

SPACE EXPLORATION SYMPOSIUM (A3)
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ASSESSMENT OF THE STRATEGIC KNOWLEDGE GAPS FOR EXPLORATION

Abstract

In order to prepare for safe, effective, and efficient human exploration beyond Low Earth Orbit (LEO), system and mission planners will need access to data that characterizes the engineering boundary conditions of representative exploration environments, identifies hazards, and assesses resources. The knowledge developed from this data will inform the selection of future destinations, support the development of exploration systems, and reduce the risk associated with human exploration. Such data can be obtained on Earth, in space, by analogue, experimentation, or direct measurement by remote sensing or in situ. In order to accomplish this, it is necessary to identify the Strategic Knowledge Gaps (SKGs) associated with potential destinations for human exploration, what measurements or data are needed to fill those gaps, how the knowledge is best obtained, and for which missions and functional capabilities the knowledge is needed.

A Strategic Knowledge Gap Assessment Team has been formed within the International Space Exploration Coordination Group (ISECG) and charged with developing an internationally integrated set of SKGs to inform joint efforts at planning human and robotic precursor exploration of the Moon, asteroids, and Mars and its moons. The effort also includes articulating how currently planned robotic missions and ground based activities will contribute to filling the SKGs and elucidation of potential future missions and activities that complement those currently planned and could provide robust opportunities for international cooperation.

These observations/measurements will directly support engineering design and also assist in numerical model validation.

This paper will present the outcome of the analysis performed by the ISECG SKG Assessment Team to document the internationally integrated set of highly relevant gaps, as well as information on how planned robotic mission and ground based activities fill these gaps, in the second iteration of the ISECG Global Exploration Roadmap (GER).