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EXPANDING OPTIONS FOR IMPLEMENTING PLANETARY PROTECTION DURING HUMAN
SPACE EXPLORATION: UPDATE ON AN IAA STUDY

Abstract

Missions and operations on the vast majority of objects in the solar system are not subject to planetary protection constraints because they cannot to be contaminated by Earth life in ways that impact exploration. In contrast, Mars, Europa, and Enceladus, which represent locations with biological potential, are subject to strict planetary protection constraints for missions of all types.

Planetary protection controls established by the Committee on Space Research (COSPAR) of the International Council for Science have been in force for nearly five decades, ensuring responsible exploration and the protection of science information from harmful contamination. While guidelines for planetary protection controls on human missions to Mars have been established by COSPAR, detailed engineering constraints and processes for implementation of these guidelines have not yet been developed. Looking ahead, planetary protection for human missions will often be supportive of other mission needs, such as maximizing closed-loop and recycling capabilities to minimize mass required, and minimizing exposure of humans to planetary materials for multiple health reasons – in addition to minimizing contamination of planetary samples and environments for science purposes.

We report on the progress of a current IAA Study Group that is engaging human mission developers in exploring approaches by which planetary protection objectives can be accomplished through engineering or operational constraints, in synergism with other mission constraints when possible. In the near-term, this Study will provide input to the 2014 Heads of Agencies Summit regarding potential options for development of technical and engineering capabilities for implementation of planetary protection in the context of future mission operations. Ultimately, agreement at international level regarding planetary protection implementation activities is necessary to ensure that all organizations avoid releasing harmful contamination on bodies with biological potential in order to ensure compliance with the 1967 Outer Space Treaty.