19TH IAA SYMPOSIUM ON HUMAN EXPLORATION OF THE SOLAR SYSTEM (A5)
Human Exploration of the Moon and Cislunar Space (1)

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THE ISECG SCIENCE WHITE PAPER: SCIENTIFIC OPPORTUNITIES OF THE GLOBAL EXPLORATION ROADMAP

Abstract

Future space exploration goals call for sending humans and robots beyond low Earth orbit and establishing sustained access to destinations such as the Moon, asteroids and Mars. Space agencies participating in the International Space Exploration Coordination Group (ISECG) are discussing an international approach for achieving these goals, documented in ISECG's Global Exploration Roadmap (GER). The GER reference scenario reflects a step-wise evolution of critical capabilities from ISS to missions in the lunar vicinity in preparation for the journey of humans to Mars.

The GER is driven by high-level objectives with a strong scientific component. In acknowledgement of the prominent scientific stakes in exploration, ISECG agencies have engaged in a coordinated interaction with scientific communities over the course of the last two years and initiated the development of a Science White Paper. This document's content is shaped by the scientific community in an open, transparent process. It addresses the scientific themes of investigations enabled by the GER mission themes, i.e. exploration of the lunar surface, extended duration missions in cis-lunar space and exploration of near-Earth asteroids, and discusses how these investigations feed forward to the horizon goal of human exploration of Mars. Specifically, the document will

- ensure international science communities' perspectives inform the future evolution of mission concepts considered in the GER,
- communicate overarching science themes and their relevance in the GER destinations, and
- identify and highlight the scientific opportunities in early exploration missions as the GER reference architecture matures.

A draft version of the Science White Paper has been discussed with international scientists and agency representatives at a dedicated two-day workshop organized by participating ISECG agencies and the

COSPAR Panel on Exploration in February 2016 in Paris, with strong support from the European Science Foundation and NASA's Solar System Exploration Research Virtual Institute. Once mature, the document is expected to be published in the fall of 2016.

The authors will provide an overview of Science White Paper development process and the key messages from the paper together with recommendations for the future evolution of the GER.