



Spacelab-1: Where the known meets the unknown

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Thirty years ago, astronaut Ulf Merbold became the first West German in space

Ten days, seven hours and 47 minutes – this was the duration of Ulf Merbold's first experience in space, which began on 28 November 1983, when the Space Shuttle Columbia delivered him to Earth orbit. On board with him was the European Spacelab research module in which Merbold, as payload specialist, conducted 72 experiments. Participating in the D1 mission was definitely an experience of a lifetime, which continued with the astronaut's flight to space in 1992 as part of the STS-42, and in 1993 when he was transported to the Russian MIR station on board a Soyuz spacecraft. In this interview, he talks about his selection by the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) and the European Space Agency (ESA), his work as the first non-United States citizen to participate in a NASA mission, and his mood during the hours counting down to the launch.

Interview by Manuela Braun

You were the first West German to go to space, as part of the first Spacelab mission. Five years before you, Sigmund Jähn became the first East German citizen to travel to the Soviet Salyut 6 Space Station. This time in history is constantly referred to as the 'space race'. Is this also the case within the missions themselves?

I do not share this view. When NASA's Apollo programme came to an end, Europe decided to accept the invitation offered by the United States to contribute to the new 'Space Transportation System' (STS). ESA developed and built the Spacelab, thus becoming a player in the field of human space flight. I do not think that the ESA Council was delivering a political message to the East when they decided to build Spacelab. Since the German Federal Republic was only one of the, then, 11 member states, it is at least certain that it was not in the German government's hands to show the German Democratic Republic how things should be done. And as for me, I was not sent by the politicians to make a statement; I was chosen by researchers from the ESA member states, Japan, Canada and the United States. It was different for my colleague and present friend Sigmund Jähn. Upon his return, he was sent around the country, and schools, roads and ships were named after him. He served as living proof that socialism is better than anything else. Sigmund had a military background, and I had a scientific one. This is a very important distinction to me, personally. Someone from the military is of course going to serve his or her country, but someone with a scientific background is taught to question everything and find answers. My role in this mission had nothing to do with politics.

You were a scientist in the field of metals research. What made you decide to apply to be an astronaut and go into space?

I worked at the Stuttgart-based Max Planck Institute for Metals Research and was one of the few with an unlimited contract. So I could have remained at the Institute until the end of my professional career. But when I was in my mid 30's, I wondered whether it was time to open myself up to a new field of research in addition to solid-state physics. To get a glimpse of the possibilities, one day I bought the weekend edition of the Frankfurter Allgemeine Zeitung at the Stuttgart main train station. I found an advertisement in which the DFVLR, DLR's predecessor, was looking for scientists for the first Spacelab mission on behalf of ESA. I applied and was one of the 2000 shortlisted candidates.

What was the selection process like? It was clear that only one person would be selected for the flight...

It is true that, at the time, we assumed the selection would be for a single flight. This was part of the compensation Europe received for granting the United States unrestricted use of Spacelab. Everyone was aware of the probability of being selected. The selection process took place in two stages; each ESA member state was allowed to present five candidates. From the applicants that had been preselected in Germany by DLR, which included, among others, Ernst Messerschmid and Reinhard Furrer, ESA chose me. Next in line were Claude Nicollier from Switzerland and Dutchman Wubbo Ockels. Overall, the selection process lasted about one year. It was a 'knockout' process – until there was a last man standing. DLR was in charge of conducting the language tests, scientific interviews, as well as the medical and psychological examinations. Incidentally, most competitors 'fell at the last hurdle'.

The training for the first Spacelab mission began in the summer of 1978. Our scientific programme was extraordinarily exciting. To demonstrate the versatility of the Spacelabs, the experiments that ESA and NASA selected for the flight involved a variety of disciplines. They addressed atmospheric physics, astronomy, Earth observation, biology, materials science, medicine, plasma physics and technology. Even if I had not flown, the training paid off for me. It was a one-in-a-million opportunity to stick my nose in various scientific papers. In a good experiment, the known triggers the unknown.

Since the launch of the first Space Shuttle was postponed by NASA again and again, our mission was delayed as well. NASA gave Claude Nicollier the opportunity to complete the training for 'Mission Specialist'. That's why he left the Spacelab mission, and Wubbo Ockels and I remained. Meanwhile, the Federal Republic of Germany had decided to establish a national mission, the D1 mission. To this day, I'm glad that Wubbo and I were both ensured that one of us would fly on the Spacelab-1 mission and the other would be a backup for D1. For the final selection of who would be the first choice, the scientists of the Spacelab mission formed a committee and voted on who they wanted to entrust their experiments to. They chose me. Wubbo Ockels flew on the D1 mission later, in the autumn of 1985. So we both made it into space.

Nowadays, it is common practice for missions to be comprised of an international team. You were the first non-US citizen in a NASA mission. How was the collaboration?

As Europeans, we didn't have friends. Some of the US astronauts had had to wait 20 years before they were able to fly, and we arrived and were given a seat, just like them, on the mission. There was bad blood between us. Also, the management of Johnson Space Center regarded us with suspicion. For example, we were not allowed to enter the astronauts' gym, which was for NASA astronauts. In addition to me, this was the first time that NASA also had a US scientist for research. We were appointed 'Payload Specialists', and this did not sit well with the astronauts on hold for a mission. They had been waiting for their turn on the Space Shuttle since the Apollo era. My US colleague Byron Lichtenberg and I were therefore being doubted by those in the United States who thought they were the 'proper' astronauts. It was not easy. Our task was to perform the experiments optimally, ensuring that the researchers acquired the necessary quantity of data of sufficient quality by the end of the mission.

You were in space for 'only' 10 days and had to perform 72 experiments in this time. To do so, you worked in shifts around the clock. Everything needed to run smoothly in this unfamiliar situation. How did you deal with this pressure?

I flew a total of three times. A difficult phase for me, each and every time, was the countdown. You are strapped to a seat in the shuttle. The hatch is closed. Then one has to wait two hours until launch. This is a moment in which what goes through my mind is whether I will meet the high expectations of the scientists who have trusted me with their experiments. Each experiment is not just a great deal of money, but also years of people's work. At the same time, one is also happy that, after years of preparation and training, the flight is finally here. It's an interesting state of mind. The moment the spacecraft starts moving, all of your concerns disappear. The journey begins with 3000 tons of thrust under you; the acceleration is one of the best sensory experiences. In eight minutes, we have travelled 250 kilometres upwards and reached a speed of 27,000 kilometres per hour. And then you find yourself in microgravity, where you must be guided and see that you don't have enough hands to steady yourself while working at the same time. But it is great fun. When someone is off shift, they are supposed to sleep for eight hours, but during the off-duty time, we would always sit and look out the window.

Which of the 72 experiments did you find most fascinating for yourself?

I wouldn't want to grade them. But of course there were experiments in which the astronauts had more of a laboratory assistant role; for example, we had to place materials samples inside furnaces and then start the particular computer program that controlled the melting and solidification processes. That was it. Such experiments are, of course, not as interesting as others in which you control the entire sequence. Medical experiments were also special. For these, one of us served as an experimental subject, and the other was the 'operator'. In these cases you clearly had more responsibility. In other experiments, we had to improvise – for example, when one of several film magazines for DLR's metric camera, which was to acquire undistorted images of Earth, became jammed.

Things did not go smoothly during the return – there was a computer failure and even a fire inside the shuttle upon landing.

Before the launch, my fellow passengers and I were confronted with all possible emergencies in simulations. It turned out that we could always find a solution. That's why I was always confident and trusted in the abilities of my fellow passengers in the spacecraft, and as it turned out, we were also ready for the difficulties in the real flight.

Which mission would you like to see in the future?

I have a science background, so I would like to see that we make proper use of the International Space Station as a laboratory over the next 10–15 years. In the long term, I see today's citizens continuing to challenge what our ancestors accomplished with their ships. This can only mean that, at some point, the human exploration of our Solar System will begin and people will go to Mars. I know that our current worldview was not developed only in universities, but much of what we know today came from people who went there, where no one had been before. Columbus, Marco Polo, Livingstone, the polar explorers. Why should we stop now and not continue what they started?

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In Spacelab – Ulf Merbold



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to Earth orbit. He was selected for the Spacelab 1 mission by the German Aerospace Center (DLR) and the European Space Agency (ESA).

Credit: DLR.

Life in microgravity



The six astronauts on the Spacelab 1 mission (1983) lived and worked in shifts. The STS-9 shuttle mission with Columbia was the first flight by a spacecraft with six people on board.

Credit: NASA.

STS 9 under way



The German astronaut Ulf Merbold (bottom left) flew in space for the first time with the United States citizens John Young, Brewster Shaw, Owen Garriott, Robert Parker and Byron Lichtenberg on the Spacelab 1 mission.

Credit: NASA.

Spacelab 1 in space



The European Spacelab research module was launched for the first time on 28 November 1983. On board were 72 experiments in the areas of atmospheric physics, solar physics, astronomy, Earth observation and medicine.

Credit: NASA.

Ulf Merbold



Ulf Merbold can look back on 55 days in space over three missions. From 1967 to 1978 he conducted research at the Stuttgart-based Max Planck Institute for Metals Research on problems in solid-state physics. Two years after his graduation in 1976 he moved to the European Space Agency (ESA). During this time he qualified for the Spacelab 1 mission in 1983, during which 72 experiments were conducted in microgravity. Nine years later, on 22 January 1992, Merbold flew with Discovery on the STS-42/IML-1 mission, returning to Earth on 30 January 1992. Immediately after his second shuttle mission, Merbold began preparations for the Russian EUROMIR 94 mission. An already experienced astronaut, he embarked on this third spaceflight on 3 October 1994. The destination of the flight was the Mir station, where he stayed until 4 November 1994. He was the first ESA astronaut to participate in a Russian mission.

Credit: DLR.

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