

Image: Sterilising an antenna for Mars

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Credit: ESA–A. Dowson

A ground penetrating radar antenna for ESA's ExoMars 2020 rover being pre-cleaned in an ultra-cleanroom environment in preparation for its sterilisation process, in an effort to prevent terrestrial microbes coming along for the ride to the red planet.

Part of the Agency's Life, Physical Sciences and Life Support

Laboratory based in its Netherlands technical centre, This 35 sq. m 'ISO Class 1' cleanroom is one of the cleanest places in Europe. It is equipped with a dry heat steriliser used to reduce the microbial 'bioburden' on equipment destined for alien worlds.

The item seen here is the WISDOM (Water Ice Subsurface Deposit Observation on Mars) [radar antenna](#) flight model, designed to sound the subsurface of Mars for [water ice](#).

"After pre-cleaning and then the taking of sample swabs, the [antenna](#) was placed into our dry heat steriliser, to target the required 99.9% bioburden reduction to meet ExoMars 2020's cleanliness requirements," explains technician Alan Dowson.

"To check the effectiveness of this process, the swabs are subjected to a comparable heat shock and then cultivated for 72 hours, to analyse the number of spores and bacteria able to survive. The viable bioburden is then calculated for the surface area of the WISDOM antenna. If this level is below the mission's maximum then it is cleared for delivery."

All the cleanroom's air passes through a two-stage filter system. Anyone entering the chamber has to gown up in a much more rigorous way than a hospital surgeon, before passing through an air shower to remove any remaining contaminants.

The chamber's cleanliness is such that it contains less than 10 particles smaller than a thousandth of a millimetre per cubic metre. A comparable sample of the outside air could well contain millions.

By international planetary protection agreement, space agencies are legally required to prevent terrestrial microbes hitchhiking to other planets and moons in our Solar System where past or present alien life is a possibility.

Provided by European Space Agency

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