come into play when you're going to someplace like Mars. It's going to be way more efficient for the crew to just plan their whole day, figure out how to get the job done.

ROSS-NAZZAL: So who's the flight director for 50 and 51?

WHITSON: Amit G. Kshatriya and Ed Van Cise.

ROSS-NAZZAL: When we talked in August, you were talking about how the crew size has grown since the last time you were up there. You're going to have six crew members instead of three, and you were thinking about how things might change. I wondered if you could expand on that, what you think is going to change from your perspective, having six people in that large facility.

WHITSON: Yes. When I flew before, the vehicle was smaller, didn't have as many modules, but there were many times where you worked solo most of the day, and you'd just join up with your crewmates at lunch and supper. Because we have even more modules now, I think even though we have more people many days that's still going to be the case. I may be working on a project in a lab, Thomas [Pesquet] might be in Columbus, and [Robert] Shane [Kimbrough] might be in the JEM. We might be working there for most of our day and not have a lot of interaction.

But we will have more people to rely on if you have problems, I think that's great, because it was always a big deal if I had to go find somebody to lend a hand. When you're so shorthanded and everybody's got to get everything done, that flexibility of having more people, because somebody will be running ahead while somebody else is running behind, [is important]. You can always help each other out more, I think. There's a little more flexibility in that because I'm not just looking for one other fellow that's got a little time. There's more folks to choose from in order to get help or to lend a hand, if needed. So I think that will be interesting to see how that plays out. Again, I think the most efficient crews are the ones that can really take advantage of that interaction and make sure that everything's getting done well.

ROSS-NAZZAL: Have you had a chance to spend much time with your fellow crewmates?

WHITSON: Actually, two weeks ago I had the first training with both of my crewmates, Oleg Novitskiy, the Russian cosmonaut, and Thomas Pesquet. He's the astronaut from France. We are a Soyuz crew, so we will overlap with two other different Soyuz crews. Shane Kimbrough's the US astronaut on one of those, and Mark [T.] Vande Hei's the US astronaut on the other.

Their crews are going to be up there at different points in time while we're there, one crew for the first three to four months and then the other crew for another two months. So we'll have overlap with those other crew, but our first training session as a group of three was here a few weeks ago doing the emergency training.

The big emergencies on board the Station that we practice are fire, depressurization, or toxic atmosphere. We do a lot of training for each of those scenarios. We spent most of two weeks in Building 9 practicing, going over all the hardware that we need: the portable breathing devices, the fire extinguishers, the ammonia sensors, all the different toxic atmosphere sensors that we have, just trying to understand all the hardware and the procedures. The procedures have changed dramatically, which is a great thing, because they were way too complex. They just kept growing and growing as we were adding new modules. Pieces were just getting lumped on, and finally a big team of folks went back through and really reintegrated it and made it make sense, made it much shorter. We took a book that was about almost two and a half inches thick, and it's down to less than an inch thick. It's been very good changes. Obviously it's still not perfect, because it's hard to plan for every variable that might happen during an emergency, but it makes it much easier, I think, for the crew to understand the logic and follow the process, so that if there is an off-nominal, additional thing they have to consider, they know the basics much better, because it's much simpler, much more straightforward.

That was our first training session together, and it was pretty fun. I think we're going to have a really fun crew. Oleg has a great sense of humor. He flew with Kevin [A.] Ford, and Kevin told me in advance that he just really respected the guy and really enjoyed being with him, so I'm looking forward to flying with him.

Thomas, this is his first flight, and he is quite a character. I did NOLS, the National Outdoor Leadership training, with him. We went camping for a little over a week with some of our other crewmates and got to know each other in less than optimal conditions, just to understand what you're dealing with when you're talking to people, what their needs are, what's important to them, not important to them, just on that basic living part. When you get onboard Station it's not exactly like a hotel, and you can't go to the store to get things you need, so you have to compromise with what you have. It's an interesting experience. Getting to know somebody in an environment like NOLS is a good way to see how they react to things, see how to interact with them well, because you need to be able to interact well with whoever you're assigned with, because you don't get to pick. So you're flying with these guys, and how do you make this work the best?

ROSS-NAZZAL: Yes, that's interesting. Will you be doing those sort of activities with Expedition 50 and 51, or is that something that was just specific to another assignment?

WHITSON: It was specific. It was kind of a generic training event. We will be doing more emergency training together as a crew of six with both of the overlapping crews, so we will have some more emergency training here in the US. I will do a lot more training in the Soyuz with Oleg. He's going to be the commander of the Soyuz, and Thomas is going to be the left-seater. I was the left-seater last time, and now I'm a right-seater on this flight. We have, I think, our first three-person crew Soyuz training in November of this year, so that'll be fun to figure out how to make that team work most effectively.

We will have additional training together. I know, for instance, in the next couple of weeks I'm training with Thomas in various different EVA preparations—prep and post is what it's called—and other little tasks that we might end up doing together, so that's fun to get to interact with people and train with folks. So much of what our training is for the Station is solo, and you don't quite get to develop that sense of team that I've seen in some Shuttle crews. But I've also seen some Shuttle crews that didn't have all of that. As I said, you don't get to pick, so making the best of the group that you have is the key part, I think. Making the team the best that it can be is a very important soft skill, as opposed to a technical skill.

ROSS-NAZZAL: I was looking at the crew for Expedition 50—I didn't have much of a chance to look at 51—but I noticed that there were a lot of rookies on that increment, at least from what I could tell from their bios.

WHITSON: Fifty? No, Shane's Soyuz commander as a rookie, and he's actually the commander on the Soyuz, so they must think very highly of him technically to make him a commander the first time around. And his other crewmate has flown one time before; I think it was Expedition 24. And Shane's flown on the Shuttle before twice.

ROSS-NAZZAL: I think he flew [STS]-126.

WHITSON: One twenty-six for sure, yes. I was thinking he had another one, too, but I'm not positive.

ROSS-NAZZAL: What did you share with Thomas, since he hasn't flown before? What sort of things were you sharing with him? "This is important," or "Don't sweat it."

WHITSON: I've tried to do that on a lot of things. One of the things I told him is spend some time on your food selection. I said, "I know you don't think it sounds important here, and you might think you can eat anything, but spend some time on it," because that's the one thing I hear people complain about the most. "Oh, man, I wish I had spent a little more time." Even people who will eat anything, will later lament that it is one of the few things you have a choice about in your life, when you get onboard the Station. And, of course, then we've had crews who spent the time but the food blew up on the launchpad, which we've had happen three times in the last year.

ROSS-NAZZAL: That's disappointing.

WHITSON: You have to be flexible then, but at least put planning into that. There's things that he was telling me about how many weeks he was going to be actually in Europe over the next year, which his very little, because he's a left-seater. He said, "Well, I have two other weeks, but I'm on vacation when [I'm] home. Well, I might get some additional training on—". I told him, "No, go spend it with your family. You won't need additional training on anything. You'll be fine. What you do need is to be rested." So there's things like that that I've tried to advise him on, what not to worry about. Shane will have been there for three or four months by the time we arrive, and he'll be able to help, and I'll be able to help. So I just told him, "No, take your vacation. You need it. Take it."

ROSS-NAZZAL: I was going to ask you if you had a chance during all this time—I know you're so busy prepping and getting ready for these—is there time to take vacation and relax, or see the locales when you go to Russia or Europe, Japan, take a little time?

WHITSON: You can, if you weekends while you are on travel. But there's not a lot of other time, and the problem is I get tired of traveling. We do get vacations. My flow's about 18 months, and I think I have five weeks in that timeframe to have vacation. Some of it's pretty dictated. For instance, the two weeks of Christmas you get vacation, since there are no instructors available. Often, if we have a holiday here in the US, they'll send us to another country so that we can train there.

ROSS-NAZZAL: Take advantage of that full week.

WHITSON: Yes, instead of a partial week. So the training flow gets a little long, but we do have the week before the last trip to Russia when you would go for launch, there's a week off. Typically, however, that week we spend getting ready to leave for, in essence, a six months mission plus the seven weeks before the flight. So you're leaving for seven and a half months, and just taking care of "leaving the planet" stuff takes up that last week. I do get one other week in the earlier summer, before I launch, so we'll try and do something fun for that one.

ROSS-NAZZAL: So you do get a little breather here and there.

WHITSON: Yes, I do. You just need to make sure you take advantage of them.

ROSS-NAZZAL: Yes, good memories. I was looking at your Facebook or Tumblr page, I can't remember which, but there was a statement that you have to travel to Russia nine times in preparation for this expedition, and I found that particularly interesting. How many times have you been there since you started training?

WHITSON: I've been there twice so far, and I have one more trip this year, and next year I have four trips, so that's eight times.

ROSS-NAZZAL: How long do you go when you go over to Russia?

WHITSON: Most of the trips are three to four weeks. However, two of the trips next year are tied to—and actually one this year was tied to ESA [European Space Agency]. I went to Russia for three weeks and then went to ESA for one week, so it ended up being a four-week trip. There's two trips next year that are three weeks in Russia, and one to two weeks in Japan. So we'd go from Japan to Russia, and then back home. So an around-the-world trip, go west to get to Japan, go west to get to Moscow, and then go west to get back to the US.

ROSS-NAZZAL: Oh, goodness.

WHITSON: It's much easier from the Space Station going around the world. It only takes 90 minutes.

ROSS-NAZZAL: I wonder if you can talk a little bit about training in these countries. I imagine the culture is so vastly different from the US, and in Germany things have got to be different from Russia and Japan, and Canada.

WHITSON: Yes, everybody has a slightly different style, but our trainers have worked together and tried to come up with some commonalities of how we're doing things. I think Russia's probably the most different in their philosophy, but even they have adapted their philosophy a lot since the last time I went through the training flow, and is more similar to ours in this training flow, as compared to the previous ones. Previously, their focus was much more on theory and less on, "Here's how you actually use this information on orbit. Here's what we want you to be able to do on orbit," and that physical operations capability has been more of the focus of the US training, as well as all the other USOS [US Orbital Segment] partners. Japan and European Space Agency and Canada have been much more similar, but even those trainings systems have changed, too, just like the US system has changed over the 16 years. I was one of the first crews that trained in the European Space Agency for the Columbus module, since it arrived during my last expedition, and they have changed their training dramatically from that training flow I went through in the previous time. The same training that I did on that one-week trip to Europe I did in two weeks in the previous training flow, and so it's definitely gotten better in terms of condensing it down to the information you really just need to know.

ROSS-NAZZAL: When you go to Russia, are you speaking Russian, or are you working with translators?

WHITSON: I'm lucky enough that for most things I can go without translators, so routinely in my classes I don't have a translator. There have been a few classes that are a little more complex. The motion control systems I usually have a translator for, just because I don't have quite the right vocabulary for some of the more complex ideas in that system. Even though I understand it in English, I don't know the vocabulary for it in Russian. Even for those classes, the translator was sitting in the room, and I would just say, "Okay, I didn't get that last part," so we could go 90 percent of the time without a translation, but when I needed something translated it was just easier to use somebody in the room. But in general I don't have a translator in any of my classes there. In Europe, it's all in English with lots of fun accents, because they have instructors from all over Europe.

ROSS-NAZZAL: Oh, do they?

WHITSON: Yes, so you have Italian instructors, German instructors, just the whole gamut of folks. And then in Japan they also speak English, as well. So everywhere else is English. It's just Russia where we have to have the different language; we're taught in a different language.

ROSS-NAZZAL: So is that part of your basic training component that you have to continue with your Russian language training?

WHITSON: Yes. Yes, I mean, for survival. Well, I mean, it's important, because the one thing that any crew has to develop, in addition to those interpersonal relationships, is common

understanding of the language. So on my first expedition my Russian wasn't that good. I was with two Russians. But I knew, for instance, that one of my crewmates always mixed up Tuesday and Thursday in English, so I would always say those in Russian. You develop a common language. You understand what the other person understands. When my Russian commander would speak to me in Russian, I started thinking, "Hey, I'm learning Russian, I'm getting pretty good," and then he'd talk to somebody else and I would not understand anything he said. So he was talking to me using a vocabulary and a word set that he knew I understood. We developed this common understanding of what each other could say and have complete understanding of the other person. That was really important.

My other crewmate on that mission, he spoke very formally to me, and it made it much more difficult to understand his Russian. I asked my other crewmate, "Why is it so much harder to understand him?", and he tried to explain—he just didn't understand how to simplify the vocabulary enough that I would understand. My Russian wasn't good enough to do complex conversations with him, either, so it was a little bit limiting, in that regard, particularly since his English was also extremely limited.

Expedition 16, I flew in the left seat, which is like the copilot seat in the Soyuz, and all the communication, all the procedures, everything is in Russian, so I had to get a lot better at Russian before my second flight. I was, I think, pretty comfortable, but, again, developing that common language with my crewmates, and with the person that I was talking to on the ground was important. Our lead Soyuz instructor happened to be the one that was talking to us during launch and descent, so the three of us developed a language that everyone was comfortable with and understood all the time, and that was beneficial for our group. My technical knowledge of

Russian, things like pressures, temperatures, pumps and fuel, was much better than my ability to talk a lot more about more interpersonal kinds of things.

ROSS-NAZZAL: That's funny. So you've been maintaining this Russian training since when?

WHITSON: '96?

ROSS-NAZZAL: Ninety-six? It's been a long time.

WHITSON: Yes, that's when I became an astronaut. I had taken some Russian before that, before I was selected as an astronaut, but I was incentivized at that point in time.

ROSS-NAZZAL: So I wanted to ask about some of your general training, besides the Russian training. On your Tumblr page and Facebook you talk about having to keep up with your T-38 hours and working out, doing 7-15 hours on this specific exercise machine. Would you talk about some of those basic building blocks that you have to check off every month or week?

WHITSON: We do have T-38 training requirements that we have to meet. It's twelve hours a quarter of flying time, so it's not too bad, for a back-seat person. For a front-seat person it's a little more challenging, because they're doing 35 hours, I think, per quarter, so it's a little more challenging for them to fit that all in the schedule. We usually do an NBL [Neutral Buoyancy Lab] run on each of the trips. They're pretty evenly distributed throughout the training flow. There's nine of those planned, but there might be more if we knew, for instance, later in the

game that we were going to do additional EVAs. We might get additional of those training sessions. We typically have four hours a week of Russian, and we're scheduled for a minimum of four hours a week exercise, but obviously you have to be exercising more than four hours a week in order to stay in shape to the degree that you need to to perform well, I think.

Once we've demonstrated a training level, then we will routinely have what they call routine operation sims [simulations], or they'll have consultations to remind you of the important things, some important change that's occurred, or just to ensure that you're getting practice on the things that you're going to need the most when you get onboard Station. For instance, how to change out the urine tanks, which has to be done regularly if it's not connected to the urine processing system, which works great, but there's always times when that goes down. You have to collect it and store it and then empty those into the urine processing system, because that helps us maintain our life support system. We get the water back from that for drinking; we can use it to electrolyze and form more oxygen to breathe, as well, so that's all part of that life support system, and its interconnectedness.

So every system has its things. I have to be a crew medical officer, so recently I had CPR [cardiopulmonary resuscitation] training. I will have integrated, advanced cardiac life support training with my crew when they're here later in the month. It'll be a crew of three of us practicing what procedures, who would do what, and how you would divide up the responsibilities in case of that kind of an event. It's just amazing to me the level and complexity of everything that you need to be proficient on, the robotics operations, the systems knowledge, everything. You have to be pretty proficient on all of it.

ROSS-NAZZAL: What are your hours like? I'm just curious. Is it 8:00 to 5:00? Are you working longer days?

WHITSON: Mostly, it's pretty 8:00 to 5:00. When we were doing all our work over in Building 9 for the emergency procedures, the days were a little bit longer. Sometimes a facility [or] capability that's rare or harder to schedule, then your days might be a little longer. But in general, I think this training flow is the easiest one I've been in, and some of it is because our training has become more efficient. It doesn't feel quite as compressed and busy as it did before, which is why I'm talking to you.

ROSS-NAZZAL: Right, yes.

WHITSON: I'm able to do this, even though it's on my lunch break.

ROSS-NAZZAL: Oh, I'm so sorry. I'm eating up your lunch break. We can go to the cafeteria, if you'd like.

WHITSON: No, that's all right.

ROSS-NAZZAL: We did that once with somebody. It didn't work out very well.

WHITSON: Yes, I'm thinking, lugging all this hardware might not be the right thing.

ROSS-NAZZAL: Well, it's not too bad, it's just all the noise. And when you eat, it's hard to talk, because you don't want to have food in your mouth and talk. The last time you were at the ISS, you were building the outpost. This time you won't be, so do you think it will be more like working in an actual lab, like when you were an NRC [National Research Council] fellow, because you won't have to be putting together these components in space?

WHITSON: I do think it's going to be much more laboratory science oriented this time around, which I don't mind at all. I enjoy doing all the science. I'm interested in the different types of science that we do onboard, and I think that diversity of ideas that come up from all the investigators all over the world for us to try out on board is pretty exciting and fun. I like the experiments that require more hands on stuff, just because I'm used to working in a lab doing things on my own. A lot of the experiments are mechanized, automated, so that it doesn't require a lot of crew time, but for me the most fun things are the ones that do require the crew to be involved a little more integrally. It's just a little more interesting, exciting to do. It's great that we have that many things going on onboard the Station, so I'm looking forward to it.

ROSS-NAZZAL: What are some of those experiments that require you to have more hands-on involvement?

WHITSON: On my previous expedition, we did some experiments involving ultrasound, so looking at various organs in the body using ultrasound as a potential diagnostic tool and demonstrating whether or not we could do that. That requires some skill and hand technique, and I was being directed by the ground team real-time on, "Move your hand clockwise, or

counterclockwise, and slide it up or down," depending on what they were trying to image or visualize. And another interesting one for me was called InSPACE [Investigating the Structure of Paramagnetic Aggregates from Colloidal Emulsions]. It was looking at a colloidal suspension of iron molecules, and if you put it in an electromagnetic field then you can actually form solid structures. They think it could be used in suspension bridges or in buildings for additional support during earthquakes, or at least it has potential applications for things like that.

During the investigation, one interesting thing happened, because my eyes were getting a little old. I thought I dialed in 20 hertz on the electromagnetic field, and it was only 2, 2.0. We saw an unusual waveform, so it not only formed a structure, but it formed it in a wave. [It] was actually a moving wave, and the investigators were very intrigued by it, so when I finished all the investigations at 20 hertz then we went back and repeated it at 2, because they hadn't seen it on the ground. So that, to me, is a little more exciting—I was actually involved, even if it was a mistake, being able to see something different.

ROSS-NAZZAL: That's interesting. I was curious, when I was thinking about questions, if they were giving you most of the biochemistry experiments, for instance.

WHITSON: Not necessarily, we all do whatever experiments they timeline us to do. I think the crew will get attached to certain experiments, and you become more efficient at certain experiments. I remember during Expedition 16 Dan [Daniel Tani] and I traded tasks so that I could continue doing the one experiment that I was just talking about. I told him, "I'll do this task for you if you do this one for me," so we traded tasks, just because you get a little bit

attached. You get good at it, you get efficient at it after you've done it a few times, and it saves time in the long run to be the same person doing it.

ROSS-NAZZAL: That makes sense. So do you work much with the PIs [Principal Investigators] on the ground before you go up?

WHITSON: We will have briefings with them, usually. It depends on how complex the science is. We also can have on-orbit briefings, as well, or just written text briefings that we read before we do the investigation. All that's good because that way when you do your public affairs events you can talk about the experiments, and have a little more background and reminders for what the potential benefits, or why we're interested in looking at X or Y in zero gravity. So it helps us explain it better to the public.

ROSS-NAZZAL: When I opened JSC today there was a story about ISS and brain research. Are you involved in any of that research that's going on?

WHITSON: I'm doing the cognitive studies. Most people are, I think, but the one European study I'm not doing, because they prioritized a different US study for me, so Thomas may be doing that one. I don't know for sure yet.

ROSS-NAZZAL: Do you get a chance when you come back from this increment to work with the PIs and maybe publish a paper, or is that their research? You were the operator in space.

WHITSON: The reality is it's their research, and most scientific disciplines require the intellectual input, as opposed to just being the hands, and I think many times we're just the hands. I have been on a number of publications, some of which I felt like I did contribute to, and others which I felt, "That's on the edge of whether or not I think I really was providing a lot of intellectual input in this," other than just being your hands on orbit. So there are some opportunities, but I don't think it should be done, except when we are providing that intellectual input.

ROSS-NAZZAL: I was just curious about that. It would be a nice opportunity for you to get a few more publications.

WHITSON: Yes.

ROSS-NAZZAL: You talked a little bit about working out at the NBL. Have things changed at all? I know, for instance, the oil and gas industry is out there. Does that complicate things for training?

WHITSON: For our training, probably the biggest complication is the Station structure didn't fit in the pool in one piece as it was before, and now they've closed off probably only 25 percent of the pool and given it to the oil and gas industry. That meant we had to take apart more of the other pieces of the truss structure; it's doable. It's not ideal. It didn't fit in one piece before, so we were breaking it apart anyway. So it's just now in more pieces, so you have to say, "Okay, now float me over to that next piece and then I'll crawl across it. Now float me over to that next piece, and I'll crawl across it." So it takes a while to get out to piece six.

ROSS-NAZZAL: It sounds like it. So what sort of things are you simulating, since you don't know for sure how many maintenance EVAs or things that you'll be working on?

WHITSON: We have these EVAs called critical contingency EVAs. I don't know the exact number. The number changes, but it's somewhere between 10 and 14. They're considered the EVAs that are most critical that would need to be done in a relatively short turnaround time. In those nine EVAs that we practice prior to launch, six of them will focus on different aspects of those critical contingency EVAs so that we will be exposed to the hardest part of each of those tasks and have some familiarity in case in a contingency we had to perform those EVAs. So, for instance, on Expedition 16, one of our contingency EVAs was doing a room R&R, which is a bearing motor roll ring module remove and replace. It's the beta joint that rotates the solar arrays around that 360-degree axis. So on the end of the truss you have alpha joints that rotate the whole array that the wings are on, and then the beta joint rotates each portion of the wing. And we had to replace—it's about the size of a large trashcan—one of those. The only time I'd ever practiced it before was in the NBL. I'd been once or twice, just as this contingency EVA, and we ended up having to perform it.

The other contingency EVA I did was not part of the critical contingency EVAs, but to try and understand some of the problems that were going on. It was to look at the SARJ; the solar array alpha rotary joint was running at high currents. So we went and uncovered each of these panels to look under it at this supposedly indestructible metal that was flaking off everywhere underneath. It ended up being fixed on a later Shuttle flight. Actually, I think it was

on Shane's. They greased it all up, and it worked, so we didn't ever have to replace it, which would've been a very, very big deal if we'd had to replace that.

ROSS-NAZZAL: You're also working in a buoyancy lab over in Russia, so you get time in the Russian suit?

WHITSON: No.

ROSS-NAZZAL: No?

WHITSON: I did on my first flight. When I was crew three, I had to train as a potential crew member to do EVAs during that timeframe. I also trained on Expedition 16, as well, so to do Orlan EVAs but not anymore. Now the USOS trains their crew for the EMU [Extravehicular Mobility Unit], and the Russian side trains their crew for the Orlan. So I have done one EVA in the Orlan on my first expedition, and then my second expedition I did five in the EMU.

ROSS-NAZZAL: That's interesting. I was curious about that. When the Shuttle was flying, I've heard that it's good to be prime crew. Is that still the case now? You get the best time on simulators, and, from what I understand, best parking spots, things like that? Is that the case for Station?

WHITSON: That's not the case. Being assigned crew now gives you higher priority, like to get T-83 flight time, because your schedule is much more limited, so you have higher priority for that. You don't get a closer parking spot.

ROSS-NAZZAL: No?

WHITSON: I mean, the only good part about being prime crew is you know you're next. It's good. That's a good thing.

ROSS-NAZZAL: Yes, you're assigned. Do you think there's any significant or major challenges that you're encountering as you prepare for this next expedition to go up, or things are just going really smoothly?

WHITSON: Well, knock on wood, it's going very, very smoothly. I don't anticipate any problems or issues. Obviously I hope we're all very prepared for anything that can happen. We practice a lot on these emergencies and hope none of them ever happen. We need to be prepared, and I'm comfortable that we will be there. We've done a couple weeks of that training. We've got a few more weeks of that left, and I'm confident we'll get there, because we just have really strong crews, so I'm happy about that.

ROSS-NAZZAL: I had read recently that there was a French documentary crew that came and did some filming. Can you talk about that and what they were interested in?

WHITSON: They're doing a documentary on Thomas, and I guess I am going to be involved in it, too. They did one previously with [G.] Reid [Wiseman] and Alex [Alexander] Gerst, and focusing on the fact that they were both rookie crewmembers, US and European, going up on their first flight. On mine, they want to focus on me being old and experienced.

ROSS-NAZZAL: That's their thing.

WHITSON: And Thomas being the new guy, so I'm not sure how it's going to work out. All right, yes, I'm old.

ROSS-NAZZAL: "Seasoned," I think is the term.

WHITSON: Experienced.

ROSS-NAZZAL: Yes, there you go. Just depends on how you say it, right? Looking back since you've been selected for this mission, are there any fond memories that you have of things that might have happened, or just an experience here or there, maybe meeting someone?

WHITSON: I don't know, fond experience—a memorable one is that Oleg and I did water survival training in Russia, in the Soyuz capsule. Normally it's done with all three crew, and they had asked me if I wanted to do it, because they weren't going to require me to do it again. I said, "Only if I'm doing it with my crew." So Oleg was there, and that was my first time to actually work together with him. It was great because we got to know each other. Again, like I

was telling you about the National Outdoor Leadership thing with Thomas, you find out a little bit more about people when you're not in optimal situations, and you're inside of a small capsule. We're changing clothes; you have to get out of your Sokol suit and into the flight suit, and into the thermal suit, and then into the Forel the water suit, the hydro suit that you get into.

ROSS-NAZZAL: In the Soyuz?

WHITSON: In the Soyuz. And normally there's three people in there, so you're lying across each other, helping each other get dressed and undressed. There were just the two of us in there, which made it significantly easier, but still challenging enough that we were joking in the capsule while we're doing all this. We thought that maybe Thomas should stay onboard the Station just in case we had to do this, because there was a lot more room there with just the two of us. No, but it was fun. It was a good experience, just getting to know him.

The NOLS experience with Thomas and Shane was good. Shane and I trained in Germany together for that week, and we had a good time. I probably went and did more and saw more because he was there, as well. He'd been stationed in Germany before and knew some folks, so we had a good time. So the fun times are the people, I think, the most memorable times.

I have a great training team, though. I have really enjoyed doing the social media thing, and writing all these stories about them, and getting them to talk about themselves, finding out more about them than you would just knowing, hey, that's my ECLSS [Environmental Control and Life Support System] instructor. You get to know them a little bit more and understand where they came from, what excites them about their job. So that's been fun.

ROSS-NAZZAL: So everybody that's on the Tumblr page, those stories, those are all of your trainers assigned to your expedition?

WHITSON: Not just trainers. There are other folks that work in the program. One that's already been posted is a young lady that works at Marshall [Space Flight Center, Huntsville, Alabama], so we have many stories. Actually, I have a whole bunch of them; we've just got to post them as they go, to spread them out a little bit so that I could work on them when I had time and not have to worry about them when I don't have time. It's been fun writing all those down. We have flight directors. We have flight controllers. We have instructors, and folks that are working payloads, different people working throughout, engineers that work on exercise hardware. So there's a pretty wide variety of people, and I'm interested in getting everybody's story. One of the cool parts about being an astronaut is you get to meet this huge diversity of people as you go through a training flow, these engineers that built this hardware, that design some particular widget that does a particular thing. Everybody is very justifiably proud of everything they've done, and it's cool to put all those pieces together.

ROSS-NAZZAL: Yes, that is. Who came up with the icon? It's not quite, but it reminds me of—this is dating me, but like *Charlie's Angels*, every time I see it.

WHITSON: I didn't think about that. It was Melanie Whiting, the intern that was working with us on social media.

ROSS-NAZZAL: It really stands out. It's very colorful.

WHITSON: Yes. She did a phenomenal job. She took some fantastic pictures with the trainers, less posed, less traditional things, which I think makes some of the pictures a little more interesting.

ROSS-NAZZAL: Yes, I was going to ask about that, about putting that together. You said you're writing their stories.

WHITSON: I have a webpage where I ask them to fill in different questions, like what was the biggest challenge you had to overcome, what's a fun story about your job, what's most interesting thing? I gave them several questions; they could fill in any of them, and then from that try to put a story together based on what they've said. How that relates, in some cases, to me, and how I've interacted with them, or how it played out in my life, which may be similar, or in contrast, just a way to give people a sense of how different people overcome different things to get where you are, and how cool the jobs are and all of that.

ROSS-NAZZAL: Yes. I've enjoyed reading them, myself.

WHITSON: Good.

ROSS-NAZZAL: What's been the response to your campaign?

WHITSON: Less than I wanted. I had higher hopes. I think a lot of our folks are engineers, and not really used to sharing information, so it's taken some encouragement to get folks to talk, and that was what was so great about having Melanie around. She's unfortunately finishing up her school now, but when she was working here as an intern she could go back and get them to fill in some holes and tell a little more of their story. That really helped put the pieces together. Now it's me working on it, and it's going a lot slower.

ROSS-NAZZAL: Have you gotten any response from kids saying that they really appreciate these inspirational stories

WHITSON: Yes, there are a few posted on there. I haven't seen a lot. As I said, disappointed.

ROSS-NAZZAL: Yes. We'll have to go out there. I did like the photo of you, I wanted to tell you. I thought that was nice.

WHITSON: Which one?

ROSS-NAZZAL: Oh, yes, I guess I should be specific—I'm not sure about how old you are, maybe 8 or 10, on your family farm?

WHITSON: Oh, yes, yes.

ROSS-NAZZAL: Yes. I thought that was nice to include, and inspiration, again, for the younger crowd about making it where you are, and your work ethic, too. I thought that was nice to read. So, since you're flying on Expedition 50, I was curious: is NASA planning anything big for the 50th increment at this point? NASA likes to celebrate those anniversaries.

WHITSON: I don't know. Not that I've been told. Shane's planning—I think the Superbowl is going to be during that time, so I know he's thinking about some of those kind of things, but nothing that I know about.

ROSS-NAZZAL: Are you planning anything special for your command?

WHITSON: No.

ROSS-NAZZAL: Planning on taking up anything special for an organization or history?

WHITSON: I've flown a lot of things on my first two flights from my alma maters and from high school, so I'd flown the standard things for folks. There was one organization that I'd worked with since then. It's the Iowa High School Girls Athletic Union. (I played basketball growing up and ran track.) They had worked with me on another project, and I had asked them if there was something that I could fly for their organization. The Iowa Aviation Hall of Fame had inducted me, and I asked them if there was something I could fly for their organization. And Character Counts, I think they're nationwide, but there's a chapter in Iowa that a former teacher of mine is involved with. So those are the three that I think right now that I have, and we'll see if

I can get anymore. We have to have all that stuff signed off and delivered by January or February of next year, so I don't know that I'll get anymore before then. I've flown numerous items for individuals before. I can't be very big, so lots of regulations on what you can and can't fly for people.

ROSS-NAZZAL: All right. Well, I think I've touched on all of the questions that I came up with, but I'm just curious if there's anything else that we might talk about?

WHITSON: I can't think of anything specifically.

ROSS-NAZZAL: No. All right, well, I'll get this transcribed and send it to you. Thank you very much for giving up your lunch hour.

WHITSON: No problem.

[End of interview]