

Max Planck researchers collaborate with partners in more than 120 countries. Some of them have kindly agreed to write about their personal experiences and observations for our website. Dietmar Germerott from the Max Planck Institute for Solar System Research in Göttingen spent 11 weeks at the Esrange Space Center balloon and rocket base in northern Sweden, where he watched over the Sunrise III mission. Here, he recounts his experiences from the launch of the balloon-borne solar observatory.

PHOTO: MPS / D. GERMEROTT



The Sunrise III observatory shortly before launch on the Hercules crane vehicle. The huge balloon in the background to the right is already partially filled with helium. During flight, it carries a load of almost three metric tons.

“Oh, you’re headed on another class trip?” asked my wife when I told her I was set to fly to Kiruna. By that stage, I’d been to the balloon and rocket launch base in northern Sweden so often that it was starting to feel like a class reunion: there’s a huge number of researchers and technicians that pay frequent visits to the base, and I’m always bumping into old acquaintances. The Esrange Space Center is located in the forests of Lapland, surrounded by nature. It’s far from unusual for a reindeer to suddenly appear in the middle of the launch area. The station has space for around 100 people. This time, however, there were so many teams on site that I initially had to move to accommodation around 25 kilometers out from the base. While there are rustic log cabins available there for summer use, every winter sees the construction of a new and exclusive “ice hotel.”

I spent a total of 11 weeks in Kiruna. There was never a dull moment, and I

never had to deal with the dreaded cabin fever. During the daytime, I generally worked on my computer. Then in the evening, I would head to Kiruna with colleagues for dinner. I even took a trip with a friend from Nasa to Narvik in Norway. But the thing that stood out for me was the fleet of vehicles that were available to us: my parents had a farm, so even as a child I’d had the chance to drive combine harvesters and tractors. There were no agricultural vehicles at Esrange Space Center, of course, but I was more than happy to make do with the wheel loaders and rollers – and Hercules, a huge crane and launch vehicle. In my spare time, I lent a hand to the people at Esrange by using a wheel loader and a roller to level the launch site after winter and prepare it

for the spring. My efforts were rewarded with a snazzy jacket and a hat to match. And there was another surprise in store on my last day: they let me steer Hercules across the launch area!

Sunrise is the largest solar observatory ever to have left Earth’s surface. The helium-filled balloon has a diameter of 130 meters and houses a gondola which, alongside its measuring instruments, rises to a height of 37 kilometers – where the conditions for observing the sun are every bit as good as in space. After two extraordinarily successful Sunrise missions in 2009 and 2013, Sunrise III was penciled in for 2022 and aimed to deliver new insights on the sun’s atmosphere; however, due to technical problems, the

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## KIRUNA, SWEDEN

flight had to be aborted shortly after launch. So now it was time for a second try.

Sunrise's launch was timed around the midnight sun – a short time window during which the sun never sets on the Arctic Circle. It's only then that the solar telescope can collect data around the clock. But the weather was not on our side: June was a washout, and because the sensitive instruments have to be protected from rain, we were repeatedly forced to postpone the launch. Before we knew it, it was early July; the stratospheric winds were already starting to grow weaker. Soon they would be too weak to carry Sunrise westwards to Canada, where the landing was planned.

July 9 was the last possible launch day, and, as luck would have it, the weather forecast looked good. Winds die down at night, so we began our preparations around 9:00 PM. At 10:30 PM, Hercules went into action and maneuvered Sunrise from the main hall to the launch site. A tanker truck

pumped helium into the balloon, which accommodates a full 500 kilograms of the noble gas. Inflation alone takes a good hour. Then a quality check to round things off: are all the connections good? Are the electronics working? The entire final check is recorded on video, to make sure any potential errors can be checked and reviewed afterward. Then – finally – the long-awaited command: “Ready for balloon liftoff!” The tether was released. At 6:24 AM, Sunrise took off into the sky and rose high above northern Sweden.

There was an incredible feeling of relief. It was still far too soon for euphoria, given the memories of the aborted mission of two years ago. Things can still go wrong, even after a successful start. Exhausted and full of mixed emotions, my next move was to head for breakfast. Then I went to grab some sleep. Once I'd woken up in the afternoon and had been able to reassure myself that everything was running smoothly, the last bit of tension fell away. Sunrise was in flight!



PHOTO: MPS / SIEBERT-RUST

Dietmar Germerott

60, is an engineer in Sami Solanki's working group. On the Sunrise mission, he is responsible for ensuring the smooth operation of data transmission. Sunrise III landed in the Canadian Northwest Territories after a six-day flight. Shortly afterward, the data storage devices were recovered undamaged.