

**EXPEDITION 42/43 CREW INTERVIEW  
ANTON SHKAPLEROV – FLIGHT ENGINEER 4**

***Q: Why did you want to be a cosmonaut?***

A: That is a good question. I would say that, for me, the decision to become a cosmonaut, like for all other cosmonauts and the astronauts, came after watching different movies and, as many girls and boys, I was dreaming of becoming a cosmonaut and watched different documentaries and movies about cosmonauts and astronauts. So I thought that the only way for me to become a cosmonaut would be to become a fighter pilot because most members of our first corps of cosmonauts were primarily pilots. So that is why I decided to fly fighter jets. When I became a professional pilot I realized that it would be impossible for me to become a cosmonaut because they are people so well educated, such great people, that it is just above me, that I am not good enough to become one. I am just a lowly fighter pilot defending my country. But when I turned 30 I was based in Kubinka, near Moscow, and so I decided to try my luck and apply to the corps of cosmonauts. I had to go through a number of medical studies and tests in our central medical institute and I wrote to my command that I wanted to apply. They spent about two years studying my mental state, my physical conditioning, even my family, and in two years they gave their verdict. I was ready to start my cosmonaut training to become a member of the cosmonaut corps. So that is how I started my cosmonaut's career.

***I would like you to tell us a little more about your background. Tell me about where you are from, your hometown, and what your childhood was like growing up.***

I was born in Sevastopol in Crimea. I had a pretty normal childhood like any boy had. I was running around, loved to be outside, going to the beach, swimming in the sea because the city is right on the Black Sea. My father was a submariner, so I knew from early childhood that I would join the military. When I was 15, in the eighth grade, I joined an aviation club in Sevastopol. I flew small planes and when I turned 16 I got my pilot's license and started flying aircraft on my own. So I thought, well, maybe if not a cosmonaut I would be a pilot and I would devote my life to aircraft. When I finished high school, it was an easy choice for me. I knew it was aviation. But what can I tell you about Sevastopol, my hometown? It is a wonderful town. It is beautiful and a lot of crew members who went through water survival course visited the city. It is great. There are a lot of Navy personnel there. It is very clean, nice, very cultured, so everybody who visits Sevastopol says that it has a great, rich history and I am proud of calling this town my hometown. I was very lucky to grow up there. It is not just a Navy town, it is actually a space town now.

***It must have felt really good to see it from space during your first flight?***

Of course. I saw Crimea and my hometown only from a bird's eye view from an aircraft 400 kilometers above Earth, and when I saw it from that point, it was great. When I had a chance, when it was not overcast, I was taking pictures and pretty much any time of the year I wanted to take pictures I could send them to the ground and show everybody what a beautiful city it is. It is just great. People there are great. It looks awesome.

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***A moment ago you told me about how you had gotten your pilot's license and were already flying in an airplane, before you even graduated from high school. Tell me what came after that, after high school. What is the story of your education and your professional career? What were the major events in it that ultimately led you to be a cosmonaut?***

After I graduated from the aviation academy—I was a straight A student there and got a commendation—I went for my second higher degree in engineering, so I was getting ready to become a test pilot of different vehicles. Once I graduated from the academy, I was sent to serve for just one year in a regular air wing. After that I joined the Hussars, the Russian Hussars, and I was working shoulder to shoulder with Russian Strizhis and it was a great experience. We were not only guarding the borders of Russia as fighter pilots, we were also like Blue Angels, and it was great. At the same time I was doing scientific research and finally, this spring, I defended my dissertation. I became a Ph.D. in sciences, so I am working on my education step by step. Before my mission to space, when I was studying at the academy of the Russian president, I got my law degree. I know I am working in different directions but I am constantly learning and working on my education and I think it is great. I think in my later life I will benefit from it and my career will benefit from it.

***What was your area of your Ph.D.? In what subject did you earn that degree?***

Well, it is actually a classified topic. It was on aerodynamics. That is all I can tell you, aerodynamics of an air wing, how they fly in formations and how they lead aircraft and how the plume from the aircraft influences the remaining aircrafts in the air wing. That is all I can tell you.

***You are one of only a little more than 200 different people who have ever been aboard the International Space Station. As you go back there for a second time, what are your hopes about how you may be able to use this mission to help inspire space explorers of the future?***

I am hoping that my example will be an inspiration for future space explorers to become cosmonauts and astronauts and I have a chance to do that. When I am on the ground, I meet with different audiences of different age groups: school children, college students, people who have already gotten their education and are working in different areas. It is not a secret that it is not just engineers or fighter pilots who go to space. There are doctors, people of any education. I think we should include more people from other areas, like journalists or somebody with education in cinematography who would be able to make much better documentaries and pictures than just the cosmonauts or astronauts. About a hundred years ago people started flying aircraft and everybody thought that they were superheroes, they were brave and strong and nobody but them could do that. But just a hundred years past, just a blip, it is nothing for the history of humankind, so in just a hundred years, via the Internet or just coming to an airport without any proof of our physical conditioning, we just come to an aircraft, to an airport and buy a ticket to fly to different countries. So maybe, just like that, we would be able to buy tickets to fly to

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space. Maybe we would not even need a ticket. We will just come to a terminal, board a space vehicle, and fly to another planet. So I am hoping that my example shows that it is not something that is impossible to achieve. I was a common boy who studied hard, worked out, did not have any bad habits like drinking or smoking or doing drugs, so there is nothing impossible in that—it is achievable. Look at me. It is all in your hands. If you have a goal, if you really want it, you can become an astronaut or a cosmonaut. It's up to you.

***And when a cosmonaut flies in space, he assumes some unique risks, but I would guess that since you are doing it that you think those risks are worthwhile. Anton, I want to know what you think it is that we are learning from flying people in space that makes it worth taking the risk?***

Of course, besides all the fun things about space exploration and my mission to space, it is real interesting how you can move in zero *g*, like swimming, turning around, floating. Of course there are risks, risks to your life, but that is not new to me. I am a fighter pilot. Any mission that I had was a risk that I took. It is a very interesting job and I am ready to take all these risks, to get this shot of adrenaline, because I know that every day on board benefits humankind. When I am aboard the International Space Station I am at the forefront of space exploration. I have the best technology available to humankind because the most modern developments in technology actually get to the space station, and when I meet with people, scientists, when I visit different colleges and development laboratories, I understand that I am working with the most advanced technologies, thanks to them. So that is my motivation.

***You and your crewmates are getting ready for your launch to the International Space Station. Anton, tell me about the goals of this flight and what your jobs are going to be on this mission.***

Well, specifically, talking about my duties, let's begin from the very beginning. First of all, I think my prime goal as the commander of the Soyuz vehicle that will bring myself, Samantha Cristoforetti for flight engineer 1, and Terry Virts as flight engineer 2, would be to bring the crew safely to the station and return the vehicle, the Soyuz, to the ground on time.

***In terms of the six months that you three are going to spend on board the station, is there a particular goal of the flight for you in your time on board, on orbit?***

Of course. It is going to be a six-month mission which includes many objectives. Most importantly, I will have to be living and working on board the ISS, supporting its operations. I will be responsible for the Russian segment and, of course, I will be responsible for working out, maintaining myself in good shape, following my flight surgeon's advice that will be supporting me from the ground.

***You spent a six-month mission on the space station before. What are you looking forward to seeing when you get back this time?***

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I hope that there are no great changes on board the ISS. Maybe it has changed for the better. It is more than 10 years old now so maybe the changes would be for the better, I hope, rather than for the worse. And I am hoping that I will be tasked to perform duties that I did not do during my first mission, for example, working on different payloads and experiments for space exploration.

***The station assembly is essentially complete now and so the real attention has turned to the science work that is being done on board. How do you explain to people what the potential is for what can be learned aboard the International Space Station?***

First of all, this mission will be a little bit different from my first expedition and I am talking about science experiments here. During my previous flight, the Russian crew members, Anatoly Ivanishin and I, were working on over 50 experiments within six months. During this upcoming mission I will be working on those 50 experiments alone and five of those experiments will be completely new. So it is a new strategy, new scheduling for the experiments and I think it is a great idea. I think it is a step forward for the development of the ISS because, as you said, the assembly stage of the station is complete, so now we can fully devote our attention to space exploration for the future of humankind, for different sciences, and I think we can continue working for space exploration now fully.

***One big area of concentration for the science is to learn more about how the space environment affects the human beings who go there and to try figure out ways to minimize or eliminate the negative effects. In fact, in March the station program is sending two crew members to go for a full year in order to continue that research. You are going to be there, of course, to greet those crew members as they arrive. What are your thoughts about the year-long mission to the station?***

I think a one-year mission is a step further. It is a continuation of our research. I think even a six-month mission is great for the study of the influence of space and zero g on the human body as it is not a good influence. If we look at the history of space exploration, we have had people who stayed on board for a year and even a year and a half, but now we have new hardware. Science has made a great step forward. I am talking about space medicine here and I think this 12-month mission—or missions, because I hope it is not going to be just one mission—will be able to show more clearly how space influences the human body. I hope our scientists will develop some medications or hardware that could lessen the adverse effects of the space on human body so that we can explore not just Mars but further planets.

***If you got the opportunity, would you like to go for 12 months?***

Of course. I think any mission is a part of my job and I am prepared for a long mission physically and mentally. If I am tasked to fly for 12 months I will agree and will be proud to be entrusted with such a task.

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***You have been to space and experienced the effects of getting there and then of working there and then coming back to Earth. From your perspective, what are the aspects of that adaption to space and then the readaptation to gravity? Which of these is more important for us to work on to maximize our chances for successful exploration in the future?***

I think you know that when I got on board I did not have any great problems with adapting to zero *g*. However I did have to readapt to Earth conditions. I think that you should not rush yourself. You have to give yourself time, and now they know better how your body adapts to zero *g* and how much time it takes you to adapt to Earth conditions when you come back. So I was following their advice and, within half a year, I recovered, passed the state commission and was ready for future missions. So I think that my main advice would be to follow your doctor's recommendations.

***During this mission you are going to be working on experiments that are human life sciences experiments. Can you give me a couple of examples of things that you will be doing on this flight that are designed to learn more about this area?***

I think the main direction in which Russian science, space science, is moving is studying the influence of space on the human body. So there are going to be five new experiments, three in the field of medicine and biology. One is called Cardiovector where we are going to be studying, using my body, the influence of space on heart activity, how your body adapts to zero *g*. Then there will be another experiment called Cosmocard where we are going to be studying the influence of spaceflight on the characteristics and the work of the heart, myocardial function, myocardial function of the heart. That is what the flight surgeons and the researchers are going to be using my body for. So the main goal of these studies is going to be to see how I am adapting to zero *g* and how we can actually develop rehabilitation programs for crew members who return to Earth.

***Along with the biomedical experiments that you are going to be doing, there are, as you said, many, many other experiments that are going to be on the agenda for you during this trip. Give me a couple of examples of other kinds of science research that is going on during this mission that you are going to be involved in.***

Besides the biological and medical experiments, we are going to be studying the surface of Earth from space and carrying out educational experiments to promote space exploration. For example, one new experiment is going to be an educational one. It is called Chemistry and Education. I will be working with different poly materials and will show how the zero *g* environment influences all these different poly materials. Primarily they are going to be in the forms of little balls, and once all these materials come back to Earth, they are going to be studied by our scientists on the ground and will make a really nice scientific documentary for school children to show how zero *g* influences different processes.

***Along with the science work that you are going to do, station crew members have a lot of other work. They are responsible for keeping the station in good shape and***

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***flying safely. Tell me about other kinds of things that you do on any given day or any given week. What else do you do while you are up there?***

Of course, we are not working all the time. We are living on board the station. Let's just imagine a house where you live, where something always breaks down, becomes obsolete or old or you want to buy something new, buy something from a store. The same thing happens on board the station. We periodically have certain duties to do, for example, we are cleaning the station regularly. We don't have any housemaids so we take rags, wipes, and get down to it, vacuum, clean. We get about two or three hours for that and I think it's not quite enough for we sometimes invest our own time, but we do our best to keep the station clean because it is our home. We live there and we are extremely interested in keeping it nice and clean. If something breaks down we have to carry out our operations and install spares and we are trained on the ground for a year and a half or two years to know how to do that. For example, if our car breaks down, we take wrenches in our own hands, think hard and fix what broke down, and if we can't fix it, then we call our specialists on the ground and ask them for advice. As you can see the station is still flying, it's still in space, and it just is a good example of how we can keep it up there and in good shape.

***From time to time station crew members have to go outside to do some work. Now I realize the plan could certainly change but as we talk now, what is the plan for spacewalks during your six months on orbit? Who would go outside and what work would they have to do?***

Well, once when I had already spent three months aboard, by that time I was working in a really good company, and, of course sometimes, once you've spent so much time together you feel that it is getting a little bit old, despite the fact that we are great friends. So when I had a chance to do a spacewalk I just rushed out of the station. It was just like a reloading of your, like your internal computer. It was great for my emotional state. I saw something new. And speaking about spacewalks, I think any crew member is dreaming about this as it is such an opportunity. For our expedition there are two American, USOS [U.S. Operating Segment] spacewalks. As for the Russian spacewalks, we are not planning to carry out any, but the plan can change to accommodate objectives and goals that might come up if, God forbid, anything breaks down. Or maybe we are going to have a new experiment, maybe they will add something that would require a spacewalk. Everything can change.

***In fact, you are going to be on orbit when we note the 50<sup>th</sup> anniversary of the first spacewalk by Alexei Leonov. Tell me what you think about the development of spacewalking and how important that has been to our space exploration efforts.***

Of course, 50 years have passed, and the first spacewalk was actually to just prove that a man is capable of performing such a thing, to see how a human body reacts to such an exposure and to working in a spacesuit. Of course, now it is a much more difficult task. It is dangerous. We spend on average of about six hours and now there is the record-breaking time of eight hours. So it all depends on the objectives posed to the crew

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members and, of course, even if we do not have a scheduled EVA, we are working in our Hydrolaboratory to get ready for such an objective, so that if we have to perform it we do not freak out. Of course, we are excited because once you hear, oh, you are scheduled for an EVA, you are like, oh my God! So then we start working on preparing our spacesuits, and when we come back we are exhausted and happy at the same time. So I can't imagine going to the station and spending time in space without performing an EVA. Sometimes we work on the outside of the station. We carry out the R&R [repair and replace] operations, install different hardware with various materials. For example, we installed trays with different materials to later return them inside the station and send them to the ground for study by our scientists.

***The International Space Station and its human crew members get resupplied by a small fleet of cargo vehicles these days. Tell me about the different cargo ships that you may get a chance to work with during your flight this time.***

During my expedition we are going to have two Russian cargo vehicles, the Progresses, and then we are going to have a commercial vehicle, Orbital-4, two SpaceX vehicles, SpaceX-5 and -6. All these vehicles are necessary to deliver hardware to the station, water, food supplies, oxygen, everything that supports the operation of the International Space Station. The difference between them is that the Progress does not return to the ground but the American Dragon can bring back the results of our experiments or some hardware that has failed can be returned to the ground, studied, fixed and find out what was the reason for the malfunction. So the goals are pretty much the same and it is great that our partners now have their vehicles, even commercial vehicles, and I am glad to see that it is a partnership. It is not just one country working on something; it is a partnership of the countries.

***We have talked about many different aspects of your flight, from the science to potential spacewalks and the things that you do to keep the International Space Station flying in good shape. And we fly it for a reason. Anton, tell me what the reason is: what is it that we are learning from these missions to the International Space Station that is helping prepare humankind to explore beyond Earth orbit?***

It is not a secret that the population of Earth has been growing steadily and there will come a time when our Earth is going to be incapable of supporting all the people living on its surface, so we will have to find another planet that would allow for humankind to develop. I have read that scientists have found another sun with a number of planets that, at least maybe one of them, is capable of supporting life. It is at the same distance as Earth from the sun. So maybe we will be able to leave our solar system and get to that planet. But it will require longer than just a year of flight to get to such a planet and that is why it is so important to study the influence of space on the human body. Scientists are trying to find ways to preserve the human body in a good condition so that we could travel such great distances and be capable of withstanding radiation and space environments to get to a hospitable planet. We are constantly moving forward so I am hoping that, of course, it's going to be in a very far, far future, not in my time; people will say thank you to all the cosmonauts and astronauts who traveled to space and gave their

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bodies for the sake of science and scientific experiments so that humankind could break away from its solar system and explore space.