

NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT

ORAL HISTORY TRANSCRIPT

JEAN-LOUP J. M. CHRÉTIEN
INTERVIEWED BY CAROL BUTLER
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BUTLER: Today is May 2, 2002. This oral history with Jean-Loup Chrétien is being conducted for the Johnson Space Center Oral History Project in the offices of the Signal Corporation in Houston, Texas. Carol Butler is the interviewer and is assisted by Sandra Johnson and Cassie Cowan.

Thank you very much for coming in and talking with us today.

CHRÉTIEN: You're welcome.

BUTLER: To begin with, if you could tell us about how you became interested in aviation in particular, the military, and how that led to you becoming involved with the space program.

CHRÉTIEN: That's a long time, so it's a long story, so I don't like to tell you all of it. I'm an old guy already. So I started many years ago, and that was during World War II. I was a young child in Brittany, France, living a couple of miles from an airport that was occupied by the Germans, on the French shore of Brittany. So, of course, every day I had the chance to see those airplanes, either German or British, flying over and a lot of fights. So I was living under a part of the theater of fighter airplanes of the World War II. I had a permanent 3-D movie under my eyes. Of course, that probably printed in my mind the wish of becoming a pilot. At the end of

World War II, I was eight years old. I remember those last years. So I wanted to fly, also become a pilot.

So a few years later, I started to build my first model airplanes and tried to make them bigger and bigger until I got to the point I wanted to make a real one. But my mama, very tricky, got the stuff out and didn't want me to fly in my own machine. I was, I think, fourteen years old. [Laughs] So I never finished it.

Then I started to fly when I was fifteen, so pretty soon, and got my first license a year after, when I was sixteen, and then went to the Air Force Academy and became a fighter pilot. It was my goal. The year of the Air Force Academy was also the year of Yuri Gagarin, 1961. I was just graduated from the Air Force Academy. That's when I said, "Okay, I want to go to space."

So I aimed to test pilot school, which I did six or seven years later, and I became a test pilot and was watching and following the space program. The French Space Administration had started also to show interest in manned spaceflight. That was in 1976, I think, or [19] 77. Of course, I was a candidate, and I was bothering them already, and even before there were any official candidates. So I think that they knew me a little bit, and so when the official selection started, I had a little plus somewhere because I had been to that administration a couple of times following summer school for space, even if I was a test pilot. So when the selection became official, I had a small advantage, I think, to all the others. They never told me that.

So in 1980 I got selected, 1979 the process started, and I got selected together with another guy, another French guy, and the two of us went to Star City [U.S.S.R.].

BUTLER: During that time from 1961 to when you were selected in 1980, were you very closely following what was going on with the manned space programs in both the Soviet Union and the United States?

CHRÉTIEN: Absolutely. At that time we are following more the U.S. one, because we did not get many informations about the Soviet part, first. Second, I was in the military, for us, Soviet was the enemy, potential enemy. So we are not finding as much what's happened. At least we had a different view. But, again, we had very little informations, and most of the times it came from the U.S. information, we got in, mostly through the military. Third, I was involved—the past years just before the selection, I was deeply involved as U.S.-French cooperation, military cooperation within the south of France, and I was responsible for the organization of exercises over the Mediterranean Sea between the U.S. Sixth Fleet and the air defense system in the south of France. So I was really involved and spending a lot of my time on the U.S. aircraft carriers, and I was feeling that if one day if I was going to fly in space, it would be from Houston. So I was very surprised when they asked me to go to Moscow.

BUTLER: When you were selected in 1980, did you still at that time have the impression that it would be through the United States, or was it at that point that you realized that it was moving toward the Soviets?

CHRÉTIEN: Well, at that time it was already clear that I would go to Moscow, when the selection started, because we got the information about that selection process first by political informations

with the media, and, second, by the French Space Administration, “Okay, we are looking for candidates to fly to space, but from Moscow.”

But until that, there had been another selection the year before for ESA [European Space Agency], and happily. Of course, I was a candidate, and that was for Spacelab mission, and unhappily no Frenchmen were selected. That’s a tough political story, and we can talk about that, if you want, later on. But the French president was very upset with that result, because France is a main contributor to ESA, and half of the French space budget goes to ESA, and we pay more than double than the country that is following us, which is Germany. So, of course, that was a very strange first selection for the Spacelab mission, that no French people were selected, and the French president was very upset. So that’s why I was sent to Moscow.

BUTLER: How many individuals were selected for that Spacelab mission? Was it just—

CHRÉTIEN: I think there were four or five at the end, five, and I think one quit very quickly. So there was one German, one from Holland, one from Switzerland, Claude Nicollier, who is still here, and Wubbo Ockels, Claude Nicollier, the German guy, forgot his name?

BUTLER: Ulf Merbold?

CHRÉTIEN: Ulf Merbold, yes. And number four, that might be the Italian [Franco E. Malerba].

BUTLER: Okay. Did they have any reasons that they expressed for the selections?

CHRÉTIEN: The mistake that there was, is that it was the first time Europe was selecting astronauts, and the express were for scientists, and people got confused with that probably during the talks with NASA. So they were looking for pure scientists. So the French Space Administration told me, “No, we are not looking for guys like you. Test pilots, that’s finished.” Of course, I was very disappointed. I was following their program, and they said, “No, no. Sorry, it’s just pure scientists.” So they selected the pure scientists, and at the end when the ESA-NASA committee selected the last candidates, among, I think, forty people in Europe, I said, “No, it’s scientists, but also people who have flying experience, and Ulf Merbold had flying experience. Claude Nicollier was flying for Swiss Air. All these guys had it, but the guys that France had selected were pure scientists, so they were eliminated.

BUTLER: Well, that’s too bad. But it did work out for you to move into the program with the Soviet Union.

CHRÉTIEN: And I flew earlier. At the end, I was the first western European in space, because, for different reasons. The first European selected, it’s Ulf who flew first, but the flight was delayed, and he flew, I think, one and a half year after me. So, at the end, the former president was happy. [Laughs]

BUTLER: Well, here you had been in the French military working with the U.S. military on cooperative activities. The Soviets were the enemy, but now you were working with them. What was that transition like for you?

CHRÉTIEN: Of course, we knew Star City a little bit before definitely arriving, because during the selection we had to go there. Only once, I think, at the end of the selection. We were discovering, of course, their world, and I remember one of the candidates, I don't know whether he knew that he would not be selected. He was an airline pilot, flew fighter also, former Air Force Academy. I remember I said, "I leave you my seat. I am not coming here." [Laughs]

It's true. It was a little bit—we don't want to be bad, but these guys know where their problems. Now they changed. But going to the building where we would live, I remember the mailboxes were hanging down, and there were no phones. The apartment was very, very small. They said, "Okay, no cars here. You will have to use our own transportation system. If you want to call your family, you have to go for our telegraph system." So it was big cold shower.

BUTLER: Quite a culture shock.

CHRÉTIEN: It was a cultural shock. But the guys were very nice. The people were very, very nice and really trying their best to say, "Okay, we are what we are. We have what we have. But you will see, you will enjoy it."

The first month was very hard. After three weeks, I was really—I was bachelor. I mean, I was in the condition of a bachelor. My family was in France. My kids were in France. I said, "Okay, that's not for me, either." I was really, "Oh is that the price you pay to go?" But after three weeks, it started to get—I think it got better when the president of CNES, who after then became space minister, Mr. [Hubert] Curien, came to Star City and told these guys, "Okay, we are French. We are not Soviets. So the rules, you need to change part of the rules."

I think the main one with which I was fiercely disappointed and even say, “I’m not staying here,” is when they told us, “You will go back home in two years. You will have short vacation in the summer, but you have to spend it here,” and stuff like that. So I said, “Okay, I’m not going to do that.” [Laughs] So the president of CNES came after three weeks especially for one week of talks, and rearranged everything and said, “Okay, you will come once every two or three months to France for scientific purposes, to follow the experiments.”

But to show you there is a shock of culture. They were military, these guys were military, and, of course, they saw us a little bit the same way. I think it was a couple of months of observation besides, “Okay, let’s see how these guys behave here.” Then things became much better, and then we started to like it and liked the ambience and energy, and it became, in my memory, probably the two most fascinating years of my life, really, for many reasons.

First, that shock, then how you get adapted to that. I was personally in touch with a couple of pilots of the Normandy [unclear] Squadron, who flew during World War II, and they told me, “They were the same with us. Of course, it was a war, and you are not at war. You are going to space as a scientist. So you are not a colonel of the air force going to war. But, just remember, it’s the same people and the same traditions, and they are a hard people, a tough people. But you will see. You will like it.” And that happened.

There were a lot of funny events. Like, every Friday night, I was going downtown Moscow, and telling them I knew what I want. I mean, that was the deal that the president of CNES had obtained, after work they could not tell us what to do. But we are not, that’s what the Soviet, true, we could not drive a vehicle, which is, in fact, very understandable at that time, because we would have got killed one day in a car it seemed like.

So every Friday night I had my driver and my big Volga, black Volga, that could go anywhere because, of course, a special member. So I was saying, "Take me here," "Take me here," and, of course, I was meeting the bachelors of the U.S. Embassy. We had always at a bar meeting at the Marine Club of the U.S. Embassy, where all the military bachelors were meeting, the western military bachelors, and then we had an all-night meeting. This poor driver was taking me to all these places, waiting until six o'clock in the morning, taking me back home.

It was a great time, just because things, again, it was not war. It was not the enemy. It was just a very special environment, conditions. So we played the game. We played *a* game. We played the game to behave well and honor all the people on the western side. But we wanted to show that we are westerners. And they were fair. They were fair.

When I arrived, I remember that small apartment, the first thing I put in my shelves to show where I was coming from, were all my souvenirs coming from the U.S. Sixth Fleet. I had my *US Nimitz* cap and the lighters, the Zippo lighters. My partner [Patrick Baudry] said, "Are you crazy? You are giving me the most chance to be assigned, and you will be my backup." It started that way.

Later on, I heard, it was after the flight, mostly Alexi [Arkhipovich] Leonov, you know Alexi Leonov, who flew with Tom [Thomas P.] Stafford on the Apollo-Soyuz [Test Project] program. And Alexi liked a lot the U.S. Every Saturday we saw Alexi with jeans, also his baseball cap. And he was number two of Star City, and he was always dressed as a U.S. Texas farmer. I understood from him that the link between the astronauts and cosmonauts, at least some of them who knew each other, it was very strong, was very strong.

BUTLER: That's good.

CHRÉTIEN: So I did not make a mistake.

BUTLER: Good.

CHRÉTIEN: At least political, diplomatical mistake. There are plenty of stories, like the microphones. We knew, of course, we were under the microphones. We used them almost every day. One day we complained about the quality of breakfast. We decided to go on the mike and said, “This is not fair. Such an awful breakfast. Disgusting. We should have at least caviar for breakfast.” The next morning, for one week, we had caviar. [Laughs] They had the good sense of humor.

BUTLER: That’s good. And you were able to work within the system but still retain—

CHRÉTIEN: Yes, and exploit the system. We exploited it a lot.

BUTLER: Well, and it did work out well. You built a good relationship with everyone there at Star City. If you could tell us about some of what the training was that you participated in while you were there, how you trained both generally at the beginning and then specifically for your first mission.

CHRÉTIEN: Yes, the training. First, we were there for two years. That’s a long training. If you get advanced training, that’s a lot, when you see now how long they train the guys just to be

passengers. We were trained to be on the right seat, which is the—what they call the cosmonaut who sits there is an experimenter, the guy who is going to do science in space. On the other hand, they wanted to show, through that training, to show the other side what they were able to do. So they had to say to give us much more than normally was necessary to do this kind of flight, just for that reason, to show it; second, because of our background, the test pilot and the engineers. So we got the training of the left seater, and we were complaining about it because we said, “We don’t need that.”

I remember spending fifty hours on a very detailed course about the theory of space navigation, the [unclear], the real theory of how the computer gets informations, how you navigate in space. And even to fly on the left seat, I’m not sure you need that, but that were two years, and that was work, and the lessons were more like the scholar tradition with an exam every three weeks, and a teacher coming, teaching you at the blackboard the theory of everything, and you had to take notes and write your own handbook. So we learned a lot, and I still have those handbooks here. At the same time we were learning the Russian language.

We really started training on simulators in the second year, but the first year was purely theoretical. We also had survival training at the end of first year, coming back from the summer vacation, had and a nice week in the Black Sea to get used again to the system, and start by nice sea training survival.

BUTLER: All of this training, both the classroom sessions, the simulators, were these all done in Russian? You said you were learning the language.

CHRÉTIEN: All in Russian, and that's something I've been trying to convince people here, try to have our people speaking Russian as soon as possible so that we don't need interpreters anymore, because that's a mistake. What good are the interpreters? Most of the time they cannot be real technicians. I've been following the courses for NASA many times at Star City, taking a group of astronaut candidates, and follow those. The very first is a waste of time because half of time is spent in translation, plus thinking. The guy who translates has to think, so he takes more than half of the time by definition. So at the end, it's only 30, 35 percent of the time—of the useful time, is dedicated to the candidate, and there are a lot of mistakes during translation, just because the guy does his best, but he doesn't understand all of it.

For the future, I think as long as we work all together, and we understand that we keep the Russian language, its essential to have people fluent as soon as possible in Russian so that they don't need interpreters anymore, then you double your efficiency, at least. Personally, I think I triple your efficiency.

BUTLER: Did you know Russian before you began your training, or did you have an interpreter for part of it?

CHRÉTIEN: No, the beginning of selection when we—six months before going to Star City, we were five candidates left on the table. So the five of us were taken by the French Space Administration for six months of intensive Russian language training, plus, of course, some training on the scientific experiments. But the goal was to get us as good as possible before moving to Star City. So we had six or eight month's intensive language training. I remember well it was twelve hours a day, including Saturday, and it was a nightmare.

BUTLER: Definitely intensive.

CHRÉTIEN: Very intensive, yes.

BUTLER: But it obviously paid off for you.

CHRÉTIEN: It paid off, yes. We arrived there. In six, eight months, we cannot be fluent in Russian, but at least we had the good luggage. Then the Russians at Star City, we had the Russian language teacher, so that the first months we spent probably two-thirds of the time still learning Russian, about one-third of technical course, and two-thirds, and then slowly decreased, and at the end of the first year we had already a good technical package, and we were fluent enough in Russian. That helps a lot.

BUTLER: You mentioned the first year was classroom training. At the end of that was when you did survival training, and then the second year you moved into the simulators. What simulators did you train on?

CHRÉTIEN: In fact, we moved to our crews. We started crew training the second year. That was the time when you have still have classes, and mostly for us because we're on the first flight. So we had, if I remember well, like, 60 percent of the time with your crew in sims, and some classes, too, and 40 percent of the time on our own, with teachers to keep learning the space theory. It seems, I don't remember how many hours, but that's what we do now here. Soyuz—I

don't remember how many hours in the sim, the Soyuz simulator, and the Mir—at the time it was a Salyut-7 simulator.

I think, to give good numbers, that can be checked. Unhappily, I don't remember it. Roughly, I think we had three long sims a week in the Soyuz simulator and a couple in the Salyut-7 simulator, and same thing when I went back for Mir, and all the rest in theoretical classes. Spent a lot of time also with the flight director. I spent a lot of time with the flight director working on the checklist, on the ascent, entry, and orbital ops.

BUTLER: Did you spend time training also on the experiments that you were going to be conducting?

CHRÉTIEN: Yes. From time to time, I don't know how many times, probably once a month, we had people coming from France, from the scientist group, and spending like a week there, teaching us different techniques and the tools. And also having this kind of training with the Russian partners, because they had taught Russian partners about those techniques.

For example, the medical was the most demanding, and we had that echograph on board, and it's quite demanding when you are pilots to understand how these things work here and to look at them and interpret and be able to move your—to have to look at your heart, what's inside, and have the right position of the echoes so that you get a good picture. So we spent a lot of time training on that device. So that's interesting.

BUTLER: And your crew members had both been in space before?

CHRÉTIEN: Yes.

BUTLER: I'm sure they talked with you a bit about what it was going to be like.

CHRÉTIEN: Oh, yes. The commander had flown several times. I think that was his fourth flight or third flight. I don't know. He flew many times. The other one had one short flight and one long-duration flight. I think he spent what at that time was long, four or five months, on *Salyut shest* or 7—6 or 7.

BUTLER: When you learned that you were going to be assigned with this particular crew, around the beginning of the second year that you were in training there, and you continued your mission-specific for the rest of that year. What was the most challenging part of all of this training and getting ready for the mission? Was it putting up with some of this theory classes that you weren't sure you necessarily needed, or was it the culture shock? What was the most challenging part for you?

CHRÉTIEN: I think the most challenging was to wonder who of us would be flying. We are two, and for the first year, and that was a mistake. For the first year, we are in competition. They would do the final selection after the nine first months, before summer, before leaving for France for one month's vacation and also see the scientists. That's when the Russians gave the French Space Administration their own position, "It's your own choice."

So we knew that during that year that we had to do our best so that we had the chance to get selected, and it's not a very pleasant situation, because we are two good friends and working

hard together. I think very quickly we decided, “Okay, we’ll do our best, but we had better stay very well linked,” and we see it’s kind of a poker game, and one of us will be identified, but we don’t need to think it depends so much on us. It mostly depend on the people, and they probably had already their own choice in mind for different reasons. But that was probably the most challenging, the most unpleasant and difficult part of the trip.

We strongly recommended, when coming back, never do that again, and if you send new people there, tell them who is flying and who is not flying. That’s what they did. We had other teams going later on, again and again, until last year, and they always know who would be prime and who would be backup. So that was the worst part of it.

BUTLER: That would be very challenging.

As the time approached for your mission, was there anything specific that you were doing differently from the mission-specific training that you had been doing up until that point, as you came close to launch, within a few months or a few weeks of launch? Did things change at all?

CHRÉTIEN: No, not much. It was very pleasant, the way it was going. It’s a very, very, again, specific environment, and with their following their own traditions. And it was a very rich, very rich lesson about everything, more going deeper, going into the launch date, getting closer to launch date.

BUTLER: Did your family ever have a chance to come over and visit you during any of this time?

CHRÉTIEN: Yes, my kids came several times. So, yes, they came four times in two years. That was also the deal of the president. I think that whenever they want to come, they can come. So they, yes, at least four times they came. But Baikonur [Baikonur Cosmodrome, Kazakhstan] was at that time totally closed to families, even Russians, I mean, anyone. So the families could not attend the launch. They could see it on their TV. When you think about it, that was a little bit hard.

BUTLER: I'm sure it must have been. But I'm sure they were excited for you as well.

CHRÉTIEN: Oh, yes, yes. They came after our landing, and they were in Moscow when we returned to Star City after landing. The families were there.

BUTLER: That's good.

Well, the launch day did come, and you went on your mission. Everything went well working on experiments. If you could tell us a little bit about some of the key aspects of your mission, some of the most memorable things for you, or what was maybe the most challenging moment during the mission itself.

CHRÉTIEN: Yes. Maybe just before the mission was something we did not mention that doesn't exist anymore. It was quite special. We had to spend two weeks in Baikonur for quarantine. That was in June, so it's not the worst time to be in Baikonur even if it's very, very warm. So we had to spend two weeks. That was, psychologically talking, it's good to get close to your launch area and the ambience. Also, culturally talking, it's quite interesting. At that time, Baikonur was

way—much better shape than it is now, with traditions with everything. It was also a rich part of the world. We stayed up there two weeks.

So, the mission. So you mean the main mission and the—

BUTLER: Yes, the mission itself, what you were—some of the key points of what you were working on, or some of your memories of your actual spaceflight.

CHRÉTIEN: Okay. So I mean ascent, all that part, that's not—

BUTLER: Oh, anything you'd like to talk about, ascent, and the launch itself.

CHRÉTIEN: So, the launch itself. Again, we had the launch, I think at ten-thirty at night, something like that. It was an evening launch. The day before launch, we don't need to talk too much, because everyone knows now it's always the same up there, Russian traditions. We had a few traditional events, of course, with the medias, with the official people, in going to the launcher, and getting ready for launch first.

Your first trip to space, you're wondering how it will go, even if the two others brief you during. And I got confused. My main memory of the launch was that I had a watch that was not the right one because I got confused with the numbers. So I was expecting every event at the wrong time.

BUTLER: Oh no.

CHRÉTIEN: I knew everything was going normal because you feel that you are pushed up, and I could see the two others, and we are looking at the checklist, but I remember when I was waiting for the first-stage blowup, for my watch it happened one minute before schedule because I was still waiting for the next minute. So I suddenly hear a big noise, “Brump,” and everything stopped because before the second stage starts, there is a few seconds when you feel like nothing is happening. So I wondered, “What’s that?” because of that one second, and I looked at the two others. They were very quiet and feeling normal. As I say, you can imagine you are pushed hard, first by the boosters and the vibrations. So then when you don’t expect anything, there was a big boom, and everything stops, “Okay, our rocket blew up.”

BUTLER: Oh no.

CHRÉTIEN: Then I understood that it was wrong with my watch, but I could not put it—it was not at all the watch we had now. We did not have an Omega. I think I had a personal watch which was not that adapted for spaceflight, and I could not recycle the ascent, so everything happened in disorder. But we arrived in orbit, and, again, I could see that the two others are feeling comfortable.

That was, yes, impressive. A first launch, I think, for everyone is always very impressive, and mostly, if you get in that situation where things happen not in the order you think they will happen.

BUTLER: And, of course, once you reached space, I’m sure that was quite a significant moment for you. Here it was something that you looked forward to and trained for for quite some time.

Looking down at the Earth the first time must have been—or were you able to look down at the Earth from the Soyuz capsule?

CHRÉTIEN: Yes, the good thing is that after the cover, the rocket cover, that's probably like three and a half, four minutes after launch, this thing goes away, and your windows get open. You can look through it. I had the one on my side there. The other side is the side of the guy on the left. So you had a very nice view on the side. There is nothing to see during launch itself because it's close to your head. You cannot turn your head that easily. But as soon as you are right in orbit, you can look through that window. That's great to look at space the second you are in zero-g. But the most fascinating for me at the instant of the stop of engine, and the acceleration on the Soyuz, of course, is bigger at the end than the one of the Shuttle, which is limited to three, and I think here we go up to almost four or maybe even a little bit more. So you suddenly go, and you feel like you are stopped.

The strangest part was that everything starts to—you see a lot of things that are moving around you. There is life inside the spacecraft. Like, your pencil, everything is alive, when before nothing is moving. That's funny, to see all those things, the books, start to float, and I think, a lot of life coming in, and these objects turning on themselves. You get used to that very quickly. In fact, I remember when arriving there, looking at all of those things floating around. I found it very, very funny.

Then I looked through the window, and there was a beautiful sunset, and I was impressed looking at that, for the first time in my life, the curve of the horizon and the darkness of the Earth and the darkness of the sky. It was just this white phosphorescent line of the horizon, and I was looking at that. Gee, this is worth the price to come down here. [Laughs]

BUTLER: Worth getting used to that totally different culture and spending the time away.

CHRÉTIEN: Yes, spend those two years in a place, you get your—how do you call that? Your—I forgot the English name for that. You get your reward.

BUTLER: Yes. Well, and you did spend several days in orbit at the [Salyut] Space Station performing the experiments that you had worked on. What was that experience like for you, working with the crew members and just working in space?

CHRÉTIEN: It was a great thing, too. Of course, I knew these guys for the year I was training with them, these two guys and two others up there a little bit less. First, we had one day in the Soyuz. At that time it was not two days, but just one day before docking, and we were up there ready at like at one-thirty in the morning. Everything was ready for the twenty hours' navigation we had before the next evening, and the recommendation of the ground was, remember, try to sleep the first day. Okay, I have to try to sleep. In the Soyuz there is not much room, and I was very surprised. I had six hours' light sleep the very first night in space. I was quite—and the two others two, all of us. It was a kind of a funny thing, the suits floating around and you try to find a place, because, again, it's not big.

Then the next day, mostly really there's not much to do during those twenty-four hours, a few change of orbit, keeps you a little bit busy from time to time. But it's a long navigation, and even now with two days it's really a long navigation with not much to do.

The main milestone there was three hours before docking when my two partners became very hungry and they wanted to eat. There is a small kitchen in the Soyuz. They always wanted to eat, and I was not as hungry as them. I was not sick, not feeling sick at all, but just not hungry. I was on the top of this compartment watching them preparing their food and to see these two monsters preparing their dinner and eating and eating and eating. I started to get, you know, like in a boat when you are—don't have a strong appetite at the time in the boat, but then you see the others eating and you find that disgusting. I was watching these monsters, and I say, when do they stop? They are passing me food. I say, "No, no, no. I wait." [Laughs]

Then we went for docking, and there a real nice dinner was waiting for us. Then I had my appetite there, because the two guys in the Salyut 7 had prepared a very nice Russian dinner for all of us. But the two monsters were still hungry, so they had their second dinner, no problem.

BUTLER: Did everything go well with your experiments during—

CHRÉTIEN: So then the flight itself more important than all of these food details—

BUTLER: Oh, no, this is very interesting. That adds some of the human interest to it.

CHRÉTIEN: So we had first medical experiments. As I say, the echography was probably the main one. The second one was neurosensorial experiments. There were a couple, at least more different experiments in the neurosensorial. Then we had the astronomy experiments, in astronomy and astrophysics. There were two or three of them, and one in radiation. We had also

metallurgy. We were trying to make crystal, space crystal. Many people were trying to do that at that time. There was a nice oven in Salyut 7 for that. So we brought home the five-side, I think, eight different cartridges to put in that oven. So there were some crystalography. That's about it, enough to keep you busy for seven days on [Salyut] Space Station. Everything went well. The scientists got all of their results.

The most difficult at the beginning was the echography, for two reasons, because your heart is not in exactly the same place when you are in zero-G, and we did not do any training in parabolic flights where we might have—I don't know, it's too short, twenty seconds to do echography. So for the first hours the first day, I could not find at all any of the pictures that I was used to see on Earth. I'm very worried because, okay, what are we getting here? Every time I thought that I get the good pictures, it was not at all. After a while, I'm asking some of these guys to come around because they had been trained, too, at least two of them. They were coming quickly, "Oh, it's good. Don't worry. Put that in the printer, and don't worry. Come and enjoy the flight."

At the end, it appears that the second reason, probably it's the most important, that the echograph that we had on board, we had never seen it before, and it was much more performing than the one we had for training. Yes, that also is something sometimes you don't know with scientists. When you have a test pilot and military culture, when you are used to have straight things, always the same, and if something is different that people tell you. But, here, no one told us that they were not at all the same. So the second one, the one involved was much more performing, much better, a lot of detail, and I'm not the doctor. I'm not the scientist in the cardiovascular science. So, of course, all these things, what is that? Then that's where the Russians were right, "Ah, it's good. Don't worry. Your heart is still there. So what you get,

they will be happy with it. Don't worry." At the end, that's what happened. But I had to get used to these new pictures that I'd never seen.

But the good thing on that experiments, probably which is a kind of a shock also at the beginning is that it's very interactive, and the lesson of that mission and for the future on my next flights, if you don't get into an interactive loop, you get bored very quickly. The second experiment, the neurosensory experiment, was totally—that was a disaster, and then you had to make the second flight. I mean, we made it, but we were upset at the end of each session because we had to spend two hours or more raising your arm, putting your arm down, then closing your eyes, opening, long. It's not interactive at all. It's something that's observing you, I mean, telling you, "Do this. Now do this," and you have to raise your arm twenty times in a row. This poor Russian cosmonaut, writing on his paper, we did the second, number three, number four, number five, number twenty, and then for another, and another, totally not interactive experiment, and that's a little bit risky in that people get disinterested during the flight and that they don't do it well.

But nowadays we have experiments which are much more interactive, where you really interact through computer. They are computer-assisted. So, well, we did that, too, all the way. Then the astronomy was not very interactive, too, but at least we had to operate a lot of different stuff to make sure the orientation of the [Salyut] Space Station was good, that we were not moving because we're doing long, very long-duration exposures, for more than one minute, filming faraway objects in the universe. So that was tricky, at least three people or four people involved in that experiment all the time, waiting for the dark night and having the Station's right orientation, then stop it. We could not use any of the attitude engines during the exposure because the light of the film was so sensitive that the picture would have been white. They got

results. I know they were happy with their result. I'm not sure they're very important for science, but they got results.

The metallurgy, we got those crystals. I don't know what they have done with them now. The bad thing, too, is the scientists, they get the stuff and they don't tell you much after about what they have done.

BUTLER: That's too bad.

CHRÉTIEN: Except the doctors. The cardiovascular stuff, we had many meetings with them after.

BUTLER: Well, eventually it came time to come home, come back to Earth. If you could tell us about that experience.

CHRÉTIEN: That was a great time, too. Again, starting with the funny part of it and then talking a little bit more about professional and technical. The funny part was that we were in a rush because the commander, Vladimir [Aleksandrovich] Dzhanibekov, who was a piece of fun in the flight. I tell you, these guys, really, having someone like him in the flight, you don't get bored. He was late to get on his seat because he was doing some stuff in the orbital compartment, and he was still in his underwear when we were already sitting in our suits on our seats. You cannot wear your—it's not an EVA [Extravehicular Activity], the IVA [Intravehicular Activity] suit on the Soyuz. You have to do that in the orbital compartment and to get ready. He was busy there. I would say, "Vladimir, in two minutes, we start deorbitation, and the door needs to be closed,"

and Sasha [Aleksandr Segeyevich] Ivanchenkov, will say “Hurry, where is he? In two minutes, and if the door is not closed, we have to wave off and they won’t be very happy down there.”

He said, “ Yes, I’m coming. I’m coming.” Then we realized that was a small compartment that’s put in the left of my head here only when I am in my seat, and it has to go with special—tricky thing. But the technique of it is not a very good thing, so we could not have it there in place. One of the bolts did not want to go in, and we are out of time. We have that problem, and we have not solved that problem.

“Yes, I’ll do it. I’ll do it.” So he came, was still in the underwear, and for two, three minutes, and tried to put it. “I’ll do it,” and he could not do it because it was something wrong. Maybe with the vibration on the ascent, this bolt moved or turned. This thing could not be—then we saw him start to be worried. He rushed back into the orbital compartment, took one of these huge metal cutters that we had for the crystals and that we disassembled so they were remaining there with the garbage, took one like a hammer and on all the protection of the Soyuz [bulkhead] and started to tap on this bolt, just take it away, and I say, “This is space!? Please, where’s the hammer?” [Laughs] And I could see the metal, and that’s the frame of the Soyuz [bulkhead], just melded to the frame of the Soyuz. He was breaking that part right on the side of my head, and time was going. [Laughs]

Then he rushed back in and put his suit on. Thirty seconds, thirty, twenty seconds, came back in, it was not totally fit, closed that door, and right in time. One of the funny part of the return.

So then we started deorbitation and everything was going fine. One event that we watched from up there was kind of funny, too, is that from space was the Falkland War. We

could see through the clouds big, black smoke of one ship. I guess it was that, because it was a huge black stain of smoke in the white clouds.

But we started reentry. That's very impressive, too. I must say when you fly on the Shuttle later on, you see the huge difference. Coming back to Earth in a capsule, you really feel that you are in a storm, and you know that you have parachutes on your back, and that will get open all by themselves. There is nothing you can do. You have no control on that. So also for test pilots when you are used to handle all the things by yourself.

And the same thing with that damn watch, it was not at all adapted for spaceflight. I gave it to my daughter after.

So I was again looking for different events, and everything was going fine, and I had the time that one second precision at the time when the parachutes are starting to work, and I was waiting, looking at the small wand [second hand]. Okay, it's now five seconds, two, and nothing happened. We are still in reentry. "Geez!" So I started back in my seat here, "There's something wrong here." I actually don't get up, and, again, I was looking at them, and they didn't say anything, and, again, my watch, it was the wrong time.

The parachutes, and like, twenty seconds later, they got opened. They start, and that's where you get worried very quickly because they start opening at the time when if they don't get open, twenty seconds later you are on the ground. So that was really fast, ten kilometers altitude, and you go—you are still going Mach 1-point-something vertically, so you hit the ground very quickly. So they started working. I said, okay, again, my watch was not the right time. So the rest it went great the parachute got open, and that was a very, of course, very smooth final flight.

It takes longer. I think it's fifteen minutes, descending under the parachute, and you can look through the window. You can see the helicopters running around. The funny part, you

know where you are landing, because there are a lot of trucks and people in Kazakhstan [U.S.S.R] who know, and they are waiting, and when they see the parachute coming from far away, they all go full speed, and you see the dust in the back, so you can see contrails following along. And say, "Okay, the meeting point is probably where we are landing." And that's exactly what's happened. And you land. There were, like, I don't know, fifty trucks, tractors, horses, and people of Kazakhstan coming to welcome you. It's kind of funny. Can you imagine at the Cape [Canaveral, Kennedy Space Center, Florida] if after landing a Shuttle, all the people coming from the beach and fishermen all welcome you?

BUTLER: And that's quite a contrast, too, having them ride up on horses when you're in a spacecraft.

CHRÉTIEN: Yes, when you get out of the Soyuz and you see a few of these guys on mules and they don't have shoes, people are living in the desert, and they are there, just keeping away, not too far. There are a lot of contrasts.

Now, Soyuz was on the side, and there is a sensor for landing, a sensor that tells the altitude of the Soyuz, so it burns small rockets so the landing is smooth enough. Then most of the time the Soyuz lies on its back, and those sensors are radioactive. They work, and so the technicians are supposed to very quickly close that part and tell people, "Don't get too close." It's gamma radiation, I think, its just a sensor. And after our landing, I was wondering because there were people all around the Soyuz. I said, "These guys are right there where they should not be." That's also part of what these guys are doing.

On the second flight, they were much more careful. But at that time they didn't seem very cautious, and so some Kazakhstan people got probably some radiation in their stomach.

BUTLER: Well, you had come back from—and now you were the first westerner, other than an American, to have gone in space, the first one to go up on a Soyuz, on a Proton rocket to the Salyut. What was this experience like for you publicly, through the media, the response from both the western media and from the Soviet media and the French media?

CHRÉTIEN: I think they are—well, again, it's not the place for much talk about difference of political culture within our countries, and the same thing in Moscow, too. The best and well-framed contact that I had was with the U.S. people, who knew exactly what the—and I have lots of anecdotes about that. Our people, they're always wondering if they made the right choice, and that was, unhappily—our flight happened at the beginning of the first Afghan war. So the French president said, “We don't know that flight anymore.”

So the president—so we came back to France, there was absolutely no official welcome back. I think we arrived at the airport. They had told the press that we are not coming that day. So we arrived like tourists, and the only people welcoming us at the airport in Paris when coming back were the people from the Soviet embassy. [Laughs] There was no one else, no others there.

BUTLER: That's interesting.

CHRÉTIEN: So we came back in a total shadow. A total shadow. I was personally okay with that, because—so that I can go on vacation and have a good time. That's what we like on all

flights now here. The rest on this first flight to be totally overloaded by requests that you have to honor. So at the end— But it was strange to see that the same people that had decide to send you there then decided to totally ignore you and say “Sorry, but we don’t deal with those people anymore.”

Through the relations and personal relations through the military, the U.S. military and also NASA was interested to know about that flight, and we kept on the professional side, and we started to have very strong relation with NASA and with some American people whom I knew before. That’s probably how very quickly we came down here, because we were in Houston one year after the flight, one and a half year. I met Mr. [George W.S.] Abbey, John [W.] Young, and Bob [Robert L.] Crippen when they came to France after the first flight of the Shuttle. That was before my flight. So we had already a good relation with NASA Administrator and a lot of astronauts, and they did not care of the Afghan war, was totally— That, I think, is a good thing here, people separate things. That was a good lesson, too.

BUTLER: So your interactions with NASA, both a little bit before your mission and then afterwards, with briefings, led to you then coming here, you and your fellow crew member coming, for the [STS] 51-G crew.

CHRÉTIEN: Yes. And for the anecdotal part of the story, too, we met with NASA Administrator [James M. Beggs] at the Paris Air Show, 1981. So that was right after the Shuttle launch, and one year before my flight, but I was already assigned as a prime. The head of French Space Administration, we had that lunch all together, and they were talking about the eventual next flight here, and the deal was to fly the guy who would not fly with the Russians. But he kept

saying, “No, no. If you fly, we want to fly you.” So kind of difficult how to explain the one guy was my backup, to say, “No, next I am doing it again, because they are interested to fly the one who flew with the Russians so that have some comparison.” So we were in the situation very—for a long time, when coming down here, NASA was still pushing it, “We are more interested in flying the one who flew already.” So it was kind of tricky.

But on our side, we could not—I mean, I was not involved in that. It’s not my—I did not have anything to say. But the head of the French Space Administration one day told me, “You know, that’s what they asked me, and do you think it’s fair if I do that?” and I could not tell him, “Yes.” So it happened the other way. I came down here and reversed the position. But that was the right thing to do, because just imagine on the personal side if we had done it the other way, had gone for that second flight. Then we would have been in a very unpleasant situation.

BUTLER: Well, it did work out, because you did eventually have your own Shuttle mission. Before you came here for the 51-G mission, did you serve any particular assignments with the French agency?

CHRÉTIEN: The two of us remained as astronauts, but there was a very timid start in the space community in Europe to build, to see what should we do in the future or what should be the European space program. Although there were many ideas, we were still not talking about the Hermes. Hermes was a small space shuttle that I don’t think at that time we were already talking about that. But capsule, or what should we do? So we were moved to the Technical Space Center, the [unclear], Space Center in France in Toulouse, Space Center [unclear] there technical assignments to follow this point.

But, also, we spent a lot of time in conferences and debriefing the flight. Then as soon as we knew that there would be another flight, we also worked with the scientists on the experiments that should be brought on the next flight. So that was the assignment for that short period.

BUTLER: When you came down to work on the 51-G mission, what point was that mission in progress? The prime crew on the astronauts from the NASA side had already been appointed, and then you were coming in as payload specialists. How far along had the mission planning gone for that?

CHRÉTIEN: How far? Sorry.

BUTLER: How much training had the NASA crew been through on planning for the 51-G mission before you came down?

CHRÉTIEN: Ah, we came here, I think, in August, July, August, and that specific flight because, in fact, the flight number was changed because Jake Garn came to fly, Senator Jake Garn, and took the seat of Patrick [Baudry on 51-D]. So the flight was postponed. We moved to another flight, to 51-G, so before 51-G it was a flight that was going to happen, I think, in February. So the training would have been very short, like three or four months, because we started training in September, early September, for a flight to happen in January, I think.

But that was the principle of payload specialist training, where your specific part of Shuttle training is very short, which makes sense. And then the flight was postponed to the one,

to 51-G. It happened in July, so we spent almost one year here. But we are in Building 32 with the experiments, and, in fact, in close relation with the PI [principal investigator] and mostly the echograph PI and neurosensorial, I think. But we took on board the two medical experiments that I had on the first flight. So most of the training were with these guys in Building 32. There were very, very little training on the Shuttle as a payload specialist. Mostly, at that time, you spent very little time with your crew. That was the main difference with the formal training on the Soyuz.

I don't know, now we almost don't fly payload specialists anymore, and all the years I've been here, I've not seen any payload specialists flying. So I don't know if it's still the same or, at least now—yes, I've seen a few of them. They are with us in Building 40 South. They are on the sixth floor, but you see them from time to time.

So, of course, I remember Baudry, Patrick was disappointed because he thought that I would be a Shuttle crew member, and we told him, “No, you are a passenger.” After that training, it should have been the same thing, also, in the Soyuz, but, as we said, at the beginning of the two years, and they decided for us much more than necessary so that we could come back and say, “Oh, we got great training.”

So, of course, he was, “I'm not getting the same thing here.”

I said, “No, but it cannot be any other way.” And when you go through mission specialist training after, you understand what are the difference, really specific training for each kind of crew member. If you are a pilot, you have your own training. If you are a mission specialist, you have that kind of training, and if you are a payload specialist, you have it, and it's just a very little bit of what the others are doing.

When, on the Russian side, it's only three people, and they are close to each other with the same panel, so it makes sense that they are trained together. Here we have huge machine, seven people on board, some are up there, some are downstairs. So it cannot be the same training at all. But it was hard. And some of the astronauts, I remember, tried to explain, said "oh, Patrick, it's just because it's different." And he was "Alright, alright. I want to be on the flight deck and see what you guys are doing." [Laughs] But they were nice. They took him many times on the ascent-entry training so that he could see this from the back what you do, ascent, entry, and he had a chance to follow a few of them.

We had great guys at that time, great friends like [C.] Gordon Fullerton, Owen [K.] Garriott, and Karol [J.] Bobko, who was the first commander on the flight we are supposed to go. It was a good time.

BUTLER: The culture difference between the Soviet and the American, they're obviously very different, as well as the training differences that you had mentioned. Was it more similar to what you were used to, coming here?

CHRÉTIEN: Yes, I was not surprised here because, again, I had been working with American guys for a long time, and most of the U.S. experience, and also the Air Force, and so I knew how it would be. I had absolutely no surprise. Here, the good thing is that they tell you. "This, you won't do it. This, you do it," and you know exactly what is your frame and is no discussion, it's kind of military, and at the time with NASA it was much more military than it is now, which I won't say that they are bad. Now the civilians are bad. Don't make me say that—

BUTLER: No, no.

CHRÉTIEN: But I have been in the military for most of my life, so you are used to it. You know what it is. And, of course, there were a lot of differences, but, again, the tools are so different. It's not cultural. I think culturally people here are much closer to the Russians than Europeans are close to the Russians and mostly to the French. You find here a lot of traditions which are quite similar, probably because a lot of American rules also come from eastern countries, from the east of Europe, as well as from the west. So I was not surprised at all.

BUTLER: Interesting.

CHRÉTIEN: But, again, yes, the tool is very sophisticated, and the Shuttle at that time was still a brand-new tool. It was 1984, and the first flight happened in '81. So people were really busy learning that tool and dealing with that very, very complex tool and not having really much time to do [unclear] and play the guitar during training. [Laughs]

For me, I mean, it's very nice on each side. That's why I probably remain for so long in that program. It's very nice to work with these kind of people on both sides, very, very nice people. They were very nice to us on both sides. That's also a great lesson, people dedicated to—I'm not sure we would do the same, just go training in Italy and France. I'm not sure we'd get the same thing. Italians and French are a little bit similar for that. [Laughs]

BUTLER: What was your role as a backup during the actual mission itself?

CHRÉTIEN: In here? The 51-G?

BUTLER: Yes, 51-G.

CHRÉTIEN: Much less than being a backup in Russia, just because in the spirit here you don't have a backup. I think even initially they were not planning to have any backup for us. It's just an agreement between the French space administration and U.S. space administration. They say, "Okay, can we have a backup just to keep going that way for the future?" and they agreed.

But the problem is that you don't really have training for the backup, because if you go to Building 9 with the crew and you have a session training, where is the backup guy? He's not really the crew. In the Soviet system or the Russian system, you always find two crews. So the backup is with his own crew, and the prime is its own crew. So you train two different entities for one year.

Here you have one crew, and suddenly one of the crew members has a backup, and that's what happened to us, and I think it had happened also to some others, but it's not very easy to deal with, the backup, when he's in the same crew. Technically, that doesn't work.

So my training was mostly to follow, to look, and just get my own culture on the system here, but just following, just looking at how it was happening and how training was happening. I went there in Building 9, just be there and follow and get my own—the only real backup training that you get then is on the experiments, the scientific.

BUTLER: Did you have a chance to go down and watch the launch in Florida?

CHRÉTIEN: Oh, yes. I think we watch a couple of launches. I think so, yes. Yes, we watched another one before.

BUTLER: At what point did you learn that you were going to be on another Soviet mission?

CHRÉTIEN: That was late. That came—I don't remember.

BUTLER: That's okay.

CHRÉTIEN: My memory is—

BUTLER: Is that while you were over here working?

CHRÉTIEN: Oh, no. That's not when we were here. That's way after. I should remember that.

BUTLER: That's okay. Well, you had gone back to France then, in between your work here as a backup crew.

CHRÉTIEN: Yes, I thought what I was going to talk about. I met my wife here.

BUTLER: Oh yes!

CHRÉTIEN: I got confused between the two questions. Oh, yes, now I will remember how that second mission got so—because that was a very interesting situation. I met my wife, Amy, here during training, during my backup training. So I had an American wife. Probably the Soviets knew all of that, because they know everything. But we had no information about the future flights, because none of the other countries had flown with the Russians anymore. There was one flight, and that's it. But they probably were still interested in what was happening with our country than with the 51-G mission.

So we got back in the process. I still don't remember exactly how it happened and how they proposed a new flight for us. I personally was asking, of course, "When is my next flight? What is my next assignment?" There was nothing on this side here, nothing on the other side, too. I started to talk, and the official decision was taken, was Mr. [Mikhail Sergeevich] Gorbachev was traveling to France, and I think that was one year after this flight, after 51-G. I'm trying to get the—or maybe in '85, which means six months after the flight. That was at the end of the '85 year.

So we were [unclear] one day, and Mr. Gorbachev officially invited. At one meeting at the end there was one Russian guy there saying, "Oh, you are going back to Star City, and you have an American wife now?" Yes, I remember that.

I said, "Yes." And Amy was starting to learn Russian, and that was early '86, yes, yes. That's it.

So we went back to France. The air fare was paid at the end of '85, and early '86 we started the process of, again, of selection to know who would go there, and they think most probably it's going to be me because it's a long-duration flight and EVA and stuff like that.

So I got my wife ready. I said, “Okay, not only I took you back to a new country, which is France, but you’re not going to stay very long. We’re going to move to Russia in summer.”

BUTLER: Now, was she working here at the [NASA Johnson] Space Center or—

CHRÉTIEN: She was both at the University of Houston and here at NASA on the project that NASA had with the University of Houston, but mostly for young people trying to be involved in the space program. I think it was Space [unclear], Space Youth, stuff like that.

BUTLER: So she was at least familiar with the space activities, so at least part of going all the way that far across the world would be familiar.

CHRÉTIEN: Oh, yes, so she was not surprised.

BUTLER: Had she known any French before she met you?

CHRÉTIEN: No, no. And she’s good in language, because she starts to learn French when we met here, thinking she would spend part of her life in France, and then she started learning Russian.

BUTLER: She gets a new husband and two new languages.

CHRÉTIEN: Yes, it was interesting.

BUTLER: So was she able to come with you to Star City when you went this time?

CHRÉTIEN: Yes, yes. Oh, yes, she could tell you a lot about her own experience. [Laughs]

BUTLER: I'm sure.

Well, how was this experience for your new mission different from both your first mission with the Soviets and from your training with NASA?

CHRÉTIEN: The first, the ambience, that is, the frame, was very different, because it was still the military, Star City, still trying to keep the same strong people, keeping us in a strong way. But the ambience was very different. It was Mr. Gorbachev, who already, a very different Soviet Union, and you could see it in many details. For example, no more of these red banners in the streets of Moscow and with the people and the heroes of the system. It was much more liberal, and, of course, for her, it made it easier.

For us, I had a new backup in the mission, Michel [Tognini], and it was a little bit more—it was different, and I won't say more difficult, but less facilitating. They were trying to become what they were not prepared for, also get more accidental. But lot of the advantages that we had the first time, we did not have them anymore, like half a pound of caviar on Friday afternoon, mandatory. Other stuff, the risks were higher. You could not go into the streets anymore. I mean, the time before, I'd never seen a student was—you can say, "Okay, be careful. Don't go there. Don't go here." Stolen some things, was really not happening. Star City was really—you could leave your door open.

That time you could see that they were feeling that some differences were happening. The level of risk was different. That was also on the end of the Afghan war, and there were a lot of mini-earthquakes in the—I mean, people earthquakes, like some military coming back, and dismissing, and talking at TV, which was absolutely impossible in the previous era. You would be sent to Siberia.

At that time, they had the TV admissions where you could see the military talking about the situation in Afghanistan and say, “That’s worse,” and complaining. The military, even I would not be able to do that in France. So the country was changing very quickly, very fast.

The rest was the same. The Star City ambience, the tools, the training was exactly the same conditions. Longer, we spent more than two years just because it was long-duration flight. But all the rest was the same.

BUTLER: Of course, this time you were training for an EVA as well.

CHRÉTIEN: Yes.

BUTLER: Did you train in the water facilities there?

CHRÉTIEN: Yes. For that, unhappily I did not get a chance here to go through my EVA training when I was in the class of ’95, because I got into a small ear accident in the pool. But it seems to be very similar, very similar, the same way, which is not surprising because you do the same thing. The EVA suits are quite different, for sure. The one here is smoother, and the other one is a little bit rougher, but the way to train seems to be very similar.

BUTLER: Well, on your mission itself, then, you'd gone through the training very similarly, of course with the different experiments, different with the EVA. But you go for your launch, and this is, of course, quite different. You're going to a different space station and you're doing this EVA. Would you like to talk through—again, you can start with the days leading up to launch, launch itself if there's any particular differences there, and then talk some about—particularly about your EVA.

Actually, before we go into that, though, we're going to go ahead and pause and change the tape, if that's all right. [Tape change.]

BUTLER: Okay. If you could tell us about some of the highlights leading up to the launch, the launch itself for this second mission that you had.

CHRÉTIEN: Exactly the same things. The stay in Baikonur was way shorter. A change also, I think we spent one week instead of two. There were a lot of people at the launch because, again, the agreement, now remember, it's a bit more, but the condition of the agreement for that flight were signed together with Mr. Gorbachev and President [François] Mitterand in France. So President Mitterand decided to come to the launch. So you can imagine the crowd, I mean the president of the country coming.

BUTLER: Was your wife able to come?

CHRÉTIEN: And then my wife was in Star City, and she was pushing hard to say, “Okay, if there are French people going, why I’m not going?” We’re still in a situation where no family had ever been in Baikonur before. So she was already in touch with a good deal of people, and she got in touch with Mr. [Eduard] Shevernadze, who was the prime minister of Mr. Gorbachev, and went to her, “Okay, I’m inviting you. You come on the plane.” So she was telling me, because the French said, “No, no, no. You’re not coming.” So there were plenty of French, a bunch of French people with nothing to do there, and were, of course, coming. My wife was saying, “That’s not fair. I’m trapped in Star City.” So she made it, with my son also. They met.

But I was happy because no one else had done that before, and my commander said, “It will be a mess. She doesn’t know Baikonur, and I’m afraid she will be dropped by Mr. Shevernadze’s people somewhere. She might never see you. This is not a good psychological condition.” And it’s true. It happened at the end that—you have seen the movies of Baikonur before launch. There’s that small room, which is twice that big [Chrétien gestures], where the media, the official, all the people who get in, and, of course, no family, and you are on the back of a glass. The other side, the crew is there and talking to these people for forty minutes. For that long there were three full airplanes and everyone, of course, had a good reason to go into that room. The room was full, plenty of people outside, totally out of control. Dark night, evening of December, very cold.

My former commander, Dzhaniybekov and Sasha Ivanchenkov, decided to go to assist the launch. Dzhaniybekov was really a very official people in the military and a cosmonaut. And he heard about that, he heard that my wife and my son would be there. He said, “What?” So he decided to look for them, and he found them. Of course, my wife was crying. She was in the parking, totally lost. There was thousand of people, and he found them right on the lot.

Typically Russian, too, the way they can—he found my wife and my son, took them, and he had all his decorations, put people aside, and took them in that room.

I was [unclear]. I was in the back of the glass. Time was going. I could not see anyone. I said, oh, [unclear]. That bunch of French people, in more ways, they are people who really had nothing to do there, but they just wanted to be close to the big people. I was looking around. I don't see my son. I don't see my wife. Suddenly I saw them in the back with Dzhanibekov.
[Laughs]

BUTLER: That's great.

CHRÉTIEN: That was not the right thing to do, but I could not say anything. She had organized that, and now she will remember what it is to be too close to the high politician. They are nice to you when they can, but then they forget about you because they have other stuff to do. So it was a big lesson.

Then the rest, the same thing. We went to the launcher and launched. But that time I got the right watch. I had a nice Omega at the time that I got from Tom Stafford with the Omega people. So I had a good Omega watch. I had even two, in case one fails, but they don't fail. Omega doesn't fail.

So, of course, the launch was quite different and quite comfortable. When it was the second time, you already know exactly what will happen. And there was a big difference with the first launch is that at that time they upgraded the rocket, the Soyuz rocket, with a new engine, new fuel, and, in fact, they did not keep in the future because they were very expensive, but much more performing. So we had plenty of weight availability for that flight that we could not

really take. So at the end they had decided to put in our orbital compartment all the stuff possible that we could take to Mir. So there was no room for us, and the navigation to Mir was two days instead of one, and when we opened the orbital compartment, it was full of stuff, full of stuff everywhere, and a very teeny space for us. But a good thing that we could carry even personal belongings, as many as we wanted. There was no limit. We were still not with the maximum weight available for that launch.

I even had a keyboard, that is now, I have to check that it's still at Building One on the ninth floor. I took it back in the Shuttle, and a French museum is asking for it desperately. It's a keyboard that spent nine years in space. So I had it in the Soyuz. We took it to Mir, left it there. I took it back four years ago in my flight, Shuttle flight.

BUTLER: When you arrived at Mir, now you were on a second Soviet space station, quite different from the Salyut. If you can explain some of the differences between the two, especially from your perception.

CHRÉTIEN: So the main difference was, much more modern than Salyut 7, totally different, of course, arrangement, I mean the way to arrange those modules. The Salyut 7, all those Russian space stations before were just one or two modules, and mostly one, when Mir was supposed to be in the future, built with all those modules around. So it was visible already in the first one that was there. There were two modules when I went there on that flight, but it was built to get more, much more.

The tools involved were—the general organization of the main module was more agreeable than on Salyut. But they had a big problem, I remember now, that they told us on the

ground that we realized was absolutely true when coming up there, that just because they were planning to have a big space station, they already started to bring along a lot of stuff, and there were boxes everywhere around, except the main module. The main module was great. But we had what's called a Kvant. They called it the first Kvant module. There was just a tunnel in the middle to go through, all the rest was hardware that had been brought there, and it was impressive to see how much hardware was already there, waiting for the next modules. In fact, it went the same way with the next one. They were always bringing up more and more stuff.

So to find out how our experience is, it was also a piece of cake. Good thing the flight was long, because the first day I remember asking Vladimir [G.] Titov, who then became a great friend and we got together again on STS-86, and he was there as the commander of the Mir, with Musa [Khiramanovich] Manarov. They had been there for eleven months already. So they got our stuff ready a few moments before, and I said, "Do you know where is my echograph?"

They said, "It's somewhere there. You have to look for it." [Laughs.] I'm going in the middle of all those boxes. In zero-G, when you move one, all the others start to move. So you start "bang, bang, bang, bang." You take one out, and they're all floating around. It's an unbelievable impression and situation, to be in the dark of this module, which is big enough, and having all these boxes that these guys have arranged just—well, it's kind of sort of like in an attic where they stay on the floor. Here, they're all floating, and, like, telling you, "Hey, you won't get me." [Laughs] So for one day we looked for our experiments. Things as big as an echograph, could not find it. That was also a big difference with the first flight.

But we got all of it, and we got back in the situation we knew for the first flight, I mean doing those medical experiments and the same kind of experiments, more sophisticated. It was much more time, longer duration.

I enjoyed it much more than the first one, because then I realized and I heard all of our astronauts here who went through long-duration flights, they all say exactly the same thing, on the short-duration flights, ten days, even twelve days, you still have not gotten to the point you get when you go for at least one month. Mine was even minimal. I was supposed to stay three initially, and the spirit is totally different. The ambience is totally around you. You feel like a spaceman. You are going to live in space for a while. You are not thinking about anything else but staying long in space and getting used to it. It takes around twelve days to really start feeling that you are living in space. Your home is space. It's after—and everyone has the same there, twelve days, two weeks, then you start.

Then the next two weeks are really so different, and, of course, if you stay three months, four months, it's so different, what it is. I know Frank [L.] Culbertson [Jr.], on his debriefing, said, "Just remember. When you get assigned to a long-duration flight, you are not doing the same thing. You won't be the same and having the same impressions of what you feel when you go in a short-duration flight. It's a totally different world."

So time was going on with all of these experiments. I found it much more attractive this time, even going shorter span, because you think about the nice side of spaceflight. For example, you are watching some stuff on Earth, and you know with the orbital position that if you don't see those things the way, it's still night, for example, in a place where you would like to see during the day, the best example, you say, "Okay, in two weeks, this part of Earth will be in the light." On a short-duration flight, you never see that. So you have this kind of thing in mind. You also have a birthday, for example. It will be in three weeks. So there is a birthday. So we have to know how we organize it. So your experiments go faster. You are not totally taken by the experiments. There is part of time that you get for the future, for events, for whatever is

there. It might be technical, too, or, I guess, for the Russian, they have to fly the Soyuz to the other [side]. It's something that you have in your mind, and it's, professionally talking, it's more well organized. That's probably what Frank wanted to mention. When you get on a short-duration, you are "boom, boom, boom, boom, boom, boom." You participate to—the very, not the best part of a space mission, of time in space. You don't have time enough to really enjoy the total surrounding of the space mission, the real space mission.

So it went great, and I was still hoping that they would let me on board for longer. But for that I had to convince—what is his name? The doctor who was there for five months, that he would come down instead of me. There were a few discussions on the ground, but that could have happened but he did not want. Because initially I was supposed to stay three months, and they did not have the module for three months. Then it was shortened to forty-five days. Then at the end, a couple of weeks before we left, they had to reduce it to one month. Then they had to reduce it again four or five days because the French president could not be at the initial launch date. We had to wait for four days.

So my flight was shrinking, and for me it was a short flight, one month, just—[Chrétien snaps his fingers]. It was like vacation when you get half of your vacation, that I wish it was still 100 percent of it, that I was wondering, how can I stay more? But I didn't.

After my first flight, at the end of that first flight, I was feeling, "Okay, if this is that what it is, on a spaceflight, I'm not sure I'm a candidate for a long one," and I know a lot of our guys are in the same situation. That was my thinking on the first flight, because we were already talking at that time of long-duration flights. Do that for one month or two months? I'm not sure, because it's so demanding, and, in fact, it's totally the contrary. On the second flight, I could have stayed much longer.

BUTLER: Well, that's good.

CHRÉTIEN: Then maybe a few words about the EVA.

BUTLER: Yes, please.

CHRÉTIEN: So the EVA, as you know, we do it here also on the Shuttle, and it's prepared. It's a little longer. It was a little bit longer on Mir. There are more technical things that you would do yourself on your EVA suit the day before. So it takes more time. There are also differences during the hyperoxygen breathing before EVA. It's shorter here. We use a different technique.

Then the EVA itself, that was, of course, the most fascinating part. Probably the most fascinating thing I've ever done in space in a life, just to open the door and get outside. Funny, because maybe the culture also, I mean, the professional culture about being a pilot and test pilots all the many years. Some people in Star City told me, and they were mission specialists, they were the engineers, so I think these guys did not have flight experience, or maybe parachuting, I don't know. They told me, "Oh, you will see. When you open the door, you hesitate. You're really feeling that you will fall, and fall to the Earth, and also during the night you will see, you will stick to the [Mir] Space Station and you don't want to move because it's so dark." In fact, none of those things happened.

It's so fascinating. The door was open. I was looking through at the stars. "Okay, let's go. Let's go." When you get out, it's just so fantastic, just slowly getting out and see the Earth.

The impression, you forget about your spacesuit every quickly, so you're really in the impression that you are free-floating with nothing, just swimming. And it was fascinating.

Then we had to start working. They had asked us to work day and night because we had a lot of different devices to fix. So we started right after we were out, and we were in the dark. But, in fact, there is light enough coming from the albedo of the Earth and also from your helmet. So we started to fix [unclear], and the six hours went just like one hour, very, very busy, but really, really fantastic. You don't have time, in fact, to enjoy the fact that you're outside. They keep you very busy, but it's a fantastic experience.

At the end when we were ready to come back, we had a main problem during that EVA that we had to use an antenna that was stored in a—that was packed and was supposed to deploy and become a very huge antenna, and then we had to drop it. It did not open. So we had to wait one and a half hours, doing other stuff, because that thing was not working. So that delayed our return.

We also had other problems, and we had a funny problem. I was supposed to take the package of that antenna and “satellite” it myself with my hands. So we had been trained for that in the pool, trained in a zero-G flight, and it was a big box with handles. I had to start moving more, then drop it in the southern direction. But, unhappily, Mir was not at the right orientation when we did that. The orientation, of course, should have been longitudinal, so when you drop that thing, it goes like that [Chrétien gestures], and then it goes further and down. You don't meet it anymore. In fact, the orientation of Mir was 90 degrees on the other side.

So the box, instead of going on the orbital plane, went off on a course— So every forty-five minutes or so, we saw it back coming, coming when we—and at the same time, of course, a

concern that people inside say, “Okay, watch. It’s coming back,” and very worried that we could collide with it.”

That box was just going into another orbit, and, of course, very quickly started to go away below us. The first time we saw it pass over our heads really fast and then forty-five minutes passing again, and then it started to go below, but we saw it, and then the day after we still saw through the window of Mir. You could see this white stuff way below us. We could not put up the antenna, so we had to work manually to do that, then also drop it. And then we are late to coming back in.

That’s when I asked for fifteen minutes more just to enjoy being outside, they told us, “No, you are way beyond your limits, filter limits. So you have to go back in.”

Then we have a very small door because we still did not have the EVA air locks, the normal EVA air lock on Mir. So the EVA had to be performed through a very simple device, a simple round door that was two handles that you move on the side of the compartment, which is very small. So we had to bring back all of our cables and all the cables from experiments, put that inside. Of course, they’re all floating. Some are still outside. So one of us has to go in front of the command panel for pressurization, and the other one, who is me, has to go on the back of him and take care of that door, put the door back in, and then lock it.

Unhappily, I had a ventilation problem in my EVA suit at the end so I had some condensation in my—I could see only half of it at the end of the EVA. Unhappily, I don’t know why, when coming back in the air lock, it was totally—more than fog, it’s water, because in zero-G that water stays there. So it’s very hard to see through it, and I had still some parts that it was closing, closing, closing, and I had to put that door, and in the door was just a cup, like a casserole, with two handles, two holes, and on the body of Mir there are two like fingers, and

you have to put that right there, the fingers in the holes so it's in the right position, and then you start turning the handle so that the lockers come over on the door.

First, we started to have a very time to take the frame off. There is a protection frame. We cannot take it off. And time was going, and people on the ground were starting to get very worried. I was fussing a lot, so I had more and more humidity coming on my—and seeing less and less. So I got to the time that this frame comes off, and I take the door and put it aside, I don't see anything, and I was staying there. I have to just put it by impression. They were saying, “Yes, do it. Do it. We don't have much time left.”

The other guy cannot do anything because he's standing in his EVA suit, and very little room. You cannot see anything and not help in any way. And say “You have it in your hand, and there's nothing that we can do,” and I can imagine how worried he was.

But I put it, and I start turning the handle, just without the thing. Some places I can see a little bit, and I could see one of the lockers coming over the door. There were six or eight of them that I turned, and I have to turn twelve times, and after four times, it stopped. So that means that those fingers are not in the hole. So I see I have to take it out again, because it not work. So I take it out. I say, “Now which way? This way or this way [to turn it]?” By that time it was totally I could not see anything. So I said, “Okay, let's this way. And if it's not this way, then we'll have take it again and try.”

So I turned it a little bit, put it back, doing nothing, turn my handle, and look at my locker and I go two more turns. That's better, and it started coming over a little bit. It stopped again. “Oh, geez.”

Those poor guys in the TSUP [Russian Mission Control Center], people told me, actually the French told me, they were white. You could feel their stomach, because we had, like, five, ten minutes left of the CO₂ filter. So I tell—I say, “Bad luck, so what should we do?”

And they say, “You have it in your hands.” It’s nothing that they can do, and no one can do anything for us here.

So just before turning back, I think, I say, “Ah-oh,” one of the guys here told me that this handle, its also a crazy side of it, was attached with a lace so that it doesn’t go out, because that could be also a “nice” situation when you’re go on an EVA, you come back, you don’t have— So we had decided to add attach this with just a lace. So I don’t know, maybe the lace is doing that now, when normally I’m sure—I suppose that it’s just because of my door again. So I say, “Maybe it’s the lace.” So I took the handle off and say, “I hope I can put it back,” break the lace, and put it back in and start turning, and it turns. And, in fact, it was right there. If I had done the reverse, okay, turned back, take that all off, we are all done. We were all done.

Then we had no more communication with the TSUP for one hour, because we’re out of—and these poor guys, for one hour, could not know anything about our situation, and they told me it was totally silent, not one word. Nobody was saying anything. They could not talk to people in Mir, too, because there was no communication.

But we closed it. We rushed, collected our stuff, and came back into Mir, and we celebrated our EVA. So we were back in communication. We are already— These poor guys, and the first thing that Titov told them, “Everyone is in here! Don’t worry.” A great lesson of the EVA. [Laughs]

That was the longest EVA at that time, because normally they were scheduled for three and a half hours, and we had spent, I think, six hours, I mean with working on the suits, six hours and twenty minutes, was totally the end of the filtration system.

BUTLER: Was your wife aware of this difficulty?

CHRÉTIEN: No, no, no. That was after our landing.

BUTLER: That's good, I think.

CHRÉTIEN: And that flight, just for history, and I find it funny, too, now. Titov was our commander, but Titov in Star City, people say "He should not go into space anymore," because this poor guy, his first flight, he collides with Salyut 7, and it was a mistake in the navigation system. They rushed back to Earth. So they just got up and down. The second flight, the rocket it explodes twenty minutes before they go, so they got ejected. Then they come back to Earth. That's a miracle. The third flight, it doesn't go at all, because his engineer, the mission specialist, got sick. So the backup crew went to space instead of them. Everybody in Star City say, "Titov, you should not go to space." [Laughs]

Then he said, "No, I go," and he went for that one year-duration flight. On board, I remember one day he was looking at his watch. He said, "Today is my anniversary, my record. I am breaking my own record of duration flight. Oh, no, that's only true if I come back to Earth." [Laughs] Knowing his luck, he should not joke about that.

BUTLER: Especially considering that you had the EVA problems with the door.

CHRÉTIEN: That's right.

BUTLER: His jinx almost wore off.

CHRÉTIEN: But we were not feeling that much of the trick, but anytime you are yourself in such a situation, you don't think one second that it will go bad. Even when looking for the second position, not one second, mostly because you do this yourself, and you are totally confident. Maybe it's not too good, but you're going to say, "Oh, I will do it." The back guy was probably less comfortable. But if I had been in his situation with him trying to close the door, if I cannot close it, I would say, "Okay, do your best and do it well."

BUTLER: It's hard when you're not the one in control.

CHRÉTIEN: Yes, you're the one in control, yes, yes. The same thing when you fly an airplane and something goes wrong. No, before training here with Patrick, we crashed in an airplane. He crashed the plane. I was in the back. So I was not in control.

BUTLER: Well, we'll have to have you tell us a little more about that— [Tape change.]

BUTLER: —came back in, celebrated the EVA, talked to the ground, said, "We're okay. We're all inside," and essentially this mission did, of course, have to come to an end. But were there

any more things that you'd like to discuss during the mission itself before we talk about the landing?

CHRÉTIEN: Talking about luck and problems, then we go to the Soyuz with Titov and Manarov, then comes another part. That my second deorbitation in the Soyuz, so you feel much more comfortable, and knowing that you have the right watch. So we are on a very typical orbit, which is called the orbit of—I forgot the English name for that, but your orbit is on the terminator, which is exactly where the dark part of Earth separates with the clear part, day and night. So we are in orbit there. So you don't see much. You see on the sides, but vertically you see nothing, because it's really, you are in the sun, and what you look down is in the darkness, a sunset condition, which means that's the only kind of orbit where you cannot do it manually, is return manually. If something goes wrong and you have to take over by hand, you cannot do it manually. So, of course, we had that kind of orbit.

We are there, and we can still see Mir. It's already far away, and we're ready for the de-orbit burn, and I need to start the program for de-orbit, start the program—computer, Poof! Big, red light saying, "Computer is off."

And I remember Titov in the middle. The first thing he does is to look through his periscope to see if he can see, and he said, "Okay, I can handle it and keep the orientation and we have the manual deorbitation." No way.

So he asked the two of us, Manarov on his side and me on the other side, "Can you from the side see if we can go—," because the risk is that you get your spacecraft not aligned for your deorbit burn, it happened already once in the Russian history at the beginning, a couple of times that they had bad deorbitation just because of bad orientation.

I was looking through the clouds, and I said, “But right now there are big clouds coming down on us. I see we are going the right way, but if there are no more clouds in a few minutes, I won’t see anything.”

Manarov said, “The only thing I see is the sun. Nothing I can do with the sun,” because it was probably way up because we were on that—no, corrected, it was his side because we are right on the terminus, so perpendicular to our orbital plane. There was no way for—and the computer—so one hour and a half to wait again for the TSUP, trying to figure out how to reset the computer.

I think when we come back to the next orbit, next contact, “Okay, we have ideas, but we still don’t know what happened,” blah, blah, blah, blah.

Okay, we go for another orbit. So it’s only after three orbits that they could reload the computer, reset it, and it worked. I remember that because you said about my wife. So that was the second bad problem, maybe less tricky, but it could have been very tricky, and we are looking at Mir, and we’re too far to go back and do a docking. We would not have had enough fuel to do that.

My wife knew exactly what time we were coming back. But she was not in the TSUP. For return, she was home with the wife of Titov. “I think they should be already back, and what’s happening?” Sasha Tiev [phonetic] calling the TSUP, they saying “Oh, no, don’t worry. We’ll tell you. We’ll tell you.” So they understood something was not going too well. So, of course, they—how to explain to people that come from orbit at a very specific time, like the Shuttle, and certainly that they could said they stayed there still in orbit for any reason, but that was still the Soviet Union, and they, “No, no, no. We’ll tell you. Everything is okay. Everything is okay.”

“So why do they stay in orbit?”

“No, everything is okay.” They still had that bad side, not to tell the truth. [Laughs]

Then it came back to normal. We landed five hours later, I mean, five hours later than—no, three hours later than initially scheduled. No. Four and a half, three orbits, so it was four and a half hours’ delay. The bad thing also is that there’s no danger, but that after all that orbit, if we could not reset the computer, then you have to wait one day because the change of direction made that you can’t go to Kazakhstan anymore. You cannot land there anymore. It’s the same thing with the Shuttle. So our window was closed after that last attempt.

So I’d say twenty-four hours on the reserve of the Soyuz, and reentry is not too good, either, because you don’t have that much possibilities. Officially, I think we can stay three days.

BUTLER: Well, you certainly had some interesting adventures on that flight.

CHRÉTIEN: Oh, yes. We landed in the fog in December, I think the 21st of the December, in the fog and the snow. That was a great landing. No one there. Could not find us because the helicopters are supposed to bring the doctors, people, technicians, could not find the Soyuz in the fog. [Laughs] I think it took them at least thirty minutes to find us.

BUTLER: So you just had to sit and wait for them.

CHRÉTIEN: Oh, we were okay. It was just starting to get a little bit cold.

BUTLER: I bet.

CHRÉTIEN: That's not the point. I mean, we are trained for that. That's the easiest part of survival training. Just stay and wait. Take a nap.

Okay, so we finished that, right?

BUTLER: I want to thank you

CHRÉTIEN: Your welcome.

BUTLER: —for coming and talking with us today about your experiences. You certainly had some very interesting times.

[End of Interview]