Packing for Mars

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Technicians in ESA’s ultra-clean microbiology laboratory, part of ESTEC's Life, Physical Sciences and Microgravity Laboratory, follow strict Planetary Protection procedures as they prepare the COMARS+ temperature sensor to be put into storage until it can be integrated into the heat shield of ExoMars 2016's Schiaparelli lander. Credit: ESA

Like surgeons in an operating room, the technicians work gowned and masked in ESA's ultraclean microbiology laboratory, ensuring a high-tech sensor will not contaminate the Red Planet with terrestrial microbes.

This temperature sensor is destined to land on Mars as part of ESA's Schiaparelli module in late 2016.

Schiaparelli will hitch a ride to the Red Planet with the ExoMars Trace Gas Orbiter, set for launch on a Russian Proton rocket at the start of 2016. By proving Europe's capability to land safely, the door will be opened for ESA's ExoMars rover two years later.

Schiaparelli will also do useful science in its own right during its estimated two to eight martian days of surface life.

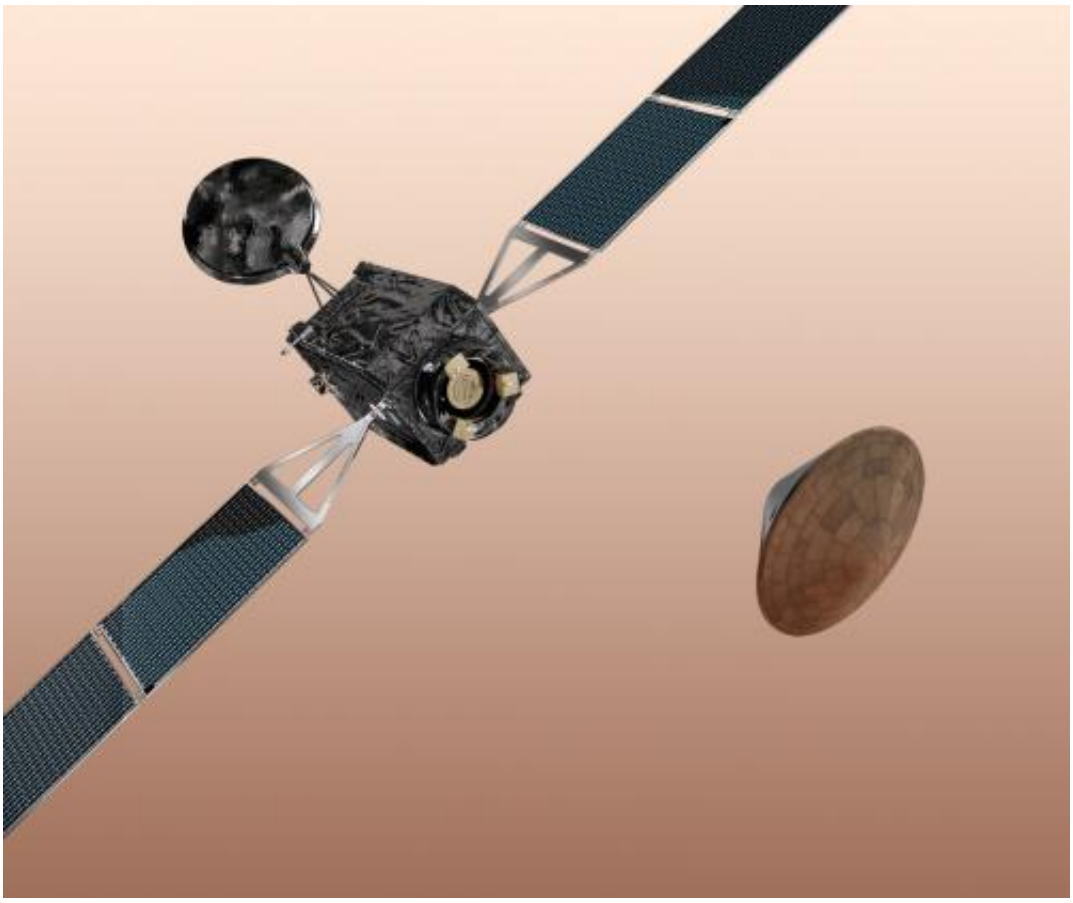
First, sensors embedded in the heatshield will record details of its plunge through the alien atmosphere.

Then, a battery-powered suite of sensors will measure the electrical activity and transparency of the surface atmosphere, its wind speed and direction, along with air pressure and temperature.

Produced by Germany's DLR space agency with France's CNES space agency, the heatshield temperature sensor package was delivered to ESA's technical centre, ESTEC, in Noordwijk, the Netherlands, earlier this year.

It must be stored until it can be integrated into the lander's heatshield, but first the ExoMars team had to be certain the sensor had not picked up any microscopic hitchhikers along the way.

Anything headed to Mars is subject to strict 'Planetary Protection' to ensure that the pristine environment is not contaminated by terrestrial microbes, which could mask possible evidence of alien life or result in a false-positive detection of life.



The ExoMars Trace Gas Orbiter (TGO), along with an Entry, Descent and Landing Demonstrator Module (EDM), form the first mission in the ExoMars programme. The Orbiter and EDM are scheduled to arrive at Mars in 2016. The ExoMars Orbiter will accomodate a suite of instruments to carry out a series of scientific investigations, including the search for evidence of methane and other trace gases in the Martian atmosphere. The ExoMars EDM constitutes a technology platform whose main goal is to enable Europe to acquire the capability to land on Mars. Although designed to demonstrate entry, descent and landing technologies, the EDM also offers limited, but useful, science capabilities. Credit: ESA/AOES Medialab

ESTEC's cleanroom, part of its Life, Physical Sciences and Microgravity Laboratory, is designed for such demanding work. Its rigorously filtered air contains millions of times fewer particles than the outside

atmosphere: fewer than a dozen particles larger than 0.1 micrometres – each equivalent to a single speck of dust – per cubic metre of air.

Technicians donned sterile 'bunny suits' before they could have contact with the sensor, entering the 35 sq m cleanroom through an air shower.

Like all ExoMars hardware, the sensor was itself built in cleanroom conditions, but the technicians were still required to make 'bioburden' checks, drawing swabs across equipment surfaces that could be then put onto culture plates to identify any contamination.

ESA’s ultra-clean microbiology laboratory is part of the Agency's Life, Physical Sciences and Microgravity Laboratory, based in Noordwijk, the Netherlands. The air on the other side of the glass is an ISO class 1 cleanroom, its rigorously filtered air containing at rest millions of times fewer particles than the outside atmosphere: fewer than a dozen particles larger than 0.1 micrometres, such as a speck of dust, per cubic metre of air. This makes it suitable for Planetary Protection procedures, such as examining temperature sensors destined to end up

on the surface of Mars aboard the ExoMars 2016 Schiaparelli lander. Credit: ESA–A. Le Floc'h

In the event, it gained a clean bill of health, which meant it could then be placed into a sterile, antistatic bag for storage within the lab's protected environment.

It joins other Schiaparelli flight equipment already in storage, including the Descent Camera that will record the later stages of landing.

Provided by European Space Agency