

The oral histories placed on this CD are from a few of the many people who worked together to meet the challenges of the Shuttle-Mir Program. The words that you will read are the transcripts from the audio-recorded, personal interviews conducted with each of these individuals.

In order to preserve the integrity of their audio record, these histories are presented with limited revisions and reflect the candid conversational style of the oral history format. Brackets or an ellipsis mark will indicate if the text has been annotated or edited to provide the reader a better understanding of the content.

Enjoy “hearing” these factual accountings from these people who were among those who were involved in the day-to-day activities of this historic partnership between the United States and Russia.

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**JAMES D. WETHERBEE**

**August 6, 1998**

Interviewers: Rebecca Wright, Paul Rollins, Frank Tarazona

*Wright:* Today is August 6, 1998, and we're speaking with Jim Wetherbee, with the Shuttle-Mir Oral History Project. Thanks again for taking time out of your schedule to meet with us.

*Wetherbee:* My pleasure.

*Wright:* We would like to visit with you specifically about your two missions that you visited the Mir. All the missions were important, but the first one that you did, I believe most people refer to it as the "near Mir." Can you tell about how you first got involved with that mission and some of your first experiences training for it?

*Wetherbee:* Well, I'd love to. It was very interesting for me. At the time that the flight crew was announced to fly on STS-63, I was up in Crystal City, working in Washington, involved in the redesign of the Space Station. At that time it was Space Station Freedom. The flight, of course, STS-63, had already been being planned by the folks down here in Houston and by the folks in Russia.

Before we were assigned, I think the Shuttle was intended to approach no closer than 1,000 feet from Mir, and that was agreed to by the Russians and the Americans. The flight directors were able to convince the Russians, after they had that initial agreement, to let the Shuttle go into 400 feet, and then even down to 100 feet.

So when the flight crew was announced, when I came on board with my flight crew, we were supposed to go no closer than 100 feet from Mir. The first thing I noticed when I asked about the flight, what our job was going to be, and, of course, it was to test the procedures and the ranging systems, the laser, the handheld laser, the automatic laser, the radar. All of these systems give range and range rate information to the target-Mir, in this case-and the camera system that was going to optically give us information on the attitude misalignment, by looking at the target. We were going to check out the procedures and the flight profile and the directions that we were approaching.

The first thing I noticed was that the target, the visual target that we'd look at, couldn't be used accurately until we got to about 30 feet. So the first thing I said is, "Well, instead of going to 100 feet, we will get much more if we go in to 30 feet." So I first convinced the folks on the American side and they were agreeable to letting us do that, but then the hard part came when my job was to try to convince the Russians to allow us to go into 30 feet. And if you remember, I mean, they had already given up a lot by saying, "Okay, you can go to 400 instead of 1,000, and then 100 instead of 400," so they were not very inclined to let us go any closer than 100.

It resulted in a pretty interesting series of meetings and discussions about why we wanted to get so close to their station, that is, of course, a national asset, like our Shuttle. I never really talked to them to see what they were really thinking about, but I'm sure they were looking at some young kid off the streets who was going to suddenly be flying a 100-ton vehicle within 30 [feet] of their Space Station, and they didn't want to have any part of it. It was risky enough for them, for little benefit, since we weren't actually going to dock and transfer any people. We didn't have any docking hardware.

We had one discussion in particular with Viktor Blagov, a good friend of mine now, who was their-I think he's their number-two flight director over there. He was in charge of the mission at that time. We were over in the Mission Control Center in Moscow, in Leningrad, discussing. He pulled me aside. We had just recently-we were there for some meetings, which I forget what they were about, but he pulled me aside after the meetings and said, "I want to ask you a few questions through an interpreter." He wasn't speaking in English. I found out later that he understood English, which I think put me at a little bit of a disadvantage. I didn't understand any Russian, and so when we were talking through our interpreter, he could listen to my English answer and immediately formulate his next question while it was being interpreted, and then he could think of what he wanted to ask and then ask the question. And I couldn't think of my response until the interpreter had translated the Russian into English, and then I immediately had to come back with an appropriate response. So I felt like I was at a little bit of a disadvantage.

But he's a man who understands the technical side of things. His job was to balance the risk versus benefit, and although they didn't see much benefit at the time, he wanted to ask me, "What is the benefit?" I explained to him that this target that we were going to use could be seen at-the plan for Hoot [Robert L.] Gibson, who was going to fly STS-71 a couple of months later, he was going to stop at 30 feet and make that visual correction, based on what he saw, and I said it would be very good if we could get in there and make that kind of an assessment, to see whether or not the target was going to work, and if it didn't, we'd still have time to change things.

I don't know that we convinced him that day, but in the next couple of weeks, they finally said, "Yes, it's okay. You can go to 10 meters," was the final thing that we decided, using the metric system, which is a little bit more than 33 feet, I think. I was happy at that point because we were going to get to do a pretty valuable, I thought, piece of test flying.

The other thing, I guess, that I thought was pretty interesting, later on, we were in-no, I'd better not tell that story.

*Wright:* Well, this is your oral history, so you can choose what you'd like to tell.

*Wetherbee:* Apparently the Russians-I don't know how it happened, so I'll tell you. The Russians were a little bit concerned because, way back in Apollo-Soyuz-and I wasn't around then, due to various reasons which I am not aware, but I think there were some pretty good technical reasons-at one of the dockings, not the first one, but the second one, they hit the Soyuz a little a bit harder than they had intended, I think, with the Apollo. The Apollo's a different system than the Shuttle. It has a very high thrust-to-weight compared to the Shuttle. I'm not sure of the specific details, but, anyway, they hit it a little bit harder than they should have.

So the Russians-we were there that night. We were having a dinner. I guess it was a lunch, and I was with the senior people at RSC Energia, the company that basically owns and operates the Mir. Of course, as is the Russian custom, they were drinking some toasts and people were having a pretty good time. And all of a sudden, the senior person, who at the time, I didn't know, the senior person in the room at the time turned and said, "I'd like to ask you a question," and of course, the whole room got quiet and they all looked at him, this senior Russian official. And he said, "Tell me. Why did they hit with four times the closing velocity than they should have on Apollo-Soyuz?"

And of course, the rest of the room turned and looked at me to see what my response was going to be, and I couldn't think of anything to say. I wasn't around then, and the Shuttle's a completely different system. The only thing I could think to say was, "Well, they were just making my life difficult for me," and I didn't know what else to say.

But the first discussion we had in the TsUP, in the Mission Control Center, and then this discussion at the dinner, made me very aware, if I wasn't already aware, that I now had a 10-meter limit and I was not going to violate that limit by even a single centimeter. I was going to go to 10 meters, 33 feet, and I wasn't going to be one centimeter closer, because I knew both space agencies in both countries were going to be watching as we approached on this flight.

Nothing much of note happened during the work-ups, other than we got delayed about five or six months, I think. We had some trouble with the payloads that we were flying in the Spacehab, so they decided to delay our flight, which put us even closer to 71, to the one Hoot Gibson was going to fly, which made it a little bit interesting for us. There was less time to correct any problems if we saw any. But as flights go, it was a lot of fun for me and for the crew to work up and get ready to go fly in space.

You can always tell when an astronaut is ready to leave. Everybody always wants to fly in space again, but they don't always want to go through the one year worth of intense training and build-up in preparation for it. I still have a lot of fun doing that and working with the people, so it was a lot of fun getting ready to go fly.

We launched, and by the way, I had the first woman pilot at NASA with me, Eileen [M.] Collins. She did a great job, and is probably the nicest person I know, always in good spirits and good humor, and always had a good time during the training and during the flight. We launched on ascent, and as a commander flying with any rookie, you always want to see how they're going to do, and you can tell pretty much when you get in the vehicle that they're going to be okay, and then, of course, during the liftoff, I could hear, the things she was saying were just like we say in the sim, and so I knew she was performing like a veteran instead of a rookie, and that was good.

Of course, the first eight and a half minutes of powered flight went pretty well, and I don't think on that flight we had any difficulties, but as soon as the tank came off the vehicle, as soon as the external tank separated, we had a "jet leak" message and two "jet off" messages, so we had three jet failures, one of them was leaking and two of them failed to operate, and it was pretty disappointing to me, because here for a year we've been training really hard to go do this mission and rendezvous with Mir, and check out the procedures and the systems and the tools that Hoot Gibson was going to need, and we've had a "jet leak" message that indicates you don't have enough redundancy to go do the rendezvous. Maybe the leak itself, if you couldn't stop the leak, was going to mean that we probably weren't going to rendezvous.

That whole first day, which is a pretty short day on orbit, you only work for, I don't know, five or six hours and then you go to sleep. As the day wore on, I was pretty much convinced that we were not going to be able to rendezvous with Mir, and it was pretty disappointing. You know, we still had other things to do, another series of objectives and another satellite to deploy, but really, I knew the mission was to rendezvous on Mir, and so I was pretty disappointed.

The next day-and, of course, we continued the rendezvous, the burns that get us closer and closer to Mir. The engineers on the ground did a great job, both Russian and American, in transferring data and really opening up the two space agencies and sharing data and communicating. It was very difficult, and a lot of people on the ground did a lot of tremendous work, a lot of good work to talk and discuss and share data and to get us closer to Mir as the real vehicles were getting closer.

By the third day, we still had not cleared the leak, it was still leaking and you could look out the back window and you could see the propellant going up for miles. It kind of goes in a cone-shaped pattern, because there's no atmosphere to attenuate its motion, and it just goes up pretty straight and it just continues, like a snowstorm for five miles up into space.

Of course, the issue is whether or not we would contaminate Mir. You wouldn't think it'd be too big a problem, but on the Soyuz vehicle, which is their lifeboat from the Mir Space Station, they have optical sensors that they use to align their platform in preparation for reentering the earth's atmosphere, so

they're going to need this thing to bring them back to Earth, and if you contaminate the optical sensor, it could be bad, and that was a risk that I did not want to take.

We got the sense from talking to the folks on the ground that the engineers were getting closer and closer to saying, "Yes, you can do the close approach," but the leak wasn't getting any slower, to me, and I got the impression they were going to let us do it. That night before we went to bed—we were going to rendezvous the next morning—I pulled one of my crew members aside, who was Colonel Vladimir Georgievich Titov, from Russia, who spent over—he, at one time, had the world record for the longest time off of the planet, of one year. I pulled him aside and I said, "You know, if this leak doesn't get any smaller, I will not bring our vehicle close to the Mir, even if they give us a go, because I don't want to cause any problems for the cosmonauts when they're coming back." Then we went to sleep and woke up the next morning, and, as luck would have it, the leak slowed down.

Now, Eileen was doing a lot of work with the ground to try to isolate the leak, and although she wasn't completely successful in isolating the leak, it did significantly slow down the morning that we woke up to rendezvous. We both looked out the window. Actually, the whole crew, you know, every day we woke up, we'd look out the window and, sure enough, it was less. So as fate would have it, now it really looked like they were going to let us go. Now, they still hadn't given us the official go, and we still had 1,000-foot double around the Mir that we were going to approach. If you stay outside of 1,000 feet, the chances are very slim that you would cause any problem, so we knew we were at least going to 1,000 feet, but to me, that's a failure if you don't get any closer than 1,000.

But we continued the approach and still were waiting for the go. We had a different radio system on that flight. We were testing out a new VHF radio that Hoot was going to use and all the crews used, to talk directly with the Mir. You need to have, in the two vehicles, an ability for the crew members to talk to each other, to coordinate things separately from the air-to-ground loop, voice loop, from the station to the ground Control Center in Moscow, and from the orbiter to the Control Center here in Houston.

So we had a separate communication directly with Mir, and the reason that ended up being significant is because the ground, the two Mission Control Centers, were coordinating the approach, and they finally had agreed that they were going to let us make the final approach, but Houston didn't tell us right away. We heard from Mir, from the Russian cosmonauts, that they were going to give us a go.

In fact, we were being televised, recorded and televised live to the Mission Control Center in Houston, but they couldn't hear our audio. All of a sudden, I saw the rest of my crew suddenly start cheering and jumping up and down and clapping, because they knew we were going to get the go to approach, and they hadn't told us yet, and so they kind of stole their thunder, and I asked the crew to calm

down because I knew the Mission Control Center in Houston hadn't given us the go yet.

So we all got kind of calm, and then later on, Story Musgrave, who was the capcom, called up and said, "We think you know this because of the reaction we saw, but you do have a final go to approach to 10 meters," and, of course, we simulated the euphoria again.

*Wright:* I suppose it was an easy part of that trip to do that again.

*Wetherbee:* Yes. But I was very relieved, because I knew that the two days' worth of work, or three days' worth of work, which a lot was being done by the ground people, that that was what enabled us to share the data and discuss the leak and be open with each other, which we hadn't really done too much of in the past. You know, the engineers were still kind of wary of each other.

As we approached-by the way, the previous night, I had asked-you know, for months, I was thinking, "Well, what am I going to say when I get close?" You know, and you have to say something nice. I was thinking about it for a while, but hadn't really decided what I was going to say until the night before the rendezvous. I figured, "Well, I guess we're pretty close now. I better get serious about thinking about what to say." I decided I wanted to say it once in English and once in Russian, since this was the first time we were going to be close and both countries would be watching, I thought it would be appropriate to say something in Russian. I had been studying a little bit of Russian, but I couldn't translate it well enough, so I asked Volodya, which is a nickname for Titov, to help me translate it, and so I showed him. For the first time I wrote down what I wanted to say, and I showed it to him. I didn't show anyone else on the crew. He translated it on the kneeboard. I wonder what I did with that. I don't remember who I gave that to. Maybe I still have it at home.

Anyway, so I practiced it a few times in my head, to make sure I could pronounce the words correctly, and we went to sleep, and then the next morning we woke up and were given the final go to approach. So we did, and, of course, all of the technical things are the most important, and the critical things that we're doing, and as we are approaching on what we call the V-bar, which is the velocity vector of Mir, in other words, its co-altitude, so now the two vehicles are co-altitude relative to the center of the Earth, flying at almost exactly the same speed, 17,500 miles an hour, and we were going 17,500 miles an hour minus three feet per second, or whatever the number is, so we're closing at three feet per second relative velocity. I'm not sure if that's the exact number, but it's something like that.

As we came up, we had four different sensors that were telling us, through a computer, what our relative position was. One of them was a handheld laser, which is very similar to the police handheld laser that they use to catch you when you're speeding down the road; one was an automatic laser system in the

payload bay of the orbiter, shining at a target on Mir; one of them was the radar out on the side of the vehicle, which at that point had started to be a little bit inaccurate, because it was looking at different targets on Mir and walking around, and so it was giving us different range information, and it was kind of noisy, so it wasn't all that useful; and we had our own human eyes that were looking out the window. We had a little, effectively, a grease mark on the window that didn't move. It's called a COAS, Crew Optical Alignment Sight, which is a point that you look at, that tells you which way the orbiter is pointing.

We had those four sensors that were feeding information into a computer to give us the relative state vector, and as we had talked many times on the ground in preparation for this flight, this was our big goal. Our mission objective was to see how these sensors all worked, and as we had prepared, two of them were lying and two of them were telling the truth. I mean, you couldn't have picked a better thing to happen on a test flight, if this is your goal, where you don't have the pressure of really needing to dock, like Hoot was going to have, but we still had a lot of, maybe, self-induced pressure, and plus, you really wanted to make sure, I've already mentioned, I was not going to get one centimeter closer. So our job was to figure out which of the two sensors were lying and which of the two were accurate.

I was flying with Mike Foale also, at the time, one of the crew members, whose job it was to play maestro with his computer. He was the guy taking all of the inputs and typing away, and it wasn't very automatic back in those days, even though it was only three or four years ago. He had to manually do a lot of labor on this computer, and I couldn't have picked a better guy to do it on the crew, because he really knows computers.

So it was pretty tense there for a while, trying to figure out what the proper sensor was to use, and as we had simulated many times on the ground, we chose the one that is the most reliable, the one that is the least complicated. We chose our human eyeballs, because that's the simplest one and you know it's going to be accurate. We disregarded the other two, chose the two that were agreeing, and then Mike later figured out what was wrong with the other two and was able to clean them up and make them more accurate. So as we approached, we finally had a good feeling about where we were.

There's another technical issue with the Shuttle. If you're on the V-bar, co-altitude, because of the orientation of the attitude control jets on the Shuttle, it's always causing you to get closer to the target. If you do nothing, you will eventually get closer and closer and impact, and, in fact, these were the two biggest vehicles that we'd ever rendezvoused in space before. Mike Foale, one time in a meeting when he was bored, on the ground, figured out that with the mass of the two vehicles, he figured out the gravitational attraction between the two, and if we were co-speed and did nothing, we would hit within three hours because of the gravity that was sucking us in.



Now, don't get me wrong, that's a very small effect when you're talking about the drag effect on the orbiter and the attitude controls jets, etc. But, nevertheless, the vehicles always want to close on each other, and we had to physically make inputs to the flight control system to keep the vehicles separate.

We were only supposed to stay there for ten minutes at the closest point of approach, so we checked out the handling quality of the vehicle and the systems and everything was working pretty well, and we came in to right about our exact distance of a little bit greater than 33 feet. The closest point of approach between structure was 33 feet. The number that was reported in the press was 37 feet, because that was the distance between the laser system and the target on Mir. You had to triangulate, and that's the longer hypotenuse of the triangle. Not that that matters, it was just interesting to see that when we came back it was reported, and still is reported these days, as 37 feet, but it really was 33 feet and not one centimeter closer. We did not get a single inch closer to Mir.

Then we backed away, because now I knew I wanted to give this little speech, and it was going to take my attention away from the distance for a couple minutes, a minute or two, and I didn't want to close in there, so I backed it away four or five feet, and stopped it and got all ready to give this little speech. By this time, there's no cameras on us, because I think we just didn't have the radar coverage or something. Mir was blocking or something. So I knew no one was going to be watching me, it was just an audio message, so I was able to cheat and read, just simply read the thing from my cue card, first in English and then in Russian.

As I got ready to read, you know, and I kept asking the crew, "Are they ready? Are they ready?" and the crew is doing what they do best, which is watching the technical side of things, and they don't care about the political speech I'm going to make. I kept saying, "Are they ready?" and they kept looking at me like, "What is he asking us this for?" and I finally said, "All right. Here I go. I'm going to start giving the speech now."

I keyed the mike and I started talking and just then the capcom, Story Musgrave, started saying something to us. Because of the two-second delay, he didn't realize that I was giving the speech. But I just kept it keyed and kept talking, and then he quickly figured out that I was giving the speech and so he got quiet. I read it first in English, and I was about halfway through the Russian when I hear, from the back, Mike Foale saying, "Back up! Back up!" Because we were starting to get close again and we were approaching the limit. We didn't exceed it, but as I was reading this speech-in fact, I can't even remember. We'll have to ask him. He may have come around and made one input. I don't remember. Or I keyed it and held the book in one hand and made a couple of inputs while giving the speech.

A couple of things I always think about giving that speech. The first is, you know, approaching

the vehicle, you're so focused on doing the technical, the test pilot things, evaluating the systems and the handling qualities, but you are just blown away by the sight that you're seeing of that huge, giant Space Station out the window. Ever since I was ten years old and wanted to be an astronaut, I've been watching these science fiction movies of these spaceships that come up next to a big, giant space station, and all of those thoughts came back to me, you know. So you're trying to get that stuff out of your mind because you have a job to do, a technical job to do, but I kept thinking how beautiful the sight looked, how exciting it was to have two countries, and you're helping to bring them closer together, and all that stuff, and yet you're trying to keep that out of your mind, but you can't because it's so awesome-looking, the view out the window. Mir looked so brilliant and white and bright, when you're not looking through the attenuating effects of the atmosphere. Really amazing.

But the other thought I always think about is, so then when you give a speech, you know, you might think it would be a pretty important historic moment, but the only thing I was thinking about was making sure I pronounced the Russian correctly, and the only thing my crew was thinking about was, "Don't let them get any closer," so it completely takes away any of the honor of doing it, and the magnitude of the situation is just gone because you cannot screw up up there, and that's all you're really thinking about. But I got done with the speech, and we eventually separated and I said goodbye to the Russians.

The other thing that was amazing about the approach was that I had not met the crew members, and now you're-I mean, 30 feet is pretty close. It's here to the window over there. So you can see these people through the window. I mean, very clearly. Elena Kondakova held up the little doll cosmonaut, which was pretty neat, and Titov, her country mate, is waving it from our side of the vehicle. And Sasha Viktorenko, the commander, I mean, you could see these people, their eyes, and Dr. Polyakov, who now has the record, was the other crew member.

I forgot to mention, when we were down on the ground, discussing whether or not we wanted to get close-this was back in the days when we were arguing about how close to get-Dr. Polyakov was on board at that time, he was up there, and I think maybe even the other crew members were there. When we were talking to them, they said, "Why do you want to get this close? This is very difficult for us. Psychologically, this is very hard for us." And I can understand their point. They are not in control of the situation, and some kid's coming up with a 100-ton vehicle, doing nothing more than adding risk, and they get no benefit from it. They were saying, "Why do you want to do this?"

But as we got closer to launch, Titov, one day, when we were down at the Cape, says-and he had a great idea-he says, "Why don't we talk to the crew?" and I said, "Well, how are you going to do that?" And he says, "I know the phone number." He calls back from a regular office telephone, and the first time we

tried it, we failed, we couldn't get through, couldn't get patched through, but the second time he tried, we were sitting around in an office down in Florida, getting ready to launch, talking to the crew members, flying overhead. So we were able to develop a little bit of a friendship, even though it was by telephone and you couldn't see them.

So then when we saw them in person, across 33 feet of cold, dark void of space, waving to them, it was like we were crewmates, even though we weren't on the same vehicle, so it really was a good feeling.

*Wright:* Did the ten minutes seem to pass quickly?

*Wetherbee:* Yes. The ten minutes went by very quickly, because you're thinking all these thoughts, and trying to do the technical side of it. It was very emotional for them. You ought to talk to them, too, because they don't see many human beings in their job, and once in a while, somebody comes up, and we happened to come up and wave to them, and it's pretty moving for them.

These are the kind of things that we learned from the Russians, the human side of space flight, the long-duration flights we're not used to, and the human side of it, the emotional feeling side of it, they are teaching us. In fact, Titov one day said to me, "I notice that the Russians talk very normally on the radio."

Americans tend to be like fighter pilots. We use a military jargon, a lingo that is very quick and terse, and you use acronyms and you convey a lot of thoughts into a small sentence, and it's a lot of radio silence, and you're doing things and working. Titov said to me, "Jim, one day you Americans will learn, it is better to talk." And they just talk about the weather and how are things down on the planet, and they just go on and on and on. Sure enough, we are learning those kinds of things. Humans need to talk to each other and not just be test pilots all the time. So that was pretty interesting.

We flew the mission. A couple days later, we had one more opportunity to talk to the crew of Mir, and so they scheduled a fifteen-minute pass for us to talk to them, and so I started. We had an interpreter on the ground, who was helping us converse. Sasha Viktorenko, the commander, in this fifteen-minute pass that we had, forty minutes later, after starting and talking, he was showing no signs of stopping. He was just talking the whole time. It's human contact. It's emotional, you know. They like being with someone or talking to someone, and I had a lot of work to do. You know, these missions we plan, everything's timelined and choreographed to the last second, and I finally had to tell him, "Hey, I'm really sorry, but I've got to go back to work," and so I finally terminated the conversation.

We came back down and landed, and then I started hearing all these other stories from folks, like Mr. [Daniel S.] Goldin, who was in a budget meeting at the time that we approached, and he stopped the meeting and they pulled the curtains back in this conference room and they displayed on the screen the

images of the Shuttle and the Mir approaching. He said that moved him so much that he couldn't continue the budget meeting after we separated. He just couldn't go back to boring, mundane things like the budget. And all kinds of stories like that.

A lot of Americans, I think, didn't realize that the Russians even had a space station up there at the time, and it had been operating and permanently inhabited for like nine years, and we didn't even know about it in America. So it was good to let people know that the Russians have a space program, I think.

As I think about the flight, probably the biggest thing about that flight was the fact that we got people talking to each other, the engineers on the ground discussing the leak, opening up their books and sharing data with each other did a lot to help STS-71, the first docking mission, because then they all were friends and it went along more smoothly.

You could've done the docking mission, Hoot could've gone up there and docked and had no trouble if we had never even flown STS-63, but the people on the ground were a lot closer together, and so from that point of view, it was worth flying the mission, I think. It actually was fortuitous that we had the leak, because it forced people to communicate and talk with each other, and it started the however many, nine docking flights after that went more smoothly because we had that initial communication.

The other thing I think about, about the flight, was when Hoot was getting ready to launch down at the Cape, I went down and gave the briefing to the guests, the VIP guests who were down there, and I looked out into the audience, and I saw, for the first time on the planet, Elena Kondakova, one of the crewmates. I was introducing the crew of STS-71, who was going to launch, and I mentioned a few things about our flight and how we had met these cosmonauts for the first time, up in outer space, and if it was okay with her, I was going to meet Elena Kondakova for the first time on the planet as soon as I'm done talking here. So that was a pretty interesting experience.

Well, I got done and they, of course, had a bunch of cameras there, and so they watched us as she came up to meet me for the first time on the planet, which I'll always remember, meeting her for the second time, but the first time on the planet. So that was pretty interesting.

*Wright:* On your next mission, you actually got to go across and shake the hands of the folks on Mir.

*Wetherbee:* Right. So, STS-86, I was fortunate enough to be selected to fly, and here I'd watched a bunch of my friends-you know, I came back from the first mission and I told Hoot, "It's easy, don't worry. It's easy." And he didn't listen to me, you know, because you haven't done it and you're really worried about it, and he did a great job, as did everyone else. And then it came my turn to get ready to dock, and I'm thinking, "Man, this is going to be hard. I'm not going to be able to do it." And it's just something you just

can't listen to anybody who says it's easy; you're always going to worry about it.

We flew-let's see, I'm trying to remember the crew members. I had another rookie, Mike [Michael J.] Bloomfield, who did a great job as a pilot. I flew again with Vladimir Titov. Our job on the second flight was to go rescue Mike Foale, who now was a crew member on Mir, and he was up there for a couple months and had some problems, as you know. He was on board when they had the collision, and there had been the fire when Jerry [J.M.] Linenger was on board several months earlier.

So as we got closer to dock on STS-86, there began to be a lot of interest in the media about whether or not we were doing the right thing, whether or not we should-well, we certainly should bring Mike Foale home, but should we really leave Dave Wolf up there on Mir. There was a lot of congressional interest. A lot of people were worried about it, thinking we were doing the wrong thing. People were saying, "No, you shouldn't leave Dave Wolf up there."

So in the weeks leading up to the flight, normally-and I've flown four times now-normally, you think about the risk really only a few times. One of them is when you first get selected as an astronaut, but the euphoria far overshadows the risk, so you don't really think about it too much then. The first time you're assigned to a mission, you think about it a little bit, but that passes because you have so much work to do. There may be one or two other isolated instances, like the first time you see the hardware, you may worry a little bit about it.

But typically, you worry about the risk-in my case, anyway, I worry about it the night before the launch. When you go to sleep, and you have to be able to deal with it. If you can't deal with it, there's no way out. It's too late to say, "I quit," but you're not going to be able to operate effectively unless you can figure out a way to deal with it, and I've chosen a way to do that. I remind myself that this is the only job I've ever wanted to do, and so it makes it easier to deal with the risk, and if anything happens, I'm going to try my best to make the mission a success, and save the vehicle and the crew, but if it doesn't work, this is the only job I've ever wanted to have and so I can live or die with that thought. So then you go to sleep.

On this mission, we were somewhat forced to think about it a couple of weeks before launch, and repeatedly we were asked, over and over again, "Do you think this is too risky? Should we launch? Should we not launch?" And so it was more of a longer-term thing, you really had to think about the risk. And a lot of people called me. Mr. [Daniel] Goldin, I thought, did a tremendous job. He's the administrator and the man with the responsibility to say yes or no, launch or not. The responsibility is all his, and he can't delegate that responsibility, he can't share it with anyone, it's all his. That's a pretty heavy decision to have resting on your shoulders. And so as we got ready to launch, I thought he handled it pretty well. He had Congress on one side and a lot of other detractors who said, "No, you shouldn't launch," and he's thinking

about the benefits and, yes, we should launch.

He didn't make the decision until the night before. Of course, he was in a lot of discussions with Mr. [George] Abbey, my current boss here, who has the operational responsibility for carrying out the policies that Mr. Goldin determines, and so Mr. Abbey also has a lot of responsibility on his shoulders, and they talked a lot.

Mr. Goldin called us and asked us. He called Dave Wolf and asked, "Are you ready to go? Tell me honestly," and said all of the right things that you want to hear a boss or an administrator say, to allow you to say, "Yes, I do have a concern," if you have any. We didn't have any, and we wanted to launch, and he made the decision the night before, I guess, to launch. So we all appreciate the fact that he made that decision.

Let me back up. A week before launch, you know, we start our quarantine period here, and then we go down to the Cape. About three days before liftoff, we were still here in Houston, getting ready to go to the Cape, and it's about two hours before getting in the airplane to go down there, when they called and said-I think it was a Monday-"Mir has just lost attitude control," and this was the third Monday in a row that they have lost the ability to control their attitude, so they're in free drift, which means if that happens during the rendezvous, you cannot rendezvous and dock with them.

So instead of going to the Cape right away, we stopped off at the simulator to figure out how are we going to rendezvous on a space station that doesn't have attitude control. And as we do most things here in NASA, in America, you plan everything out as well as you can, you think about all the contingencies and you work at it and you simulate it until you're tired of simulating, until you perfect the technique. And here it is two hours before we're going to the Cape, three days before we're lifting off, and suddenly we have a whole entire new thing that we're going to do, to figure out how to rendezvous on a station that's rotating.

On the one hand, I didn't think they were going to let us do anything. They were just going to say, "Forget about it, don't worry, if it happens, you'll land and won't dock and the mission's a failure," but to the managers' credit, they allowed us to go into the simulator and work on these procedures for, what do we do if the thing's rotating. We worked at that and did five approaches. The first one we blew, didn't make it. The next four, we did, after we refined the technique.

So I was pretty confident that we could do it, but we still hadn't quite-so then we got into the Cape and we get there, and I immediately get a phone call-this is three or four hours later-and they called up and said, "We really weren't spinning it fast enough," so now for the next two or three days before liftoff I'm down there at the Cape, thinking to myself, "How am I going to rendezvous and dock if it's spinning a little bit

faster than it was in the sim?" And without even doing any simulations, I was thinking, "Well, how am I going to do it? How am I going to do it?"

Well, I decided, through Titov, that we would call Anatoly [Y.] Solovyev, who's now up on orbit-he's the commander on the Mir-to talk to him and find out what kind of data can you give us during that situation if you lose attitude control. We had already practiced that technique of talking to them on my first flight, so I was happy that we had that experience. So we called him up and said, "What are we going to do?" He said, "I can give you-I'll make a picture, drawing you out the attitude from the Soyuz." With that knowledge, we could get a simple spreadsheet computer program to type in, that would tell us what do we type in the orbiter to match the rates of the spinning Mir and then dock.

Once we had figured that out, I was able to forget about that whole problem and go to sleep the night before launch, without worrying about that risk anymore, and then if it happened, I knew we had something in our hip pocket that we could use, a technique that would work.

And so we launched and, of course, didn't have any problems. But it was one more thing in the work-up for STS-86 that made it interesting, because so many people were talking about the fire, the collision, and now the attitude control problem that made it interesting, and we pretended it was like a rescue mission.

It really wasn't. Mike wasn't in any danger, and it really wasn't a rescue mission, but it was fun to think about it that way.

So we launched. Mike has some great stories that he could tell you about, the feelings that you have when you're a crew member who's been away from the planet for four months, and you hear that your rescue vehicle, or your transportation vehicle, has now launched and is safely in orbit. Unfortunately, they only told him that we launched. They didn't tell him that we were safely in orbit, so he still had to wait several more hours before they finally said, "Yes, they're in the proper orbit that they can come and get you." But he still was thinking-you know, you have to prepare yourself mentally for this, and you don't want to get too psyched too early and then be deeply disappointed, so he wasn't thinking we ever were going to make it, something would happen and we wouldn't come and get him, and he's just preparing himself for the worst.

But then on rendezvous day, when we come up-oh, the other thing I forgot to mention. The other reason the Russians were very worried about the orbiter coming up and docking was because, just like the Apollo, the Soyuz vehicle that they have all their experience with, and the Progress vehicle, has a tremendously high thrust-to-weight, so as it's rendezvousing, it's moving around a lot. They fire a couple of jets as they're approaching, they're really moving, and it's pretty scary-looking if you see it. Their system is

done automatically, and it finally fades it out, and it slams into a docking.

Well, you can imagine, that would be pretty difficult if you had a 100-ton vehicle that was doing the same thing. Well, what people overlooked was, a 100-ton vehicle has a very low thrust-to-weight. It's like a big ocean liner coming in, and things are done more slowly. It's a very good system designed by really good engineers, and the handling qualities are perfect in this thing, when you're talking about that kind of a docking.

And so on 63, I think a lot of people were surprised at how stable the vehicle looks, how motionless it looks as it's coming in, and it's very controllable. So that was another thing that gave the Russians a lot of confidence on 63, that the rest of these dockings were going to be okay, not like a Soyuz or an Apollo.

So anyway, now our vehicle is coming up very slowly and stately, and Mike Foale is watching us get closer, so for the first time he's thinking, "Well, this is really it. They're really coming to save me, or get me, and this is pretty good." And so then you dock. We had talked with Anatoly Solovyev on the radio. We had a new attitude control computer for him and his spaceship, and we were supposed to give it to them on the second day of docked operations, and Anatoly told us, "No, I don't want to wait till the second day. I want you to give me that computer as soon as we have the handshake ceremony."

So I decided to go him one better; I decided to give it to him during the handshake ceremony. Titov went down and drew a happy face on the outside of this box, and we opened up the hatch, and I shook hands with him with one hand, and with the other hand, gave him his attitude control computer, and he was so happy to receive that. Then each of the other crew members gave him this big, huge bucket of water that we bring up for them to use.

The only other part of that flight that will always stand out in my mind was the night-so you dock and you go in and you have the initial press event, where you have the ceremony and the press conference, with all the crew members up on board, and it's staged, and you say things that you've thought about. They're a little bit of fun, in a weird sort of way.

But the best time I had was later on that night, there are no cameras now, so no one on the Earth saw this going on. We went across and had a meal with them, a Russian dinner with them, and they were playing a tape, an audio tape, on their great stereo system that they have up there, and it was a song that I'll never forget, and they were playing on the video system a replay of us rendezvousing with them, so I could see our own vehicle coming up to rendezvous, listening to this great music. It was just a weird sensation that I'll never forget, because here I am now, on the Space Station, after having just rendezvoused, so all these memories of when I was a kid came back. It really was neat. Something that I'll never forget.

We transferred several tons worth of equipment and water and supplies, and one person to the Mir,



Dr. David Wolf, and then we brought Dr. Mike Foale back, and to watch them-you know, Mike is very happy and he's trying to contain his glee and his excitement about leaving, because you don't want to offend or upset David Wolf, who's going to be there for a long time now, just to see his face, it's pretty difficult to say goodbye to him. It's difficult, more difficult for him to say goodbye to us, and to watch the hatch close, with him on the other side, but he did a great job for the four months that he was up there.

I'll just tell you one more story, and it's Dave Wolf's quote, but I just loved what he said, and it kind of illustrated all of the thoughts that we had leading up to the mission, talking about the risk and everyone asking us about risk, and should we leave him up there. He did a great job of dealing with the risk, both pre-flight and during the flight. But each night he would talk to the ground controllers, the people who were arranging his next day's events and working the experiments with him, coordinating things on the ground. He would close each of his nightly telecoms with them, you know, he'd talk to them for fifteen or twenty minutes, and at the end of every telecom, while we were docked for the six days that we were docked, he'd end his transmission by telling them on the ground, he'd say, "Well, be careful down there on the ground." No, wait. I messed it up. He said, "Now, be careful down there. You're awfully close to the ground. You don't want to get hurt." It was a great way to think about risk. He's up there, floating around in what astronauts tend to think of as a relatively risk-free environment, although there are some risks, but he's telling the people on the ground, "Don't worry about me. You take care of yourselves, and I'll be okay up here." I just thought it was great the way he would say that. "Be careful down there on the Earth. You're awfully close to the ground. You don't want to get hurt." So I've used that quote many, many times.

I guess that's all I can think about STS-86. I was honored to have been selected, and it was a great mission that worked, mostly because of the people on both sides of the ocean, down on the ground, who make it work and that's the case with all these missions. It's the people on the ground who make them work, and then we get to have the fun.

*Wright:* Of course, on 86, you had an additional international member, is that correct? Because you had Titov and then you had a French crew member?

*Wetherbee:* Jean-Loup Chretien, who was the first person outside Russia or America to perform a space walk. He's a French cosmonaut. In fact, he's the chief of the Spationaut Office in France. They call them spacionauts. He flew with us. He had been on Mir before and had flown with Titov before, nine years earlier, and so here he was on Mir for the second time. And so they had some reminiscing to do when they got up on Mir. Jean-Loup did a great job with us.

Titov, by the way, showed us the bunkroom that he spent a year off the planet and showed where he signed the wall with his signature, and you can still see it, you know, millions of, billions, maybe, of miles later, here's his name up there, so it was pretty interesting being on board the Mir with cosmonauts who had flown it when it first was up in space, so it was pretty interesting.

*Wright:* I really appreciate your time. What time we had scheduled with you is up, and we don't want to take any more unless you have more to give us, because it's certainly up to you and your schedule.

*Wetherbee:* Probably not.

*Wright:* All right. We thank you and wish you the best of luck. Your job may be finished with Shuttle-Mir, but I am sure that they are full every day doing more for whatever projects you're assigned to next.

*Wetherbee:* And I'd still love to get back there some day, because I'm not finished with the training part and the flying part. Hopefully, I'll get to go fly again. It's an awful lot of fun.

*Wright:* We wish you the best of luck. Hope you do, too.

*Wetherbee:* Thank you.

[End of interview]