GENERAL YURI N. GLAZKOV

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

Davison: Today is May 31 [1998], and the interview is with General Yuri Glazkov of the Crew Training and Exchange Working Group, and I'm Mark Davison, being assisted by Rebecca Wright and Paul Rollins.

Good morning. General Glazkov, could you please tell us about your background?

Glazkov: That would at least take fifteen minutes.

Davison: That would be fine.

Glazkov: I joined the Cosmonaut Corps in 1965. In 1975, I flew to the orbital station Salyut 5 and Soyuz 24. The mission was not that long, but for that time it was considered quite long; it lasted eighteen days.

After a while, being a member of the Cosmonaut Corps, I transferred to work with the training. I was the head of the Department of Training, where I had all the instructors who trained to fly on Soyuz or Salyut and then later on the Mir station. I was the deputy heading the science department. Then I headed the training department, and now I'm the first deputy at the Russian State Research Gagarin Training Center.

As far as my educational background, I have a doctorate. I'm a professor and academician, and I am an author as well. I published a book. But I think that's plenty. How much can I talk about myself? (laughter)

Davison: Let me ask you a specific question about your Soyuz 24 flight to the Salyut 5 space station.

Glazkov: Yes, please.

Davison: We read in one of the books that it was reported that you caught a cold on flight and you came up with an idea of how to cure yourself of the cold by sunbathing in front of the window. Can you tell us about that?

Glazkov: This is very simple, a very simple cure. You just put your nose to the window and the solar arrays cure your cold. It's very simple, and I suggest to anybody who has a cold, try to fly up there. (laughter)

Davison: Also the book mentioned that on your flight that you had to exchange some of the air in the Salyut space station, and that almost created a breeze by opening the dump valve on one end and intake

valve on the other to move the air through there. Could you talk about that a little bit?

Glazkov: It is so pleasant. I want to thank you for being so informed about my flight. This experiment I consider, and a lot of experts consider, very important. It is called replacement of atmosphere. Of course, when a station is in orbit for a long time, such as Mir and Salyut, the products of science experiments and hardware, life-support hardware, contaminate to a certain degree the atmosphere. There are experiments with animals, with birds, and you understand that all of it gets into the environment--different smells.

So a system was designed which would allow us to clear the air, so to speak, to replace the atmosphere, because, as you understand, you can't open the window up there. A very interesting system was designed. Compressed air was released from tanks, and that formed a force pushing the contaminated or the bad air out. For that purpose, a valve had to be opened so the not-clean air could be dumped outside into the vacuum. For a space flight, loss of atmosphere is a bad situation, but we had to do it voluntarily. But that experiment went very well.

The systems now are also used here on the ground. In storing produce, fungi forms and other problems occur, and so this system allows for good and sufficient storage of frozen vegetables, especially in southern climates. In particular, we used and assessed the use of such systems in Indonesia, and it proved itself well.

Davison: Interesting. Can you tell us how you became involved with the Phase 1 and Mir-Shuttle Program?

Glazkov: My personal involvement in this program started from the directive document which established the program. I was involved in the training of the first American astronaut, [Norman E.] Thagard, who flew to our space station on the Soyuz vehicle with our crew and returned on the Shuttle. I personally was there to greet him when he returned. It was a very interesting program, and the most important thing, in my view, is that it was a very necessary and needed program. It was started timely. People who developed this program, who first thought of the idea of uniting the two space vehicles, the Mir station and the Shuttle, are very smart people.

There is a scientific definition which is called the systematic approach. This is a very important approach in researching all kinds of systems, specifically systems when not only technical means are involved, but people as well. If we evaluate separately the Mir station and the Shuttle, these are wonderful space vehicles which each has its own specifics, but integrating the two allowed us to explore other qualities and properties which, stand alone, the system did not have, but in integrating the two, allowed us to explore. So it is not just a great technical achievement, it is also a scientific achievement.

Davison: This brings up some very interesting points.

Glazkov: I am an interesting person. (laughter)

Davison: Can you tell us about the training that was involved when you had to integrate the two vehicles like you discussed earlier?

Glazkov: It warrants a long explanation, but I will try to be brief. In an integration process there is a number of objectives. The first one is, you have to unite the people who will now work on the joint program. First of all, people who come to start working on this program have various educational backgrounds, various cultural backgrounds, various histories of their countries and their formation, various personal characteristics. So the first objective is to make people understand each other. So in the initial stages of this program, we had to conduct cultural awareness sessions, not just with the crew members, but with the people who would work with them as well. This was done in the States and in Russia as well, and it was a good experience, very effective.

Another thing which we had to look into is the difference: the Space Shuttle does not go on long-duration flight. Our space station Mir, on the other hand, we have the experience of long-duration flights. NASA had some long-duration experience with Skylab missions which lasted, as far as I remember, twenty-six days, fifty-two days, eighty-four days, but there was no experience in operating a space system for a long-duration flight such as we had, for half a year, a year, even a year and a half. So both systems of training had to be adapted to each other. We had to work on this issue on the American side as well. Don Puddy was involved in that, at that time. And we found a common integrated system of training. Therefore, it led to successful training and missions and the flight of Russian cosmonauts on the Space Shuttle and the American astronauts on Mir station.

I am very happy and proud for Shannon Lucid, who established an absolute record for a long-duration stay in space for a woman, and she established it on our Mir station. This is a great achievement for us, for the Russian side.

I also wanted to stress that the work in open space is a very complicated achievement, and our training allowed this work to be done by Russian cosmonauts performing EVAs outside the Shuttle and American astronauts performing this work outside the Mir station. I consider it a huge success. I guess that's about it. Of course, there are also psychological aspects of training, and if you're interested, we can talk about it later.

I think the main result of Phase 1, which is coming to an end, is our successful transition to the International Space Station. Of course, everything that is ending now is not really an end; it is flowing into

the building, assembling of the future Space Station and its future operation. I heard President Bill Clinton a few times calling the future International Space Station "the bridge into the future," and I do believe that it is the transfer of our achievements of the twentieth century into the twenty-first century, especially for our kids. That's why I'm preparing my daughter to become a cosmonaut.

Davison: Very good. Can you talk about the differences in style and techniques, or the similarities, that you saw between the Americans and Russians in training?

Glazkov: I wanted to say that at this moment there is almost no difference, because we trained and worked together and now we have a resulting experience. The thing is that the wonderful space vehicle Shuttle does not fly in long-duration flights, so there was no necessity of performing repairs, maintenance operations, remove something, disassemble something, etc.

Now when the orbital station Mir is flying for twelve years and probably will fly for another year, and not because it cannot fly any longer, but there are certain agreements that this will be the end of the station. But the station is a lab, a laboratory, where all the research is being conducted, but it's also a home for people as well. But as you know, any house we live in breaks once in a while. You have to go to the store, buy something, replace something, repair something. Therefore, in our training we make a great emphasis on great experience and knowledge of the systems which might need maintenance or repair.

So this is the specifics. In addition to teaching people to control these systems, to operate the systems, we also need to teach them this other aspect about the system. So, first of all, we had to teach people to perform these operations, as well as establish a system of transport technical means which would allow us to bring the necessary equipment on orbit. Of course, we take all these factors into consideration in our training program.

American astronauts who took part in our training program also had this kind of training for repairs and maintenance to a certain degree. You probably know this, that the American astronauts on board our station did not just have the research duties, but were working as engineer, too. This was not just due to the technical knowledge they accumulated, but it was due to the trust we developed, in trusting them to perform these duties, and this is a very important psychological aspect, us allowing them to operate our systems.

Davison: He's exactly right. I talked to Norm Thagard after he returned from his flight, and he explained to me that he did some of the soldering repairs on some of the equipment when he was up on Mir. Can you talk about the psychological factors and the crew working together? Is that part of your training?

Glazkov: Of course it is. We have a special program of psychological training. First I will tell about our program, our system of psychological training, and then I'll tell you about the joint system.

We conduct a special monitoring research when we put our crew members into complete isolation for a certain period of time, into an isolation chamber. I had to, myself, be in this chamber for fourteen days. It is called that you're "alone in public." Everybody is watching you, but you can't see anybody. There are certain psychological nuances there, because you fight yourself.

Also I had to experience, for thirty-five days, a test of the orbital station on the ground. At that time there was two of us, but the hatches were closed and we were absolutely alone for thirty-five days. This experience created different problems. Here we had to tolerate each other, forgive each other, and supplement each other's faults or experiences. This creates its own problems. One person doesn't like certain traits of another, and so you have to learn to adapt to each other.

When the crew is three people or more, that becomes even more difficult. Every person has his own personality. We even noticed that a certain thing happens when two people unite against the third one. But this changes. This combination changes. When I was on board of a ship going in the waters of your Atlantic Ocean, this was the ship *Yuri Gagarin*, the crew was 325 people, and even more problems. You can observe even more problems. In that, we have to bear in mind, were people of the same country, from the same cultural background, from, let's say, former Soviet Union. If you were a Russian or a Ukrainian, you basically had the same background. But here you have an international element coming into play, and that makes things even more difficult.

Of course, naturally we had to remember the year 1975 and the Soyuz-Apollo Program. I'll just mention the commanders: Tom [Thomas P.] Stafford and Aleksandr Leonov. They were able to find a common language, so at that time the confrontation between our countries was quite sharp. So we built on that experience, and during the training, people get closer and closer together and begin to understand each other.

This past winter we conducted a training, a survival training, after an emergency launch, emergency return, and American and Russian crew members worked together, and they understood each other and worked very well together. Now the training will take place on the Black Sea, where our cosmonauts and American astronauts will be training in emergency landing on water.

Another very important aspect, we built three wonderful cottages where the American astronauts are housed, and they can bring their families if they desire. We also took your experience in having parties when people become very familiar with each other.

In summary, actually I'm a professor of psychology and education. I wanted to say that the most important quality which united our cosmonauts, astronauts, and all the people working in this joint space

effort, that is professionalism. Because we're pilots, cosmonauts, astronauts, we understand each other. We understand what a space flight means, what training means. Sometimes we even have to go through loss and bury some of our friends. Thank God there wasn't that many.

If you allow me to fantasize a little bit, because I do write books on science fiction, if we dream a little bit, and a lot is being said in the States now about the flight to Mars, it's a very good idea which is supported by the management and by the government as well, so if we pose this question, is the human race ready to go to Mars, we could talk about it in the aspect of training. So, again, there is a technical side to it as well as a human factor.

As you remember, Apollo landed at a distance of 365,000 kilometers. That was the longest distance from Earth and a great achievement of the human race, and, by the way, was incredible precision. It was about 100 meters from the designed point. So an incredible system of navigation was developed. Of course, this is a very important factor if we do go to Mars, because you have to navigate between stars. Otherwise, you'll get lost. Or, for example, if we take the Mir station, which has been on orbit more than twelve years, if we calculate how many kilometers the station has been flying over the period of twelve years, we could make it to the sun and back, and we don't want to go to the sun. It's too hot. (laughter)

So what I'm saying, what I'm driving at, the technical issues, to a great degree, have been resolved to achieve such a mission. From the human aspect of it, I do understand the physiology will allow us to achieve that objective. For example, our cosmonaut Pelyakov spent a year and four months on orbit, and that would be the duration to go to Mars and back. But from a psychological point of view, there could be specifics. One thing is, you're orbiting the Earth, and it's about 400 kilometers from you, and people can come to your aid, can fly up and help you. Another thing is, to go to Mars, that is tens of millions of kilometers away. Now cosmonauts and astronauts can marvel at our Earth, looking at it, but when you go to Mars, you won't be able to see it. You will lose our Earth between the stars. So, that's it.

Davison: Very insightful comments.

Glazkov: Thank you.

Davison: You're welcome. Can you tell us about your current duties as the first deputy of the Gagarin Cosmonaut Training Center [GCTC]?

Glazkov: Naturally, everything that is done at the GCTC is overseen by our head of the center, General Klemok, who is a cosmonaut, and I am involved in everything as well. The main objective, of course, is the cosmonaut training. We have developed a very good scientific system of training which has been proved by

real flight. My duties encompass development of training equipment; scientific research in the area of training; all our flight activities; our testing activities on the sea, in the air. So all of this is part of my duties, but I could talk about it for a very long time because the scope of my duties is very wide.

But in my own personal life, in my family, I also conduct flight training. My daughter already has been flying forty minutes in microgravity, two jumps with a parachute recently, studied in the school for young astronauts at Johnson Space Center, and graduated from this school. In August, my wife, her mother, will teach her to fly a plane. For many years she was an absolute champion in Europe and in the world, in piloting, and so she is willing to undertake the duty in acrobatics. So, that's it.

Davison: Thank you very much.

[End of interview]