This is one of the final drafts for the science invitation piece from Magnus Persson which can be found in published form here: http://science.sciencemag.org/content/354/6315/964 and http://science.sciencemag.org/content/354/6315/964/tab-pdf

"It is 2 a.m., and I am alone, at the Onsala Space Observatory, on a peninsula along the coast of Sweden. The area is fenced, with restricted access to everyone but authorized scientists and the rabbits, boars, deer, and cows that roam the fields around the buildings. I am using a telescope with a 20-m-diameter steerable dish to observe the radio regime of the spectrum of light. Because I am observing at a different wavelength than visible light, I can observe through clouds, and even during the day. I am observing at night because my source is only visible in the sky at night during this part of the year.

I sit in the control room in front of a big desk with several computer monitors showing different vitals of the operations. Behind me is a rack space with spectrum analyzers and other equipment to interpret the signal the telescope is receiving from space. I am using the telescope to look at the carbon monoxide (CO) gas in a cloud of gas and dust that is forming stars in the outer parts of our galaxy. The telescope is set up to be sensitive to the emissions of the CO molecules in the cloud. It focuses the emission to a small instrument, a receiver at the focal point of the telescope dish. There, the photons are converted to a digital signal that we can then store and analyze on a computer. By moving the telescope around, we can see how the emission from the CO varies with position, essentially mapping it.

The observation time is rather hectic in the beginning; I have to plan everything and calibrate the instrument. Once the telescope is set to observe, there is breathing room to do some other work, get more coffee, and eat something. I have never observed with this telescope before so I have to learn how it works, how to control it, and in what order things have to be activated and calibrated. I also have to be flexible and ready to make adjustments throughout the observations to get the most out of my time with the telescope. Observations are exciting because we are collecting light that has traveled tens of thousands of years to reach us, but also exhausting. I hope that by doing this work, I will contribute to the understanding of how stars and planetary systems, perhaps much like our own Sun and Solar System, are formed.

Magnus Vilhelm Persson

Department of Earth and Space Sciences, Chalmers University of Technology, Onsala Space Observatory, 439 92 Onsala, Sweden. Email: magnpe@chalmers.se"