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PLANETARY PROTECTION POLICY AND TECHNOLOGY DEVELOPMENTS FOR THE CREWED EXPLORATION OF MARS

Abstract

As part of planning for potential future crewed exploration of Mars, NASA is developing its planetary protection policy for crewed missions, building on concepts developed within the international space exploration community. COSPAR (The Committee on Space Research), together with participating space agencies, has over the last several years organized and held interdisciplinary meetings to consider next steps in addressing knowledge gaps for planetary protection for the first human missions to Mars. Beginning with these workshop discussions as a base, NASA has held follow-on planning activities to identify the necessary steps to be accomplished to close those knowledge gaps. Significant overlap was identified between the planetary protection needs, including; microbial monitoring requirements for crew health and medical systems; studies of the microbiome of the built environment; environmental control and life support system (ECLSS) venting and disinfection strategies; waste management, and; planetary surface operations. In many cases, efforts to mature exploration systems for Mars that are occurring in other technology domains can be leveraged with minor changes to address planetary protection gaps as well. In other cases, work planned for testing on ISS as an analog for Mars transit, or on the lunar surface as an analog for Mars surface operations, can be used to close gaps in current planetary protection capabilities. This presentation provides a status update on the findings of the COSPAR Meetings on this topic to date, together with NASA's responses in terms of agency-level plans and activities.