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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CHARLES J. PRECOURT

July 12, 1998

Interviewers: Rebecca Wright, Paul Rollins, Frank Tarazona

Wright: It's July 12, 1998. We're speaking with Charlie Precourt, astronaut with the Shuttle-Mir Program. This is Rebecca Wright, Paul Rollins, and Frank Tarazana.

Thank you again for taking time out of your busy schedule to visit with us.

Precourt: I'm glad you're doing this project. It's worthwhile.

Wright: We are, too. We have certainly enjoyed visiting, and we are visiting with as many Russian and American participants as we can. We know just a few weeks ago that you finished a mission. So how are you feeling, and how are things going since then?

Precourt: I feel really well, and things are going great. We finished our debriefings, and our report, the written report, which is always the thing that seems to take the longest to get through the system, that was completed last week. So we're essentially done with STS-91, and we have a little bit of traveling to do as a crew to visit some people at the other centers and thank them for the work they did, especially places like Stennis, where they built the new external tank that worked so well for us on this mission, things of that nature, and then we'll move on to Space Station.

Wright: You've had the good fortune of being on the first flight that docked with Mir, as well as the last flight. Can you share with us those feelings and even some of the differences of what it was like the first time going and then the last time?

Precourt: Well, the benefit of the last mission, having done it twice before, was obviously the experience of knowing what it was going to be like and being more relaxed with the mission profile. Every mission has its anxious moments, but in general we have learned to do these kinds of missions which are the model for what we do with Shuttle going to Space Station. We've learned to do them really well.

Comparing that to the first mission, I was quite anxious through the whole ten to twelve months that we trained for that flight. There were an awful lot of unknowns with the whole project. We were going to be working with crew members that didn't speak our language for what, to us, was the first time. We were going to be docking two vehicles that hadn't come into contact before. We were going to use a mechanism to do that, that hadn't really been put through the paces that we were going to have to put it through. The whole process of bringing the two vehicles together was something that had a lot of unknowns, and we were really fortunate to have a good engineering team behind us that worked it out in

such detail.

When you look back on it, the fact that we're able to work so well with the Russians really bodes well for what we're going to be doing in the future. I think most of us were a little skeptical in the beginning that we could really cooperate that well with them and solve the technical problems, because cultures are so different and the people are different in their approach to things. And yet in spite of all that, we didn't have enormous problems to make two spaceships that weren't built to come together and make them actually come together. So I thought it was a really neat experience.

But comparing the first to the last, when you're doing a first, you have so many anxious moments about the unknowns, and when you've got two missions like that behind you, it becomes a lot easier to put the mission together and think about doing things more efficiently and doing them in a way that maximizes the effectiveness of the Shuttle, which is what we're going to be doing when we do the International Space Station missions. That's what we've really been thinking about in these last flights to Mir, is how do we do this better. We know how to do it, but how do we do it better?

From a personal standpoint, I just feel really super lucky to have had the chance to fly three times to the Mir and see the Phase One Program evolve through good times and bad times and see it come out on top and be so successful. I don't think a lot of people realize what really transpired and how it transpired, because so much was written in the press that educated the public in a contrary way. The press often, even for me when I was completing the mission and taking a few weeks of leave and I was away from Houston and I'd see something's happened on the Mir, that's your only source of information, and then you come back to the office and you find out really what went on. And it's so much different that, even today, after the completion of a successful Phase One Program, I have to continuously explain to people that I meet, that it's different than what they've been reading in the papers.

The history of the program, I hope, can be documented in the light that I saw it, because, having been on the inside, I think I have the right understanding of what actually transpired and what it meant and why it happened, but I don't see a lot of that being reported very well in the press. Just to give you some examples, whenever something would break on the Mir, throughout this whole process, you'd see something in the newspapers that would say something to the effect of, "Mir computers down again. Mission is threatened," so on and so forth. I would just kind of chuckle, because when we docked the STS-71, we were woken up at two o'clock in the morning our time, with a computer failure on the Shuttle, and it never made the newspaper, and we'd just launched two days ago. This was a station that had been in space for eleven years at the time. And, you know, they have a computer failure, and they replace the computer just like we do on the Shuttle, and it's a big deal for everybody, because it's something that the press can point out is putting Americans at risk or whatever, that sensationalizes it. I regret the fact that that's what is

being educated to the American public about this program.

So, to go one step further with your question, is what's transpired from the first to the last, there's been an awful lot of ups and downs and a lot of assumptions in the reporting of the ups and downs of the Mir, in particular, that I think deserve to be put in a different light. People repeatedly said how old a space station it is, how it's in very bad condition, how it puts us at risk to operate there.

I would just like to point out a couple of facts, and that is that when we went on STS-63 to do the close approach, the Mir was half the size that it is today. They had not yet launched a Spektr module. The Priroda was still being manufactured and not even being thought of being launched. So they had a relatively small space station. Then when we went up on STS-71, we were waiting for Spektr to arrive before we went, because, as you remember, Norm [Norman] Thagard's mission was hinged to what was in the Spektr module for science equipment. So he actually launched before that module went, and had to wait for it to come aboard, and we had to wait for it to get there because then they were to reconfigure their space station in a way that the Crystal module, which is this module here along this axis to the Shuttle, when we docked on STS-71, it was actually pointing out this way. This module had just arrived, and this module wasn't there yet.

So with that change of orientation relative to what you see here, the Mir crew at the time, once Spektr arrived, had to reorient the docking port so that the Shuttle could dock safely, given the evolution of construction that they had to that point. So, on STS-71, we didn't have Priroda. Spektr had just arrived, and we went in and docked. That added essentially one module that was almost brand new, even though if you take the base block and come out one, they were approaching eleven years old. Now you've added, on STS-74, this orange segment down here that is the docking module, and then, after that, you added Priroda and all the solar panels that are associated with it, and then virtually every six months the Progress and the Soyuz vehicles are brand new, and all of a sudden you start to have a station that almost half of it is brand new.

So I'd kind of take issue with people who are saying it's old and run down, it's about to fall apart, and so on and so forth. Yes, there were a lot of problems with what was going on inside the base block and the Kvant, with some leaking fluid lines and things of that nature, but these are the kinds of problems that we all experience in our homes. I'm right now in the process of changing the coil to my air-conditioner on the second floor. My family's without air-conditioning. These are normal, everyday life events.

What I hope the American public can glean from the education of the Phase One Shuttle-Mir Program is that all hardware breaks down. We have to learn to take our hardware to space and not bring it home in a hurry like an airliner that might be flying home that has a problem, but to learn to repair it out there, because if we don't learn to do it out there, we won't ever be able to stay there very long, because

hardware does fail. Our ultimate goal is to be able to go to the moon and Mars and put bases there for scientific research and for exploration purposes and stay there and survive. So these lessons are very valuable to us. The fact that the Mir went through ups and downs and we were able to live through that, I think, is a great testament to what we were able to do together, and it should make people think twice when they try to criticize the Russians and their system for what it is or is not capable of doing.

I just think there was a whole lot more to the story than what the press was putting out. You can take all the incidents that went on throughout the flow of things-after STS-71, STS-74 took the docking module up. Then Priroda arrived. Then STS-76 took Shannon [Lucid] aboard, and that was a relatively quiet six months for her flight. The real problem with that whole increment was a Shuttle problem. If you remember, her flight was delayed. Then STS-79 brought her home finally.

Then in Jerry Linenger's increment, of course, we had the fire, and that was right before I went on my second trip. I brought Jerry home, so I got there right after the fire had occurred and they had cleaned it up completely. There was no remaining evidence of a fire on board, but Vasily Sableyev, the commander at the time, was nice enough to give me a tour and show me where everything transpired, and he gave me a little-you know the little pin they pull out of a fire extinguisher to make it work? He had about sixteen or eighteen of them on a little chain that he had made for souvenirs, and he gave me one as a souvenir. And he gave me one of his EVA gloves that he had worn outside on one of their many EVAs to repair the leaks in the system and whatnot. That was really a very, very memorable moment. I have his EVA glove in my living room, and it's a souvenir that I'll cherish forever.

But we brought Jerry home, and the station pressed on very nicely, and there was a controversy at the time as to whether or not we should leave Mike Foale because they'd had the fire on board. We worked our way through that, and Mike had a very successful increment. Unfortunately, of course, he had the collision with the Progress vehicle. I think we've learned an awful lot out of that the hard way. You know, you don't want to learn lessons the hard way, but sometimes you have to, and again, what you read in the paper sometimes is an unfortunate depiction of the events. This should not have happened, they shouldn't have had that collision, but they have dug through all of the factors involved, and they have completely addressed all of those factors that led into that accident.

We're right now-today, this morning, I was involved in some discussions with our Space Station people on how we will train crews for the International Space Station to do these Progress remote approaches, and the discussion was, since that's Russian hardware, will we have Americans involved in that kind of training. I think the lessons of this whole thing dictate that, yes, Americans who are on board are going to be intimately involved in that kind of process. We're going to have to know how to handle that kind of equipment.

So we learned a lot from that, too, and unfortunately, it took out one of the new modules, the Spektr there. But when I went back up on 91 and saw that the Spektr had been totally sealed off and it was evacuated, of course, on the other side due to the leak, we did a little procedure to pressurize it in hopes that we'd see gas that was fluorescent in nature coming out of the base of the solar array that was damaged. Unfortunately, there was not enough of a leak rate or leak pressure in the gas that was leaking for us to be able to see anything, but it was a good attempt to try to develop a technique for finding leaks should one ever happen-knock on wood it never does-on the International Space Station.

But when I looked inside, other than the fact this module was sealed off, the condition of the inside of the Space Station was better than it was on my previous two visits. The air was cleaner, it was better controlled temperature, it was drier, the walls of the surfaces of the structure everywhere were nice and dry. There had been lots of humidity on my previous two visits that was evident everywhere.

So I think seeing the whole program go up and down like that and now to see it near its end is kind of on an up phase in terms of its condition, should give us reason to be optimistic about our new Space Station. I think, really, for me personally, the memories of each of those flights will live with me for a long, long time. Having Vladimir [N.] Dezhurov, the first commander, who came back with us on Atlantis, on STS-71, sneak up behind me while I was doing some work on the flight deck-I was holding a volt ohmmeter-it has two electrical probes-and I was just about to make contact with an electrical circuit that we were repairing on the Shuttle when he made the sound of a "Pht-t-t-t" in my ear. You can't jump in space, but you can sure go reeling in zero gravity, and I could have choked him, but he had this big grin on his face when I turned around and said, "What are you doing?" And we've been really good friends ever since. It was just a neat experience to bring him to the Shuttle, show him around, and let him feel at home, and to be able to joke around like that makes for a good experience.

Then, on STS-84, like I mentioned, with Vasily having given me his glove as a gift and whatnot. He had flown MIG-23s in Germany when I was stationed in Germany flying F-15s, and we kind of wonder if we hadn't seen each other from time to time on the border. We both think about the program, where it's taken us and what we had done in our previous careers, and now it's just almost unimaginable that we could have arrived where we have. I've got friends that told me when we first started into this that, "You'll never be able to make this work. It's unfortunate that the government wants you to do this in an international vein instead of doing it our own way. But they're so different and they do things so differently, you'll never be able to get past the technical hurdles with them."

The language and the technical hurdles have proven to be not any problem at all, which is a really pleasant surprise. We see that physicists and mechanics and engineers approach problems maybe in a slightly different way, but when the physics of a problem tells you there's only one answer, you have to

come up with the same answer in many cases, and that's what's been kind of neat working with the Russians. Working with Vasily after the Cold War was certainly a neat opportunity.

Then on this most recent one, Nikolai Budarin was the flight engineer. Togot Musubayev was from Kazahkstan, he was the commander, and Nikolai was the flight engineer on STS-71. When we launched (71), we took two Russians on the Shuttle, Anatoly Solovyev and Nikolai Budarin. Nikolai was making his first flight in space ever. He'd never been on the Mir, he'd never been in space, and he was launching on the Shuttle. So for him it was a very unique experience to fly for his first time on another country's vehicle. So we took him up to the Mir, and we brought Norm Thagard, Vladimir Dezhurov, and Gennady [M.] Strekelov home, and we left Nikolai and Solovyev on board, the two of them. When we closed the hatch, I can still remember seeing Nikolai looking through the little hatch window of the base block-or no, it was actually the hatch of the window on the Krystall. We could see him from these windows looking across like so. He was in there looking at us as we were getting ready to undock, and he had a tortilla, and he was waving it at us because we had left him some of our tortillas for when he was going to be there for four or five months by himself. He now is still on the Mir station. We left him there when we brought Andy [Thomas] home.

So the relationships have become strong ones and really neat opportunities for us. I think we all have a great foundation to go from when we work together on the new station, too.

Wright: In '91 you had a very unique passenger with you as well, the director of the Mir Program in Russia.

Precourt: Yes.

Wright: And how was that experience?

Precourt: You know, it really was a neat opportunity for the American crew. He is an unbelievably operationally-oriented individual. He's not what a lot of us who are in crews think of as a manager at all. He's got two flights of 180 days each, and when you give him a job to do, and if he hasn't got a job to do, he's asking for one, but when you do give him a job to do, he knows exactly what it's all about and what needs to get done. He'd not been in space for seventeen years, is that right? Something like that. And he went right to work like he'd just come home yesterday from the last one. So that was a neat experience.

It was a lot of overhead for us because we were assigned very late as a crew. For me, personally, having the responsibility of being one of only two Russian speakers on the crew, there was a lot of overhead for me to keep him up to speed on how we do things, but that was really part of the objective,

from my standpoint it was, to make this really worthwhile, was to let him see how we do things and why and what our rationale is, so that when he goes back to Moscow now, he has in his hip pocket a really strong understanding of what our capabilities and limitations are.

He can help us cut through a lot of technical issues, I think, in the future a lot quicker than we might otherwise. Him knowing how to resolve things with the right people there and knowing who the right people here are now to look to for advice or help in resolving an issue and understanding what the capabilities and limitations are, I think, is going to go a long way. He's got a crazy sense of humor. It's really a shame he couldn't be as funny in English. He works real hard to speak English, but if you could hear some of the stuff he would tell us in Russian, I would just be in the middle of a procedures, and he'd say something and I would just start rolling, because his sense of humor is wonderful. I'm not very good at remembering jokes or I'd tell you a couple of them, but he just has a real natural sense of humor that is good at cutting through tension and making people feel good about what they're doing. That was a neat experience.

Wright: You had seen Mir, but he had never.

Precourt: He'd never seen Mir. That's right. So when he came aboard, he didn't show it and he didn't tell me right away, but a few hours later he said, "Charlie, this place is in bad shape." [Laughter]

I said, "What do you mean?"

He says, "I don't know how they live up here. This is awful. This is worse than I imagined. This is unbelievable. This is unsafe," he said.

I said, "Well, this is the way it's been for the last four years. I've been telling you this for the last two missions I debriefed."

"Yeah, but, you know, when you don't get to see it yourself, you hear these stories, you just don't imagine how bad it really is." That was the first day.

Then the second day, he started to get a little more comfortable with how things were there and how the crew had done the best they could with the situation. Stowage problems is really their problem. He said, "Well, you know, I can see how they're doing things and why they're doing them the way they are."

And then the third day, he says, "Well, you know, I think I could get used to staying up here and being here. Maybe I'll just stay." [Laughter]

Wright: I can see you calling down and making that request.

Precourt: Yes. Wouldn't that be something, to call down and say, "I think Valery wants to stay." But

really, he hit the nail on the head. He said, "You know, I think we lost control of stowage and inventory at about the three-year point with the Mir." We have food on the Mir today, and I saw it-there's still food supplies there that belonged to Shannon and John Blaha, and there are boxes with their names on them that nobody's ever going to eat, and the food just keeps going up. They lost control of inventory management, which is very easy to do. It sounds like it would be difficult or unfathomable that somebody could let that happen, but it's really quite easy to do when you've got stuff that's been thrown in your garage for twelve years and then you go back through and clean your garage and find, "Oh, I haven't seen this in years. Where did this come from?" Well, that is literally the way it is, too, in every module up there.

When we were there on STS-91, this module over here, the Kvant Two, which is used for space walks, EVA, was full from about the one-third point all the way out. You could not physically move yourself into that part of the module because all of their stuff that would normally be distributed throughout the station had to be put in one corner so that a crew of ten could actually move around, because we had all this payload in the Shuttle from the Spacehab that had to come up and be distributed in the Mir and stuff from the Mir that had to go back to the Shuttle, and while that's happening, you've got ten people and a lot of equipment, you've got to get the extraneous stuff out of the way. So they've filled this module over here with stuff. You could not move in there.

They really have a situation where the inventory management got out of control, and Ryumin thinks it happened at about the three-year point, and the crews have been struggling since then. The lesson, of course, he tried to pound home was that we'd better do something a lot different for ISS or we're going to see the same kinds of problems. So we're struggling with that, and we keep working on it.

Wright: Was the Mir what you thought it would be when you got there?

Precourt: This time around, on STS-91?

Wright: The first time.

Precourt: The very first time. That's still a good question, because I'd seen pictures. Actually, I'd have to say no. Sergei Krikalev had shown us some video and I'd seen pictures, and it was so different than the inside of the Shuttle in its layout. I mean, you can look at it; it goes in every which way. The Shuttle's still laid out like an airplane, you know. This is up and that's down, and there's front and back, and there's a tunnel in between, and everything's kind of oriented like in an airplane. In the Station, you can go from one module and turn a corner, and the floor is suddenly off to the right instead of down here, and you go to the other module, and the floor is underneath you, and every module was just oriented a little differently. It

doesn't matter to you, but when I saw that in film before I flew STS-71, I thought, "Boy, this is really strange. I can't really picture how this is." So I wasn't really sure what to expect.

We went to Star City and looked at the mockups over there, and they are nothing like what's in space, because they have nowhere near the volume of equipment packed into them. They just have the subsystems and the panels displayed for training use. So when we got it there on board, what immediately struck me was how used it was and how packed it was. It was literally like going into your garage and trying to clean it out after you've been packing stuff in there for twelve years, one of those garages that you no longer park your car in, you just park stuff in. That's the way it was in the Mir.

There were places in modules where they said they had a furnace and they were doing crystal science, and I can't imagine working in this cramped little passageway trying to do science like that, but that's the way they had to deal with the space limitations that they had. So it was quite a bit different than what I expected, and yet very readily you can adapt to that environment. When you've got two, maybe three, people there permanently, I can see where they have plenty of volume to do their work, and you can get used to the idea that things are laid out in a strange pattern like that.

Wright: One difference between the three times that you went is that the first time you weren't the commander, but the others--

Precourt: The other two I was the commander.

Wright: What's the difference in your roles and responsibilities, or how did you feel that you went back as the commander?

Precourt: Well, I think I went into my first flight as the commander with a couple of great teachers as commanders prior. Steve Nagle was my first commander, and Hoot [Robert L.] Gibson my second one, and I couldn't have been better prepared than to have had the chance to fly with those two guys. Hoot taught me a lot of great things about doing this kind of mission, and I think one of the biggest ones is just patience, you know. We have a pretty good system of engineers and scientists behind us, and we usually get the information we need from them to prepare for a flight like this.

Most of the anxiety of crews is not having all the information they think they need at their fingertips, and I think Hoot taught me to be patient with folks and watch the mission come together, sit and listen in the planning phases, and use your experience to assist the process but not to get too uptight about how things are unfolding, because in particular with these kinds of missions, things change right up to the very last minute, and we were dealing with that kind of stuff.

I think it's good that we've learned to be better with change. I think the Shuttle ought to be a vehicle that's able in the last two or three months to really change a lot of what is going to be planned and still handle it, be adaptable, because that's what it's really for, is to go to and from the station and do what is required. On a station, something could break at the last minute that requires a new part urgently, and you'd better be ready to handle that kind of thing.

So when I got to be commander, it, in one respect, is a whole lot more fun because you have suddenly shed the burden of being a subordinate, and you don't have to worry about answering to somebody else on the crew. [Laughter] But the other thing I learned from them-and I hope I did this right and I hope I did it well for my two crews-is that if everybody on the crew can be happy with their roles and responsibilities on the crew, then the crew will be a good one. So what I do is I remove- myself from a lot of the flight plan events. I could have easily said, "I'm the commander, I'm going to do this, I'm going to do this, I'm going to do this," and instead I said, "Now, let's have this person do that event. Let's let this person do that event, or that task," and I left myself as a floater-on orbit I'm talking about, mostly.

On ascent and entry we all have our roles pretty much very rigidly defined, but once we're on orbit and we're doing things like rendezvous and transfer activities and whatnot and robot arm ops, I tried to spread that around, and I would be a floater and help whenever anybody got behind in the time line. I found that that worked very well both times, and it allowed me to take in and enjoy some of the mission also, as I would not just be locked into my timeline, I could float around and see how other people were doing in the mission and keep a good picture of the overall flow of the flight plan. So I thought it was certainly more fun to be the commander, and I hope I get the chance to do it again.

Wright: Now you're busy. Do you ever have the chance to look out the window just for looking's sake?

Precourt: Yes. There are a couple of moments for me that I'll never forget. I take the time. You don't have to be docked to a space station to enjoy this one, but towards the end of the day after you've been working real hard and you haven't taken much time to look out the window, and you've eaten dinner, and it's getting close to sleep time, and it's quiet, especially when it's quiet on the flight deck, I like to go up to the flight deck and look out the two overhead windows, especially as we approach the point of the Earth that we call the terminator. You have to picture the sun over here and you're looking at the Earth here and you're up here above the Earth, so the sun is illuminating the part of the Earth that's to your left, and you're flying around the Earth this way, and the terminator is where the shadow is. It's the part of the ball that's not getting sunlight on it.

But when you're up here in the sunlight, it's kind of like a silhouette situation where you're outside

in the street and you're looking in the window in a building and you can't see inside because there's too much light outside. Well, when you look past the terminator to the dark side of the Earth, it's like that. You're in the sunlight up here, and there is Earth down there in that black area past the shadow, but you can't see it. So it's like somebody took the Earth and chopped it off and it's gone. Until you go past the curvature of the Earth and you yourself are in shadow, then you start to see the lights on the Earth's surface again and you can start to pick out the Earth.

But there's this magic line where the sky turns from bright day to purplish-blue and then black, and it's a fairly wide band right underneath you where the Earth just seems to dissolve away. It's magical, and the colors are really fascinating. I like to sit there and just quietly look at the Earth go by, that part of the view.

The other things is, once you're done docking, to just look out at the station and look around at the structure and, "My God, what did we build in space? How did we put this together out here, the Shuttle and the Mir together?" It's just pretty awesome.

Wright: Does your excitement build from when you first see it? I know when people go on vacation and they see the mountains of Colorado, you get more excited, and is it something like that when you see the Mir kind of far away but you keep getting closer?

Precourt: Yes, there is some of that, but I describe it a little differently than that. You know, it starts out as a little star, so it's kind of exciting to see who's going to be the first on the crew to spot the Mir. We'll be maneuvering, and we know where it should be, so I'll yell out to everybody, "Okay. Look out this window. See if you can see it." Then we see it, and we call the ground, "Hey, we've got them in sight. We see them," this twinkling little star out there. Then you can follow them as you go around from the sunlit side to the dark side, and you can see with each successive rev them starting to get larger and larger.

But for me, it kind of reminds me of some of these science fiction movies where Luke Skywalker is flying in on his ship and lands on the big station in the hangar, you know, where you have the planet in the background, a Star Trek kind of thing, because that's really what you're seeing, this outpost in space against black space and this huge planet horizon in the background, and if you just take your imagination one step further, you are arriving from another galaxy to this Space Station outpost in some other solar system. You can put yourself in that little world fairly easily. That's what it feels like, because you're arriving at this outpost, and to see something that's just little speck grow into something that has shape and realize there's people living in that thing is pretty phenomenal. And then you just come up alongside and hook on, and once you're docked, you can open a hatch and go inside there.

Wright: And see big smiles?

Precourt: Big, big smiles, yes. It's really neat. That's one of the best times, is opening the hatches, and everybody is just overcome with emotion and joy, the whole thing happening, you know.

Wright: I guess there's no split between international parties there, everybody is so happy to see everybody else.

Precourt: Yes. You know, it's funny, this hasn't happened since, but on the first docking, I went into the docking module and I looked through the little porthole because we were waiting for the pressure checks, and I've done this every time, and the Russians and Americans on board tend to come into here and wait. Their hatch is already open, and we're doing pressure checks with our hatch, and our hatch gets opened last to physically give us access, so you can look through this little porthole, and you can wave at the guys on the other side, and you'd see they're really antsy for us to open our hatch, "Come on! What are you waiting for?"

But on the first one, I looked in there, and I thought, "Wow. They've got their camera oriented this way." They were upside down compared to the way we were oriented in the Shuttle. So we opened the hatch, and Hoot was going to shake hands with Dezhurov, but he was upside down, and so we yelled across at Norm and said, "Norm, you guys are upside down."

He says, "No. You guys are upside down." [Laughter]

Wright: And everybody was right, I guess.

Precourt: Yes.

Wright: Your work with the Russians with this program, was that your first exchange with them or had you worked with--

Precourt: With the Russians?

Wright: Yes.

Precourt: Yes. I'd never even met a Russian except for one time in my life in Berlin. That would have been about seventeen years ago, sixteen years ago. I went to Berlin when the [Berlin] Wall was still up, and if you'll remember, there was a quadrapartite agreement. The Russians, the Americans, the British, and the French all manned Berlin in sectors, and the Russians had a representative in the control tower at

Templehof, which is the airport there. The four countries managed the air space for the Germans to fly in and out of Templehof. So they had a Russian in the control tower there, and he was a former MiG pilot. We were all F-15 pilots visiting, and we thought that was pretty weird. [Laughter] But other than that, until this program started, I hadn't had a chance to work with them at all.

Wright: Do you remember your first exchange, the first time you met them?

Precourt: Yes. I'm trying to remember. Well, it was when Sergei and Vladimir Titov came here, and neither one of them spoke very much English at the time, and I didn't speak any Russian then. Met them in the hallways and welcome, and kind of awkward exchange, and at the gymnasium the same kind of thing, and then gradually got to talk to them more and more, and they got better in English.

But I think the more pronounced first meeting was when I got assigned to STS-71 and we knew who we were going to be flying with, Nikolai Budarin and Anatoly Solovyev. When they first came over here, I had already started to learn some Russian, and we were going to take them to the Astros game and down to Galveston, and I took Nikolai in my little pickup. So we had a forty-five-minute drive to Galveston, and he didn't speak much English and I didn't speak much Russian, but we were able to, with a dictionary, talk about a few things on the way down there. You think about how the relationships started there and where they've evolved to today, it's pretty incredible, because we couldn't even talk to each other back then and now we do everything together. It's neat. But, yes, when you think back on how it really first started, you would tend to believe those that said, "You'll never be able to make this work." So the fact that we did is pretty neat.

Wright: And where do you want to go from here?

Precourt: Me personally?

Wright: Yes.

Precourt: I have so much on my plate, it's kind of out of control. [Laughter]

Rollins: Bragging or complaining? [Laughter]

Precourt: I don't know. I'm staying right here at NASA for at least the next several years. I'm hoping to fly a long-duration mission on the new station. We'd like to have some commanders of the Shuttle and that experience-those people-- fly as commanders of the Space Station, too, for those increments when the Americans will be commanding it. So I'm looking to that opportunity a couple or three years from now. In

the meantime, I'm sure they'll give me plenty to do.

Wright: You started with the program eight years ago?

Precourt: Yes. 1990 I came here. That's the other thing. In 1976, as an Air Force Academy cadet, I went to France on an exchange program with the French Air Force Academy, and, to this day, it was probably one of the best experiences and the best things that I ever did. I learned their language, had grown up with it, and then learned it very, very well for this program, and to this day I have great friends in the French Air Force because of it. Because I was so hit by that experience, so impressed with it, it had only been my dream when I was flying fighters for the Air Force, I was always looking for a way to do some more exchange type of work with the French Air Force officers, the pilots that I knew. I even got to do some dog-fight training with them in the F-15. I took a flight of six F-15s from Germany down into the middle of France to an F-1 base and arranged a one-week exchange. It's little things like that that would keep evolving. So I wanted to do some flight test work. I went to Edwards and did that, and I also wanted to keep my international exchange opportunities going. There was an exchange with the French Test Center and things of that nature.

But when I came here, something I always wanted to do, you could walk around the astronaut office area--we were in the other old building at the time--and obviously, since it was only a --national program, we had only a couple of Europeans, and we had some payload specialists that came from time to time from other countries, but by and large it was a strictly American program, and we never looked beyond our horizon of what goes on in this country for things to do.

So it was kind of my dream that somehow what we were doing here could become more international in flavor, because I just thought it was such a fascinating thing that I'd done in France. Lo and behold, you can walk around the floor up there today and you can talk six different languages. It's really, really amazing. I would never have thought that that could happen, and that was as late as '93 and '94. I mean, it's only been four years. Unbelievable. Unbelievable. It really is amazing.

Wright: And how many languages do you speak now?

Precourt: I speak French and Russian. I do French much, much better than I do Russian, but I get by pretty well in Russian, too.

Wright: Did your Russian get a lot better in your time as a DOR?

Precourt: Oh, yes. Yes. I had to fend for myself in meetings. I think it was a great experience to have

spent six months over there. It's difficult being away from the family, but you get immersed in what you're doing, and there was so much to do. It was great to be there and to see the early Mir crew members struggle through the program because of the newness of the training and facilities to handle this program. They really had to do a lot of struggling, pioneering. Norm [Thagard] was over there on his own, for the most part. So it was a very gradual thing. We got better at supporting the people over there.

So when I went, I had in my mind that somehow we were going to make life better for the folks that are training, and it's gotten better ever since. I still see a lot of feedback from the new Space Station crews, that things need to improve yet, and they always will, but when you have to travel like this for these long-duration missions, it's always going to be tough because you've got a long time you're going to be away from home just to go to space, and the fact that it's international, you've got a lot of traveling to do prior to going. It's going to be tough. So we're trying to make the training more efficient so it doesn't have to be for such a long period of time before flight that you're subjected to all this travel. So we've got a long way to go with that. But DOR opened my eyes to some of those problems that are going to be with us for a while to come.

Wright: Paul, do you have a question?

Rollins: The day of the launch for STS-91, it was hot in Florida.

Precourt: It was really hot in Florida.

Rollins: What problems does the heat cause, and what's that window? We heard that they almost postponed the launch because of the heat.

Precourt: Right. The way I understand it, there's no one single system that will all of a sudden just not work if you get to 99 degrees. It's the fact that all of the systems that support the launch were certified to 99 degrees, and we don't really know what happens past that. So if any one system out there which had telemetry on it was starting to look like it was suffering, you would have heard from the controller that, "Hey, it looks like I've got a problem here. I'm overtemping," or something like that. But we didn't have any of that, so I think even if it had gone to 99 or 100 or 101, they probably would have asked each system to take a look at their stuff, and if the telemetry looked good, they would have written a waiver for that particular day. But that's just my guess, that that would have happened.

Rollins: How much input do you have in that?

Precourt: I don't want input as a commander in something like that, because I can't look at the data. However, what data I see on board and what I know about what's impacting our ability to do what we do as a crew, I would have immediate input to. I make a call for the crew at the polling of the control team, go/no go. I get to make a call on that just like any other flight, and if I see something that I'm uncomfortable with, because it would impact my ability for the crew to do what we have to do, I would certainly make that input. The crew is generally the wrong people to be asking because they're ready to go, and you have this army of folks that are looking at telemetry and saying, "We're ready to send them." And they're in a better position to evaluate that than the crew is.

Precourt: So I was really comfortable with the way they were proceeding. There was one thing in this whole series of events leading up to the launch that caused us to launch at the opening of the window. We have a seven- to ten-minute, sometimes a little less, window in which to launch. Because, as you know, the Earth's rotating, and it's really rotating at a pretty fast clip, and so the Mir is in this orbit. You've got to picture like a hula hoop, and it's not moving in space much. It precesses like gyroscopes precess, but in any given instant it's just in this hula hoop, and it's going around this hoop. The Earth's rotating underneath this hula hoop.

So what you've got to do, you've got to wait for Florida to come directly under the hula hoop so that you can launch the Shuttle into his orbit. So if it's not quite under the hula hoop, you have to steer over to it, and if it's past, you have to steer back to it, and all that takes energy that we don't have. There are limits to how much we can steer either way, and that's what defines the window. There's an optimum time in the middle, and then there are extremes on either end.

So they elected the best time for us to go is in the middle or actually, for abort reasons, it's best even for us to go even closer to the end of the window, because it makes us steer back towards the East Coast, and if something should go wrong, we're closer to the coast. But in any event, they elected to go at the beginning of the window because they had a problem with the access arm that allows the crew to get to the Shuttle on the pad at the launch tower. The problem was a leaking accumulator, if I remember right. They had a good hack on the leak rate. They knew it was going to hold pressure enough to be able to swing back if we needed to get out on a scrub. They wanted to fudge it to more margin for that system to keep working if the leak were to get worse. So they elected to go at the opening of the window. I think they probably could have gone at the normal time, but that was their decisions, and that was fine. It was pretty hot for folks watching. We were pretty comfortable inside, though. [Laughter]

Rollins: Yes, we were there.

Precourt: You were there? That was a really hot night.

Rollins: But still, the chance of a lifetime. I didn't notice the heat.

Precourt: Is that right?

Rollins: I noticed it, but--

Precourt: They tell me it was a pretty spectacular launch from a visual effects standpoint because it was clear enough that you could see it for a long time, plus the winds were blowing in the right direction to bring the sound back towards the viewing area.

Wright: It's too bad you can't be in two places at once.

Precourt: That's right.

Wright: The last eight years, would you have done anything else, now that you've gone through all this? Can you imagine doing anything else?

Precourt: No. I could imagine having done a lot of things better. [Laughter] That's always hindsight. But, no. Shoot, I've had a lot of people ask me if I'm ready to quit flying and go work for a living, and I say, "Shoot. What would I want to do that for?" [Laughter]

Wright: When you entered, did you have any idea that you would go through all of this change?

Precourt: I had no clue. I mean, the Berlin Wall was still up. We were getting ready to fight the [Persian] Gulf War, and I almost ended up in Saudi Arabia for my Air Force assignment that was diverted here when NASA selected me. So where we are today I would have never, ever guessed or speculated this could have happened. It's a pretty amazing change of events.

Rollins: Tell us about the ceremony when they opened the hatch, because we've heard that y'all don't shake hands, because it's bad luck, across the hatch.

Precourt: Well, the Russians--I know that they say that. However, I've always shook hands with them across the hatch. The tradition is, or the way of doing things in Russian is you don't shake hands with somebody in a doorway. It's really strange, because when somebody comes to my door at home, I open the door, shake hands, and say, "Come on in." What they do is, the person welcoming either goes outside and

shakes hands outside or they quickly bring the person in and shake hands on the inside, but not across the doorway threshold. So a lot of people have interpreted that to mean across a hatchway is the same thing, but the Russians that I've talked to say, "Oh, heck, it's just a hatch. We're not going to worry about that," and we shake hands across the hatch anyway.

So my experience, having done it three times, is I just don't worry about it, just did it, and that seems to have made them happy. They don't consider it a door. But I think some other commanders have had a slightly different experience. I'm not sure. Because it seems to keep coming up as a question.

Rollins: We think of it as their home that you all are coming to visit.

Precourt: Right. Right. And yet they don't look at the hatch as a doorway, in my experience. Usually we like to bring them some gifts, so in the weeks before launch we'll be in communication with the crew by video conference or teleconferencing, we'll ask them if there's anything they need in the way of fresh foods. This crew wanted onions, sweet onions that you can eat like an apple, you know, and some tea and things like that. We make sure we bring all that stuff.

On STS-84 we did a really neat international meal that I probably ought to tell you about, because I couldn't duplicate it on STS-91. On STS-84, we had Carlos Noriega, born in Peru. We had Elena Kondakova, Ryumin's wife, Russian. We had Jean-Francois Clairvoix, a Frenchman. We had Ed Lu, who's of Chinese heritage. So we had this very internationally oriented crew, and what we decided to do was to put together some food samples from all these different cultures and put them into an international meal. We organized it, and Vasily was nice enough to let us just kind of take over the base block and lay out this meal, and it was kind of a buffet style. We'd bring all the trays with the foods prepared and we'd just lay them on the table, and everybody took parts of what they wanted and passed it around.

Jean-Francois Clairvoix, from France, brought some French foods on, but he also had a menu made up much like you'd find in business class on an airline, a card that you'd open and a cover that had airplanes from Lindbergh to the Concord and that kind of thing on it, great aviation like, and on the inside it was in Russian and English, the menu of all the things and what country it was from. We put it all on video and took a lot of pictures, and it went on for two hours. It was the most spontaneous thing that we'd planned, yet when we went and did it, it was more fun than we'd anticipated it would be. We had some gifts for Vasily and Sasha, some photo albums, pictures of all the training we did with them before the flight. We brought them the albums as gifts.

It's hard to get a time in the flight plan where you can get everybody together and do something like that, so before the flight--on STS-71, we didn't succeed in doing it. So on 84, that was one of the things I

insisted, that we find the time in the flight plan for both the Russian flight controllers and the American flight controllers, that they were going to leave us totally alone. Because typically they'll say, "Okay. It's mealtime for the American crew," but the Russian crew is off doing this, or at least one person has got something that they're being pulled away from their mealtime. With this one meal, I made sure they gave us this total freedom to be together for about a hour and a half or two hours, and it was just a really, really memorable experience to have had a meal like that.

Everybody, "What is this?" Well, Ed brought this from China. And this special juice that Carlos got from Peru, a purple juice that was really kind of neat. Different things like that made a pretty neat experience out of it.

Wright: What did you bring?

Precourt: We brought barbecued beef from a local barbecue place. [Laughter]

Rollins: Pe'te's?

Precourt: Yes.

Wright: Of course, right?

Precourt: With jalapeños and the whole nine yards, yes.

Wright: And tortillas.

Precourt: Yes. Exactly.

Wright: Thank you for sharing with us about the feast. That's something that we can all visualize to a point. Of course, we weren't there.

Rollins: But then when you think about it, that's pretty incredible, all these different nationalities up there in space.

Precourt: Oh, yes.

Wright: A sign of new things to come.

Precourt: Yes, I think so. I don't think that the space program budgets have an impact much on the total global economy, but I think what has an impact, especially that we're cooperating, is the influence. It's kind

of like a tree that the arms spread out. All these contractors that cooperate on contracts for the space program are working together that can lead to other contracts or other activities for the businesses outside of what they're doing for the space program that can really fuse some good relationships commercially for all the countries, and that can have an impact on the total budget or total economy.

So I just think that the fact that we're cooperating with so many countries, eventually perhaps on the new Space Station, it will provide the psychological impetus for politicians to force themselves to find an agreement to disputes that otherwise they wouldn't, because they'll all look up there and say, "Well, we have an investment in that, too. We have to keep this relationship going in a proper direction," rather than doing something rash. So I think it's the right way to do business.

We had an Association of Space Explorers before the Shuttle-Mir started, and it was the one time when astronauts could meet with cosmonauts, is when that community gathered once a year for a symposium. The veteran astronauts at the time, back in 1991-92 had an opportunity to meet with cosmonauts. I thought that was pretty bizarre, but when they did and they'd go to Star City and they'd see their neutral buoyancy lab like our weightless facility for training EVAs, they got to know and they got to see how neat it was to work together and compare notes on how they did things. It was obvious, even then, before we ever had a chance to really work together, that it would be great to be able to work together, because we all view--and they would say it to us at these conventions--that Earth seems like a home for all of us without boundaries that politically or geographically divide us. You can look at the Earth as one home for all of us.

Now that we're able to live that way on a station, we can move more in the direction of a global village rather than multiple cultures and countries that are at each other's throats all the time. So that's kind of neat.

Wright: I hope that you get to venture on into the ISS area.

Precourt: I'll keep my fingers crossed.

Wright: Yes, and that the next few years are as fulfilled as these are. We thank you for your time.

Precourt: I appreciate having the opportunity to talk with you.

[End of interview]