

Institute of Aerospace Medicine

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Astrobiology and planetary protection – how can we make sure to identify reliably extraterrestrial traces of life?

The search for extraterrestrial life is one of the main driver of space exploration. In our solar system not only our neighbour planet Mars, but also the icy moons of the outer solar system might be habitable and are therefore of great astrobiological interest. International space missions are ongoing or in preparation to look for complex organics molecules and direct signs of past or present extraterrestrial life. Very sensitive instruments are developed for *in situ* measurements on planetary surfaces. For the unambiguous identification of traces of extraterrestrial life a strict chemical and biological contamination control regime is necessary. The COSPAR Planetary Protection Policy and its implementation guidelines are subjected to a regular update in view of new knowledge about the habitability of astrobiological interesting planets and moons and by taking the remarkably fast technology development in the area of biotechnology and bioinformatics into consideration. Research activities at DLR encompass the investigation of the physical and chemical limits of life on Earth, the bioburden and biodiversity measurements of spacecraft and spacecraft assembly cleanrooms, actually for ExoMars2020 and JUICE, the development of a new planetary protection assay for icy moons, the development and testing of new sterilisation methods for space hardware and the test of antimicrobial surface materials that might be used in future manned spacecraft to reduce the bioburden. Exemplary results from different projects will be presented, e.g. insights into the microbiome of the ISS.