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COSMONAUT



Anatoly Berezovoy

Roscosmos (Russian Federal Space Agency)

DIARIES

Soviet cosmonaut Anatoly Berezovoy made only one space flight during his career, but it was one for the books. His 1982 mission, the first expedition to the Salyut 7 space station, lasted a then-record of 211 days. That record was broken 16 months later by Leonid Kizim, Vladimir Soloviev and Oleg Atkov, the third crew aboard the Salyut-7, whose mission lasted 237 days. During much of Berezovoy's time in space — as well as afterwards — he chronicled his observations on paper.

After Berezovoy died last September at age 72, his widow, Lidia Berezovaya, contacted Aerospace America through her husband's longtime interpreter, Olga Tunison. Berezovaya and Tunison wanted to know if we were interested in publishing excerpts of his writings in English. We were very interested, because the writings give a fascinating glimpse of a budding Soviet human space flight program, from the physical travails of learning to live in space to the social breakthroughs required for men and women to work together effectively in space.

As commander, Berezovoy lifted off with flight engineer Valentin Lebedev on May 13, 1982 aboard the Soyuz rocket bound for Salyut 7, the final spacecraft in the Salyut series before the launch of the Mir space station.

The spindle-shaped Salyut spacecraft were the first to have a second docking port, which permitted entry for crew on another Soyuz spacecraft or for delivery of fuel, water, food and other supplies from unmanned Progress cargo ships. The latter innovation enabled virtually unlimited stay in space for humans, leaving only medical issues as a limiting factor for length of spaceflight.

Berezovoy and Lebedev returned to Earth on December 10, 1982.

Six weeks into the mission, Berezovoy began keeping a diary of life in space for his wife and two children. He first started writing on the margins of his flight journal and later wrote several letters to his wife, which he twice was able to send out for delivery with visiting space crews. He eventually published his 92-page diary in Russian.

In the following excerpts, Berezovoy muses on topics ranging from the prosaic to the profound.

— Anatoly Zak
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Tricks to staying warm in the space station

Berezovoy: It was June 1982. It was the 23rd day of flight on the space station Salyut 7. [The nearly 19-ton space laboratory was the ninth space station developed and launched by the Soviets since the introduction of the Salyut series in 1971.]

Valentin Lebedev, my space engineer, and I got accustomed to the space station. We found our favorite spots: by the small round window, on the workout machines and by the equipment. Our station was much bigger compared to the early Salyut stations. It consisted of three cylindrical sections which were connected by short transfer rings.

The length of the station was almost 15 meters (about 50 feet) and the maximum diameter was more than 4 meters (about 13 feet). The amount of space inside our "house" was 82 ½ square meters (about 888 square feet). Our Soyuz T-5 spacecraft stayed docked at the station. Still, there was almost no spare room on the station because most of it was occupied by various equipment.

Anatoly Berezovoy (left) and Valentin Lebedev were the first residents onboard the Soviet Salyut 7 space station. The pair's 211-day mission in 1982 set a then-record for a space stay.



But the zero gravity gave us some advantages. For example, you could sleep practically by staying near the wall or “lying” on the ceiling or just floating in space by the exercise machine. Very soon each of us picked our favorite places and positions.

A space station is a complex organism and it's not always easy to understand the reason why something was going on. We were the first inhabitants of the new station and were the “test pilots.” We had surprises all the time. Most of them were minor problems, but they created a lot of uncomfortable situations and worries. By the third week of our flight, the temperature started to drop to between 18 degrees to 19 degrees Celsius (between 64 degrees to 66 degrees Fahrenheit). We reported this to the flight control center and we let them know that we were very cold. Specialists replied that they hadn't found any problems. They said the space station and the equipment are using more energy so, at this moment, it cannot maintain the higher temperature. Besides, they said, 19 degrees Celsius (66 degrees Fahrenheit) is a quite normal temperature and should allow us to continue the work. We were able to con-

tinue to work really because we had to move during our working hours and we would warm up during our mandatory training on workout machines.

But the difficulty remained with our sleep. You cannot cover yourself with a blanket in zero gravity. We had to sleep all dressed up and buckle ourselves to the wall and we were freezing more and more. When a body doesn't move it gets colder faster. So we were waking up very often.

Uncomfortable sleep in turn was wearing us out. We couldn't figure out what to do to warm up. We were trying to eat hot food, wearing extra underwear and socks, but still couldn't warm up. Ground control was continually convincing us that everything was just fine. It is very likely that my crew mate [flight engineer Valentin] Lebedev was suffering much more than me because he liked being warm and was a civilian who grew up in more comfortable conditions.

Once, as usual, I woke up from being very chilly. In order to warm up, I decided to work out on the treadmill. Very soon, I was able to warm up and give a shout to my flight engineer to try it for himself. But I didn't get any answer. He must be asleep, I thought. I looked around the corner by the equipment, a favorite sleeping spot for him. But Lebedev wasn't there.

Slightly worried, I started my “flight”

around the station checking other likely sleeping spots. But my flight engineer was missing. I got really worried and started to examine the whole station. It wasn't too big, but we had a lot of corners because of the amount of equipment. Valentin seemed to have vanished.

I didn't know what to think. Automatically, I looked out the open window thinking he may have gone back to Earth looking for warmth!

My head then filled with all kinds of weird thoughts about "green men," flying saucers and alien invaders. My back started to feel cold from fear. Finally, I had to call mission control and report Lebedev's disappearance. Ground control went totally silent.

Then somebody rhetorically asked liked a child, "Where is Lebedev?"

"I don't know. He disappeared," I answered.

This time, the silence lasted even longer. Then a volley of questions and exclamations began flying: "Maybe he doesn't feel well?" "Did you look for him thor-



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oughly?" "Where could he possibly be?" "What else could you do?" "Look one more time." "It's impossible."

Based on the sheer number of nervous questions, I realized the people on Earth were panicked. In order not to panic myself, I decided to examine the station one more time, this time especially thoroughly, by opening every single closet and looking behind every panel.

Finally, I found him in the section where we stored spacesuits, sweetly sleeping in his own spacesuit. The fact is spacesuits have an independent heating system, and my enterprising flight engineer figured out that he could sleep with the suit's heat turned on. A spacesuit is airtight and a cosmonaut can use it to live and work outside spacecraft or on the surface of planets. Spacesuits have been compared to a small spacecraft, and this is an apt description. It consists of all the panel blocks and systems which pertain to airtight sections of a spaceship. In a spacesuit the cosmonaut can breathe normally and move, he is neither hot nor cold, no matter how outside temperatures fluctuate. Besides that, the space station Salyut 7 was using a new type of spacesuit called Orlan, which was designed to work up to 6 1/2 hours — just long enough for warm, proper sleep. [*Orlan spacesuits were introduced aboard the Salyut-6 space station in 1977.*]

It turned out flying saucers had nothing to do with Lebedev's disappearance!



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Dining in space with a vacuum cleaner

People on the space station live in the conditions of zero gravity, which changes your perceptions about things. For example, the small packaged foods consumed in zero gravity create a lot of inconvenience. When we sit down at the table to have dinner, we are surrounded with many objects: cups, spoons, forks, bread, napkin, knife and a steak. All these things have the ability to fly around us.

A cosmonaut doesn't have enough hands to hold all the objects down while eating. He has to use two fingers to hold the spoon, two more to hold the juice glass, with perhaps another to hold down the bread. But the most difficult — and unpleasant — was eating something that crumbles.

It is not simply that the crumbs fly around and get in your nose and eyes. The debris can seriously damage the spaceship's equipment, and removing them from the ship is very difficult.

That explains why on the Salyut-7 space station, we started to eat with the vacuum cleaner running. The vacuum cleaner near us would prevent crumbs from floating around the space station.

But that wasn't the only way a vacuum cleaner came in handy.

Because my spaceflight with Lebedev was such a long expedition (it lasted 211 days), the flight control

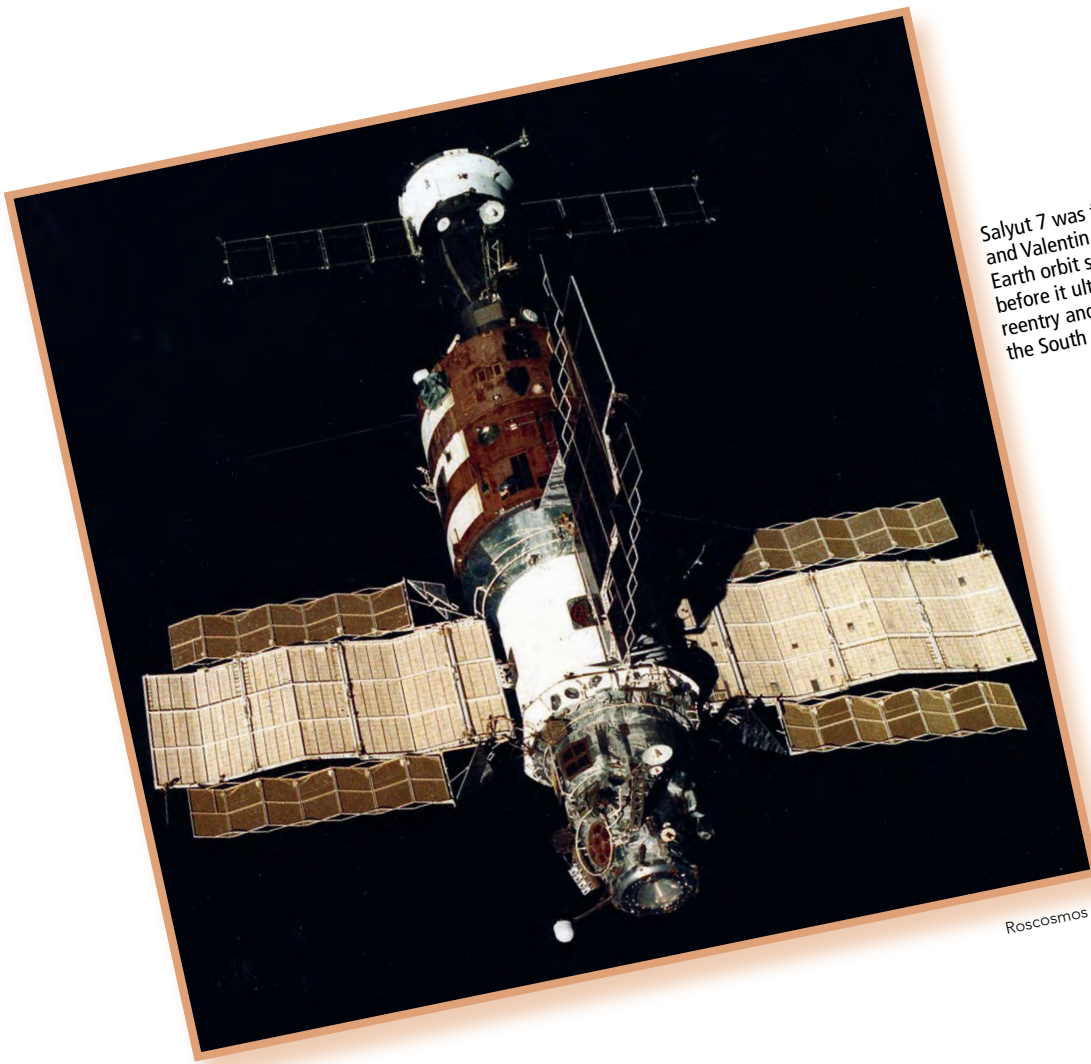
center everyday would conduct "psychological" sessions for us. It included meeting virtually with our wives, children, friends and even famous actors and musicians via television conferencing whenever the Salyut was flying over Soviet ground stations. Such connections were meant to strengthen our psychological well-being and help us cope with our isolation from Earth. But in reality, Lebedev and I were too busy with work at the space station to suffer any isolation pangs. Indeed, our families and friends worried and thoughts about us much more than we were thinking about them.

So we often spent our meeting time demonstrating our psychological health by entertaining our virtual visitors. My children were eight and 12 at that time, too young to understand what space flight was and what their daddy was doing up there.

One of these sessions happened to be my daughter's birthday and she had just started at school. Valentin and I thought a lot about how we could surprise and entertain them in educational ways. Finally we decided to demonstrate rocket propulsion with the aid of a vacuum cleaner.

As you know when a vacuum cleaner is working, one side sucks in the air and the other side expels out the air. In zero gravity, however, the vacuum cleaner will move like a rocket because of the expelled air. The "session" of connection to my family started and we began to explain what happened when working a vacuum cleaner in zero gravity. But the sound transmission was going on and off and my 8-year-old daughter couldn't understand anything we were saying. She was almost crying. Then Valentin suddenly sat on the vacuum cleaner and turned it on. His flight was very short, because the equipment in the space station could be damaged very easily, but we heard a loud laugh from our children on earth! The difficult explanation suddenly became very clear to them and this demonstration produced applause. After that, mission control suggested that we do a whole lesson for school children about how rockets move in space. On the space station, any object can perform many different functions, as well as the Cosmonaut himself.





Salyut 7 was first occupied by Anatoly Berezovoy and Valentin Lebedev in May 1982. The low Earth orbit space station hosted 6 manned crews before it ultimately underwent an uncontrolled reentry and burned up in the atmosphere over the South Pacific Ocean in February 1991.

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Apron for a Cosmonaut

The question regarding whether it is possible for a woman to be a real cosmonaut was first asked at the same time that humans began flying in space. The first answer was given by Valentina Tereshkova in 1963 [who piloted *Vostok-6* alone in 1963] and it was confirmed many times in the following years.

By now [1980s], about 50 women have been in space already and they perform all sorts of activities during the space flights. Women such as Kathryn Sullivan and Linda Godwin have taken space walks while Claudie Haigneré and Elena Kondakova took part in long-duration expeditions with international crews. Some, such as Eileen Collins and Pamela Melroy, served as commanders. Still others, including Judith Resnik and Kalpana Chawla, lost their lives during missions.

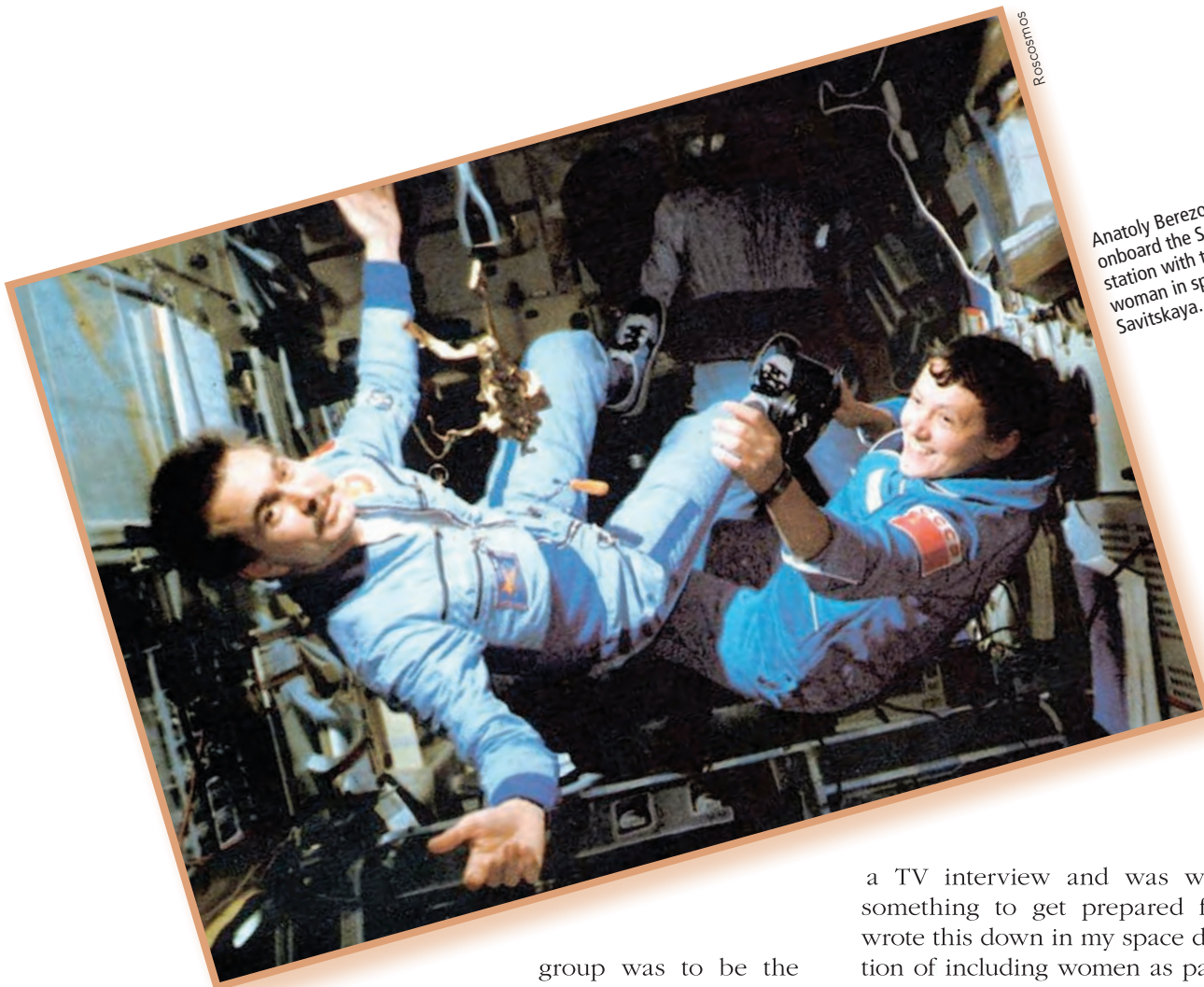
Now the leaders of the space program would not consider women working in orbit as anything special. In the Soviet Union,

after the successful work of Svetlana Savitskaya in 1982 and 1984 and then Kondakova in 1994 and 1997, any special interest in the subject was lost.

[It would take nearly two more decades, until 2014, for another Russian woman, Elena Serova, to make a space flight.]

The only inconvenience remaining was linguistic, since the Russian word “kosmonavt” has a masculine gender. *[The Russian language is flexible enough to convert the word into feminine “kosmonavtka,” but it is rarely used.]*

But in 1982 when Lebedev and I were working on the Salyut 7 space station, the problem of women in space was serious because at that time only one woman, Valentina Tereshkova, had been in space. Therefore, the participation of women as part of a space crew was an exotic experiment. As a part of our long flight, it was planned that there would be an expedition bringing a group of visitors and part of this



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Anatoly Berezovoy floats onboard the Salyut 7 space station with the second woman in space, Svetlana Savitskaya.

group was to be the world's second woman cosmonaut, Savitskaya.

Her list of accomplishments was something to be envied by any male cosmonaut. She was a pilot trained to fly several types of aircraft. She had won three world records for parachute jumps from the stratosphere and she held 15 world records piloting jet planes. She was also the world champion in aerobatic flying of Porsche planes. And on top of that she was a master of sports in the Soviet Union.

Before she became a cosmonaut, she was an instructor for test pilots. And she was getting ready for her space flight very seriously and she didn't give herself any slack as a "weaker sex." She would reject any sympathy toward her as a woman.

I have to say that in the Russian social tradition, we are convinced that there are "male" and "female" professions. Work on the space station unconsciously was looked upon as "male" profession and presence of women in space was a forced exoticism. I kind of fell into this stereotype too.

In 1982, when the expedition with Svetlana was started, I was getting ready for

a TV interview and was writing down something to get prepared for that and wrote this down in my space diary: The action of including women as part of the expedition crew, I called "evidence of high reliability of the space equipment" and psychological effect of a mixed crew I called "a stabilizing factor which increases the work ability of the whole crew." Unconsciously however, I thought of "women's" and "men's" type of work in the space station and I was still giving a priority to the "men's work" on the space station.

Even today in Russian society women appreciate it when somebody reminds them of their beauty or talks of "women's weakness" and even sympathy to women regarding their "women's mind" and "women's logic."

At the time, we were getting ready to meet the expedition of visitors: Leonid Popov, Aleksandr Serebrov and Savitskaya; we were still living up to those stereotypes. And even before our flight started, we prepared special souvenirs for the first expedition of visitors, including the Frenchman Jean-Loup Chrétien.

[Berezovoy and Lebedev hosted two visiting crews. In June, Soyuz T-6 brought Soviet cosmonauts Vladimir Dzhanibekov and Aleksandr Ivanchenkov, as well as Chrétien, a NASA astronaut who also flew

on Franco-Soviet missions. All three returned home on July 2, 1982.]

We were trying to come up with some surprise for our visitor Svetlana and took advice from Alexei Leonov.

Leonov became the first human to walk in space during the mission of the Voskhod-2 spacecraft in March 1965.

We were planning on giving [Savitskaya] a beautiful, ornamented apron which a housewife could wear in the kitchen.

I have to say that by August 1982, when we were preparing to have our visitors (including Svetlana) we had already spent four months on the space station and we were sick and tired of the necessary drudgery of kitchen work. We were hoping very much that Svetlana will be touched by our gift and its implied message and would take charge of the chores in the kitchen, which traditionally was considered “women’s work.”

August 20, 1982, the visitors’ expedition which included Svetlana arrived. Lebedev and I were very well prepared. As a

part of our work schedule, before the guests arrived, we had a big cleanup, and installed sleeping bags in the best locations around the spacecraft. Being gentlemen, we prepared for Svetlana the most comfortable sleeping spot, on the right wall of the station. Because our docking with Soyuz T-7 took place very late at night Moscow time, our special dinner was planned for 2:30 a.m. But our present to Savitskaya backfired. She suggested we take turns doing kitchen chores. Our hopes to dump all of this “women’s work” on her failed. And our scheduled time for dinners together disappeared from our daily journal completely the next day.

That was the result of our experiment to divide “male” and “female” work in space. And the word “cosmonaut” didn’t get a feminine gender form.

The subsequent history of piloting space stations has shown us that our early experiment gave us an exact result; there is no “men’s work” and “women’s work” in space. ▲



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