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

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

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

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ALEKSANDR PAVLOVICH ALEKSANDROV

March 25, 1998

Interviewers: Mark Davison, Rebecca Wright, Paul Rollins
[Interview conducted with interpreter from TTI]

Davison: Good morning. The first question I'd like to ask you is, what part of Russia are you originally from?

Aleksandrov: I'm a Muscovite born in Moscow, in Russia.

Davison: Where did you go to school and which university did you attend, and what were your areas of study?

Aleksandrov: I started my education in Moscow, in high school in Moscow, and then I graduated in a little town not far from Moscow, but the quality of education basically was the same in Moscow and that little town.

After my service in the Russian Army, the Soviet Army, I went to the university. Now it's called university, but it used to be called the Technical Institute named after Bauman. It's a high technical institute in Moscow. I graduated from that university and I majored as an electrical engineer. To be more precise, spacecraft control systems.

Davison: How long have you been with the Russian Space Program? When did you become a cosmonaut, and what was your first mission?

Aleksandrov: I worked on the Russian Space Program, the Russian space industry, since 1964. The first opportunity that I was trying to use to become a cosmonaut was back in 1967. So the things worked out in such a way that my first flight took place in 1983.

Davison: Can you explain the cosmonaut selection process, what the educational requirements or the work or flight experience requirements are?

Aleksandrov: Well, the practice, the experience in the Russian Space Program is such that all the commanders of spacecrafts and/or space stations are former military pilots or current military pilots. Mission specialists--we call them onboard engineers--they are technical specialists. They are civilians.

The requirements are basically the same to both categories of the cosmonauts. First is health. You have to have good health. You have to have the graduate degree specifically in the technical field, preferably. And the category which we call cosmonaut investigators or cosmonaut researchers, they also had to have the graduate degree in astronomy or biology or medicine or all the applicable fields. Of course,

it also is preferred to have a person who had some experience in space program before he decides to join the Cosmonaut Corps. Of course, there is also an age limit. It's not that rigid, it's not that strict, but, of course, we prefer to hire younger people. They go through basic general training and then they are assigned certain plans, certain programs for certain missions. That's the process, how it goes.

Davison: Thank you. The selection process seems very similar to that of the U.S. astronaut program. Can I ask him, which of these categories did he fly as: engineer or the researcher?

Aleksandrov: Yes, as a mission specialist. Yes, I flew those missions as what we call an onboard engineer or mission specialist, being a civilian person, so during those missions I represented the RSC [Rocket Space Corporation] Energia. It's not exactly mission specialist; it's onboard engineer.

Davison: Can you tell us about your flight to Mir, the 2B flight? How many days were you in orbit, and did you accomplish any space walks?

Aleksandrov: Yes, it was in the second mission, second flight to the Space Station Mir. I've been up there for 160 days, but I didn't conduct any EVA [Extravehicular Activity] during that particular flight. I did conduct EVA. I did participate in EVA during Salyut 7 flight.

Davison: That was the 1983 flight?

Aleksandrov: Yes. During that EVA, we installed the solar arrays.

Davison: Can you tell me what areas of Mir operation are your management responsibilities focused on now?

Aleksandrov: Since I'm in charge of the office of the operations on Space Station Mir, part of my responsibility is the EVA. So what we do, we train our people on the different operations, on implementing different tasks. During the flight, from the Mission Control Center [MCC] in Moscow we control and monitor their activity.

Davison: How does your operational experience from your cosmonaut days help you make key management decisions that concern the crew and the EVA training?

Aleksandrov: I'd like to add one more thing. We are in charge, in my office, not only of EVA; we do selection of cosmonauts. We also select them and design, if I may say so, the functionality of them in the orbit. We also design the flight simulators so that they would maintain their skills. Also we develop

different means to support the activity of the crew members on board, using computers and other means. I hope I answered your questions, since being an astronaut, I was in orbit a few times and I understand the problems. I understand the challenges that they are facing, and thus I can make certain management decisions.

Davison: Tell us how you integrated the American astronauts into the crew training flow and what changes, if any, you had to make to the training plan to accommodate your new partners in space for the EVA.

Aleksandrov: Right now we can talk not only about the Mir, but the International Space Station, ISS. The first crew already started the training on the EVA and IVA [Intravehicular Activity] on the FGB [Functional Group Block]. The fact that [William McMichael] Shepherd, as the new commander of that first crew, was present there during the training, of course imposes certain changes, imposes certain corrections into our training plans and programs. We've learned a few lessons during our joint flight on Mir and during this training for the International Space Station. We took into consideration the way the training is organized at NASA, and we act accordingly. As you know, the American astronauts conducted the EVA on Mir, and they went through the training for those EVAs at our facility in Russia, and they've done it beautifully. Of course, we would even have achieved more results if we hadn't those language barriers, and those constraints imposed on us certain difficulties.

Davison: He anticipated my next question. On a different subject, did the additional capabilities of the Shuttle resupply and return help Mr. Aleksandrov's job of exchanging crew member, hardware, and other resources during the Phase One Program?

Aleksandrov: Yes, of course. This experience in those joint flights on the program, Shuttle-Mir, Mir-NASA, has contributed a great deal to our success and our experience. Both sides are learning very useful lessons from this experience. And, of course, Shuttle bringing the astronauts on board Mir helped us with our traffic, like delivering power supply, and that program turned out to be beautiful and very useful.

Davison: A follow-on question was the capability to bring Mir hardware back to his facility at Energia and what problems might have been experienced, and some failures. Was that helpful in redesigning equipment for the service module?

Aleksandrov: Yes, absolutely. For example, the tools for the EVA, we have changed the design, changed those tools, and we took into consideration our experience of joint activity, joint work with NASA. You

see, we have an experience of making special tools for the EVA, specific tools for the EVA, but that experience of joint activity, joint work with NASA, where you can have a set of standard tools, helped us a great deal.

Davison: Can you talk to us about the Orlan suit, some of the capabilities, maybe the size limitation, the pressure, the amount of flexibility that the crew member has while he's wearing the suit?

Aleksandrov: I would probably go too far ahead in answering this question about this particular thing and the comparison, probably, question. I can tell you, based on our experience, the Orlan and units are basically, as far as the capabilities are concerned, basically about the same. Orlan is a very reliable space suit, and the main thing, the comfort, actually, of this particular space suit is that it's almost like a refrigerator. You can open it and walk in there without anybody else's assistance. It's pretty simple to control from the panel, from the cosmonaut's panel.

It has a few levels of protection against any off-nominal or contingency situations. It has redundant systems. It has a redundant pump, a water pump. It has a redundant vent. Also, in case of a contingency situation, if both systems fail, it can work in what we call injector's mode. So, in other words, it injects the oxygen into the space suit and the cosmonaut can continue working. It requires some modifications as far as the elbow hinges are concerned, to make it more flexible, which actually we've done, but as far as the capability is concerned, it's a very rigid and very reliable space suit. And the fact that our cosmonauts can work continuously up to seven hours in those space suits, it tells a lot about the capabilities of the unit.

Now we're adopting a new schematic where the crew members can conduct EVA, can perform EVA both in Orlan and EMU [Extravehicular Mobility Unit], and they're being trained right now on both units. Why is size our concern? You're talking about the excess pressure is .4 atmosphere. We use oxygen and it weighs 80 kilograms without the cosmonaut in it. There are three types of dimensions and sizes for the gloves and for the unit itself, so you can adjust accordingly, according to the height of the cosmonaut. Each pair of gloves is changed for each EVA. We change the gloves.

Davison: They're disposable?

Aleksandrov: As a souvenir, they bring it back to Earth.

Davison: Did you get one for your EVA?

Aleksandrov: Yes. I have two gloves, and some of them I just give as a gift to my friends. One I gave to

Mr. Glushko. Back then he was the general designer of Energia.

Davison: How much involvement do you or your group have in EVA training in the Neutral Buoyancy Laboratory in Russia? I'm not sure of the proper name for it.

Aleksandrov: For each cosmonaut who's training to perform EVA, we have a standard program, standard plan. First, they learn, they study the space suit. That's about ten hours. Then they train in the pressure chambers and vacuum chambers, using the space suits. Then they are trained in the vacuum chambers. They train different procedures for air-lock procedures, and with scenarios of contingency situations. Then on the airplane with zero G [gravity], they also train cosmonauts for the flexibility to ingress or egress for the EVA.

Davison: The Orlan suit or the air lock?

Aleksandrov: Both Orlan and air lock. Foot restraint training and, again, ingress and egress, to allow them to be more confident that in real life, in a real situation, they know what to do. And in parallel with that, they train in the higher lab. Then they conduct different what we call typical operations, translation along the difference paths in the station and bringing a crew member who's, for example, fainted and cannot perform the tasks, bring him inside. Opening hatches, bringing out the hardware, using the tools and things like that.

Then only after that, they are trained to perform specific tasks for a specific mission. For example, bringing the solar arrays from the docking unit into a Kvant module. For each of those tasks, they conduct not many trainings, maybe two or three. Prior to that training, my office evaluates all those tests--how to achieve it, how to do it, how to perform it. Mr. Tsygankov is in charge of that.

Davison: Thank you.

Aleksandrov: Also we not only conduct those training and those evaluations especially in the hydro lab, we also do it on the special zero-G stands. Also in space suits in our office , where Mr. Tsygankov is in charge of it.

Davison: How much ground support do you supply to the suit or the MCC during the Mir crew's training, EVA maintenance?

Aleksandrov: During the training, the personnel that participate in that-- [Brief interruption.] So in other words, it's like a reverse link between the personnel and the cosmonauts. They can participate in that

operation of the Mission Control Center to understand what's going on. In other words, my people from my office, my personnel, explains to the MCC personnel of what will be going on and how and when.

When MCC plans a mission and different activities during the mission, we become part of that planning process where we give them our input, and it becomes part of the time line for the cosmonauts. During the EVA, the shift flight director is sitting there at the MCC, and next to him our expert is sitting, just in case, who is aware of different tasks, who knows all the tasks for that particular EVA. He monitors and controls that EVA and, of course, prompting the crew what to do, what kind of operation, where, how. And we're there for the sole purpose in case of some situation arises that requires fast decision-making. We consult between ourselves, we make a decision and let the flight director know. For example, the last EVA, we were discussing of whether we should allow David Wolf to open the hatch for the crew to ingress, because he hadn't gone through that training. So we were discussing that and trying to make a decision, and we made a decision to okay this.

Davison: The final question is, which one of the Mir onboard systems do you spend the most amount of time, if there is one specific one, or your EVA or maintenance operations? For example, life support system or computer system, for EVA, maybe solar arrays?

Aleksandrov: First of all, you have to distinguish between IVA and EVA.

Davison: Is he responsible for both? I was mostly looking IVA, but I didn't know if that was his area of responsibility.

Aleksandrov: We have standard procedures for maintenance in that activity, as far as IVA is concerned, on a continuous basis during the mission. On the EVA, we do it from time to time. When we plan EVA, if it's planned EVA, sometimes you have to conduct some operations on maintenance, for example, tighten some bolts or things like that. For the EVA, actually there are three directions that we follow: scientific program, repair, and the maintenance. But maintenance is a matter of fact; we do it on an almost constant basis. I would say that 50 percent of EVA right now is used for the repair, for the last year.

But of course we do not neglect the scientific program SPSR, that will be operated during the EVA. And, of course, a number of tasks, former tasks which we had performed, was the build-up of the station, so we used EVA to build up in different increments. For example, the April 1st EVA we're planning, we will conduct the solar array repair. The following EVA, we will replace the hardware and equipment.

During IVA, we also do repair and maintenance, especially of this is thermal control system that

we take care of. Then the composition of the gas system for controlling station atmosphere and the replacement of the electronic boards in the control system. So that's how we do it in general.

Wright: He's lived and participated in thirty years of space history. Would he share with us what the most significant time for him during that time period is?

Aleksandrov: First of all, my first launch. You cannot compare it with anything in the world. Also another two events is the test of the first launcher Energia and the Buran, Space Shuttle Buran, which, in automatic mode, unmanned, performed two orbits and landed in a specific spot, without any glitch, without any problems. Those were the launchers Energia and the Space Shuttle Buran. Also another impression that affected me greatly besides [Yuri A.] Gagarin's first flight was the time when I was in the Mission Control Center ground station in Yevpatoria, the Crimea, the first docking of two Soyuz.

Rollins: My question is, what's your favorite beer?

Interpreter: German. He forgot.

Davison: Heineken?

Interpreter: No, Heineken is Dutch.

Rollins: Thank you for all your insightful information. It's very helpful.

Aleksandrov: You're welcome. It helps our future cooperation.

Wright: Tell him we look forward to hearing soon of his next accomplishments.

Aleksandrov: Thank you.

Rollins: How much sightseeing do you get to do here in the States?

Aleksandrov: L.A., Hollywood, D.C. Alaska and fishing.

[End of interview]