

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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NORMAN E. THAGARD

September 16, 1998

Interviewers: Rebecca Wright, Paul Rollins, Carol Butler

Wright: Good morning. It's September 16, 1998. We're speaking with Dr. Norman Thagard as part of the Shuttle-Mir Oral History Program. This is Rebecca Wright, Carol Butler, and Paul Rollins.

We thank you again for coming in to visit with us about this.

Thagard: My pleasure.

Wright: You were the first American to spend time aboard the Space Station Mir, and we'd like for you to tell us how you first became involved.

Thagard: Okay. I had heard, like everyone else did in the Astronaut Office, I think it was in probably 1991, that we were going to have an arrangement with the Russians in which one Russian cosmonaut came to the U.S., trained and flew as a mission specialist on a Shuttle flight, and one astronaut would go to Star City, train and fly as a cosmonaut researcher to the Mir station, and the flight was going to be--the first duration I ever heard of was three months. But I didn't know anything other than that.

In '92, January, I flew my fourth space Shuttle flight and came back off of that and had a technical assignment working Space Station again, and really was thinking about retiring, because I didn't know at that point if I had enough years to retire. Dave Helmers [phonetic] was a good friend of mine, and we were discussing what we were going to do. This was early July of 1992, just in the office one day because we shared an office, and we're discussing what we might do at NASA that would induce us to stay. Dave said there was nothing that was going to induce him to stay, he'd been accepted into medical school at Baylor College of Medicine, and that's what he'd always wanted to do, be a doctor, so he was going to do that regardless of anything that NASA might offer him. I said, well, I'd always wanted to go back to Florida State [University], my alma mater, and teach, and that's what I was trying to do, but the thing that would induce me to stay at NASA was to be the American that was in the exchange with the Russians.

Right after this conversation took place, again early July of '92, Mark Lee came into the office, and I guess this conversation came up again, and Mark said, "Well, didn't you know, Dan Brandenstein (who was then chief of the office) had a couple of Monday-morning all-hands meetings last year (I think it was November '91), said that we were going to have this exchange and that anyone in the office interested in being the participant in that to let him know."

Well, I had unfortunately been training for my fourth Shuttle flight, and that was a Marshall-managed space flight mission, Spacelab mission, so I had been over at Marshall Space Flight Center both of those Mondays when that announcement was made, so I never even knew that that was in the offering.

So I was pondering whether it was even worth it at that late date to throw my hat into the ring, because I knew that a lot of folks probably already had put their hat in the ring.

It couldn't have been more than two or three days after these discussions that Dan Brandenstein came to me about seven o'clock one morning and asked me if I were interested in flying the Russian flight. It was a bolt out of the blue, because I had never gone to him and volunteered. And I said, "Absolutely," because I thought it was a neat thing to do. I had always wanted to learn Russian, but I knew if I didn't have some real reason to do it, there was no way I was ever going to do that. It was a ride on a Soyuz rocket, it was training in Russia, and it was long-duration--not a long, long duration, but reasonably long, three months, which would be unlike anything that I'd experienced in the Shuttle Program, so I thought it was a great deal. Basically, he told me at that time that, fine, I'd be the prime, there wouldn't be a back-up. He said we didn't have the resources in the office to send two people. So that's the way we left it.

At that point in time I started self-studying Russian. I bought a textbook. Then in about October of that year, they cranked up in the office again these once or twice weekly hour Russian classes before work in the morning. It was something that I knew that Shannon [Lucid] had been doing since, I think, the previous year, because we knew this was going to go on. So NASA, the Astronaut Office, had actually hired a local woman as a Russian teacher, and she would come in, I think it was twice a week, once or twice a week, for an hour about seven o'clock in the morning, and we would have a Russian class, and there would be maybe anywhere from about four to seven of us in that class. So I did that for a while, also self-study.

I kept waiting for the official announcement to be made that I was the person that would be involved in that, and it never came and it never came, and we tried to get some funding to send the person, in this case me, to Monterey to Russian language school, and that wasn't forthcoming because I hadn't been named to the flight.

Finally, in July of 1993, Dave Leestma found some funds to send me to Monterey. Unfortunately, the funds were limited, and I actually wound up signing shared cost orders, meaning that while the per-diem rate out at Monterey, California, was thirty-four dollars a day plus transportation, I wound up with ten dollars a day and no transportation. So I wound up driving my own car out there. It was a move I hadn't wanted to make, because knowing I was going to Russia and this car was about ten years old, I wanted it to last. I didn't want to make a trip out to Monterey with it. True to form, going into Death Valley on my way out to Monterey from Houston, one of the wheels actually came off the car. There was a wheel-bearing failure, and the whole wheel just separated, and, of course, the car just skidded, but we managed to get it safely over to the side.

This was near an Exxon station in Death Valley, and we waited for several hours, and they brought a flatbed truck in and hoisted it up on it and took us back to the Nissan dealer in Las Vegas. Although they said they could fix the car, we wound up actually trading the car in on another car. So on that trip, I did some things that I had hoped I wouldn't have to do, including buying a car over 1,000 miles away from home to make it out to Monterey.

I'm trying to think back. There were some other things in there during that year. Maybe I'll pick them up later on and think about them.

Anyhow, I got out to Monterey in late July of '93, and about a week after that, Dave Ward, one of the two flight surgeons who was assigned to the Shuttle-Mir Program, joined me, and he and I basically stayed in Monterey from, me, the last week in July and the first week of August until mid-December of 1993. So that gave us about four and a half months.

I'll just say briefly, the Monterey course is eight hours a day, five days a week. It's not total immersion Russian like a lot of people think, but, nevertheless, it's pretty intensive. It's a great program, because, in our case, at least, we were not just one on one with an instructor, but there were several different instructors that interacted with us often on an individual basis, which was really a very good learning experience when you're trying to learn a language.

In December, we drove back to Houston, and I guess it was probably about a week after I got back that they finally did officially make the announcement. We also had learned that the Russians insisted on a back-up, as they always do, so we knew we were going to have to supply a back-up. There were, again, those folks who originally, about eleven or twelve, I think Dan told me, who had originally volunteered-- Shannon, of course, Story [F.] Musgrave, some other folks, and most of those folks had had some language. They'd been doing some language training in the course of time.

But in what I thought was a totally off-the-wall move, they made Bonnie Dunbar the back-up, and I haven't a clue as to why that was done. She was not, to my knowledge, one of the volunteers and really had no Russian language, and in the course of time, I think, it became clear that it's bad policy to send people over to Russia who don't have some experience in Russian before they get there.

In late February of '94, Dave Ward and Mike Barratt, another flight surgeon, the second one assigned to the project, and Bonnie and I and Ken--and I'm blank on Ken's last name.

Wright: Ken Cameron?

Thagard: Yes. Right. Ken Cameron. We were the folks that went over there. Of course, Mike Barratt was only there temporarily. The way it worked is, Dave and Mike would swap out with a little overlap

between them, but there would always be one of them there at any given time, and, of course, Ken stayed there, I think, until probably August, September, and then Bill Reedy in and took over as the DOR (Director of Operations – Russia).

Anyhow, we got there and immediately plunged into the training program, and it was a lot more similar, I thought, to our program, in the way they train and we train, than different, although there were some differences, but it was the usual thing where you have sort of part task trainers all the way up to sophisticated full high-fidelity trainers. Training consisted both of training on the Mir station and on Soyuz, because the flight was going to be up on the Soyuz rocket.

The classes were all in Russian. Bonnie had an interpreter, which was a continuing source of annoyance to me, because I could always hear this interpreter interpreting in the class. I thought that was not a good way to learn, anyway. You're never going to learn a language if you're using an interpreter, and Bonnie struggled mightily virtually throughout the thing all because of no Russian language before she went over there. I think that we corrected that somewhat, because I know Shannon, actually, as I mentioned, started Russian language training before I did, and she and John Blaha were the second and third folks over there. Well, they came in together.

We went through winter survival. That was one of the things we did just a few weeks after we got there. It was still very much winter, even though it was March when we did this there in Star City, and winter survival was actually done right there on the site, on the complex, but out in the woods. They basically take a Soyuz capsule that's been immersed in hot water, to simulate the conditions that it would be under if it had just returned from space, and then they carry it out there and plop it in the snow out in the woods, and you get in it, all three of us. It was Bonnie and I and then Veloga Dezhurov, who, although at the time hadn't been named as our commander, was the commander for this exercise, for this winter survival exercise.

We got in that capsule as we would have if we had just entered in our social [phonetic] suits, the pressure suits, and then we changed out into winter survival gear and then spent the next forty-eight hours out in the woods chopping trees, keeping fires going, trying to stay warm. The thing I remember is, as long as you were alert and active and awake, it was comfortable, you really weren't cold, but as soon as you would try to go to sleep and quit moving, then it would get cold, so it was very difficult to sleep. I don't think anyone slept very well during that period of time.

I was impressed by the fact that while the support people, the training people and the para-rescue people who were out there supporting it, generally would kind of stay back and not intervene, it was clear that they would step in any time they thought--for instance, the fire went out one time, and they were right

in there getting a fire going again. But it was a nice exercise, a very valuable thing to do, I thought.

Wright: Was that the first time you had encountered anything like that in all your training?

Thagard: I had never had winter survival. I was a Marine Corps fighter pilot and I went through jungle survival twice, once down in Panama, and then again when I got to Vietnam, they sent me back to the Philippines for jungle survival there, so I went through at Clark Air Force Base. So I went through jungle survival twice, but I never went through winter survival. And that was a good deal, too, because the winter survival, which was up in Fairchild in Washington State also apparently used to include prisoner-of-war kinds of experiences. Those were not pleasant, and I heard a lot of stories about those, but I never had to go through that. The Russian winter survival didn't involve anything like that either. In fact, it was a nice experience.

We got to know Veloga Dezhurov pretty well, again not knowing at the time that he was going to be the commander for the Mir-18 mission. But as soon as we got back to the gymnasium there at Star City, which is where the debriefings took place at the end of the exercise, Colonel [Yuri] Kargapolov, who was the training officer, the first thing he said to me when I walked into the room is, "How'd you get along with Veloga? How did you like Veloga?" And that was the first clue I had that their intent was to name Veloga as the commander. I couldn't believe that the question was directed at any other reason than that. That was the intended commander, so the Russians' concern is always how did the crews get along. They claim they know how to select crews. I think, in fact, they don't have any more insight into how to pick crews than we do, but what they do is they pay a lot of attention to personality factors and relationships between the people that they're considering for crews. So it was pretty clear that they wanted to get a handle on how well Veloga and I, at least, might get along. At that point in time I had no idea who might be the flight engineer.

As a matter of fact, I don't even remember at what point in there that the prime and the back-up crew were constituted, but it wasn't too long after that winter exercise in March. I would guess it must have been April, certainly no later than May, that we knew who the Mir-18 crew, which was Gennady Strekalov, Veloga, and I. And then the back-up, which would become the Mir-19 crew, which was Anatoly Solovyev and Nikolai Budarin.

When we came there, they gave us an apartment, both Bonnie and I. I think I was up on the ninth floor or tenth floor, maybe, in Building Two. When that building was new, apparently it only housed cosmonauts and their families, but the way it works in Russia is, I think once a family goes into an apartment, it's basically theirs almost for all time. The upshot is that not all the apartments anymore were

occupied by cosmonauts or cosmonaut families necessarily.

My wife didn't come over there when I went there originally, but she did finally join me in June. So I'd been there about three and a half months when she came over with our youngest son, Danny, who was a freshman in high school.

The apartment was nice. It was a three-bedroom apartment. It had new furniture. They had gone to the trouble of doing that, and I thought the apartment was fine, even by U.S. standards. It wasn't a luxury apartment or anything, but by Russian standards it certainly was. The only thing is, it was clear-- and I'm sure it's the economy that like things like building maintenance, upkeep, that sort of thing, weren't what they could be. Out in the elevator area, the entryway, and all of that had been allowed to run down, I think, over the course of several years. But, nonetheless, it was perfectly comfortable, and it was fine.

Wright: Was this your first trip to Russia?

Thagard: No. The first trip to Russia I took was with Don Puddy in October-November of '92 right after Dan had asked me if I were interested in being in crew exchange. That was a trip to Moscow for the purposes of talking with people from NPO Energia about the Soyuz as a return vehicle for the International Space Station. It really wasn't even related to the Shuttle-Mir Program at that time, but the reason I was sent along was because I was the one selected by SCOD to do this job, and it was just a way to get me to Russia.

While we were there, we were taken down to Baikonur and spent a night down there and got to witness a night launch of a Progress resupply vehicle while we were down there. So it was a nice trip, and we had some good discussions. I actually got out at that point to Star City and got to ride their Soyuz simulator, actually got to fly a manual entry in not their full-up high-fidelity Soyuz simulator, but the landing one that's in the centrifuge. But the centrifuge wasn't running at the time, it was just sitting there still, but, nonetheless, I flew the entry manually from those controls. Apparently they use that with their cosmonauts and it actually gives them the G profile. So they're flying it. The simulator actually simulates the G profile that would ensue if they actually flew an entry like that. So if they foul it up, I guess they get to feel the Gs that would come from not flying a very good entry. So I got to do that and then came back.

In April of '93, because I was the liaison person for the crew exchange from the Astronaut Office, I was sent back to Russia, and that time I took my wife and my youngest son, because I was assuming that although I haven't been named, I would ultimately be the one that was in the project, and I wanted them to have an opportunity to see what Russia was like. So I flew my wife and my son, at my own expense, on that trip to Moscow, and we all went out to Star City, but this time we went out to Star City to look at the

proposed apartments that the Russians were going to give us, and they showed us an apartment. It was in Building Two. It wasn't the ultimate apartment that we got, and they told us that when we were there. They said, "This is an apartment that would be one like we'll probably give your astronauts, but maybe it won't necessarily be this one, because it depends on what's available at the time the astronauts come here."

We met in Colonel Kargapolov's office, and we discussed a whole list of things I had that were liaison issues and *quid pro quo* issues, because that first mission was a *quid pro quo*. The way I understood it is originally we only had the one mission, that one crew exchange. It was a strict *quid pro quo* in which, again, one American would go as a cosmonaut, one Russian cosmonaut as an astronaut, and the other missions got added on, then, I guess, later on as part of a 400-million-dollar contract that we had with the Russians.

It was clear that the Russians economically couldn't provide for the Americans there what we could provide for the Russians here, so it was necessary to go over there and take a look and see what it was. We haggled about the business of cars and drivers and that sort of thing, and they were reluctant to do that. I think they felt that they had an obligation to do what they could, but they lacked the economic wherewithal. But we were finally able to convince the Russian space agency to commit to provide Star City with resources necessary to provide things like cars and drivers, because, after all, we had provided the rental cars for the Russians that were here, and that certainly was equivalent to what we were asking, because the way it finally worked out is the drivers were really out of the military pool there at Star City.

Two cars had actually been purchased and were supposedly dedicated to our use, but the drivers were just out of the pool. The one disadvantage to that is we would have to arrange for the cars a day or two in advance, and it wasn't really a question of the availability of the car so much as getting a driver. The upshot of that was that I usually tried to restrict my trips into Moscow before my wife got there to no more than about one a week, and it would usually be on the weekend, and it would be mainly to go to the embassy, because the embassy had a little 7-11-like store in there and just buy food.

Although there were department stores springing up in Moscow, and we did do some shopping at those as well, but again, it was such a real inconvenience to have to call and schedule ahead of time, that I usually only went in once a week, which was fine, because given the fact that you're getting tested--because the one thing that's different about the Russian training program than the American training program is there are tests. When you finish a course, for instance, the communications system in the Soyuz, you will go in and they will have experts from the design bureaus. These are the people who either design them or build them or certainly they're the experts on the system, whatever. Even if they didn't design or build it, they certainly work for the company that built it, and they're the experts. And you'd have members from

the Training Department there, and they would array themselves at a table, and I'd be back in a chair back there, and they would fire questions at you in Russian on their system, and you had to answer the questions. So it was an oral final exam on whatever the system was that you were being tested on, and you had to pass all exams at the end if you were going to be certified to fly.

Wright: Did you feel at any time you were treated differently or tested differently because you were the American instead of the Russian?

Thagard: No, I really didn't. Throughout the experience I really thought at a personal level that everybody treated us pretty well, and, in fact, several of our instructors joked that we actually did better on those tests than most of the cosmonauts. I guess it's just Russian culture. They will do thing like this, like formally testing people, which we wouldn't do, but on the other hand, the Russians are used to not taking things perhaps so seriously.

I think Olf Mirbold [phonetic] explained that to me once. In Europe, they have literally more rules than any one person is ever going to be able to understand or know, and the general tendency is to ignore rules to the extent that you can get away with it, whereas in the United States we really don't have all that many rules, but we take them very seriously. And I think it was something similar there. Yes, there is a formal testing requirement, which I took very seriously, but a lot of the Russian cosmonauts apparently just look at it as another one of the things that they have to put up with in their culture, so they don't take it very seriously.

So, no, our instructors were always extremely nice to us. I'm a teacher now, so I know where they're coming from. I appreciate it. You like your students if they do well. You're not too keen on them if they don't do well, and I think it was the same thing there. We actually did well, and they tended to like us and be very friendly, and they were perfectly open in acknowledging that, "You guys are doing great. You're doing a lot better than our people usually do." So, no, I never felt like we were being treated differently. I thought folks either treated us normally or even went out of their way to be nice to us, and I didn't get the impression it was a strained thing, either, something they were trying to manufacture. I felt like that's just really the way they felt.

While they did feel that way toward us personally, you could still get some hints from conversations and things that some people's view hadn't changed about the Russian and American roles in the world. I remember one day it was raining at the end of the day and we had come out of the simulator, and so there were several of us, myself and several Russians, at the entryway to the building waiting for the rain to let up, because I didn't have my umbrella, and I needed to go back home, back to the apartment. A

couple of Russians behind me were talking about Alaska, and one of them said, "Well, as far as I'm concerned, Alaska is properly Russian."

The other one said, "Well, the Czar sold Alaska to the Americans 100 years ago."

The other one says, "Well, I don't care. He had no right to do that. It's still properly Russian."

The other guy says, "Well, you know, you've got to be careful what you're saying. The guy standing in front of us is an American."

He says, "I don't care. He doesn't know what we're saying."

So it was actually kind of useful sometimes for people to perceive that maybe you didn't understand their language.

Wright: You learned a lot that way?

Thagard: Yes, and you could get some of that. But that's philosophical. In terms of interpersonal relations and the way they treated us and the way I really think they felt about us--and I heard them talking, because one time we were sort of getting hassled by a military Customs guy when we came back from Baikonur, and Colonel Kargapolov was there, and he's arguing with this young Russian captain. Part of the conversation was Colonel Kargapolov told him that he worked for the Russian Government and this was part of a Russian program, and he didn't want this captain hassling and antagonizing in the way. What he said was, "our Americans." So we were their Americans as far as Star City was concerned, but then the young captain came back and said, "Well, I work for the Russian Government, too, and I have rules that I have to follow." It was a typical bureaucratic kind of thing.

The interesting thing, when I think back on all those conversations, I remember them as though they'd been English conversations, but they were all in Russian. It's kind of strange. I never thought in Russian, but I understood it pretty well, and I could listen to those conversations and know full well what they were saying, but every time I think about them like this one, I think about them as though they had occurred in English, but they didn't, of course.

So, no, I thought the Russians treated us pretty well. I never felt awkward or uneasy. The only thing I remember is about the first night after we got to Star City and I was going to bed in my apartment. All the lights were out. I had the door open because it was still cold, but you don't have any thermostat, you have no control over the heat, and Russians really pump the steam in through the radiators so the apartments tend to be hot even in the dead of winter, even when it's thirty below outside. The only way you can cool them down is to open up a door or window. So we used to open up the door out to the balcony. There were gunshots outside, and I thought, "Oh, great. We just got here, and now the revolution's come,

and we're going to be caught up in the middle of it."

About two or three days later Bonnie's interpreter was just engaging us in some kind of conversation, and she mentioned that one of her father's friend had gotten drunk a couple of nights ago and taken out his revolver and was out trying to shoot out the streetlights, and those were the gunshots that we had heard.

Wright: I guess that's the good news.

Thagard: That was the good news.

Wright: How about your feelings as a trained Marine pilot with numerous combat missions behind you? Did you have to adjust some of the ways that you had felt being trained for those missions and now you were being trained for a different mission, the new culture you were in?

Thagard: I thought it was extremely ironic, because when I was flying missions in Vietnam in 1969 as an F-4 pilot, I thought that there was an excellent chance that at some point in time I'd have interactions with the Russians, but I thought it would be of a somewhat different nature than they turned out. If anyone in 1969 had ever told me that I would wind up having a captain in the Russian force as a commander, I would have said, "You're crazy. Maybe if I get captured as a POW or something that might happen."

But, no, by 1992, with the lessening of Cold War tensions, I didn't find that all that unusual. I was ready to take the Russians based on what I saw when I got there, and what I saw when I got there are people who, while they're somewhat culturally different, nonetheless, are just people. When you're not dealing with things that are set up somewhat artificially by the way governments are aligned and everything, and when it's just people to people, it's a whole different story.

Wright: Your other prior missions were, of course, on the STS missions, and you had trained to fly in space with the Shuttle, but now you were taking a different route. Would you share some of the experiences of what it was like training and then, of course, taking your trip aboard the Soyuz?

Thagard: Sure. The one thing is, for the Russians and for the Americans, when you come into the astronaut or cosmonaut program, you spend at least a year just getting familiar with the agency, with the organization. For instance, they took us to all the different NASA centers. I think the cosmonauts do the same thing when they first get there. In other words, there is a candidacy period which is about one year. You get sort of basic information on the Shuttle, for instance, during that year, and it's only after the end of the year that you even become eligible for assignment to a space flight, and that doesn't usually occur

immediately after the end of the year. So you've got a couple of years, usually, to get your feet on the ground and get a good background in the agency, and, for instance, a Shuttle before you get assigned to flight.

What we were faced with is having a little more than one year to combine a candidacy program and specific mission training for the Mir-18 mission. Because remember, in spite of our experience in Shuttle, we had no experience in Soyuz and Mir. We knew very little about that. So we had to learn all about the Soyuz and Mir, which is something you would normally do again in that year or two candidacy period in the program, plus specifically train for a three-month space flight during that period of time.

On Spacelab missions, we train at least a year and often a year and a half. Even on our simplest missions, the training period's no less than about six months. And then you've got to throw in on all of that the fact that it was all entirely in Russian and not in English. Nonetheless, I don't remember feeling very daunted by that, because after four Shuttle flights I felt comfortable enough with that, and I knew they had a fairly structured program in Russia. So my attitude was whatever we need to know or do, they'll take us through it, and, indeed, that was the case; they did do that.

But obviously the Soyuz is different than Shuttle. The nature of the flight's different. Shuttle flights are short, so you can intensively train for virtually every aspect of them, and that's not true for a three-month flight. You simply cannot do that. In fact, you're going to wind up having things happen during the course of the flight that you never anticipated at all. It's possible in the future, with even longer flights, that there will be activities, experiments, space walks that were never foreseen at the time that you trained and then launched. I think that different aspect's one we're going to have to get used to with International Space Station. It's decidedly different than the way you approach a Shuttle Program.

Again, the program was very structured. They took us through it, and even though we got a lot of training on things that would have been good if we were actually going to be a part of the routine maintenance and repair team on board, the fact is, I never felt that they were going to actually let us do that when we got to orbit, and that did largely prove to be the case. I remember having one conversation with Colonel Kargapolov toward the end because they wanted us to take this course and be tested on the thermal system in the Mir station, and our instructor had told us that that wasn't a course that they normally gave to "guest cosmonauts," he called it. Of course, we were not supposed to be guest cosmonauts. We were actually supposed to be formal members of the Russian crew, because that was the *quid pro quo* agreement. But I still suspected, just like the instructor said, that we would not ever actually use that information. In other words, why take the course? We're not going to do that anyway.

I broached that subject with Colonel Kargapolov, and he said, "Oh, no. That's not true. We will

use you when you get there. You will work on that system." Well, of course, I got there and I never worked on that system, even though Veloga and Gennady did a couple of times.

So we had the year and we had the candidacy period and specific mission training all rolled into one, and you're dealing not just with one vehicle, but with two, because the Mir station training course is, while not totally unrelated, has not all that much overlap with the Soyuz training program, and in some cases you have to duplicate courses. We had two communication courses: one for Soyuz, and we had to pass an exam at the end of that, and then one for Mir station and had to pass an exam at the end of that. So, two different vehicles that we were training for.

Wright: Can you tell us about the differences of launching in the Russian spacecraft compared to the American spacecraft?

Thagard: Oh, yes, and I can probably relate the events leading up to launch two. I guess it was two weeks before launch, they made the official announcement that Veloga, Gennady, and I had passed all the tests and we were the prime crew, and they had a press conference to do that. Then we flew down to Baikonur, and we went out to the Cosmodrome there, and we actually did much the same sort of thing that we do in the Shuttle Program with our TCDT, Terminal Countdown Dry Test. Again, I was always impressed more by the similarities than the differences in the programs. So they do exactly the same thing. A couple weeks before flight, they take the crew down to the launch site, put them in the vehicle, and you go through all the steps as though you were going to launch, and it's just a chance to exercise all the procedures, a rehearsal, if you will, for launch.

Then we flew back to Star City. That was the time that we had the hassle with the captain who was the Russian Customs representative at the airfield next to Star City. That's where the Russians send their crews from when they're going down to the launch site. Then they gave us, I think it was a couple days about 100 miles west of Moscow out in the woods there, they have a sort of, I don't know, rest hotel or something. Anyhow, we spent two days there, all the crews, the prime crew and the back-up with their families, meaning kids, wives, everybody, and it was just really nice, get-togethers in the evenings, we ate together, and big fires there in the fireplace, and we'd go out and play ping-pong or go in the sauna or do a lot of cross-country skiing. I remember as I was going down one hill there and got up to pretty good speed and wondered how I was going to stop myself without injuring, that this was a dumb thing to be doing about a week before flight, but anyhow I survived it.

In fact, my biggest fear over there the whole while was that I'd slip on the ice or something like that and break something. I mean, I've broken seven bones in my life, and I figured that was what was going to

happen and then Bonnie would fly. I remember one thing where we were at, Bonnie says, "Well, of course, we want Norm to fly," and I'm sitting over there thinking, "Yeah, right, Bonnie." [Laughter] But anyhow, it all worked out, and I didn't wind up getting injured.

Then, just like we do, they go into quarantine one week before flight, and their equivalent to the crew quarters here, the quarantine facilities at JSC [Johnson Space Center], is the bottom of the Prophylactorum, which is that little hotel that they have there. So, again, same time frame, one week before flight we went over there, and our wives could come in, we could get together for evenings, but you're still there in the place by yourself, basically. You each have individual rooms. And then three days before launch, you fly back down to Baikonur, which is the same thing that we do here.

That three-day period down at Baikonur I kind of thought was nice, too, a whole bunch of people down there, and they've got a lot of tradition, and it's just nice. I just thought that was kind of nice to see the other side. I remember--and I don't even know if this ought to be in here--but Veloga and Gennady and I had shared the cost of buying the party supplies if you like to throw a party for the support people down there, and part of that is a couple of cases of cognac. Well, all of the cognac that wasn't drunk at the party, which was more than a case, as I remember, we went in Veloga's room and our young Russian captain who'd been our Soyuz instructor--the way it works is the Soyuz instructor during training becomes your basically Cap Com for launch and threw the first couple orbit or two before they turn it over to Moscow mission control. You know, in our system, as soon as the Shuttle clears the tower, launch control turns it over to mission control, but they wait a little longer. They actually wait until you've been around the world a time or two.

But anyhow, so our young captain Soyuz instructor and Veloga and Gennady, and I were in Veloga's room a couple days before launch, and we were decanting this cognac into the--I'm sure you've seen them. They're these plastic--they're often used for chemicals, but these plastic bottles, about liter bottles, I guess. So we decanted all those into those things, wrapped them real tight with tape, after screwing the cap on as tightly as we could, and then wrote what in English would look like COK, but is SOK in Russian, "sok" is the word for juice. So we labeled them all "juice," and they carried them out and put them in the Soyuz. So we launched with quite a lot of cognac on the Soyuz.

Wright: I guess the question might be, how much of that was brought back at any point in time?

Thagard: Well, they don't bring anything back, and we'll talk about that, I guess, later on.

But anyhow, the events leading up to launch are pretty similar to what we do in our program. When we went out to suit up, you're in one room, and then there'd be a room like through there, and where

that blackboard would be a window looking into the other room, and there's curtains that they can open or close, and they alternately--and I don't know what the schedule is, but at times they'd have the curtain closed, at times they'd have them open, but people in the other room are Russian Government officials, NASA people, media people, and that sort of thing, because you're in a medical quarantine.

We suited up. You have to go through pressures tests with the suit, and just before I started suiting up, they let me go over there, they opened up the curtains, and my family was there, my wife and all three of my sons. We had actually--as I said, my youngest son--and I didn't mention this, but he was there and my wife was there, but my wife actually was working half-time as an English teacher in the high school at Star City, and this was not an English school, this was the regular Russian high school for Star City, and our youngest son went through ninth grade at the Russian high school. So I thought that was kind of nice, that my family actually was out in the regular community. We didn't send him to any special schools or anything while he was there. He attended ninth grade, actually, in the Russian high school.

Anyhow, they were there, and we could talk. Of course, the way they do it, you've got a microphone and a speaker and they have a microphone and a speaker because you're through a plate-glass window due to the quarantine, and it was not exactly a private conversation, because there was this camera there, there were all these cameras and media people sort of lurking around, recording and looking while this was going on.

After I talked with them for a few minutes, they closed the curtain, I went back and got suited up, and after all three of us got suited and gone through our pressure test, then Veloga, Gennady, and I went over to that window and sat there together. They opened it up again, and this time there were NASA officials, Russian space agency officials, and then Russian Government officials, and we had some words with them. And they close it up, and finally it was time to go out.

A part of that that I remember that was kind of odd is, it is a quarantine, and consequently they had these alcohol wipes that people were supposed to use if they were going to come in contact with the crew. Oddly enough, they made us, the crew, wipe our hands off with the alcohol wipes as well, and I never did understand what the purpose of that was. Was it to protect ourselves against each other? So that was kind of an odd thing.

Anyhow, we got suited up, and we start walking outside, and, of course, it's bitterly cold that day, it was below freezing, and there was a quite strong wind blowing, and it was the only time in my life when I was actually glad I had a pressure suit on, because those things are usually hot and uncomfortable, especially if you start moving around in them, and yet it was just perfect for that day at Baikonur. So Veloga, Gennady, and I walk out, and they've got three tape marks, little half-boxes there, and the idea was

we would walk up and put our toes in those boxes, the three of us. This was right in front of the Russian general that commands the base, and we stood at attention. Veloga saluted the general, told him that we were ready to go fly, and the general gave us permission to go fly, and this is another little ceremony they had. But lurking around the general is this huge crowd of people, and so we're literally rubbing shoulders and walking through this crowd, in spite of the fact that we've just gone through all these elaborate quarantine things with alcohol wipes and we'd been in quarantine for a week.

We go out to the pad, and there is--and it really is true. Apparently when [Yuri] Gagarin was going out to the pad on April 12, 1961, for the first flight, at one point out on the road to the pad between the suit-up building and the pad, he decided that he had to go to the bathroom one last time, so they stopped the bus and they let him off, and he just basically went to the bathroom right there next to the bus, and it's tradition that every cosmonaut crew since then has gone through.

The Russians had actually taken us down to Baikonur in October-November of '94, for the Mir-17 launch, or the Mir-17 crew's launch, which was Sasha Viktorenko [phonetic], Elena Kondakova, a woman cosmonaut, and Olf Mirbold, my friend who'd been my crew mate on my '92 Shuttle flight. The Russians had insisted that I ride out on the van, the Astro van with the crew. They said, "Well, you're next. You need to see what goes on. Get up there." So I rode out with Olf and Sasha and Elena, and true to form--this is the night launch--true to form, the bus halts and I'm thinking, "This is curious," because I'd heard about this. It wasn't a surprise to me, although I wanted to see if they really did it. They stop the bus, and I'm thinking, "Well, this is cute," because Elena Kondakova is not really too well equipped to participate in this little ceremony. They insisted I get off the bus, too, so that I could see what was going on. I mean, I couldn't take their word for it.

So I got off the bus, and what happened was, just like we do, they have cosmonaut support people, so there were some other cosmonauts who were down there with the crew, including the back-up crew, but some other cosmonauts who were just down there to help with things. So as soon as they get off the bus, two of the support cosmonauts came up and sort of semi-surrounded Elena with--she's got her back to her two male crew members--and engage her in conversation, and of course she knows what's going on. So she stands there and she talks to the two cosmonauts while their crewmates in the background participate in this usual ritual going out to the launch pad.

And sure enough, the day that we did, we stopped, and we all three got off, and I'm thinking, "It's broad daylight out here." We'd just gone through one huge crowd, and I can see that there's another crowd up to the launch pad. I'm thinking, "I really don't want to participate in this." So after that's over, you just get back on the bus and go out to the launch pad. Of course, I'd known this because I'd been there for the

other launch six months before this, that there's a huge crowd at the launch site, which, of course, in NASA, even before they start to fuel the Shuttle, they move everybody except the light room crew back at least three miles from the launch site. Not the Russians.

In spite of the fact that in 1969 a rocket--not a Soyuz, but, nonetheless, a rocket blew up on the launch pad, and it killed 163 people. Despite that, but they don't have lawyers in Russia, and they're very fatalistic, they figure if it's your time to go, you're just going to go. So everybody assumes their own risk. There was a huge crowd out there, and you could see the vapor coming off the liquid oxygen tanks telling you that the rocket's fully fueled and ready to go. Again, I was impressed that we'd been in a quarantine for a week with these strange requirements and here, once again, we're wading through this huge crowd of people. I mean, you're literally brushing by them as you go through, and then you have to wade through the crowd, go over to the pad, walk up the stairways.

As I started walking up the stairways, somebody yelled out my name, with an obvious American accent, and I assume it was some American reporter or something. Anyhow, I turned around in response to that yell and almost lost my grip, almost fell off the ladder as a result. [Laughter] So one more time I was thinking, "Cool. I got all the way to the launch pad, and this is where I'm going to fall off the thing, and that'll be the end of that." But I didn't. I managed to get my grip back, and we walked out. What you do is you go up this short flight of stairs to the platform base, you walk over to an elevator, which then takes you up to the boarding level, which is up near the top of the rocket.

I was actually the first person in, the way they did it, into what's called the living module. The Soyuz crew compartment is actually two modules, the descent module, which is the little cramped thing that looks like an old Gemini capsule, and that's the only part of it that is with the crew when they land at the end of the mission, but there's this living module above that. They're connected by a hatch that you have closed during ascent and entry. It is the living module, for good reason. That's where the food is. That's where the toilet is. That's where the cognac was stored, the supplies and everything, and you enter it through a side hatch. So I was the first one into the living module, but Gennady was actually the first one from the living module to go down to the descent module, because he had to turn on electrical power and things like that.

So Gennady went in, and then I went in, and then Veloga went in, and then, of course, you shut the hatch, because in the case of an abort--and Gennady, my flight engineer, had been on one in 1983 that blew up on the launch pad, and he had survived because they do have an escape system that works right off the launch pad, pre-launch, and all through ascent, a lot safer in that regard than the Shuttle is, which doesn't really have an effective escape system after lift-off.

Anyhow, so then Veloga got in, we shut the hatch, and it's about the same period of time before launch, about two hours before launch, that you get into the thing. You have a window. I had a window to my right, Gennady had a window to his left, but they're under that aerodynamic shroud. So basically you have a window, but it's looking out at the inside of a shroud. You don't really have a view out. The sequence of events are pretty much similar. My only duties during the pre-launch were to power on the radios, make the frequency shifts--I'm sorry, to make the television shifts from time to time. There are two television cameras, one on my side looks over at Gennady and Veloga. It shows them both. And then one on Gennady's side looks over and just shows my position. According to a time schedule, at various times I would have to switch the television to be on them or on me.

Then we just lifted off. It's very similar to what the Shuttle feels like, not as much noise, not as much vibration, but similar. I mean, it's not a different sort of ride at all. In first stage, I think that's the stage where you actually get up to three Gs, which is the max Gs you ever get during the mission, during ascent, which is about the max the Shuttle--well, it is the max the Shuttle gets. But the Shuttle gets it toward the very last minute of powered flight, and then the Soyuz, it's toward the end of first stage, and it's a three-stage, rather than a two-stage.

Once the aerodynamic shroud goes away, which is once you get above the atmosphere, then I could see out my window, but it's a small window, and on ascent I wasn't able to see much out there, I think, a cloud or two or something like that. The main thing I remember is that while the ride was more or less similar, although again you just didn't have the same sense of power with the Shuttle, it was never quite as noisy and never quite as much vibration as the Shuttle in first stage, but never as smooth as the Shuttle in second stage, because once the Shuttle's solid rocket boosters separate, it's like you're being propelled by a giant electric motor; it's very smooth and fairly quiet.

The Soyuz was never that quiet, but it was never, again, as noisy and with not nearly as much vibration as the Shuttle does while it's on the solid rocket boosters, because on the solid rocket boosters, that almost popcorn-like sound you hear from them, you not only hear that, but you feel that sort of popcorn vibration in the Shuttle when it's on the solid rocket boosters.

The main difference at the end was that when the Shuttle main engines cut off, they just cut off, it's not a huge emphatic thing, but when the main engines cut off on the Soyuz, it was very emphatic, almost like a clank or a clang or something like that. I don't know why that is. One possible explanation I've been told is that the Shuttle, of course, throttles back, so it's basically at idle, it's at 65 percent when the main engines cut off, whereas the Soyuz third-stage engine is at full bore when it cuts off. But whatever the reason, that was very emphatic.

Of course, at that point you're in orbit, and I could look outside. I remember one of the first things I saw was the solar battery on that side, which, of course, is different on the Shuttle, too, because the Shuttle doesn't have solar batteries, but you could see that solar array on the Soyuz out of the window of the Soyuz.

Again, one of the nicest features was the fellow we were talking to on the ground, at least for the first hour of flight, was the same person who had been our trainer for the Soyuz throughout the whole period of time that we were in the training program, for twelve and a half months. I liked him. He was a nice young man. He was a young captain in the Russian Air Force, a really good guy. When we got down to Baikonur for the launch, he was helping me. He went with me to my room, he was helping me carry some of my stuff in there, and I opened up the door to the room, and the door opened that way, and I looked over to my right for the light switch, and there was no light switch. So you look behind the door, and the light switch was behind the door, so I had to come in the room, move the door back so I could turn on the light, and when I looked back, this young captain was smiling at me, and he said, "In American the light switch would have been--" and the way he put it, "--where it should have been, right?" [Laughter] But, I mean, he knew exactly what was going on. He was well aware. In fact, some of his other conversations indicated that he would have been just happy if he could have found some excuse to come to the United States. It was clear that he recognized that, in Russia, there's not necessarily any pride in workmanship and things aren't necessarily done in a good ergonomic fashion, but he realized that in America--but that was just priceless, I thought. "In American it would have been where it should have been." [Laughter] So, anyhow, we got to talk to him for the first orbit or two, which was kind of nice, and then they transferred control to Moscow mission control.

Wright: How long were you up from the launch before you could see your approach to the Mir or you got to see the station?

Thagard: It's a two-day affair, and there are several different stages. You have to do a couple of burns. Once you get basically the equivalent of a "go" for orbit, just like on the Shuttle you can take those suits off, we could open up the hatch between the living module and the descent module, and then we had the whole range of the station available to us.

There is a toilet in the living module of the Soyuz, but it basically is a funnel-like affair that's attached with a flexible tube to the structure.

In consequence of that, you'd have absolutely no privacy, so folks usually tried to get themselves in a position so they don't have to defecate while they're on the Soyuz, and we were told that, I was told that.

What happens is, most people just take enemas before they launch. I don't know what Veloga and Gennady did, but that's what I did, because I felt I don't want to have to use that thing either. If nobody else wants to use it, I sure don't want to use it. Other than that, it's not a bad place to be for a couple of days.

One thing I found out is that as a sufferer of space motion sickness, and at least in my case it is a motion sickness, absolutely no question about it, the Russians claimed for years and years that they just-- and I guess they were trying to claim that their cosmonauts are just tough, that they don't have space motion sickness, or at least not anything that's worth commenting about in their program, and yet I suffered from it on all four of my space Shuttle flights. What I found out on the Soyuz is there is a reason why they do better. You cannot move around. There's not that big volume on the Soyuz. It's a much smaller volume. So you just don't move around, and you certainly don't have as many head movements. You get on that mid-deck after the Shuttle gets in orbit and you start moving your head, going over and unlocking lockers and getting equipment out, because, you know, you basically hit the deck running when you're on a Shuttle flight. You've got so much to do and so little time in which to do it, that immediately upon clearance, a "go" for orbit, you're up, just darting here, and throw big head movements, lots of movements, and there is absolutely no question that that's what causes and exacerbates space motion sickness. Because I couldn't move around, I really never got beyond stomach awareness, and it was twenty hours into flight before I took anything, and I only did it that one time.

What I'd found out on my '92 flight, I'd asked them to put an IV in before I launched, what they call a heparin lock, which is, you've got the IV in there, and then you've got just a little reservoir where there's heparin to keep the thing from clotting off so that you maintain the vein open, and it's got a little rubber thing over the end so you can inject stuff into the vein. You can take IV medication. So what I wanted to do, because I had not had much luck with scope decks, it would always protect me for a day or two, but then when I'd stop taking it or even if I kept taking it after a day or two, it would no longer protect, it would keep me from getting sick the first day, but it would just mean I'd be sick on the second or third day. I'd tried other things like Thinargen [phonetic] suppository, and that didn't seem to work, so I thought I'd try heparin IV.

On that flight in '92, about six hours into the mission, like I always did, I started getting symptoms of space motion sickness, and I just took a real small dose, twelve and a half milligrams of Thinargen IV, and the symptoms within five minutes were just gone, totally. I mean, it was a cure. It was a magic bullet for me, and a few hours later, when the symptoms started coming back again, I took another twelve and a half milligrams and the symptoms went away. Went to sleep that night, woke up the next morning, no symptoms and never had any more because once you get over it, it doesn't come back.

For that reason I had launched with an IV in place on the Soyuz as well, and I remember telling Veloga Dezhurov, our commander, that I wanted to do that, and he really didn't want me to do that. He said, "If you need any sort of IV medication, we'll give it to you when you get there, but I don't want you to have the IV." But he didn't order me not to, so I went ahead and had the thing in. About twenty hours into the flight, we were about to go to sleep, and I had stomach awareness, but if it had been any other flight, if it had been a flight on the Shuttle and I hadn't taken anything at twenty hours into the flight, I would have been nauseated and probably already thrown up once or twice, but I just had stomach awareness.

But anyhow, we were about to go to sleep, the day was over, we were going into our sleep period, and I wanted to sleep well, and I asked Gennady if he would give me a small dose. He wound up not giving me twelve and a half, which is what I wanted. He gave me more like twenty or almost double what I asked for, which is still not a huge dose, as a matter of fact. The normal dose is fifty or a hundred milligrams of Thinargen, so these are small doses, but it put me to sleep, and when I woke up at the end of the sleep period, I didn't have any symptoms and never had any symptoms after that.

So it was unquestionably the easiest flight in terms of space motion sickness, and the only explanation is that it's just that smaller volume and the fact that you are not moving around and you're especially not making a lot of head movements. So there is a reason why the Russians had a better track record than we did, and that's an excellent idea, to go up there on a small vehicle like that, because what that means is, by the time they get to the Mir, which is a big volume, they'll already be over the space motion sickness susceptibility period anyway and it won't make any difference. So I thought it worked out well.

Anyhow, we would, from time to time, have to go back down and get into the descent module to do the burns, because you have to do the rendezvous burns in there. I actually did not see the Mir station out the window. My responsibility during the rendezvous and docking was control of the radios and the television cameras and to help generally monitor, help Veloga monitor things, watching on the CRT as we went through the systems checks and things like that. I could see if I leaned over Veloga's periscope view, but to do that would be interfering with Veloga, so I took a brief look at it through the periscope. The television view was about, I thought, as good as the periscope view. So the only way I saw the Mir station when we were going up there was through the television.

Anyhow, everything was perfectly nominal. While the commander can take over and do it manually, the fact is the automatic system worked all right, and we went in and we had a docking. It was not violent. In fact, the way I describe it is if you've ever backed a car into a loading dock and they have those rubber cushions and you hit it without--it'd be about like that, kind of a little bump but nothing

awesome, nothing scary. It's a definite contact, no question about it, as though you'd just bumped into something, but not a violent sort of collision.

Then, of course, you have to spend time doing pressure checks and things like that, and then they just cracked open the hatch, and Veloga handed--not getting out of the hatch, but just handed through the slightly cracked hatch into the Mir station the American and Russian flags, and then we closed the hatch again. When it was time, all the checks were done, we could open up the hatch and go on board, they insisted that I be the first one on board, and when I went on board, Elena Kondakova was there with a little tray, and she had Velcroed or somehow attached a little bit of salt and some bread, which is supposed to be a traditional Russian greeting for a visitor. Of course, everybody hugged and good times were had by all. It was a nice time. It was a fun time.

Wright: Did you feel honored, since you went before the commander?

Thagard: Oh, yes. I thought that was a nice gesture on their part, but that was what they insisted that we do. Now, maybe I'll learn later on that they always send the least liked or least important person first, but I sort of felt at the time it was just a gesture of friendship.

Wright: Tell us about those next few days when you were first among the crew.

Thagard: Right. The six-day period that we had of overlap is pretty typical, the idea being the old crew can hand over to the new crew, because it turns out that when something's been up there for years and years, the ground never really knows the full state of everything. They just don't. The only way the new crew can get all of the up-to-date information is by talking with the old crew, this hand-over period, and that's exactly what went on.

I remember both Elena and Paryakov [phonetic], Dr. Paryakov, of course, had already been there over fourteen and a half months. He was then becoming, and is, the record-holder for human with the longest space flight. The first thing is that I was impressed by Paryakov, Valeri Paryakov, because he didn't look like a person either from a physical or a psychological standpoint who had been on a space station for over fourteen and a half months. His legs were just as big as tree trunks, and he was in a great mood. Of course, I'm sure knowing that he was going home in a few days would probably put one in a great mood after fourteen and a half months, but nonetheless, I just got the feeling that he had done just perfectly fine. One of the things that I was keen on the whole while I was up there were the physical and psychological aspects of being in space flight for months at a time, so I wanted to see what this man looked like when I got there, and I was impressed. It just told me that, indeed, at least some humans can do that

without much of a problem, and he was clearly one of those who did. That was nice. It was good to see that, because I figured, gee, if he did that well after fourteen and a half months, I probably don't have much to worry about for just three months.

So there was the hand-over period, and Elena and Valeri took me around, they showed me where all my experiment equipment was, and just gave me a general familiarization with the Space Station, which was very handy. It turns out that while they do have some logistical tracking and there's even a logistical program on one of the laptops up on the Mir station, the program is incomplete and the ground's knowledge of where things are is incomplete. So there were things I probably never would have found if they hadn't physically led me by the hand and said, "Okay, this is here and that's there." I know it was for Veloga and Gennady, too, but that six-day hand-over was invaluable for me. I would have had to struggle, especially early on, if I hadn't had that hand-over from them.

There were some interesting things in there. Veloga, our commander, who's a thirty-two-year-old lieutenant commander in the Russian Air Force, had been just the nicest guy throughout the training period. We used to do home and homes where he'd invite my family over to his apartment and we'd invite them over to ours. In fact, we had a lot of get-togethers, all of us did during the course of flight, especially Veloga and I. Of course, Veloga was a rookie; he'd never flown before. Gennady and I both had four flights. Gennady actually had four and a half flights before that, because he was on the one that blew up, so he got a rocket launch, but he only went up three miles instead of getting into space.

But when we got on board, Veloga changed, in that he became somewhat authoritarian, and I don't think that sort of approach is ever going to appeal greatly to Americans, and I kind of wondered how Gennady was going to take it, too, because Gennady had all the experience and Veloga didn't, and yet, fortunately for me, I didn't sense that Veloga was that way any more toward me than he was toward Gennady. You know, if I'd felt like it was just me that was being singled out, I probably would have had a lot of trouble with it. I didn't much like it, but, again, I could see that Gennady was the same way.

While we were still in that six-day hand-over period we were, all of us, all six of us, the old crew and our crew, were around the dinner table there, and all of a sudden Veloga just curtly ordered Gennady to do something, and Elena Kondakova just looks over at Veloga and says, "My, you're bossy, aren't you?" She says, "Why don't you do it yourself?"

And I'm sitting there thinking, well, great, because that's sort of my attitude, too, but I wasn't going to say anything, but she just flat out said it. I started thinking, "Well, we've got to be up here three months. I don't much like this. What to do?" And I said, "Well, fortunately I've got Gennady up here. He's treating Gennady this way. Let's see what Gennady does." What Gennady would do, he'd put up with it

for a few days, and then all of a sudden he'd just level a blast at Veloga, and Veloga would back off a little.

So I couldn't actually make myself do that, but one day shortly thereafter, Veloga said something that sort of finally pushed me over the edge, and I just leveled a blast at Veloga, and over the course of time, things just got better and better and better, and by the end of the mission, anytime Veloga would address me, it was always, "my friend." It was great, but it didn't start out that way. I think that what I was seeing was probably a couple of things. I think the Russians culturally tend to expect and their commanders tend to behave in a somewhat authoritarian manner, and I think Veloga felt a little ill at ease in the fact that he was the commander but he was the rookie, whereas he had two folks who'd already flown four times in space. So he probably felt a need to exert his authority early on. But fortunately, that didn't last, and things got better, and, in fact, things were great towards the end of it.

That was a nice thing, our relationship to the crew. I thought we'd start out getting along well before we flew, but we actually ramped up as the flight went along, which is better than doing the other. There was another thing in there, too, that was related to some of this. Maybe I'll think about it later on.

Anyhow, after six days, the other crew got on their Soyuz, undocked, and--

Wright: Was there any special tradition to send them off as it was to greet you when you arrived?

Thagard: No, I don't remember that. Oh, I know what I wanted to say. Having said that about Russian commanders, I didn't find Sasha Viktorenko to be that way at all, and Olf Mirbold--because Olf had launched with him six months before. That was the time they overlapped the two crews by a month, but then the sole reason for doing that was to allow Olf, the European, to be on the station for one month, because normally it would be the six days that we saw, and that stretched Mir to the limit.

They had a total power failure during that month, because when the life support system has got to take care of six folks, it's a bigger drain, and the Mir always was--well, at least recently, with the degradation of solar batteries over time, which happens, I mean, that's what happens with solar batteries--it just simply couldn't easily support six people for that long a period of time. It just put too big a strain on the electrical power system, and apparently they were asleep and either didn't get an alarm or got one and ignored it, and the next thing you know, the whole system, electrical system, just tripped off line. Olf said it was a mess then, that they spent the next week or two just moving good storage batteries and bad storage batteries around on the Mir station until they gradually got everything back on line again.

Anyhow, Olf had told me when he came back from that mission that--and it was nice that I knew Olf and that he had flown just before I did and then came back to Star City for a while, because he gave me a nice debriefing that gave me a lot of insight into what things were like on board the Mir station. So

anything I found wasn't a surprise when I got there. But one of the things Olf told me was that Sasha Viktorenko was just a super good guy. He said he was both a pleasant fellow, but also extremely competent, just knew everything about the Mir station and the Soyuz, and that was exactly my impression. So I can't really say all Russian commanders are like that, but I've talked to some of the other folks that flew on Mir after I did, and some of them saw what I saw in Veloga, only even more so in some cases.

So again, it's bad to generalize, because it's clear that not all Russian commanders are like that, and Sasha Viktorenko was one of those who was probably more like you would expect to find in an American commander. Although we've got some American commanders who are fairly authoritarian, too. But again, I think if you looked at the scale of things, you'd find the Russians toward this end, the Americans would be a little bit further down towards the less authoritarian end of it.

Wright: Did you have any hesitation as the Mir-17 crew started to depart?

Thagard: No.

Wright: You were ready to start this journey?

Thagard: Actually, I was ready for the Mir-17 crew to leave. I liked them, I thought they were great folks, but, again, it stretches the resources on the Mir station. You've only got one toilet, for instance, so all of a sudden it's like being in the coach cabin on the airplane. I mean, there are considerations like that. So while I liked them personally, I thought the Mir station was probably a better place to live if there were only three people on board rather than six people.

It was kind of funny when they undocked and they were doing the fly-around of the station, because we were still listening to them on the radio, and Valeri Polyakov--if you know Bill Thornton. I don't know if you know Bill Thornton or not, but Polyakov reminded me a lot of Bill Thornton. He's this big guy, an extroverted guy, but can be sort of like a bull in a china shop, that kind of thing. He was apparently being real rambunctious, just listening to him on the radio as they were undocking and flying around before entering, and Sasha Viktorenko would go, "Shhhh," you know, just trying to calm him down, get him to be a little bit less rambunctious. It was just fascinating to listen to that kind of stuff.

I will make this comment. What I heard, although I obviously wasn't there, is that Polyakov did just beautifully when he came back, had no particular physical problems at all in spite of that--and I would have guessed that. He had this penguin suit, which is that suit with the elastic bands and the shoes attached that the Russians use, and you can apply tension from the shoulders down to the feet. You work against the straps, which means you get some exercise, but one of the main things is, they think that compression

may help slow the bone loss that you get from space by simulating the compressive effects of gravity. Well, he had one of those suits where he could actually measure the tension on that thing, and apparently he put tension on that thing that was far more than any cosmonaut or most human beings would ever bear, and he would wear it all day long.

Sasha Viktorenko, by contrast, and Gennady Strekalov, our flight engineer, they didn't wear the penguin suit because they just didn't think it was comfortable. They just wore these wool sort of jumpsuits that is the alternate to wearing the penguin suit on board. In fact, Gennady never wore the penguin suit until just the last few days before we entered, which probably is too late to get much benefit at that point.

But Viktorenko, again, just to emphasize, this man had a definite approach and toughness and character that I think allowed him to do what he did, but he apparently fared very well when he came back. Then I saw him in October of '96, and he told me that he had heard about my bone loss, and he told me that he lost about the same amount of bone in over fourteen and a half months that I lost in just not quite four months.

Wright: What was your choice of attire while you were there?

Thagard: I wore the penguin suit. The recommendation was that you wear the penguin suit eight hours a day, and I did that. I think there were maybe no days, but certainly not very many days that I didn't wear that thing at least eight hours a day. I will say this, if you started doing much work at all, it would quickly become hot. There were times when I would actually unzip it to the waist and take the top off like we used to do with flight suits in Vietnam. You'd take them and peel them down to the waist and just tie the arms in front of you so you'd just be wearing just the bottom part of it, and if I had very much strenuous work to do of any kind, I would generally tend to do that with that suit.

It was not particularly comfortable, but one of my goals all along was to walk off the vehicle when I came back, and the Russians schedule you for two one-hour exercise sessions every day, and typically, except near the end of the flight when they were both on the treadmill, one will be on the treadmill and the other will be on the exercise bicycle. I would guess over 90 percent of the time I availed myself of at least one of those hour sessions, and probably about 40 percent of the time I did both the one-hour exercise sessions a day. But I was determined, and I think Polyakov was of the same mind. I think he made a decision up front that he was going to do whatever he needed to do to be in good shape when he came back, and it worked. I mean, it does make a difference; at least I think it does.

Wright: Did you find your days becoming routine as you were aboard the Mir, or did you have totally

different tasks to do every day?

Thagard: There were twenty-eight experiments in the complement of experiments for the Shuttle-Mir Program. That's what I was tasked to do while I was there, and at least for the first few weeks I was fairly busy because we were doing a succession of experiments, and because they were different experiments, it didn't become all that routine, at least not for some number of weeks.

However, we started having problems with the freezer. That was the one that we froze the biological samples, the bloods, the urines, that sort of thing that we had taken in the course of conducting the metabolic experiments and other experiments, so I started spending a lot of time trying to get that freezer to work. Finally it failed entirely, and then at about six weeks, they finally realized that I had lost a lot of weight, so the freezer failure and losing the weight, they wound up postponing or canceling some of the experiments in the May time frame, and I wound up not having enough to do, and that's not good, because what happens if you don't have enough to do, even though it's space flight and all of that, you still get bored. I mean, there's little by way of entertainment there, and you need to really be busy.

The way I debriefed it when I came back is, the most important thing from a psychological standpoint is to be reasonably busy with meaningful work. My Russian crewmates, from just before the first space walk on the 12th of May almost to the end of the mission, were chronically overworked. I was chronically underworked. Underwork, boredom. Overwork leads to tension between the crew and Mission control center, is what I saw. So you don't want to be at either extreme; you want to be somewhere in the middle.

I do want to comment about the food situation on board. I mentioned that we had to train and pass examinations on all of the systems in order to be cleared to fly. That included the food system. I actually had to pass an oral examination on the Mir food system, and the course that I took and the exam that I passed and the way the food system on the Mir usually works is that you have a six-day menu that then repeats endlessly throughout the flight, and that six-day menu is good for 2,600 calories a day, roughly. However, also on board the Mir station is something that the Russians called a supplementary food system. We have a similar thing on Shuttle. We call it the pantry food supply. But the supplementary food system is a large variety of interesting foods, and the cosmonauts can freely choose from that supplementary food supply as they like, and it's expected to supply an additional 400 to 600 calories a day.

We got on board and had one of those teletype messages--the way you get your messages up, your schedules, and that sort of thing--came up, and it basically said that we were supposed to start recording everything we ate and drank from that moment in time throughout the whole course of the mission. That was not something that any of us had known about. We knew we had a requirement to record all we ate

and drank during the conduct of certain experiments, but only during those experiments, not from Day One throughout the whole mission. The Mir-18 food supply was 50 percent Russian food items and 50 percent American food items, roughly, the way it was constituted, and it was distinguished from other food supplies on board Mir station in that it had bar code labels affixed to it, and we had a bar-code reader. The idea was you would bar-code everything you ate and drank, and that's the way you would maintain track of all you ate and drank.

There were no food logs, and paper was in such short supply that later on, when we moved the solar battery and had to reroute the electrical cables to change the distribution on board Mir, Gennady took marker pens and wrote out the new schematics on an aluminum can lid. There were no bar code labels on the supplementary food supply. Basically, that requirement put the supplementary food supply off limits to us if we were going to adhere to this requirement to record everything we ate and drank.

Worse, we--Veloga, Gennady, and I--had exactly the same six-day food supply, that ever-repeating thing. We had not picked any of that. You know, on Shuttle, individual crew members pick their six-day diet. It's a personal choice. You have input into it. Veloga, Gennady, and I had no input into that. I'd been asked a number of times before I flew what I thought of Russian food, and I said, "Well, in general, Russian food's fine. There's some things I don't eat," and I always use the example of the fish aspic and stuff like that. Well, out of the six-day food supply, four of the entrees were canned fish. So right away you've got four entrees that I'm never going to eat if we're up there a million years, let alone several months.

Veloga and Gennady, there were things in there they wouldn't eat, like the asparagus. So I gave them all my canned fish, but, see, I had two people I could give to. They were trying to give me all their asparagus and some other things. Well, I would have eaten two asparagus a day, every day we were up there, if I had taken all the asparagus that they wanted to give me.

The upshot is, the food supply was not adequate for any of us. I showed that message to Veloga and Gennady, and they looked at it and said, "Well, we're not doing this. If we do this, we'll lose weight," because they knew it was going to mean that they couldn't eat anything out of the supplementary food supply. So after a couple of weeks, I noticed they were eating a lot of stuff, so I asked Veloga, I said, "How much would you estimate, of the food you're eating, percentage-wise, is not in the bar-coded food stocks that's our food supply?"

Veloga said, "About 25 percent."

I asked that of Gennady, Gennady said, "About 50 percent."

But I religiously adhered to the requirement and was constantly hungry, and I'm just losing weight. We have a mass-measuring device up there which gives you your weight, and it was my job every three

days to weigh everyone and then report that weight to the ground, which I did every three days. It still wasn't until I had lost seventeen and a half pounds that all of a sudden the ground took notice, and then we have a big private medical conference, and they've got the doctors, the Russian doctors, on line, and they're saying, "With that much weight loss, you're not just losing fat. You've lost muscle mass," and this sort of thing, and at that point they told me that I was free to eat anything on board other than my crewmates, and that's the way they put it. They said, "Well, we still want you to do it." They said, "If you want to eat foods that don't have bar-code labels, write it down."

I said, "We don't have any good way to do that. There are no food logs, and there's no paper around here to start creating food logs."

"We want you to do it."

And then, and one of the things that's been the most aggravating thing out of that whole flight is, about five days before we landed, the Shuttle was already up there, and somebody handed me a message that was up-link news that they had gotten, and it was a reprint of an article that Marsha Dunn, an Associated Press writer, had written. Now, this is five days before we land. She's obviously never interviewed me, never said anything. She attributed to me in that article that I thought the food was blah, that it was a pain to record it for the scientists. Well, it was totally untrue. I never thought the food was blah. The problem was we were denied access to most of the food, and in any event, I was the only one of the three of us on board who religiously had adhered to the requirement to the point of losing seventeen and a half pounds. In fact, I refused to deviate from the requirement until the ground released me from doing it.

And I'll be honest with you, I think to this day that it was somebody--and I won't name any names-- I think it was somebody who was responsible for that fiasco with the food and somebody in the NASA program who felt that the best defense is a good offense, "We'll just blame the victim, and we'll take ourselves off the hook." Otherwise they're going to have to answer for a seventeen-and-a-half-pound weight loss in a crew member. But that was one of the most aggravating aspects of that whole flight, was to come back and have things misrepresented like that.

Anyhow, I wanted to talk about the food supply, because that sort of thing shouldn't really happen. There's no good reason for that to happen. First of all, on long-duration flights, we realized way back in Skylab that you needed to have plenty of food and it needed to be interesting, and somehow we lost that. We forgot totally about that, and I don't know why that is, because I read medical results from Skylab and talked with the people, and certainly I think corporate memory in the Astronaut Office is good about that stuff. Bill Thornton was around, and he bugged people because he made sure that they remembered that lesson. But that's not what we found when we got on there, and NASA can't duck responsibility because,

again, half the food items supplied were American food items, and that requirement to bar-code, record everything was an American requirement. The Russians didn't levy that on us. That came out of the principal investigators from some of the experiments on the American side of that thing.

Wright: Did you have very many Progress vehicles come while you were there?

Thagard: We got one Progress vehicle. I think they were doing them about every four months or so. On April 12th, right around midnight, just after midnight on April 12th, a Progress came up. In fact, I got to go in the Kvant II module and look at it and took a lot of video of it as it came up. By rule, you're supposed to come back and be in the core module, because you're supposed to be where you can get to your Soyuz in a hurry if you have to, in case the thing--as it did later on--comes crashing into the station. So Veloga told me that I could stay in the Kvant II module, which had a good port through which to take pictures of the thing and watch it, but he said, "Before it docks, I want you to come back into the core module."

I said, "Fine." So I'm up there videoing, and all of a sudden I realized, hey, it's about to dock. [Laughter] And I tried to get back to the core module, and I was going right in the spherical part of the core module, which is the thing to which it docks. I was literally right there within a couple feet of it when it docked. Of course, I could hear it a little bit, but I didn't feel anything. So I sort of blew that, but I got some good pictures of it.

Wright: Any good stuff on the Progress?

Thagard: Yes. The nice thing is, all the crew members get a five-kilogram care package that's put together by families, friends, that sort of thing. So Veloga did and I did and Gennady did. Even though it was after midnight, we stayed up and did the pressure equalizations. I videotaped Veloga and Gennady while they were doing their hatch ops, and they opened up the hatch. One of the things you notice is that the air smells different inside the vehicle, but it's not any special air supply or anything. I guess it's just the Baikonur air that was in there. I noticed the same thing when the Specter module came up and we opened it up.

But it was just chock full of supplies, including more of these same six-day food canisters, and the care packages, some additional clothing. For instance, they try to make sure that you get about one of those penguin suits a month. I didn't mention the clothing. They have these plastic packages of small, medium, large what they call "sports underwear," and basically it's all cotton and it is lined shorts so that actually it does have an inner lining in it so that you can use it as a gym short as well as underwear, and then it had a tee-shirt and then socks, and again, every three days you get a new one. The way it works is,

you also exercise in that gear. So what you will do is--my routine was to have three pair, the pair that I had on as underwear, but then since you can exercise twice a day, I'd have two additional pairs, and they would be the pairs that had been six days before and three days before. In other words, they'd been my underwear, but they were already discarded or would have been.

What that does is, when you get all hot and sweaty after exercise, you can just put these things up, and over the course of twenty-four hours they'll dry off so they'll be dry the next day when you want to use them for exercise again. Then you already have the second one which you're using like that, so if you're going to use both exercise sessions a day, you've got two dry pair of exercise gear, and then at the end of the three days the oldest one you just throw in the trash, and you just keep cycling through these things every three days. So it worked all right as a system.

In terms of clean-up, they give you one wet towel, and these are just cloth towels in plastic wrapping that have some sort of--it never felt like it was any sort of chemical at all, just wetted with water, although Veloga assured me that there's some kind of cleaning or disinfectant or antibacterial solution in it. I'd get one of the wetted towels a day and two dry towels a day. And that works fine. If you need more, you can always just wet one of the dry towels or put more water on the wet towel. But it worked fine for cleaning up after exercise.

Wright: You mentioned the Spektr a few minutes ago. How did the delay of its arrival affect your expectations of what you had planned to do?

Thagard: The Spektr module had a lot of American science equipment in it, and had it gotten up there sooner, I would have used some of that equipment to actually perform some experiments. However, I did do the check-out, I think, on virtually all of the American gear that came up in that module, including the exercise bicycle, the CD--it was a disc recorder, optical disc recorder, for recording data. There were a number of computers, laptops, that came up, and I checked them all, powered all those up and made sure that they were operating. There was a centrifuge in there, some metabolic gas experiment equipment. So it was my job to check that out, and I did get to do that.

Being late, though, again did mean that a period of time there in the middle of the mission, that May time frame, where I had too little to do, it was just prolonged. Had the Spektr module been up there, that wouldn't have been so bad; I would have had more to do. At the first part of that period, it was actually kind of nice, because even though I'd had four Shuttle flights, they'd all been short and so intensive that I never really had much time to look out the window. So I did finally get to look out the window. But what I found was, after a couple of weeks you look, say, "Oh, yeah. Been there. Seen that." It's always

going to be a neat thing to look out the window, because it is kind of like looking at a map, and with binoculars you can see some detail, although not tremendous detail. But again, Earth's only so big, it's not infinite, so after a while there was a certain sameness even to some of that.

Wright: Any areas that you remember as being more spectacular than others while you were looking out that window?

Thagard: I do remember, probably because I've always been fascinated by Tierra del Fuego, the southern end of South America. I usually tried to be looking out the appropriate window when we'd pass over that region of the world. I saw the Falkland Islands a lot, and I got to watch winter come to the southern Andes and Tierra del Fuego, because we launched in March, so, the Southern Hemisphere, I guess, was fall when we launched, and as the mission progressed, it was going toward winter, and you could see the lakes in the Andes start to ice over, and snow, and finally at the end, even though Tierra del Fuego has a lot of inlets and cuts through their waterways and all, you could even watch those start to ice up.

But down in southern Chile and Argentina, there would be these roads that would just run straight for, it looked like, 100 miles or more, never saw any sign of traffic there. You wouldn't see anything that you would recognize as a town. You can recognize cities and fair-sized towns, anyway, even from space, and I just thought how neat it would be to just get on that road and travel and see where it went.

So, yes. And we had some nice passes down through northern Europe. I remember one day when we came down over northern Europe, and I could see Italy and Yugoslavia, and the Dardanelles, and Turkey and the Black Sea, and finally over the Suez Canal, the Mideast. It was just some really neat passes over the Earth and with some actual time when I could not have to worry that something was going undone while I just looked out the window.

Wright: Did some of the duties that you had include taking photos or videos out the window?

Thagard: It wasn't a duty, but I did it a lot. At first, I think Veloga was a little reluctant to let me take a lot of pictures, but then when the Progress came up there, it had a whole bunch of American film, and I think Veloga looked at that film and put two and two together and figured, well, our people wouldn't have let them launch the film unless it was okay for them to take the pictures. So after that, it was no big deal, I just took any pictures I wanted to take. So I took a lot of still photos. Veloga had a brand-new Nikon camera on board, and Veloga just basically gave me that and said, "You can have this camera, and here's the instruction manual, and figure out how to use it," so I learned how to use that camera, and it was a nice camera.

Wright: How were your pictures?

Thagard: Most of them turned out all right.

Wright: Also on the Mir, we understand there was a medical procedures checklist that was developed that ranged from an extreme to minor occurrences for medical purposes. On facing pages you had the Russian and then you would have the English. That was basically developed for your flight so that you could take that with you in case you needed that.

Thagard: I don't remember any ones that had facing pages. Certainly for the science program, science procedures, we had English-language procedures and Russian-language procedures. I never used the English-language procedures; I always used the Russian procedures. I would never claim fluency in conversational Russian. I just wouldn't. I could get along okay with Veloga and Gennady. I could understand because they are well-educated Russians speaking a very nice form of Russian. I could understand just about everything they said, that was not a problem, and I could make myself understood. I couldn't go down to the flea market in Moscow and understand a lot of that. The news broadcasts that we would get up, because it's such rapid-fire Russian, there would be times when I would only understand maybe 25 percent of that. But technical Russian, I would claim fluency. I could read the Russian technical documents, including the medical checklist, all the procedures checklist on board, as though they were English. I had no problem at all. Again, I'd just claim fluency in technical Russian. I never had a problem with technical Russian.

Wright: As a medical doctor, do you feel that the medical equipment that was aboard the Mir was satisfactory for whatever you would need it for?

Thagard: I didn't really try to learn very much about the Russian medical system. They had theirs in little green sort of plastic-covered cardboard boxes with snaps on them. I just never learned that system. I would have if it had been the only one on board, but there had been a fairly nice American medical kit that had gone up and had been part of the equipment that went up with the experiment equipment for the flight, the twenty-eight experiments, and I used that. Even if I had to treat Veloga or Gennady for whatever, unless they could come up with the Russian medicines that they were supposed to use, I treated them out of the American kit.

Wright: Other than the motion sickness that you mentioned, were there many times you or any of the crew members felt ill when you were on board?

Thagard: Well, I can't talk about a lot of that because it's medical stuff and I'm a doctor, but minor scrapes and abrasions, the spacesuits tended to cause that, so I'd wrap Gennady's hands before he'd go out on space walks and things like that.

I suffered an eye injury. On May 18th, I was exercising. The Russians have these expanders. They're just these elastic things, I'm sure you've seen them, where you pull out like--because obviously weights aren't going to work in space for resistive exercise. So they had three lengths of expanders, and there's sort of a stirrup at either end so you can either hold it or you can put it around your feet, and the long one you can actually put the loops around each foot and loop it around your neck and do basically deep knee bends and things like that, and I was doing those, and one slipped off my foot and slammed up and hit me in the right eye. I was pretty sure for a while that I had done some serious damage to the eye. I had photophobia, meaning light hurt it. In fact, it had such photophobia, there was a little light-emitting diode on the TEF, the thermoelectric freezer, a little freezer that was sitting there in the base block that I put some of our medical samples in. The light from that light-emitting diode was enough to make that eye hurt, and when I had this eye open, it was like looking at the world through gauze. So I patched the eye. I didn't know if I had a corneal abrasion or what, but I went ahead and patched the eye.

Gennady came in, and he saw the eye patch, and he said, "What happened?" and I told him. He said, "Oh, yes. Those things are dangerous. That's why I don't use them." [Laughter]

I just said, "Thanks, Gennady, for the heads-up on that one."

Wright: Something you could agree on. [Laughter]

Thagard: Right. We finally had a medical consultation. The Russians actually brought an ophthalmologist in, and I don't remember, either Gennady or Veloga--I think it was Veloga--held the camera on the eye--not on the eye, but just looking at the eye to give this ophthalmologist who's in the Mission Control Center in Moscow a look at the eye. For a while they had prescribed one thing, some antibiotic drops. This ophthalmologist looked at it, he had the history, and he said, "I think what's happened is you actually had an injury to the eyelid." And he said, "What's happening now is you've got some inflammation in the interior lining of the eyelid, and that's what's causing the pain and the problems," and he recommended using steroid drops, which you wouldn't want to do if there were some sort of infection, for instance. I guess he was right, because I started using steroid drops and the symptoms went away and it was fine after a while. But I did have blurred vision and that looking through gauze for several days after that.

Wright: How did you find the communication from the Space Station to the ground?

Thagard: Not very satisfactory generally simply because, due to economic problems, the Russians don't like to pay for the satellite, and therefore they tend to restrict communications to those periods of time when you're actually passing over ground stations physically located in Russia. There were days, I remember, when we had as little as about forty-two minutes of communication time for the whole twenty-four-hour period. That's for everything. Obviously the stuff I was doing can't have priority over stuff that you need to do to keep the Mir station running. The upshot is, I think there were four times during the flight when I went seventy-two hours without talking to anybody in the Mission Control Center.

Now, I could talk to ham operators, because one of the things they did is, when we got up there, they said I could use the ham station. I said, "Well, I don't have a license," and Veloga said, "Anybody that flies on Mir station, the Russian Government authorizes them to use the station." I was a little hesitant. I figured that's fine, but what if the Federal Communications Commission of the United States harassed me when I came back. But anyhow, I could use the ham radio, and I did use the ham radio a lot. But for official com through the Mission Control Center, there were four times that I went seventy-two hours without talking to anybody in the Mission Control Center, no air-to-ground at all, and that's not satisfactory.

The impact is, not as some people try to say, psychological except in the sense that you are sent up there to do some tasks, and I don't know how everybody else feels, but I notice the thing that always got my anxiety level up the most in space flight is the feeling that I wasn't going to get something done. For instance, when that freezer started failing and I really needed some help with it, I couldn't get the help. There were other times when I had problems with experiments and it was going to cost us data or something, and I either couldn't tell them on the ground or I could tell them and then I'd have to wait a day or two before I ever got a response back. And that's awful, because when I fly, I take those things--it doesn't matter if I didn't even like the experiment or the principal investigator. Once I get there, I almost feel a proprietary relationship. It's my experiment. Now all of a sudden whether it gets done or not is my concern. I don't care what they think. I've got to get that experiment done. So that was a bad situation to put someone like me in, anyway.

But, again, not from the psychological standpoint, except in that regard, because the fact is, with a ham radio operator, if I wanted to talk to somebody I could, but it is clear that in a formal program there ought to be formal and reliable communication means. So one of my debriefing items was that that com situation was not satisfactory.

Wright: How about the support for you on the ground? Were they able to provide you what you needed when you were able to get hold of them?

Thagard: The Cap Coms were, again, Dave Ward and Mike Barratt. They had served as our flight surgeons while they were there and rotated while they did the same thing as in the Moscow Mission Control Centers. They would rotate out. They'd spend several weeks there and then the other one would come over, and that's what they did throughout the flight. Dave and Mike, I always had the sense that they were doing everything they could do and that they were just as frustrated as I was with trying to get responses.

As an example, one day I called down, and I don't remember the specifics of what it was, but I had some problem and I said I needed help. The word came back that they couldn't help me with that right now because they were in the middle of a simulation, and I had never heard--I was just astounded by that attitude. I had never heard of a situation where a simulation had priority over an actual ongoing activity in space flight, because if you look at where the money is, the expensive hours are up there. I wouldn't say they were cheap down here, but, gee whiz, people don't like to be launched with responsibilities and then have less that number-one priority, but that's the word I got.

Another time is after the Spektr module came up there, they actually cast me to do check-out of quite a lot of gear over a weekend, which normally would be an off period, normally from about noon on Saturday and then Sunday. Of course, towards the last half of the mission, we didn't get those, although we did the first part. But nonetheless, normally that would have been off period, but they scheduled me to do the check-out of the gear over the weekend. And as always happens, everything doesn't work exactly as it should according to the checklist, and some problem came up with one of the pieces of equipment, and I called back down, and the word came back as, "Well, we can't help you until Monday because we gave all the support people the weekend off."

Well, but they had tasked me to work over the weekend doing the check-out and yet hadn't provided to have the support people in place to support that check-out. That was a bad aspect to the Mir flight, the feeling while you were up there that the orbital activities just didn't have any priority. Not in Russian, because, again, these things were--although there was a Russian PI and an American PI for all of that, Americans had the lead on all of that stuff. So it was definitely a NASA problem, not a Russian problem.

Wright: When your time that you were there finally came to an end, how was the last month? Did you spend lots of time preparing for your trip home on the Shuttle?

Thagard: We had to do a lot of, I guess, stowage, getting things ready to come home, because some items

were going to be brought back on the Shuttle side to make sure that I knew where those were and that was all properly catalogued and everything and ready to transfer. Also, just before the Shuttle came up there, I had been doing check-out of gear in the Spektr, and it was gear that I think Bonnie was going to have to go in and have access to when the Shuttle came up and do some stuff with it, and consequently I didn't want to restow it. Veloga came in and said, "You've got to go restow all that gear."

I said, "That's foolish. It's going to just be unstowed again when the Shuttle gets up here."

"No, it's got to be stowed. It looks bad. I don't want them to see the Mir looking like this," and I'm looking all around at the base block and said, "Well, you'd better keep them out of here." Anyhow, he and I argued a little bit, and he finally said, "All right. Fine. Don't restow it. Do what you want to do," and he left.

So I got to thinking a while and said, "Well, shoot. Just for the sake of good relations, I'll go back." So I went back and stowed all the gear, and, sure enough, when the Shuttle came up I had to unstow it all again and go do it.

Wright: Were you able to prepare your crewmates for the ride on the Shuttle? Were they looking forward to having that new experience?

Thagard: Oh, I think they were, yes. I think it's in the nature of things like that, that you want as many different experiences as you can get. I know that one of the big attractions my part of the program had was the opportunity to ride on the Soyuz, for instance, which would be a different experience than the Shuttle.

I remember that Gennady had a huge concern. He came to me a day or two before the Shuttle came up there, and he says, "We don't have passports."

I said, "Well, I don't think you need them."

He said, "Well, I think we do." He said, "I'm worried that they're going to arrest us because we'll be coming back and we don't have passports or visas."

And I kept trying to allay Gennady. Of course, he comes from a different culture, but maybe knowing what I know of bureaucracy, I should have been worried a little bit along with him or for him, but I couldn't believe that in a million years they were going to arrest Veloga and Gennady because they arrived in the United States with no passport. I hadn't even thought about it, but Gennady obviously had been thinking about it quite a lot.

Another funny thing occurred in that there were a number of Shuttle delays, you may remember. Our flight was supposed to be three months, but it wound up being closer to four months because of delays in the Shuttle. But Gennady, I think, never wanted to fly the mission in the first place. He was talked into

it. He certainly was ready to come home at the end of the mission, because he and Veloga had been quite overworked, I thought, for certainly the last half, if not last two-thirds of the mission.

One day when the crew had gotten on board the Shuttle and weather caused them to abort the launch that day, Gennady was just livid. He came to me, and he said, "There is absolutely no excuse not to launch a spacecraft for any other reason than a problem in the spacecraft itself." In other words, weather was no reason.

That harkened back to when we launched out of Baikonur, because it was a cold, windy day, and both the cold and the wind, either one of those, would have kept the Shuttle from launching on that day, and that concerned me. In fact, the day of launch I said to Gennady, I said, "Gennady, we can't launch today. It's too cold."

He said, "Oh, the colder the better."

So I granted him that, because it doesn't have solid rocket boosters with rubber O-ring seals. So I said, "Well, all right." I said, "But it's still too windy," because it was almost gale-force winds at times, certainly in gusts, and the Shuttle as an airplane couldn't do that. You couldn't launch the Shuttle with that much wind.

He just said, "As long as it's not a hurricane." So they don't have these weather restrictions that we have on the Shuttle.

But he was livid when the Shuttle aborted the launch that day due to weather at the Cape. Veloga and I and Gennady had been looking out the window as we passed over the Cape, and it was clear that it was just solid clouds just almost over the whole Southeast, along the Florida and Georgia coast and then on the Gulf Coast almost over to Louisiana, maybe Texas, just solid cloud cover.

And Gennady says the weather was fine anyway. I'm here, and Gennady's here facing me, and Veloga's behind Gennady, so I'm looking at Gennady, and then behind him I can see Veloga, and Gennady's saying the weather was fine. There was no reason why that thing couldn't launch.

Veloga hears this, and he smiles, and he's pointing like this to Gennady's head, just doing like this for my benefit, because I'm sitting there. Veloga and I were wondering what window Gennady had been looking at, because he certainly didn't see the same weather that we had seen. But then Gennady says, "Well, that's fine." He says, "Just don't even let it launch. We'll just wait until September, and we'll come home in the Soyuz." And this was not really in character with Gennady, because throughout that mission, Gennady was just the nicest guy in the world. There was never a time that I was doing something and he passed through the area that he wouldn't ask if he could help. I mean, that's just in Gennady's nature. But he wanted to go home, clearly, and he was not happy with the Shuttle delays. So he says, "Well, we'll just

wait, and we'll come home on the Soyuz."

And I looked at him, and I said, "That's fine with me, Gennady." I said, "I've never ridden on the Soyuz. It's an experience I'd like to have. You, on the other hand, are going to miss your daughter's wedding," because his daughter was supposed to be married in August. So that kind of shut him up.
[Laughter]

Wright: Did you have lots of preparations to do other than the stowage, or were you just finishing your experiments or setting up more for--

Thagard: Mostly trying to finish up whatever check-out and leave that gear in the Spektr module in a configuration that would allow further check-out to occur, because there was some more check-out, as I mentioned, that was going to be done by some of the crew coming up on the Shuttle.

The Russians in that period of time asked me to do a medical test on Veloga and Gennady that they normally do on all their crew members just before return, and it basically consists of collecting blood and subjecting that blood to a number of analyses. It's what we used to call in medicine a Smack [phonetic] Twenty. It's basically looking at a whole bunch of different blood parameters: hemoglobin, hematocrit, glucose levels, potassium, sodium, chloride all these different blood parameters. I had never even heard of the thing before, but they asked me to do it as a medical doctor on board.

So I finally found the checklist for the thing, and it was an experiment called Replitron. I found the blood analyzer, and then there were some little special blood collection tubes. Because, you know, different tubes can have different things in them for blood collection, heparin or different kinds of--EDTA, different chemicals can be in there, depending on what the tube is going to be sampled for. I couldn't find some of those, and I called back down to ground and said, "I can't find these."

They wound up having, as happens from time to time--I mean, it happened several times--that was the first time it happened with me, but with Veloga and Gennady from time to time, especially Veloga, that you need to find something, you can't find it, it's not in the logistics program on board, and the only way to find it is by calling the crew member who used it the last. So they'll just literally pick up the phone and try and locate the Mir crew member who last used those items. So in this case they called Valeri Polyakov at home and asked him where those were, and he told me. It was behind some panel in the Krystall module.

So I went in the Krystall module and got behind that panel, and there were just all kind of bags in there chock full of equipment. They were white stowage bags. In some cases they didn't have any labels on them or didn't have anything listed on the bag. In some cases someone had actually written in black marker on the bag what its contents were, and in some cases those actually were the contents of the bag,

but not in all cases. To make a long story short, I looked through--I mean, it was just almost a forest of these bags, and they still weren't in there. So at the last I just went in the American medical kit and found the equivalent and used that instead.

But after going to all this trouble to learn how this experiment and this gear worked and to find all of this stuff, which took over a day--I mean, it was really a procedure, calling back down to the ground, "Where's this?" I needed Veloga and Gennady, because what they wanted me to do was take their blood and run it through all these analyses, and Gennady just says, "No, I don't want to do it." [Laughter]

So I look at Veloga, and Veloga says, "Well, if Gennady doesn't want to do it, I don't want to do it."

Meanwhile, I had amassed all this equipment. So I said, "All right, Gennady. Take my blood. I haven't collected all this gear just to do nothing with it. We're going to do an analysis here."

So Gennady drew my blood, and I did an analysis on my blood. [Laughter] But that was an example of the sort of thing that can happen, though, on a duration space flight. I had never been trained to use that equipment. I had never heard of that procedure before. I literally had to learn it on the fly at the ground's request. But if the procedures are good, and the Russian procedures were well written, in general, I had no problem. I felt the Russian procedures were easy to follow. You could do those sorts of things, but it does require good procedures, and if there's some timing problems, then you'd probably need to rehearse it. Fortunately there were no time-critical steps in that.

I meant to mention before when we talked about American versus Russian procedures, in the case of the science program, the twenty-eight experiments that were part of the Mir-18 experiment complement, another reason why I used the Russian and not the American procedures is that the American procedures were derived from the Russian procedures. That's kind of fascinating, because the principal investigators, all the leads were Americans, and the original procedures were worked up in English, translated to Russian, which then became the Russian procedures. But we at least got to look at them, make comments, and get them changed and altered. Once those were in place, then the English-language procedures that flew were translated from the Russian. So even though it started out in English, the final ones in print were actually derivative. They'd gone English, Russian, and back to English again. So the Russian procedures were closer to the original than were the American, and therefore probably had fewer mistakes in them, plus in training I'd worked to the Russian procedures, so I already knew they'd already basically been debugged and verified and corrected.

Wright: The Shuttle finally launched and it was on its way to meet you. Were you able to watch it approach?

Thagard: Of course, they used the two-day rendezvous and docking scheme just like we did when we launched on Soyuz. Yes, actually I did a lot of video recording of the Shuttle and some still photos, too, out one of the big windows in the Kvant II module, but I didn't see it until maybe three or four hours--I think about four hours before it actually docked. It came up from below and then flew out ahead of us and then came back in.

But it was quite an awesome sight to see the Shuttle, just like it was kind of an awesome sight watching the Spektr module back about a month before that, because the Spektr module came up and docked on June 1st, as I remember, and the Shuttle docked on June 29th. So, yes, it's a pretty awesome sight. I had really thought that with two 200,000-pound vehicles coming together in orbit, that everybody on both Mir and Shuttle's eyes would be about yea big and everybody would be nervous, but when it actually came to the event, that wasn't true at all except for maybe Hoot [Robert L. Gibson], because he had to fly the Shuttle. But it looked like it was so slow and so well controlled that you just never felt like anything was going to get out of hand. In fact, it progressed very nicely and very smoothly into a dock, and it was very precision, I thought, very well done.

Wright: I guess you were glad to see it.

Thagard: I was glad to see it. Honestly, I was ambivalent. On the one hand, I feel a bit like Fred Gregory did. He was a pilot on my second mission. I remember Fred telling me just on our last day of flight or something--it was a seven-day flight--he said, "You know, a week is just about the right time," he says, "and then it's time to go back and tell everybody how it was." And you sort of feel that way. But on the other hand, I wasn't being untruthful with Gennady when I said, "Fine. We'll just wait. I'm perfectly happy to wait on the Soyuz." It wouldn't have bothered me all that much if I'd found out--the thing I think that I had in my favor that the six that followed didn't is that they were tied to the Shuttle. I was never tied to the Shuttle. Veloga, Gennady, and I were the Mir-18 crew, we were going up together, and we were going to come back together. That was either going up on the Soyuz and coming back on the Shuttle, but if it didn't come, we were going to come back on the Soyuz at the end of the six months just like any other Russian crew.

So I know from Day One that I was never going to be there longer than six months. I remember plainly I was ambivalent throughout that whole period of time. On the one hand, when the Shuttle would get delayed, I'd feel like, "Oh, gee, I'm not going to get to go home as soon," but then I was thinking, "Okay. That's longer time in space. Record's extended. And then finally, if it doesn't get up there at all, I'll get to come back on the Soyuz." I had a lot of ambivalence about the Shuttle coming up.

At the last, yes, it was nice that it came up, but it wouldn't have bothered me all that much if it hadn't, either. But I remember Hoot joked. He said, "We thought about stopping a few feet short of docking and just negotiated with you for a fee to come up and continue the docking," and I remember over air-to-ground I said to Hoot as he was coming up, I said, "Well, isn't that the way it is? You call for a taxi, and it takes it weeks to get here."

Wright: How was it when you landed? How did you feel?

Thagard: I felt pretty good. I felt very heavy, but then I had felt heavy on landing or entry on the others. I remember on my first flight in 1983 telling Bob Crippen, our commander, that he could quit pulling all those Gs any time he wanted to, and he said, "Well, we're pulling about a tenth of a G right now," and that was just a six-day flight. But after 115 days, it was that feeling only even more pronounced. I felt very heavy.

On the other hand, when wheels stopped, I unstrapped, and I was actually the first one to unstrap and stand up, and I remained standing. I had to wait until they got Veloga and Gennady out of the way, because I was on the starboard-most side next to the bulkhead, and of course, the hatch is--I'd have to step on them to get over, and I wasn't into jumping at that point, so I really did have to wait for them to get them out of the way, but I walked off with no assistance. I didn't have that much of a problem.

We wore these monitoring equipment, a blood pressure cuff and EKG stuff underneath it, and that blood pressure cuff under the arm of the launch escape suit, it was pumping up every couple of minutes, was just too much. My whole arm was bruised when I came back, and I didn't have any feeling in my left hand because of that, and I was thinking that that's just one more thing if you've got to get up and bail out of this thing in an emergency, that's not going to help matters.

I thought about that, too, would I be able to get up and bail out. I think I would have been able to, but it would have been tough, because when I stood up at the end, I didn't stand up with a parachute. I've been told all that gear with a parachute is almost ninety pounds, and you've got enough trouble just with yourself, let alone a lot of gear. Again, I think if I'd had to bail out, I probably could have done it, but I would have been really stressed and strained to do so.

Wright: How long was it after you landed that you felt like you were back to your old self?

Thagard: Actually, the heaviness went away within an hour or two. By the time they had done all of the medical tests out in that people-mover and gotten us back to the Owens Building there at Kennedy Space Center, I didn't feel heavy anymore. I still didn't feel totally gainly. I felt a little awkward, more so than on

my shorter Shuttle flights. I had a real sensation that if I were to bend forward, if I weren't careful, I'd continue to go forward, and if I bent back, if I weren't careful I'd continue to go back, and the usual problem of going down a hall, and if you had to make a right-hand, left or right turn, you would tend to overshoot. You'd tend to brush your shoulder on the opposite wall. You just don't turn sharply enough, and that's all because of the gains that change in the vestibular system while you're there.

I continued to have balance--just feel differently balance-wise for five days after the flight, which was different than any of the four of my Shuttle flights. On every one of my four Shuttle flights, on waking up the morning after we landed, I couldn't even tell I'd been in space, but it was five days before that was true after Mir.

Wright: Since this was such a long-duration flight and it was so different from anything you'd done before, how did it affect your family?

Thagard: I don't think it affected my family. It was kind of curious that there were articles that said that I was lonesome and I'd repeatedly said that I missed my family. It is true, I did repeatedly say I missed my family. The reason I repeatedly said I missed my family, because we had a lot of press conferences, especially toward the end, and the question that almost every interviewer ever asks is, "What do you miss the most?" and I always said, "My family." So then they come back and say, "He repeatedly said he--" Well, yes. I was repeatedly asked the question. Would I have been better off if I'd given them a different answer every time?

It didn't even compare with being in Vietnam in 1969 for a whole year. I mean, a whole different situation. There my wife, except by letters, we never talked to one another. We did meet one time. After I'd been there about nine months, we met in Japan for a few days, but we didn't even have any communications other than written communications during that whole year. So every week on the Mir station we would have family com session, and sometimes that would be two-way television. The only unsatisfactory part about it was, they went through a couple of satellites, and you got that annoying delay, so you'd tend to step on one another, meaning you'd start talking before the other one would finish and that sort of thing.

The every-week family com is exactly the same frequency of communication that my wife and I have any time I'm on travel. For instance, the four and a half months out at Monterey, I'd call home once a week. For the first three and a half months I was in Russia and my wife wasn't there with me, I'd call home once a week. So it was perfectly in keeping with our normal--I was just fascinated by some of that stuff. I never understood where they got some of that stuff. I just never did. I saw an article recently by Yahoo

that I had talked about my periods of depression on board Mir station that was due to problems in Russian language. Well, I never had any periods of depression, and never any private or public conversation ever said anything about any periods of depression, and as far as I know, I probably had fewer language problems than almost anyone else that flew. Language was just never a particular problem while I was up there.

I think this guy had me confused with somebody else who did talk about those things, but, nonetheless, that's what you come back and find. You find people--and I called this guy's chief. This was a Reuters guy out of the Cape. I called his bureau chief down in Miami and told him to cease and desist, and I said, "And I don't understand you guys." I said, "I'm alive and live up in Tallahassee." I said, "Do you people ever make any effort to go to the source and find out whether something you're about to say is true?" And that's the thing I found when I got back. Virtually without exception, the articles that were written never had anything to do with me. They were never articles based on anything that was said to me in conversation with me.

What I found was, apparently what happened with a *Pravda*--no, it was an *Ivestia* [phonetic] article that said I was complaining about things on board Mir station. He called several cosmonauts, and one of the ones he called was Valeri Polyakov, who'd been there, and Valeri said, "I think you misinterpreted what he said because it's an English-Russian thing." That is what he did. What I said was there were things you had to worry about for flights of six months or longer, and I said they weren't problems to me because my flight was only three months. Well, they just dropped the business that I said they weren't problems for me because my flight was three months, and they said I had the problems, which I explicitly said they weren't problems.

So anyhow, that article appeared about a day after we came back, and then it just got reprinted widely in the United States without ever checking with me, and it was a Russian article from that hotbed of journalistic truth in Russia. So just the American press just ran with it. And then what I found after that is articles were written on articles. I mean, you'd have an article written, and it was clearly based on somebody else's article that had been written earlier, which was never true in the first place, and nobody ever calling me and saying, "Is any of this true? What did you say? We heard this," and that never happened.

Wright: Has your family adjusted to not believing what they read in the paper, to usually call and check with you to see if any of that's true?

Thagard: No. I said it didn't affect my family. Folks forget that my wife and I have been married thirty

years. Except for the one son, we already had two grown sons. One was a college graduate and the other just recently graduated. The fact is, once you get up to--I mean, I was fifty-one when I launched and fifty-two when I came back, and my wife was a few years younger than me. How much are you going to change by anything that happens at that point in time?

The one nice thing for me is my wife, starting when I was in med school, more or less ran the family because I had to turn over all the financial stuff and tax returns and everything. So I don't have to worry when I go off that things won't get done, because she intends to do those things anyway. So from the family standpoint, I was in good shape. I really didn't worry about are things going to heck in a handbasket. That wasn't a consideration that I had to worry about while I was there.

Wright: You mentioned your son went to school in Russia while you were there. Being a teenager is such a time of change for them, I'm curious on how well everything adapted for him.

Thagard: He did well. In fact, I was proud of his performance over there. He really did well, except he broke some kid's nose, punched him, but that was a kid that was beating up on the son of another cosmonaut who was his friend. That was a twenty-one-year-old, and he was just--

Wright: He came to the rescue.

Thagard: He was just fourteen, so I thought that was kind of interesting. Again, fortunately, there are no liability lawyers in Russia so we didn't have to worry about getting sued. But no, I thought he did beautifully over there, and he learned Russian. He had friends. He went out. I think he generally had a pretty good time while he was there. He wrote an essay for school a couple of years ago, and my wife saw it and she showed it to me, and it was actually about the whole Russian experience. He said, "Well, when I found out I was going to have to go, I didn't like it. It really bothered me," but he said the upshot was that he felt it had been a great experience in the end.

Wright: I know with your intense training schedule your days were full. Did you have much family time to see the sights or to visit the city?

Thagard: Well, my family did. My son and my wife did make some trip to some resort area there east of Moscow. I never did. Honestly, I wasn't too interested in doing that. I had enough to do, because I'd study most nights until ten or eleven o'clock after I'd get back at around five or so in the afternoon just because you know you're going to have to pass tests.

Wright: Six months after you landed, you made the decision to change your career. Could you tell us about that transition?

Thagard: Of course, I'm a graduate of Florida State University, and in '85 I was actually approached by the then-dean of the engineering college about coming back and being a teacher at FSU, so the original thing was, they approached me. But at that time, I still wanted to fly in space some more, so I didn't pursue it. Then after my third flight a little bit and especially after my fourth flight, I really thought been there, done that, it's time for a career change or I'm going to be too old to change careers. So I started talking with them more seriously.

Then in December of '95--I mean, we talked a lot over the years, but they finally actually put an offer down on paper and sent it to me, and it was one where you could actually have the job if you said, "I'll take these conditions," and they were what I wanted, so I took it. The only thing sudden about it was they actually finally put a real offer down on paper, but we'd been talking about it for ten years at that point in time.

Wright: We been doing this project for the last few months. Of course, your name comes up quite a bit, and associated with that, we've had people call you a trailblazer and a pathfinder. Do your students see you as such?

Thagard: A lot of my students don't--I don't necessarily tell them, although some do, some don't, is the answer. I've gotten smart in my old age, if somewhat cynical. There are teacher evaluation forms, and what I have found is if the class before you pass out the teacher eval forms, which is very near the end of the semester, I come in and give them a presentation with either slides or video on my space flight experiences, and then we don't have a lecture that day, and the next day I pass out the teacher eval forms, and for a lot of them, that's the first time that they know.

Wright: Originally when you took this assignment, you were going to be the only one at that time that was scheduled to do this. What was your reaction when you found out that you were going to be the first and there going to be others to follow?

Thagard: I don't know that I had a particular reaction. I don't think I did. In fact, I guess I had kind of hoped that some of them might come over there earlier than they did just so we'd have some more Americans around. But Shannon and John didn't really get over there, I think, until '95, just before we launched.

Wright: Most people have said, too, that they were able to learn so much from your experiences. Do you feel that you were able to take as much information as you wanted and provide it so that the next people that were going to board the Mir would have real information to work with?

Thagard: I remembered that Olf had come back to Star City and had made a point for us to get together and had given me a good debriefing, which helped me a lot when I went on Mir. We came back, I think, to Houston on a Friday night after the landing, and the next night, Saturday night, Kirby and I had John Blaha and Shannon Lucid over for dinner. The whole purpose was to start giving them some idea about what to expect. Then I think in the course of the next week or two, then we got formally scheduled, too. So we had both that dinner the night after I landed and then we had a more formal session in a room like this up on the sixth floor in Building Four.

Wright: Do you still visit with all the folks that you worked with preparing for this mission?

Thagard: I get back to Houston several times a year, but it's usually like this. I came in last night, and I'm going to leave on the afternoon flight. That's typically the way it is. I don't think I spent even longer than twenty-five hours on any of my trips to Houston, except for, now, for the first six months after I retired, my wife and youngest son were still here in Friendswood. In fact, we didn't even sell our house for a year after then left or they came to Tallahassee. So I did spend several days then, but since June of '95 I've not been back to Houston for longer than twenty-four, twenty-five hours.

In July of '95, Veloga, Gennady, and I were asked, I think, by an ad agency working for AT&T, to go for the opening of the Olympics. So Veloga and Gennady and their wives actually flew into Tallahassee. My mother-in-law has a house in North Carolina that she spends summers in, but she has a house near ours in Tallahassee, too. She was in North Carolina, so we just gave them my mother-in-law's house. So we wound up spending several days together there in Tallahassee, and then we just drove up together to Atlanta, and then when they left for Russia, they left from Tallahassee. So I've seen Veloga and Gennady, and then I saw Veloga and Lena, his wife, here in Houston last year, I think when I came over for my annual physical, because he was back over doing some training. So Veloga gets back from time to time. I've talked to Veloga, I think, and Gennady both on the phone briefly this year.

Wright: Is there anything you can think of that you would like to add that will go into your oral history, that you would like people to know, that maybe we haven't covered?

Thagard: Well, I've probably forgotten a lot. No, I can't think of anything offhand, but if I do, I'll let you

know.

Wright: I guess there was one question that I didn't get to ask. When you were up there for three months, less than six months after your landing you started another career. Are there times, do you think, in between those periods that you forgot you were back on ground and maybe did something which was normal to do when you were on the station?

Thagard: No. And that's probably not a bad question to ask, because I remember from Skylab we had heard that some of the folks coming back from the longer missions did things like they would just drop a coffee cup because they thought if they let it go, it would continue to float. We heard about people that fell in showers or had balance problems. I remember that when we had landed and after they'd done those medical tests that they were going to do, they gave us some time to get cleaned up before flying from the Cape back to Houston, and they had just completed those new crew quarters there down at KSC, and I went in the shower there, and there was a sign there that said, "Don't use hot water and don't stand." This was for returning crew members. So I took a hot shower, standing. [Laughter]

I'll be honest, I've heard different folks, because there have been seven of us, and I think I've heard attributed to Dave Wolf that he had a lot of pain and things like that, muscle pains and that sort of thing. I didn't experience that. We've heard the reports about people dropping things, having big balance problems. I didn't have any of that. In fact, when we got back to Houston out at Ellington Field, I remember George Abbey came on the plane, and he said to me that there was a crew van waiting outside to take me to the crew quarters because they were going to sequester Veloga, Gennady, and I in the crew quarters. Bill Readdy was there on the plane, and he was our driver.

So we got down to the van, and I said, "Take me home, Bill." [Laughter] So Bill took me home. We didn't go to the crew quarters. We went back to my house. Dave Ward did stay that night at the house just because he felt like he ought to do that. But I didn't have any problems. We have a two-story house. I didn't have any problems going up and down the stairs. I mean, I wasn't running up and down them, but I did fine. Like I said, the heaviness went away in a short period of time.

The only big thing I noticed is if I did something that would be moderate exertion, I could sure tell it. Normal activities, I couldn't really tell that much of a difference, but if I went up many stairs--I could do the one flight in our house, that wasn't a big deal, but if I went up a couple flights, that would be a fairly big deal. On the other hand, five days after we landed with Ellen Baker and I think maybe Charlie Precourt was with us, several other folks there in the astronaut corps at noon in Houston, and we're talking now July 12 of 1995, I jogged three miles, and that's five days after we landed. It was the hardest three miles I ever

did, but I did it. So the coming back was not a problem at all. There was absolutely no adjustment. I'll admit things were different, but it just didn't seem to be that big a deal.

Wright: On your way back to Friendswood, did you whip into a drive-in place and get you some food?

Thagard: No. Actually the Shuttle had brought up some fairly interesting food. I know Ellen Baker joked that I sort of buried myself in the pantry food, and I did, because it's like anything else, even though once we could use the supplementary food system, the food was pretty good, there still was a lot more variety once the Shuttle came up.

Rollins: Did you gain your seventeen pounds back?

Thagard: Unfortunately that and more, and, you know, I didn't launch overweight. In medicine we used to talk about the ideal 70-kilogram man, because that's the one we based all the drug dosages on, based on a 70-kilogram human. The day before we launched, I weighed 70 kilograms, which is 154 pounds, so I was not overweight when I launched, but at one point in there I got down to--well, I was down probably to under 140 pounds. I lost seventeen and a half pounds, I think, at the lowest point.

Rollins: But you came back more than the 154?

Thagard: Unfortunately about ten pounds more.

Rollins: That's not too bad.

Thagard: In fact, when the doctors came on and said I'd lost muscle mass as well as fat, Dave Ward came on after that, and I told Dave, "I hope nobody thinks that I'm unhealthy up here. I feel fine," and I did. I was somewhat perverse, by the way. I knew I was losing weight and I knew what the cause was. I wanted to really see how long it took them on the ground--because as I told you, I was reporting those masses every three days, and nobody was saying anything. It wasn't like I just all of a sudden reported one day a seventeen-and-a-half-pound weight loss. It had been going down like that. I just kept sticking to only eating the bar-code-labeled foods and reporting the masses every three days, and I just said, "I'm going to see how long, if ever, they let this process go on before they finally realize that they need to do something," and the answer was six weeks and seventeen and a half pounds was how long they let it go.

But I wasn't going to do it until I died or got in serious trouble. I mean, I am a doctor. I knew perfectly well what was going on. I just wanted to see--because that's one of their jobs. You've got folks

up there, you need to monitor them. You're getting the information. Are you using the information? Why gather it if it's not being used?

Rollins: Yes, there's one thing I am curious about. You talked about your military career and your time in Vietnam. Most guys would have been content to come back home from that and have a military career, but you chose to become an astronaut and become a doctor, too. When did you decide to become an astronaut?

Thagard: When I was a kid. I read science fiction starting when I was in elementary school, literally fifth, sixth grade, something like that, and I knew then that if there ever were such a thing as an astronaut, I wanted to be one. Then in 1961, as a senior in high school, Gagarin and Al [Alan B.] Shepard [Jr.] flew, and then I knew that if I ever had a chance--I knew that if NASA ever accepted applications for the astronaut program at a time that I thought I could have a chance, that I would do that.

When I was in flight training in '66, I picked up the paper one morning and noticed that one of my professors, whose name, actually, signature is on my master's degree--his name is Tony Llewellyn--had been accepted into the astronaut program. He wound up never flying, but he did get accepted into the program, and I remember well thinking, "Well, I don't have the credentials to do that now, but, golly, I wish that were me, and, boy, if they ever do it again and I think that I can get in, I'm going to apply." Of course, after that NASA didn't even take applications for ten years.

Finally I came home, I was a senior in med school, and I came home one day from being, I think, all night--I don't remember what rotation I was on, emergency room maybe or something like that, and my wife said, "I heard an ad on the radio today that NASA is taking applications for astronaut again." I said, "Well, I've got to send off for an application," and she said, "I already did." So actually, my wife sent off, and I joke sometimes and say, "And sometimes I sit down and wonder why did she do that?" [Laughter]

Wright: How do you describe yourself? We've shared some of the things that we've heard: trailblazer and pathfinder and pioneer. You were able to start this program and take it to where someone could follow in your footsteps, and you've got a long list of accomplishments. If you were to sum yourself up in one or two words, what would you say?

Thagard: Lucky. I took that assignment really seriously, and I tried to take the attitude that I wasn't going to be the ugly American, that I basically was supposed to be a cosmonaut and fly as a crew member on a Russian crew, so I was going to take it like that. I wasn't going to go over there and try to be an American and take my environment with me. I was going to accept whatever conditions were there, and I did, I think, for the most part and found that perfectly acceptable.

In terms of the other things, let's face it, there were a number of folks that could have done it. I just was lucky enough to be the one that got to do it. Given that I got to do it, I tried to do a good job at it, again, especially mindful of the aspects that this was a Russian-American thing. So there were some sort of international relationship sorts of things that had to be accounted for.

Honestly, I never got upset about anything, I don't think, that had to do with the Russians. I hate to say it, but the only sources of irritation that I had throughout came from NASA, at any point. That was always true. It went to things like reading in the paper Randy Brinkley [Program Manager, ISS]--because I think Bonnie had complained about something over there and it got back in the paper, and that made me mad because it made me look like I'd been a part of the--and the fact is, I didn't mind what this complaint was about at all. Randy Brinkley was quoted in the article as saying, "Well, NASA was providing adequately for its astronauts, is supporting its astronauts over in Russia," and I looked at that and said, "What kind of support is he talking about?" Because as I looked around my apartment, everything in it that I hadn't brought personally was Russian except for the laptop computer, which didn't work, and, in fact, didn't work even after I was asked to bring it back. On our trip back in May for training in the States, they asked me to bring it back. I did bring it back, and it still didn't work when I got there.

But the truth is, the reason that bothered me is because we didn't need the support, but what I objected to is people claiming they were supporting us when, in fact, they weren't. But I again would say I'm not complaining because they didn't support us. We didn't need the support. My fault with them is these claims of support that was basically nonexistent. It simply wasn't there. It didn't need to be there, but they shouldn't be making claims that aren't true, either. There was nothing wrong with being there in Russia. Even the fact that Moscow was an hour away so you're fairly isolated out there was fine, because if you were going to do the studying and the training and get ready for that, you needed to be out there doing it. You didn't have a lot of time to be going off doing other things. Again, I knew it was limited. I knew that at the end of some period of time it would all be over. So I never had a problem, never felt like I was pushed or pressed or overwhelmed or anything like that.

Wright: I can think of one thing that's come up that we haven't heard the answer to, and that's what happened to that cognac?

Thagard: Oh, yes. Well, the cognac seemed to disappear, although I don't know that I ever saw anybody sipping away at it or anything, but what would happen is, typically on a Friday night, Gennady would come into the base block there at the dinner table and have a little smile on his face, and he'd look at me, and he'd say in English--he did say this in English--he'd say, "It's time to have a drink," and on special occasions like

someone's birthday. In fact, like my birthday present, because I had my fifty-second birthday when the Shuttle was there, the Russians gave me a bottle of really good Russian cognac.

I probably might not even ought to say this, but I will anyhow, because what can they do, sue us at this point? Anyhow, Charlie Precourt, Veloga, Gennady, and I went back in the Spacelab module on the Space Shuttle, and I didn't just want to do that without giving Hoot some heads-up. So I went to Hoot, and I said, "Hoot, I just want to tell you that--" and he looked at me and said, "I don't want to know about it." [Laughter] So, Charlie Precourt, Veloga, Gennady, and I went back in. It was about a fifth of cognac, I guess, and between the four of us we had a fifth of cognac, but I never saw anybody drunk. In fact, I never saw anybody drink more than what I would consider to be one shot. Because how would we do it, we'd take the cap off one of these plastic bottles, and even with alcohol there's enough surface tension that it tends to adhere to the side, it just doesn't come gushing out, and as long as you don't agitate the bottle, its contents tend to stay in there. We all had our straws, and we would take straws and we would stick them down into one of the bubbles and just take a sip, and then you would gently push the bottle and it would float over to the next person, and they'd put their straw in.

Wright: Sounds like it was a system that worked well.

Thagard: Oh, yes. There were just lots of neat things like that. The fact is, the biggest problem on board Mir for me, again, was just too little to do for a period of time. Overall, for many crew interactions or anything else, there was nothing awful about it at all. There just wasn't. I mean, I'd love to come back and tell everybody it was just awful and we really were tough to bear up, but it just wasn't like that.

Wright: Did you bring your own recreational activities, or did the Russians provide that?

Thagard: First of all, my wife had sent up several things, but one of the things she sent up was a *New York Times* crossword puzzle, and I love those things, typically. But there was no way--Veloga and Gennady were very busy, extremely so, and there was no way I could sit there and work a crossword puzzle, even if I were bored, while Veloga and Gennady are running around working. I just couldn't bring myself to be seen to be idling my hours away, so I would at least try to act like I were doing something, even if I weren't. Ellen Baker sent up the swimsuit issue of *Sports Illustrated*, which I thought was kind of cute, and I wound up giving that to Veloga. Veloga liked it.

The other thing was, and I didn't say this before, but typically from about noon on Saturday--I did mention that--from about noon on Saturday until Sunday, until the space walk started--remember we launched on March 14th, and the first space walk was on May 10th, but for about the first six weeks things

were fairly light. I mean, they weren't overly intense, even for them. So we would be able to take a day or a day and a half off on weekends. There was a whole library of video tapes up there and a little entertainment center with a VCR and a television monitor, and so on a Friday or Saturday night we might well sit around at the dinner table and watch movies. There were all sorts of movies, German, English, French, Russian, American. I remember I watched *Pretty Woman* up there, although they were all overdubbed in Russian. So I was glad I'd seen it before in English so I could understand what was going on.

There were also some not hard X porno, but sort of soft X stuff, and Veloga would put some of those things on, and Gennady just couldn't bring himself to act like he had any interest in that at all. So Gennady would be sitting there reading a book while Veloga and I were watching this, something like *Emmanuelle* or whatever, something on that order, no real outright pornography, but still stuff with a lot of nudity in them and things. It got my attention and certainly Veloga's attention, but Gennady would have nothing to do with it. Gennady was the serious engineer. He was not interested, would read his book.

Wright: We're glad to see your life get into an order that you wanted it now and certainly wish you good luck in your new career.

Thagard: Well, thanks. I guess I would say this, you asked how I got interested in space. This is no ego on my part. This is just the way it was. In high school, I told my classmates that I wanted to be a medical doctor, a fighter pilot, an engineer, and an astronaut, in high school. Now, having said that, that was not a smart thing to say. I actually did get to do all those things, but, as it turned out, it was due not only to wanting to do those things but because of just plain old circumstances.

The fact is that I had given up any thought of being a doctor because when I got off to school at Florida State in 1961, I'd gone there with the intention of getting a bachelor's degree in engineering only because I had a hobbyist interest in electronic design. I wanted to learn how to design electronic circuits, but I was then going to med school after getting a bachelor's degree. But the Vietnam War and the draft intervened, and I wound up going into the Marine Corps. I don't know how I would have reconciled, though, for instance, being a medical doctor with being a jet pilot, a fighter pilot. There's just no way. So that wasn't very well thought out or planned in any event.

So I did the Marine tour and came back in at Florida State in a Ph.D. program in engineering science in 1971, and I hadn't been back more than a few weeks before Florida State announced that they were terminating the School of Engineering and Science. At that point, I figured if things were so bad in engineering, it's probably time to look for a new professions.

My mother-in-law said, "Well, what are you going to do? What do you want to do?"

I said, "Well, I've always wanted to be a doctor, but I figure I'm too old," because there was a real age discrimination back in those days for people trying to get in medical school.

She said, "Well, if that's what you want to do, that's what you ought to try to do."

So I went to talk to the pre-med counselors at Florida State, and they looked at my record, and the guy said, "Well, I'll be honest with you. I think you can get into med school somewhere, I just don't know where." So I switched over to pre-med. I did finish all the Ph.D. courses, but didn't do the dissertation for the Ph.D., but I did the pre-med stuff and applied to nine med schools.

But the Baylor catalog--I wrote off for the Baylor College of Medicine catalog, the first page of the catalog said, "Applicants over age twenty-five are rarely given serious consideration."

When I interviewed up at Duke School of Medicine, Dr. Osterhaut [phonetic], who was the chairman of the Admissions Committee said, "I'll be honest with you." He said, "There are going to be members of my committee biased against you because you'll be thirty when the class starts." So that was the kind of age discrimination that was going on in the early seventies trying to get into med school.

Nonetheless, I did the pre-med course work and applied to nine schools and got into five of them, including all four of the Texas schools. I applied to UT-Houston, UTMB down at Galveston, UT over in San Antonio, and UT-Southwestern up in Dallas, and wound up going to UT Southwestern up at Dallas. Then, as I said, my wife sent off for my astronaut application.

So the fact is, although I had said those things in high school, it took a lot of sort of strange turns before it actually--it couldn't have all come together as a plan, except, again, for things like closing of the School of Engineering Science.

The other thing was, remember I was at Tallahassee, Florida State. How'd I get out here in Texas? Well, my mother-in-law was a personnel manager for a department store in San Antonio, Texas, and she knew the dean of the San Antonio medical school, the University of Texas Medical School that's there, and she went to him, and she said, "I have son-in-law who would like to go to med school, but he doesn't know what his chances are. Could you help out?"

He said, "Well, have him send me his transcripts, and I'll let you know."

So I sent my transcripts to him, and he came back and said, "I think if he moves to Texas and establishes Texas residency, we'll probably admit him to our school." So in 1972, June, with no job, I rented a U-Haul and moved my family to San Antonio, Texas. We got there on a Friday afternoon about five o'clock, and the headlines in the *San Antonio Light*, which is the newspaper there in San Antonio, that next morning, Saturday morning, read "Medical School Dean Fired." It didn't seem all that funny at the

time. [Laughter] At the last you have to feel like you either have charge of your life or somebody else has charge of it. All you do is what you can do, and then things will work out. I really always have thought that things work out. I mean, truly, if there's anything I think that I think that a lot of folks don't seem to, is that it all works out fine.

Wright: Do you think it's going to work out for that FSU football team this year?

Thagard: [Laughter] Except maybe that. We've got a tremendously talented football team. We just have a very inexperienced quarterback. I don't know if you watched the game, but our quarterback threw six interceptions. I don't know any quarterback, let alone an FSU quarterback, that ever did that, and I don't know what's wrong. We really got out-coached, because the coach should have yanked the guy early. He was obviously rattled and not going to be effective that day. They didn't take him out.

Wright: The season's not over yet, so maybe it'll be better soon.

Thagard: But he threw an interception on the one-yard line when we were about to score, and then he threw an interception in the end zone when we were about to score, and then we actually did score, and it was another touchdown and it was called back because of a holding penalty, and then we wound up not scoring. So we had ample opportunity to win the game. That's all right. We'll beat Duke [University], but then who doesn't?

Wright: At least it's going to be an enjoyable year for you, and like we said, we wish you the best of luck. We certainly thank you for taking twenty-four hours out of your time to fly back in and visit with us.

Rollins: Great stories.

Thagard: Thanks.

[End of interview]