TOMMY E. CAPPS

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Wright: Today is August 18, 1998. We're speaking with Tommy Capps with the Shuttle-Mir Oral History Project. Rebecca Wright, Paul Robbins and Franklin Tarazona.

Thanks again for taking time out of your busy schedule to visit with us. We'd like to start with you telling us about your role and responsibilities with the Shuttle-Mir Program.

Capps: Thank you, Rebecca. It started out, actually, as we first learned about the Shuttle-Mir Program in October of '92, I was working with a small group of training managers, [as] the lead of that group handling the training for Shuttle Program. We got our first notification that we were going to do a joint program with the Russians, which was, at first, very exciting, but we had a lot of unknowns and we had a lot of questions immediately.

But after a few phone calls, initial phone calls, to Sergei Krikalev and Vladimir Titov, because we really didn't know who to work with at the time, these were the first cosmonauts that were coming over for STS-60. Sergei Krikalev was the prime and Valogi Titov, Vladimir Titov, was the back-up. So our first initial conversations with them were new and exciting and telecons.

So we started at that point. The first docking was planned so that we needed to start training very, very quickly. So we initially got them over here in the November time frame. We first talked to them [Russian cosmonauts] in October, got them here in November time frame. Then we had from November to February of '93, which was the very start of training for STS-60, an important milestone for us in the Shuttle world, because that's when the crew comes together, starts training in the Shuttle mission simulator.

So we had from November to February to get two new guys [trained in basic Shuttle knowledge] whose language skills were being improved daily, but were pretty far down the road from the foreign nationals we'd worked with before. So we had from November to February to get them up to speed on the Shuttle, basic training for Shuttle, understanding what Shuttle was, understanding a little bit about their roles and responsibilities. So it was a very difficult job for all of us. We had a lot of initial contacts with the Russians on training plans, trying to learn to communicate with each other, even though through an interpreter it was [still] a different language after we communicated.

What we were doing then is trying to get them familiar with the Shuttle systems, getting them up to the point where they could join the rest of the crew in February and start training. We did that successfully with a lot of their cooperation. But some of the interesting things that none of us thought about before is, well [for example], can they drive in the United States? We were really worried. I basically starting off, initially from MOD, looking at it from a training perspective--but with Don Puddy, and later Steve Nagel, and I, in a Crew Exchange Training Working Group, and [in] that working group, we had two Russian

friends join us, Aleksandr Aleksandrov as co-chair and Yuri Kargapolov. So the four of us with Steve Nagel working [with us] occasionally were trying to get in place the training and the crew exchange issues.

So little things like driving was very, very important suddenly, because here we had two new guys coming to the States with very limited language skills. Even though Krikalev had been studying English and did have a start, in his own words, he was about seventy percent of understanding what we were talking about. Not being able to speak [at that level] as we all learned, a foreign language is more difficult to speak, but he could understand a lot.

So we started trying to do things like take them out for driving lessons. We were really apprehensive about them driving in Houston in all of our aggressive traffic and freeway traffic and so forth. What's ironic is Don and I made our--well, Don made one or so trips, but our first trip to Russia came in like May of that same year. After a few hours in Moscow, I realized that we were totally silly for wasting our time trying to teach these guys how to drive in Texas. If they could survive Moscow traffic, then they had no problem whatsoever driving. It was an experience. A lot of new experiences.

I remember very vividly our first Christmas together [with the cosmonauts and their families]. This was an introduction. You've got to realize Russia had not been celebrating Christmas that long, and so they were interested in a lot of our customs. Very, very enjoyable time for everybody, but a difficult time because they were trying to adjust to our training materials.

But basically what I did is put in place a group of instructors that tailored the training to their needs. We had had a lot of foreign nationals here before and trained them and they worked on the Shuttle, but they always came to us with pretty good English skills. They didn't have the culture differences that we had with the Russians. The unique thing for us was learning what the Russian culture was, trying to understand it. They, the same for us. So many things that are a given, very simple adjustments for a lot of other foreign nationals, the Japanese, the Europeans, and so forth, were difficult for the Russians. So there was a lot of time and effort in addition to the formal training. . Our instructors helped them understand how to live here, how to work here, how to understand our approach. But basically we had to develop a training program that was very much tailored to them.

STS-60 was a very successful flight. We learned a tremendous amount of information on how to approach training with the Russians, how we should adjust our program as necessary. So those were very, very valuable experiences for us.

Stepping forward in time, we flew other Russians on the Shuttle. We had to develop programs for varying degrees of involvement with the Shuttle. Some were just passengers. Some, again, were much more involved as mission specialists. Basically my role evolved as the Crew Exchange Training Working

Group role [evolved], working with Don and Yuri and Aleksandr in all the aspects of the Shuttle-Mir Program, at the same time I was managing a group of individuals that held the management end of training for Shuttle.

So basically my role became defined as all the Russian activities. I did that purposefully. I set that up for myself, because I just felt like we needed the focus and concentration, so I could let the other people in my group go worry about all the other flights. I just concentrated on the Shuttle-Mir flights, because we were having a number of those.

Basically that involved the training for cosmonauts when they came to the U.S. to ride on the Shuttle, either as passengers or as full MS. I got very involved in those flights. The training for astronauts in Russia, Mir training for astronauts in Russia, our long-duration crew members starting out with Norm [Norman Thagard] and Bonnie [Dunbar] as his back-up. Then Shannon [Lucid], John Blaha, and [Jerry] Linenger and [Michael] Foale and [David] Wolf and [Andy] Thomas. I don't think I'm leaving anybody out. But all those guys were concerned with the Shuttle-Mir training that they received in Russia. Obviously, when they came here for science training, I got very heavily involved in making sure that the management of that went well.

At the same time, cosmonauts that came here, riding as passengers on the Shuttle, or if we were docked with the Shuttle, that was an important aspect that none of us really anticipated, but you realize if you're on Mir and been there for a while and then Shuttle docks and then you're moving to the Shuttle, you've got a lot of Shuttle safety-related-type aspects that we needed to make sure they understood, so we put in place a mini program. It wasn't real involved, but about a week's worth of training to get a familiarization with the Shuttle. Not that they would do ascent or entry on the Shuttle, but actually just visit the Shuttle from the Mir.

Obviously, with the cosmonauts, we had probably every scenario we could have developed. The cosmonauts that would just go uphill on the Shuttle, stay on the Mir; we had cosmonauts that would come down on the Shuttle, that had not done ascent; we had our own long-duration crew members we were bringing back. So that led us to try to get an understanding of the post-flight experiences.

Probably, for me, one of the most rewarding aspects [of Phase 1] was the post-flight period for our crew members and also dealing with the Russians coming back on the Shuttle after a period of time on the Mir. Basically, from the three auspices of the Crew Exchange and Training Working Group, I managed a small team of individuals that met every day after the landing and did an assessment of where the crew member was, what kind of requirements we had from different communities, and making sure that was all coordinated and worked, and then I went back to my MOD counterparts, who handled the scheduling of

that post-flight experience, and what it is, put together a little team of a flight surgeon, myself, from a management perspective, but the flight surgeon, the scheduler, an MOD-type individual, and then the baseline data-collection person, the science-type person, and then the rehab, which was probably the most critical piece of that. So we all basically met and assessed the needs of the crew member and tried to make sure that we metered out their experiences.

The reason we evolved to that, our first experience, in my opinion, with Norm Thagard, was just horrible for him and for everybody. We oversubscribed his time. We basically had not got a good handle of what the demands would be press-wise, PAO activities. We didn't understand, because we're all science, engineer-type people, we don't really think of the ramifications of the politics and public policy and all involved in these kind of missions, investigations by inspector generals and congressional committees and so forth.

Basically a lot of those demands spill over in a post-flight experience, too, so we very quickly learned we had to put together a team and go manage that. We did that. I'm so thankful by Andy's flight, we felt like we did a really good job of that. To me, one of the most rewarding experiences is from a chaotic mess, we evolved to a very structured, organized, reasonable post-flight experience, that the crew member's health is first priority, obviously.

We had a very strict priority list whereby the events that were scheduled came under the category of--crew health was always first. Rehab, obviously was second, and very closely tied there. Then we would get into baseline data collection, which gave the scientists their valuable science experience through the crew members' eyes. Then we would work debriefs, and then other events, PAO and type events. So we put a lot of structure into that.

In this whole process, the post-flight experience had to evolve through the training, all the way through the period of training, for the crew members. Talking about the LDM crew members now. Their periods of training in Russia and so forth in many ways was very similar to this post-flight experience. We found that because it was very easy to oversubscribe them, we had to get very intimately involved in the Russian scheduling aspects and coordinating with our schedulers back here to make sure that the transition from when they were in Russia would come back here for science training, all that blended very well. So we found that we had to get very, very--in fact, Don Puddy and I had to get very involved in actual crew schedules and so forth there in Russia.

We had in place a director of Russian operations. We call them DORs. The astronauts that were there basically worked under Don's Crew Exchange and Training Working Group. We coordinated with them. They did a lot of the in-country-type negotiations with the Russians. But we found ourselves having

to get very involved in those schedules. The reason for that is, basically the language was a tremendous burden. And some new things for our crew members like testing and quizzing and things that they went through, we found that the language was a tremendous burden. So, to be able to accommodate the needs of the crew members, we needed to basically have a very structured scheduling program.

The Russians were very, very good about making sure that the work week was forty-two hours and things like that. But what didn't count in that was the self-study and the time at home, trying to get a lot of the language down. So we had to keep that all smooth, which kind of was not unlike post-flight periods. So I think we had our lessons learned that kind of merged together there.

One of the things that I found useful for me is, I spent a good bit of time with the Europeans that already had worked with the Russians for a long time. A new concept for a lot of us, being very ignorant at the time of the Russian culture and so forth, we took culture courses. In fact, NASA put together an extremely good Russian culture course. Steve Jones put that together and we took it. Every trip to Russia validated how good a job he really did on the course. But one of the things we didn't understand very well is basically the Russians are very Oriental in nature, so a lot of their culture and aspects are somewhat Oriental-related. We stereotype them as Europeans. They look like us. They look like Europeans. They in many ways communicate like Europeans. But we found that many of the things that drive them, their decision-making process, the ability to work on something for years and years and years and not have to see an immediate finish or reward like we have to have, is very, very different for us.

So what I was trying to do is to get into their heads a little bit through the Europeans and understand how Europeans dealt with a lot of the common problems that we had. It was very rewarding for me. The Europeans were very candid and open. The folks from CNES, the French Space Agency, were extremely cooperative. I made a couple of trips there to try to understand their training program, but mostly spent time talking about how can we jointly crack the nut of understanding the Russian program and how can we accommodate the Russians needs and desires, but at the same time take care of our crews.

They had in place [in Star City, Russia]a similar-type function as the Director of Russian operations that we had there. They had a training counterpart. They had kind of counterpart, my counterpart, that basically was responsible for the training for their crews there, for Euro-Mir Program and so forth. We spent many, many hours together strategizing, well, how should we approach negotiations and so forth. They had a tremendous advantage on us, because they could just hand the Russians cash and make things happen. We can't do that with our procurement processes and so forth.

But I probably should say a couple of words about the contract deliverables. For me, one of the best things that happened for us on making things actually happen in a very slow-to-change environment

was the contract deliverables, whereby if we needed to upgrade things in Star City to accommodate our crew training, we were able to do that through a contract. Obviously, we were paying the Russians money to deliver items that we need, including models and their simulator, including visuals for their simulators, and those kind of things. So we could actually pay for those things to be upgraded in order to provide for our crews the training for the level we thought that they should have. That's a difference in the ISS [International Space Station] Program and people are struggling with that right now.

But I found the Russians, even though many times economically or the wherewithal was not for them to come through on a deliverable as timely as we would like, they did come through, their heart was in the right place, they did try to deliver. But we did have that lever of not paying if they didn't deliver. Therefore, there was a lot of motivation to provide what we needed.

A very simple example is a very simple model of the Mir in the correct configuration. It was important to us that all the modules that we were docking with, our astronauts in Russia understood what the configuration of the Mir was in, were the Spektr and Priroda modules in the right position and so forth. The Russians didn't necessarily see the importance of that fidelity. Because we thought it was important, we thought it was safety important, we thought it was important because of the orientation of the crew members, we were willing to pay for a new model to be built. Basically, we're talking about a long tube with a model and a light shining through it, so your visual actually shows in your simulator for your hand-control motions, shows an accurate model. We could talk about that concept all day long, but we had a difference in philosophy of training. The only way we could get to our philosophy, the U.S. philosophy, that we thought was important was to pay for it, and we did, and it worked. So that was kind of a lever that we had, and I'm very pleased that we did that.

The other thing that I felt was extremely successful for our crew members that we were able to negotiate through money is a crew onboard support system. We call it the COSS system. Basically, that was a system whereby it's just a laptop computer with a CD-ROM and so forth, where we could put in video images of, for instance, science equipment. If it's a particular science experiment, we could set up all the equipment, take photos of it, put it into the computer, so that on orbit, the night before a crew member was to spend time-line hours the next day putting that experiment together, they could look at it, look at the parts of it visually, look at some key notes about it that they entered themselves, or we entered for them. Basically, that system gave them a nice refresher, because you realize you may have had that training months before you fly and it would not be fresh in your mind. So it was a good refresher, but it also, in my opinion, technically was a good tool to get the accuracy. Did this item plug into this item, and those types of analogies. So we were very pleased with that.

At first the Russians were very resistant to that [concept]. I remember Don Puddy and I negotiating, hours of negotiation, talking about it. But then they locked on and just love it now. I mean, it's something that they think is extremely important. But our role was to try to find a champion on the Russian side that understood the importance of the concept. We were lucky that Aleksandr Aleksandrov backed us and he understood the benefits..

That concept of reinforcing the training with materials was very, very important to us. Basically the Russian culture, for many reasons, there were not many training materials available. That was one of the biggest problems that we had to face, is that our crew members were used to a lot of visual cues and a lot of training materials. Now, you think about, of course, I'm a little older, so I can remember the lectures back in college where we didn't have much visual reinforcement. You just took notes and you studied your notes and you had a textbook and so forth. But the generation of astronauts that, basically, we're dealing with, a lot of them grew up in the computer age. A lot of us had to learn that the hard way and they actually had it in school. So they had a lot of visual reinforcement, whether it was Gameboys at home, or whether it was computer toys, and so forth.

The Russian environment basically was much like the old days of our schooling system, whereby you took notes, you listened to the professor, you studied those notes. You'd never really dream of many handouts or pieces of paper that helped. It just was not a published-type system. It was basically a listening-type system. So this was very, very difficult for our crew members, particularly in a new language, because they did not have the luxury--we got into Phase One so quickly and we were flying so quickly, we didn't have the luxury of giving our astronauts months of Russian language training before they went to Russia. Basically they had to learn it very quickly. It's a difficult language.

So what we would find is that lack of materials to reinforce their lectures was a phenomenally big problem. The Russians were very, very reluctant to give us those materials, because, number one, they felt that it was giving away a lot of their secrets. Now, realize they had just come from a Cold War era and it very difficult for them to fork over that [their training materials]. Another is, they'd been selling a lot to the Europeans, so it's kind of and issue of getting monetary return for that. This is my opinion, but a lot of it also was a resistance to publish the knowledge that you had, because in their old system that basically knowledge was power. So if you had a piece of information, a concept, or you were the instructor in a particular area, you guarded that very, very carefully, because if you put it all down in writing and you handed it to someone, you were at that point dispensable, and if things were not working well for you with your management or whatever, you could be moved on out into another area.

So there were many, many reasons why we didn't have a lot of materials. We found that by buying

what we call komspecs, basically buying a contract deliverable, was to give us the written material for our crew members. Of course, it was in Russian, a lot of it was outdated, and part of the problem was to try to verify the data. So those were very difficult times for our crew members, very difficult times for all of us.

But we've evolved where we did get a lot of those materials. We were able to take those and put people in place to try to turn them into useful training materials. Therefore, [we] evolved to a point where the more common things that we have now in training, the visual cues, the computer-aided things, were more in place and we were using more complex visuals by the end of the program. So that Andy Thomas was able to debrief and say, "Hey, these items really, really did help me," and so forth. So that was an evolution.

Part of the adjustment for a lot of us in the early days was just learning to adjust to the climate, learning to adjust to deal with meeting in remote areas and meeting in a culturally different environment than here. We had a lot of adjustments. We wanted to make sure we didn't offend our [Russian] friends. I remember many, many times, it is a custom in Russia to take off your coat and hang it. It's almost a ceremony, in my opinion, to hang it at a certain place. But I would find that we were in meetings, Don Puddy and I, particularly, met a lot in an area in the edge of Moscow, Mitishi, where it was very cold, very difficult environment. We'd go in, and basically you had to just layer clothes. I learned that I would wear a big thermal jacket with a good thermal liner, and I would unzip my outer jacket and then make a big ceremony of hanging it, but wear my liner through the whole meeting with insulated underwear under that and the whole bit. I'm not very cold-natured, but I found that there's a lot of adjustments.

Some of the things we learned was just surviving and how you survive in Russia. I think the Russians had the same problems here with our hot summers and how to dress accordingly. We had a lot of cultural exchange that was fun in a way and wonderful experiences in a way, but, I think, very difficult at the time. When we [in the U.S.] were used to going into a meeting with an agenda, one, two, three, four, and get through that agenda, and maybe after a week of meetings we were past item number one and we had this big plate. Don Puddy and I and Yuri Kargapolov and Aleksandrov worked really well together, because we became very good friends. We became a real team. I think one of our successes was that we could move through a lot of material very quickly. Now, we found ourselves, if we had to join a larger meeting, that we got bogged down immediately. But the four of us together could crank and we had an awful heavy workload for a long time, so we had to move through the material. But we found we could have our differences, our negotiations, our arguments, whatever, but we would work them out and get past them very quickly and move through the agenda.

I think one of the things that we learned together was what were the battles that we fought, what

was really worth fighting for and what was not, and try to come to some mutual understanding. We would find by the end that Don and I could write the protocol, which is basically a document of the meeting and so forth, before we ever left the country. We would write it and then we would work to that protocol together. We would basically share that with our Russian friends and we would sit down together and negotiate to the point that by the end of the meeting we may have revised that protocol some, but we had a good starting place. It was a very good technique for us we learned early.

The other lessons learned that was critical, I think, is a small working group, our working group of four people, and we would bring in who we needed. Don't misunderstand that. If we needed expertise from the science area, we would bring in Dr. Bogomalov from the Russian side, or John Uri, or somebody from the U.S. side. We would sit there and work those particular issues, but basically reconvene back to our small group to make things happen.

The science training piece, I got involved in that. We were having a lot of difficulties with the integration of the science training into the Russian world. You can imagine our scientists learning to deal with the environments in Star City. Moving people in and out of there was a logistical problem, housing and all of the ramifications of that. I still wore my hat as Crew Exchange Working Group member, but joined Rick Nygren's science group, for about a year or so, just as a matrix, just to try to help lend some mission operations experience, some training experience, some scheduling experience, to his folks. Also we had some things working well with the Russians at that time. I went over and headed up one of his IPTs, his Integrated Product Teams. I got Lisa Spence, a young lady here in mission operations in my organization, to work for me over in Russia. We had a very successful experience in trying to get the science training integrated into the Russian program and try to reach some agreements and some understanding of what we needed. Basically what we needed was a crew support-type person to go in and understand the procedures. If this was U.S. training provided to the cosmonauts or to our astronauts there, to understand those procedures backward and forward and integrate those into the Russian system.

The difficulties we came about was the different way of writing procedures in the different countries. What our astronauts were used to here was very, very different, 180 out, probably, from what the Russians were used to. So we had to get some folks together procedure-wise. A lot of the procedures were almost just in time-type procedures, because the science program was evolving and developing as we go. So it wasn't like we had a lot of structure already in the program. But that team pulled together.

I found it very rewarding that we actually accomplished a lot of the science that we needed to, as far as the science training. I was worried about the training of the science, not so much just the end product. But we were able to do that, improve the quality of the training on both sides of the ocean jointly.

We actually together worked very, very hard. The Russians counterparts there, I know Ivonti Zorinand some of those guys were just interested in it as we were, in making sure that the product was a good product for the crew training.

But that was an era that was very interesting for me. It was fun. But it was rewarding. I think it was about a year and a half or so that I spent working in that, at the same time Working Crew Exchange work, crew-type issues. I never left that, I just did less MOD-type duties at the time so I could do that.

I guess, we're up to today, twenty-four trips later to Russia and several trips down to the Cape during the launches. I guess I should comment that was always a good experience for me, is we'd go down and support the launch of each of the Shuttle-Mir docking programs where we had a lot of fellowships with the Russians. We had a lot of technical problems to solve immediately. The training was usually over with at that point, and Don and I both were into more a logistics mode, making sure that our friends from Russia understood what was happening at the Cape, understood what was happening with the launch and share the launch experience together. That was always very rewarding.

I'll share one story that always I get a little emotional with, because it was, I guess, the first year. Up until '92, October of '92 time frame, up until October, November, December, our Shuttle mission simulator basically was very, very closed to foreign nationals, particularly Russians, so the last person in the world I would ever think that I would take in to a fairly secure simulator, because we had done a lot of the military, joint military Shuttle flights. We all had secret clearances. It was a very closed environment, and I remember after things loosened up and the Air Force or military got away from a lot of the flights for the Shuttle, we were able to actually loosen up a little bit. So I could take people into the simulator that normally I could not take. So I took General [Yuri] Glazkov over for a tour of the simulator, the motion base, and went through it and set him in the flight deck. We talked a lot together and shared that experience.

We walked out of the building and I said, "General, I just realized that just a few months ago I would have never, ever have been able to show you this simulator." We had a good hug and we had a lot of conversation about how far we had come in a short period of time from the Cold War days.

My first trip to Russia, the very first thing he wanted to do is to get me over in their simulator, which we did and we went over there. We did almost the identical thing. We were in Star City, we walked outside, looking around, and he said, "Tommy, do you remember you took me through a simulator in Houston?"

I said, "Yes, I really do."

He said, "Well, I feel the same way right now." And so we both shared that moment. But it really

brought home to me the value of the Phase One Program, how quickly we came from a very, very--well, all of us, a very much lack of understanding of each other's cultures. We had a lot of negative feelings. A lot of us--you realize that I grew up in the era in East Texas, where we had the practice bomb raids. We hid under our desks and drilled if the Russians were going to basically invade or whatever, or bomb us. And the Russians of my age group did the same thing over there. Of course, we all, in different military experiences and different civilian experiences, both were guarded against each other's culture. So I think the reality [is] that [now] we could sit together or work jointly a program that brought our two countries together.

A young man in Russia that's working right now for me on this ISS Program just got through with a very similar experience for himself with a driver there. One of the NASA drivers was going to have a birthday party. Ron's leaving, I think, Friday on the NASA plane and not going to get to participate in the party. So I think they're having a separate little party. But Ron said, "Tommy, you were right. You told me when I went over here that the whole reason we're doing this thing is not just the NASA technical aspect. It's not the space program or a way to get money to Russia and all. It's basically the blending of the two cultures, so that our offsprings and so forth will be basically joint-ventured and working together and not necessarily doing military numbers on each other." I think the reality hit him after several weeks in Russia. But the real value of what he's doing right now as a young person in Russia, besides the technical and supporting the crews and all that, the real value is getting to understand the Russian people and working with them.

That's my data dump. Any questions?

Wright: [Laughter] And a very, very good one, at that. For six years you watched it grow and you watched it change.

Capps: Yes.

Wright: Was there ever a time that you thought maybe it was just so difficult, whatever you were going through, that the benefits wouldn't be worth the agony?

Capps: Yes, I really did. There was a period of time, actually more recent than you might expect, that I felt like that [Daniel] Goldin had an opportunity to pull out of the ISS Program with the Russians and he should have taken it. I think that would have been the right thing to do, for many, many reasons at the time. Right now I still think the right thing to do is to go do it [continue the program] because of the side benefits, besides the Space Program. But I think that all of us need to search our soul and figure out what's

the best way to spend American dollars. I still feel like that it's a lot cheaper to jointly work together in space, because if we did not do that, those guys have got to have jobs and they can't all drive their cars as taxi drivers. We feel like that--I personally feel like that the money is well spent. It helps the Russian economy. It would be very easy to go to a military environment, I think, for a country in trouble. That's one way to get out of it. I think the U.S. is an example of that in the past. But I think my view right now is, yes, it's worth it. It's the right thing to do.

But, yes, there was a point. We were just agonizing, we could not reach agreement on some crew training and so forth. It was at the point, it was a very low point for me, because I felt like we weren't making the transition from the momentum from Phase One to Phase Two. I saw a lot of momentum in Phase One. I saw a lot of successes, saw a lot of agony. Don't misunderstand. But I felt like we weren't making the transition. Now I kind of see some transition and I've got very high hopes that we'll get the right people in place and the right people working the program that will benefit from the experiences on both sides, the Russian and the U.S. side. So I think it's well worth it. But I will admit that there was a point where I was very jaded about it. Not for long.

Wright: What kept your momentum going?

Capps: I think it's working with the Russian people was fun and the rewards of seeing the changes in both sides on understanding each other's culture. I think that was a big one for me. I think just watching the career opportunities for our own young people, getting some experience working with the Russians, now they've got something they can bring to the table that nobody else has, nobody else in the U.S. has very much so.

I think looking at some of those young folks that now have a set of credentials that they are able to go into a very, very difficult environment, work in a different language through an interpreter, or of their own skills in Russian, and able to perform very, very difficult tasks, I think that experience is fantastic for them. I think they have grown very quickly, matured career-wise that might have taken them years here. But I know one or two young folks that, maybe twenty years from NASA, they would get to the credible level they are right now, that they're walking in after a year or two of experience, because they have been there, done it, they've performed in a very hostile environment and performed well. So I think that's a driver for me, was to watch the people move through it.

The other was just the close relationships of working with Yuri Kargapolov and Aleksandr and Don Puddy and Charlie Brown, being able to actually count our successes. You have to do that in this kind of program. You have to take, hey, we went to this meeting, we needed twelve things to accomplish and we

got seven of them, and they were important ones and we have them prioritized. We came back and we felt like that the long plane trip and the long period there--for me, working in Russia is a very draining experience. Most of us worked twelve- to sixteen-hour days. When you're there it's very difficult, because basically you work with the Russians all day and then you stay on the phone all night trying to work with people here. So it can be very, very tiring. By the time you get back, you're just devastated. My wife teases me, because the one thing I want to do immediately when I get back is go to my lake house. She said, "Tommy, it's a wasted trip, because you're going to sleep for two days. Why are we going to get in the car and break our neck to get to the lake?" But I think it's an environmental shift that I usually need. But I found that it is extremely tiring.

I do think burnout is going to be problem an ISS. We need to understand that for people. We need to have the support mechanisms in place to try to help folks on both sides of the ocean. I mean, the Russians need it here just as well, because they're doing the same thing. They're on the phone all night talking to Russia, or all day and all night, a lot of times. So it works both ways. So we do have to understand the people aspects and put in place the support mechanisms for people.

I guess, to also answer your question, one of the most rewarding things for me was to try to help support and keep the people in Russia going and feeling good about what they were doing. One of the most frustrating aspects of working from Russia, or in Russia, is trying to make things happen back here, because you have this window of opportunity to quickly negotiate with the Russians, reach a conclusion, and move out and make something happen. You have this narrow window that the time has finally come, and you call back here and you need this piece of data or this information. Well, people here have a dozen meetings and their own world, too. Your little bit is in their priority somewhere, but it's still not necessarily the top thing to do. If they don't get back to you, because you're nine hours' time difference, it's very difficult. So you've got to catch them. Your twelve o'clock at night is when you're talking to them. If they don't come through for you, you've missed your opportunity the next day, because they're asleep when your window of opportunity has presented itself in Russia.

So it's extremely frustrating for our folks in Russia not to have the support mechanisms back here or the response back here. What may seem a very trivial thing here may be a big deal in Russia. You have a chance to really respond back to Kargapolov with an answer that will let him make the plans for the crew for the following day. Little simple things, but it can be a big deal in Russia. Particularly the crew members, all of us, everybody in Russia go through a psychological adjustment and some tough periods. Depending on where you are at that point in your life, whether you're having a tough period or not, many times thing become amplified. What may be very simple and mundane here and is no big deal is a big deal

there, because it's amplified because of conditions or language or whatever.

My opinion is, our support mechanisms have to be very, very much in place here. I am very proud, even though it was very difficult, there were many times when we did support our folks appropriately in Russia and we did give them those quick responses they needed. I think that was something that was very important to me from the beginning. I think it helped us.

The Europeans told me that, and I listened very carefully. They told me that you've got to have people in place that are fast movers, that are movers and shakers, basically, real go-getters in Russia. If you've got that and people respond to them back home, then you can be successful. They put some of their just outstanding people over there and found out real quick that part of our secret was the quality of people we put in Russia.

Wright: The twenty-fourth trip, how was it different from the first time that you went?

Capps: Oh, it was tougher, I will admit. The first two or three trips you're just in such awe of everything and the culture and learning everything. But then the trip itself becomes more tiring. There's no question about that. Learning to adjust to the larger decisions groups for the International Space Program, which obviously involves bigger groups, and some of the issues that I thought ought to be resolved fairly quickly, because they were in larger groups, didn't get resolved. So it was a little bit frustrating there.

Culturally, I guess, every trip I learned something new. Every trip is rewarding, from being able to understand more about the Russian culture, more experiences culturally, be able to see my friends there, my Russian friends, their children growing up and watching them adjust. It's interesting that you can go to Star City and look out the window of the Prophi [NASA Office area] and you'll see "Best Buy Sacks being used as Kites" and strange things that look so out of place. But what I'm seeing is their children really benefiting from their experiences with us and, I hope, vice versa. So it's very rewarding to watch the opportunities that are now there for some of the Russian children. I think that's a unique experience.

Of course, twenty-four trips later, I know my way around a lot more, so it's much easier to get around. I like to function in small groups there. I found it very difficult to go do tourist-type things in larger groups, because everybody wants to do something different. I found that it just draws a lot more attention.

Basically my best experiences there, particularly Charlie Brown and I, Don and I were real compatible, Steve Nagel, of course, always. What we would do is just kind of strike off on our own, away from a bigger group, dress down so we blended in with the Russian culture. We'll never be taken for Russians, but I think that's a successful [technique]. And then basically just going and getting an

opportunity to see the city and getting involved with the culture a little bit. It's much easier now for me and I find that very rewarding. I tend to kind of strike off on my own and do that.

It's interesting to watch--I guess Charlie and I have a lot of common interests, so it makes it real easy for us to travel together. We're very quick to make a decision where we want to go and we don't have to worry about waiting on a lot of people to get all their stuff together. We're kind of real portable. So we have a lot of fun. You don't have a lot of time there to do much tourist-type things, but we can really make our time count, because we know the city real well. It's very, very easy for us to get around on the Metro and all.

How is it different, twenty-four trips later? I think you're just so much more independent. If you get stopped by the police, which I have a few times, I'm able to work through that without any problems. My language skills have gotten better, so I have a lot better understanding of what's going on around me and how to get in and out of different environments, different stores, that type thing.

I like some of the museums there, not so much the art museums and so forth, but the military museums. Charlie and I like to go through unique-type places. We have enough contacts now that are real friends in Russia that they take care of us really well, and we try to do that for them here, take them up to our lake house and stuff like that.

Wright: Those early days when the cosmonauts were here, did you feel somewhat as an ambassador?

Capps: Oh, yes. Yes. Yes, I really did. I remember I took Titov up to our lake house in East Texas, which is nice. Basically, Cynthia and I don't have any children, so we're able to spend our money on toys and stuff. But it's interesting in the culture, we'd go up there and it was a very rewarding experience, I think, for him and his family. He had, at the time, a seven-year-old boy and a freshmen-in-college girl. Sweet kids, really nice kids. But it was interesting in that East Texas is much like part of Star City. He felt like he was at home in the woods and all. Of course, this was after a period of time here with city life and in Houston and studying hard and so forth. I think, we get out on the Wave-runners, which he thoroughly enjoyed doing a lot of things like that, but it was very difficult for him to understand how can an average NASA guy afford this kind of situation. Well, the deal is, that's one reason, we put our priority there. But every year you save up, you buy one nice thing, whether it's a four-wheeler or a Wave-runner. It was hard for them to understand that we didn't suddenly just buy everything. It wasn't like one day we went up and we bought everything. So those little concepts are hard for them to understand, the understanding of material wealth and understanding of just things. Well, I built my house myself, so I saved money and could afford to do it and those kind of things.

It's interesting, in the culture, well, they like to do a lot of that kind of stuff. They like to build in a different fashion. So we have a lot of things in common. So I think part of the cultural exchange is how you accomplish things and things you enjoy and in sharing those experiences. We do a lot of that.

I think Charlie Brown and I both feel very strongly that that's an important thing to share with each other, is how do you do things. Simple concepts that we take for granted, we need to stop and remember now Moscow has a lot of McDonald's and things like that. So it's a little different. But at the time, I took a couple of good friends of mine up to the lake. We loaded up our van with them and I took them up there. Well, we wanted to go to eat. At Dayton, Texas, just pulled into a chicken place there and ordered chicken and we went on. We ate it on the way up to the lake. I never thought anything about it. Well, the next time I was in Russia, Maxine and Igor said, "Tommy, Tommy, come here. We want to show you something."

I said, "What? What?"

They drug me into the gym, the astronaut gym there, and they wanted me to meet this guy. So I met him and so forth. I didn't catch on what exactly was happening. Well, what they were trying to do is to explain to him--he'd basically called them liars. They had talked to him about us going in and getting the chicken and all. He just wouldn't believe them. This could not happen. There's no physical way you could go up and order and receive it within a few minutes and then get it and eat it and be on your way. I guess just by showing him the person they were with and the pictures was some kind of proof that helped. But what they wanted me to do is the next time Cynthia and I go by and take a videocamera with time-tags. [Laughter] So that you go up and you order the food, you receive the food, you pay for it, and you get on your way, and you have it all time tagged in a matter of minutes there. But, of course, now in Moscow, McDonald's has a drive-thru. At the time it was just unheard of. This guy could not be convinced that nowhere could you have an ability to have that kind of service that quickly and all. It was just a concept that he would not believe in.

The cultural exchange has been really good both ways. A lot of the concepts in Russia that we wouldn't--we miss a lot of the emotional experiences of the culture, unless we get very involved with the people. I think that's one of the fun things about dealing with this program.

Wright: You've been in this business a long time. You were able to share information with the Russians. Did you learn also valuable pieces of information from them on how we can redo or enhance our training program, as well?

Capps: Yes. See, we had never done, except Skylab era, and I'm always quick to point out we had the first

space station with Skylab, but I think the long-duration flight piece, I think one of the biggest pieces of information for me personally is we needed, and we still need, to understand the psychological ramifications of long-duration flight. The Russians had a much better handle on that, I think. So that immediately was a lesson learned. Don and I felt very strongly about that we needed to understand that, because the psychological experience of a long training period, plus the long flight, is a critical thing.

As far as technical advances, I'm not sure that I can say we learn a lot. I think we learned a lot about how to work in a strained environment or with a different culture. I think, yes, the Russians understood more about working with different cultures than we did, because they've doing it a good it. And if you start thinking, Russia is so big, you got a mongol world and they're totally different from Moscow guys. So those were the kind of things we learned.

But technically, I'm not sure how much we picked up there. I have a lot of respect for their program. I have a tremendous amount of respect for what they were able to do with the amount of funding and economics that the Russians had during the latter part of their program. It's hard for us to understand how, with very little, what you can accomplish. They were a real testament to the ability to use resources very, very prudently, very well.

Wright: Are you glad you did it?

Capps: Are we glad we did the program? Yes, I really am. I look back at it as probably one the most rewarding things that I've ever done. It was a real challenge. Some things about myself, personally, I learned about, that I can be much more tolerant to a different culture than I thought I could. I think my wife kind of thought, "Boy, how is this guy going to go over to Russia, a redneck East Texas guy, and work with an ex-Communist world?" And I will admit there's a few times that I was very, very annoyed that we were spending money in some ways, and our net return I couldn't see very well. Having had five or six years dealing with it, I realized that we were getting a lot more return on our dollar than a lot of people think we were. You can't measure it in technical data, by any means. But I think the return on our dollar--so, yes, I'm very glad we did it.

The people, I think, everybody that you interview will say probably the people aspects is probably one of the most rewarding experiences, including working with the people that I wouldn't have had an opportunity to work with here in the States, even, wouldn't have a natural reason to sync up with, because we're all in our Shuttle world and locked into that. Because of the type of involvements we have with the Shuttle-Mir Program, we reached out to even other organizations that MOD would have not even had to really deal with, or someone else would have dealt with them and not us personally. So I think the Crew

Exchange Training Working Group, because of all the different ramifications of crew exchange, when you start thinking about what all that involves and then training what all that involves, you reach across the center to a lot of areas. For me, personally, working with the other directorates, working with the other aspects of centers, was extremely rewarding.

Before I came to MOD, I did a lot of that. I worked with the engineering director a lot and science director a lot. So I came with a lot of understanding of those directorates and people and the management of those directorates. So that gave me a real edge. Coming through the MOD world and the Shuttle world and the console world and all that, I had lost some of that working with other directors. So this program gave me a chance to go back in and renew some friendships and fellowships and all with those, I think not just the Russian aspect, but the community itself.

I challenge you to find, other than maybe Apollo, a different era in NASA that as many people have pulled together as willingly and as aggressively to form a team to make something happen in a short period of time as the Shuttle-Mir Program. I think that's probably one of the big successes. I think George Abbey understands that very, very well. I think it's important to him that we take the same people in Phase One and we move them into maybe different roles, but at least into Phase Two, so we get that experience, because I think teamwork was one of the biggest assets that he had going for him in the Shuttle-Mir Program, was the real team together. When I say the Phase One team, that doesn't just mean the program office Phase One team, that means all the directorates on the team, science and engineering, safety, SR and QA and the world. Probably a good experience for NASA, probably a deepening of NASA's team concept occurred during the Phase One program. My personal opinion.

Rollins: Why were you stopped by the police in Russia? [Laughter]

Capps: Just random. Actually, I've been stopped three times, so I think it's because I have a beard and they think I'm Chetzkian [phonetic]. Because I usually go in fatigues or dress down pretty good. I try to blend. I think it's important to blend, so you're not a target. I think it's important.

I learned real quick that the random stops are just random stops. They're not necessarily after an individual for any particular thing. I certainly wasn't doing anything wrong. Each time it's been in different locations in Moscow. What I do, I've learned very quickly to just show them my letter of invitation in Russian, because obviously you give it to them in English, that's pretty stupid. But if you give it in Russian that shows you're official and then certainly I make photocopies of my passport and those kind of things and don't drag out [the original]--I usually have my passport on me, but I drag out the photocopies first.

Each time I felt like that it was more of a--they felt like it was an obligation just to see, just a random stop. I don't think I was a target to extort. Now, other folks have had a little problem on trying to extort money from them and this kind of stuff, but I usually go with my papers and go prepared and I'm usually pretty firm in my interaction with them and with my limited Russian was able to get away. But I'm usually, each time--well, I guess once with two of us, but each time was by myself. I think it was just random.

Rollins: They didn't take you to the police station?

Capps: Oh, no, just--

Rollins: You have an exchange in the street, when you realize--

Capps: Yes. Right. Yes, I think part of it is they might be thinking in terms of, "Here's an American. I can get twenty bucks if I don't take him to the police station," and stuff. I was very polite and courteous and didn't let it upset me visibly. Just basically drug [my documentation] out the very first thing, I started talking about documentation. Get them from the aspect of what am I doing, or whatever, to a documentation point, because I know that's what they're after. So you get quickly into that mode, I think is important. Then I always have a copy of my letter of invitation in Russian with me at all times.

Once I was running from Ismoliva to the Metro to get bananas and I had my backpack in the van and didn't have it with me. It's one of these typical things, you know, things become real important in Moscow that wouldn't here. Never would I run a block and a half to get bananas while the van is waiting on me, but fruit is one thing I miss a lot of in Russia. I eat a lot of fruit and stuff here. The van was at the Ismoliva Park, so I was running up by the hotel over to close to the Metro to a fruit stand there, and a policeman just, I think, thought maybe I was running from something or whatever, and he stopped me. I started explaining very quick, bananas, and where I was going, and the NASA van was there and pointed to it, and that if he needed documentation I would go get it. No problem. So that was kind of a funny experience. Bananas are real important in Russia. [Laughter]

Wright: So the three weeks at a time that you were in Russia, did it go quickly? Were your days full?

Capps: Oh, yes, your days and nights are extremely full when you're there. It doesn't go quickly in that you miss your family and dogs and all those kind of things. Or I do. But, yes, there's never enough time to get all the work done. Our agendas are always too full. We are extremely bad about saying we've got all this stuff to accomplish and we've got X period of time to accomplish, and that makes it very difficult.

We're too aggressive, I think. We've got to learn that. We've got to learn to be careful about that, because we'll burn everybody out. You're physically tired. At the end of the three weeks, I was really ready to get home. Now, I think the longest I stayed was four and a half weeks a couple of times, and a lot of three-week trips.

Some of the hardest trips, we'd be there for like three weeks, get back home and then for some problem we'd have to turn around and fly right back. Charlie Brown and I did that one time. It was just really difficult for us, because you hadn't even really synced up from the jet lag. I do great going over, which is a real advantage for your negotiations, because if you fly in there on--in the early days we'd try to get there on Sunday afternoon and go to work Monday morning. Well, you're still jet-lagged and a zombie and the Russians have a lot of advantage because you are out of it. So I adjust real good going over. Really, I guess, the adrenaline or something makes it pretty easy. But coming back I'm usually just dead, just devastated by the time I get back. I think, yes and no, time goes quickly, because you've got more to do than you can do, but then you miss home.

Wright: In the negotiations, were they different from those early days to what you're doing now?

Capps: Yes, they were different in the early days because we were path-finding so many things. I would like to think that we've got past a lot of the early somewhat controversial-type issues and we're more into just arguing about when the crews are going, rather than that they are going, that type of thing. They're somewhat different.

The negotiations are stressful on everybody, particularly if you just disagree. I think the hardest things on the U.S. side is we're used to resolution at the end of a meeting, of some type, and you just don't necessarily get that. That was difficult.

Rollins: Is that the lake house behind you there, that we've heard so much about?

Capps: Yes. Yes, I enjoy my lake house. Six years away I'm going to be up there. I spend a lot of time on the tractor and playing. I've got about eight acres on a lake, so I have fun.

Wright: It will be interesting, the next six years. A good period of your life, six years.

Capps: Yes. We've kind of been on a Phase One high. We've been very intense, it's very rewarding, very stressful, obviously, but it will be interesting to see. We need to be flying right now. We're used to flying. If we're not--the Shuttle or Shuttle-Mir, if some of our crew members are in orbit, then everything's clicking and falling into place. That's a mission operations directorate mind-set. So the adjustments for a

guy like me, or a lot of folks like me, to a program that's not flying, to the ISS Program, until we get something in orbit, it's difficult.

Rollins: It's a long dry spell.

Capps: Yes, it's difficult. I will admit that. I like planning and stuff like that, but I think the real motivation is the successes and the challenges of space flight. I think we thrive on that, is why we're in this business. Almost every waking moment, to a certain extent, if you've got somebody in orbit, you're thinking about them or the systems that are keeping them in orbit and that kind of stuff.

I think probably I should say a couple of comments about the last--STS-91. I think, for me, a very emotional experience. I think, if you remember, we were down at the Cape, we were ready to get ready for the launch, and Mir had a computer problem. Suddenly we brought a team together that could not have happened a few years before, I mean, in the Phase One Program, whereby in real time we had a laptop with the Mir orbital status on it. We had Victor Blagov there to work it. We had a full team sitting together, NASA and Russia, constantly communicating with each other as to what was happening on Mir, what was happening getting ready for the Shuttle launch, and pulled together as a team.

It was a very emotional experience. Really, it was a sobering experience for me, because I really got to thinking about how far we have come, because we would have had a lot of side-stepping and sashaying back and forth, and either reluctance to share information or maybe uncomfortable that we could share information, whereas by the 91 stuff we were there. We were clicking and we were a program. That's a very, very rewarding experience. Then obviously, go out and launch the Shuttle and have a great flight and everybody's safe and everything is fine. We haven't done that yet for ISS, so, for me, until we do that, it's hard for me to get emotionally behind the program. We can do it, but we've got to see the reality of it.

After the Challenger instance, a lot of us kind of went through some of that. Until we flew again, we were all kind of fumbling around, and we were all doing our thing. We were doing a lot of paper. We were having a lot of meetings and we were doing a lot of discussions. Some of it was productive and some was not. But then when we flew again after that, that was *the* best thing that ever happened to any of us. So I think it's kind of the same emotional state I'm in right now for ISS.

So I guess I'm getting my little rewards by trying to support the guys in Russia. So I'll bring it down that way. But until we get a vehicle into space, we're all going to go through that. Flight directors, it has to be agonizing for them.

Wright: We look forward to hearing from you again, all the new accomplishments that you'll be doing.

Capps: Okay. Thank you.

Wright: You may be up at the lake house in six years.

Capps: Yes, you'll come interview me in about six years up there.

Wright: We'll do that.

Capps: I love what I do, but I'm looking forward to moving up to the country.

Wright: I can understand why. Thanks, Tommy.

Capps: You're welcome.

[End of interview]