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RESULTS FROM THE INTERNATIONAL SPACE EXPLORATION COORDINATION GROUP (ISECG) ASSESSMENT OF IN SITU RESOURCE UTILIZATION (ISRU) FOR HUMAN SPACE EXPLORATION

Abstract

The Technology Working Group of the International Space Exploration Coordination Group (ISECG) is a worldwide agency-level group that leads the task of identifying technology gaps and the associated potential actions for closure in the scope of current and future architectures within the Global Exploration Roadmap (GER). In 2019, an In-Situ Resources Utilization (ISRU) Gap Assessment Team was commissioned to address questions such as 'What strategic knowledge gaps (SKGs) exist that need to be addressed?', 'How can GER elements and architectures be adopted so that they are ready to use ISRU products', and 'What technology and demonstration investments by governments are needed to meet GER mission objectives, and encourage commercial involvement?'. Due to the (launch) cost of interplanetary travel and especially to planetary surfaces, sustainable human exploration activities can be achieved through ISRU in areas such as life support, propulsion, radiation protection and waste management. Infusing ISRU technologies and capabilities in the architectures within the GER can enable overall mission efficiency, towards sustainability. The paper will provide an overview of the process, products, and results of the ISRU Gap Assessment Team on establishing an international strategy for resource assessment and usage of Moon and Mars resources for human exploration and potentially enabling space commercialization.