



Astronaut and guinea pig – all in one

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In 1993, during the second German D2 Spacelab Mission, astronaut Hans Schlegel orbited Earth 160 times and conducting numerous international experiments as payload specialist. This was Schlegel's first flight into space. Twenty years later, he recollects how the mission began, which of the experiments he remembers the most, and what work was like on board Spacelab, the space laboratory.

This interview was conducted by Manuela Braun.

The D2 mission got off to a nerve-wracking start; the launch sequence was terminated just three seconds before the scheduled launch time on 22 March 1993. How long after disembarking does it take for your adrenaline level to go back to normal?

On this mission, even in the days preceding the launch, we experienced many, many postponements. And now, it suddenly appeared that everything was falling into place. The local weather had improved, and all the other parameters, including for example the weather over the Atlantic at the possible emergency landing sites, were in our favour. Our spacecraft was working properly. The team was well prepared and ready to go. Then, as we were seated in the shuttle throughout the two and a half hour countdown, we kept hearing the same thing: everything is working; we are heading up into orbit today. We were already at the stage where the rocket engines were ignited, and at the point where the main engines were being swivelled into position. This caused the Shuttle to move slightly out of alignment – we could sense the movement. Then, suddenly, just three seconds before launch, we heard a warning siren we were familiar with from simulations. Of course, when it happens for real, you get an adrenaline rush – if, indeed, any increase is possible so shortly before a launch. Within a few hundredths of a second, the on board computer had shut down the engines. We were aware of this because the background noise started dying out. Then came the tension; what has happened? Is the situation dangerous or not? Will we have to exit within the next few seconds, glide to the ground in escape baskets and go into the bunker? On the one hand I was disappointed about the cancelled launch, but I was also relieved that this dangerous situation had been resolved successfully. At the time, I did not feel very affected, but looking at the photos of us disembarking, I can now see total disappointment all over my face. A very interesting experience, but not one that I would be keen to repeat.

It then took almost an entire month before things really took off. You trained extensively for your first flight, but does training – no matter how extensive and thorough – prepare you for those first moments of weightlessness during a flight on the Shuttle?

Experiencing a launch failure, and then concentrating again to prepare for another launch is very much as it is in sports. You need to be able to focus as though this were the first and only launch. You then prepare for that event. Our training is also designed to prepare us for zero gravity – for example during parabolic flights, where we can experience microgravity – virtual weightlessness – for 20 seconds at a time, with several repetitions per flight. But sustained exposure to weightlessness and the physical adjustments our body has to make – these are things that you can only prepare for theoretically. We hear all about it, but actually coming to terms with the physical and psychological reality is something that everyone has to do for him or herself. It can take between two to five days to achieve a balance, and to learn how to deal with weightlessness.

Your mission lasted 10 days that were fully occupied with experiments ranging from robotics to biology. You are a trained physicist. Which of those experiments has made the most lasting impression on you?

During the preparatory stages, you do not distinguish between them. If you conduct an experiment after a 10-hour work day in space, you apply the same care and attention to it as you would to an experiment at the start of the day. However, naturally enough, you learn a great deal during your training because one must carry out these experiments with a critical eye. Is everything proceeding as planned or is there a deviation due to a fault in the equipment or the performance? Of course, that's precisely what made me become a physicist – experimentation with reasoning. To be perfectly honest... I particularly liked the medical experiments where the astronaut is not only the person performing the study, but also the guinea pig. For example, during the launch, I had a catheter inserted in a vein on my left elbow that went through the jugular vein to just five centimetres from my heart. During the flight you have to check that everything is being recorded. It also requires 'removing' your own physical feelings and perhaps also a psychological aspect, because you are monitoring the readings from your own body. I found this to be particularly challenging – but at some point, you get used to it.

Whenever you see photos of astronauts during experiments, they are often smiling or look amazed. Are you genuinely as delighted and puzzled by the results that you get to witness?

To be perfectly honest, we know that we're being photographed, so we try and put on a friendly face. On the other hand, the mission and successful completion of experiments make you feel satisfied, happy and give you the sense that you've really accomplished something. The first time I recall thinking to myself that I was in a relaxed state of mind was after four or five days when, while in contact with the ground station, I heard someone laughing in the background. At that point you know, not only that you've conducted your experiments correctly, but that the scientists on the ground are in a relaxed mood about the successful mission. This joy is transmitted to the astronauts.

On the D2 mission, you flew through space with Spacelab. In 2008 you flew to the International Space Station, the ISS, to help install the European Columbus Module. How would you compare working life on board the two space laboratories?

Very different indeed. Purely in terms of size, Spacelab and the Columbus Module are very similar – six and a half metres long, five metres in diameter, equipped with experimentation cabinets and life support systems. However, the procedure was completely different. For the D2 mission, we spent years gaining an understanding of and rehearsing the individual experiments. Then, over a period of just 10 days, we carried out one experiment after another without any deviation whatsoever – everything was very tightly defined. Today, with the Columbus Module, we have a laboratory that remains in orbit for years, and in which experiments in weightlessness are conducted right around the clock. It is a bit more like a laboratory down here on Earth, where several series of experiments can be conducted in succession with different parameters.

During that D2 mission, you were in space for 10 days. For the Columbus mission, you were up there for 13 days. Would you ever have been attracted to a long duration mission of the kind now familiar to us today?

Oh yes! That was why, after the D2 mission, I worked as a backup cosmonaut for a German-Russian mission, and why I later applied to be a European astronaut and be trained in the USA for a long duration flight. This never happened for me, though. Instead, I was selected to carry out a Shuttle flight, and to take the Columbus laboratory up to the Space Station. I ought to be satisfied with that, and it was indeed a great honour. Nonetheless, my real dream was to spend a long time in space. Today, I am still an astronaut and am still mission-capable, but given that I am now 61, I can well imagine that I won't be selected.

What about the Moon or Mars?

Absolutely! My vision is that mankind might return to the Moon to learn how to survive on other planets, and perhaps even to build a base there. For me, the ultimate objective – and mankind will do this – is to fly to Mars and settle there. The only questions are these: will we do it and when will that be? I hope to be here to experience the event when it happens.

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Hans Schlegel during the D2 mission



Astronaut Hans Schlegel in the Spacelab wearing an ultrasonic measurement device on his forehead. Under the AR-TISSU experiment, tissue thickness and stability along the axis of the body were studied under microgravity conditions. The picture was taken during the 1993 D2 mission.

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D2 mission – a working day up in space



Astronaut Hans Schlegel working with the FPM experimentation system for fluid physics during the D2 mission (STS-55).

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Science in microgravity



Astronaut Hans Schlegel particularly enjoyed the medical experiments during the D2 mission. The 10-day German Spacelab mission was launched into space 20 years ago.

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