

International Cooperation for Space Exploration (1)
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AN UPDATED REFERENCE LUNAR SURFACE EXPLORATION SCENARIO FOR THE GLOBAL
EXPLORATION ROADMAP (GER): THE GROWING GLOBAL EFFORT AND MOMENTUM
GOING FORWARD TO THE MOON AND MARS

Abstract

In January 2018 the International Space Exploration Coordination Group (ISECG) issued its third edition of the Global Exploration Roadmap. It reflects the consensus of ISECG space agencies on a common strategy and roadmap for expanding human presence into the Solar System, with the surface of Mars as the long-term goal. Since then many ISECG agencies have been renewing and updating their plans for exploration and corresponding science goals and technology development strategies.

To further support the coordination of lunar exploration plans of agencies, ISECG updated the GER reference lunar surface exploration scenario in 2020. Based on the "ISECG Exploration Goals" and "Sustainability Principles", and building on inputs from the various agencies, lunar surface exploration objectives have been formulated. A sustainable operation on and around the Moon is recognised as a shared goal directly contributing to enabling human missions to Mars. Key elements for achieving higher levels of sustainability are longer surface missions by surviving the lunar night, and the introduction of reusable elements. ISECG also initiated further analysis related to the potential of In-Situ Resource

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Utilisation, including the use of regolith and water ice on the lunar surface, which may create opportunities in the coming decades.

This paper will describe the updated reference lunar surface exploration scenario, which is documented in an Addendum to the GER. It details the exploration architecture element concepts that are required for an exploration campaign to progressively meet the formulated goals and objectives. The updated scenario not only supports coordination amongst space agencies to prepare for future missions, but also provides context and anchor points to test and implement ideas for concrete partnerships and missions. Such partnerships amongst government agencies, academia, public-private partnerships and purely private sector partnerships will bring to bear the best ideas and solutions from around the globe.

In the Global Exploration Roadmap the Moon is a key destination on the pathway to Mars as well as in its own right. The GER highlights a conceptual Gateway in lunar orbit and its importance for sustainable human exploration. It shows how the Gateway will be used as a staging post for human and robotic missions to the lunar surface and deep space.

The ISECG membership is steadily increasing, reflecting a growing global effort and momentum going forward to the Moon and Mars. Since the 2018 GER release, the number of ISECG members has grown from 15 to 26 participating agencies.