



Planetary Protection at SEA

The European Space Agency has exciting plans for exploration of the solar system. This programme, known as “Aurora” has a robotic element (which is the main focus of UK participation) as its first phase and potentially a later phase involving human missions to the Moon and to Mars. Some of the more ambitious projects are too expensive for a single Space Agency and these are planned to be carried out in cooperation with other Space Agencies around the world (NASA, JAXA etc).

Mars is a fascinating place to explore. It is one of the few places in the solar system where there could be extant or extinct life. Finding life (or the relics of life) on Mars would answer the question “Are we alone in the Universe?”

As a result, spacecraft going to Mars must take due account of “Planetary Protection”. Two stages exist – all missions (including Beagle 2 and ExoMars) must prevent forward contamination (taking terrestrial organisms to Mars) and mission such as Mars Sample Return (which, as the name implies, will land, collect a sample and return it to Earth for analysis) must prevent backward contamination. The level of sterilisation required to meet the COSPAR treaties (Class 4b if going somewhere where it is thought life may have existed in the past, and Class 4c if it may exist now) is more stringent in many ways than in facilities dealing with the most dangerous biohazards

SEA has been working to bring the academic expertise based in the Open University into the Aurora programme; our expertise on this topic is recognised and we are now working on our eighth contract in the area. We look forward to carrying this forward into the flight hardware phase of the programme as one strand of SEA’s participation in the exploration of the solar system.

Planetary Protection involves imposing many technologies and techniques that are not normally considered for Earth orbiting satellites such as the sterilisation of complex, or delicate, engineering systems. To achieve this SEA is applying technologies and techniques from non-space industries such as semiconductor manufacturing, nuclear containment, bio-containment and pharmaceutical manufacturing.

The SEA Planetary Protection team is fully trained to NASA Planetary Protection standards. They are responsible for the Planetary Protection implementation on missions to Mars such as the ESA preparation for ExoMars for Mars Sample Return (MSR).

*the European Space Agency’s ExoMars rover
Image credit: ESA*

