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A VIEW TO THE NEXT EDITION OF THE GLOBAL EXPLORATION ROADMAP

Abstract

The Global Exploration Roadmap (GER) is the human space exploration roadmap which reflects the policies and plans of space agencies that are active in the International Space Exploration Coordination Group (ISECG). The GER represents a high level status of the collaborative work of an increasing number of space agencies to prepare for the future of human space exploration. It recognizes the role of robotic explorers to gather information about locations where humans may one day live and work. The GER reflects space agency planning on the roadmap to Mars, starting with the International Space Station and next into cislunar space. Cislunar space enables advancing capabilities needed for establishing sustained human access to destinations such as the Moon, asteroids and Mars. The framework of ongoing collaborative activities includes 1) common goals and objectives, 2) a reference scenario that reflects a step-wise evolution of critical capabilities from ISS to missions in cislunar space and the lunar surface in preparation for the journey of humans to Mars, and 3) coordination and collaboration of preparatory activities.

This paper will review the work of participating space agencies to advance the reference scenario and architecture of the GER with focus on:

• Further refinement of cislunar deep space habitat concept and missions which support NASA's asteroid retrieval mission and lunar robotic activities; • A human lunar transportation architecture; • Conceptual studies of a human lunar surface exploration scenario; • Coordination of interest in lunar polar volatile prospecting; and articulation of science opportunities.

Given the significant impact and increasing fidelity of the GER reference scenario and architecture, agencies have the opportunity for increased collaboration and coordination in the range of preparatory activities described in the GER. In particular, International Space Station (ISS) partner agencies have developed detailed roadmaps and plans for using the ISS to demonstrate the critical systems needed for exploration beyond low-Earth Orbit. In addition, agencies have increased efforts to look for collaboration opportunities in the area of advanced technologies. They continue to share investment priorities in pursuit of possible collaborations and future critical contributions. They have also looked closely at the challenges and gaps of two technology areas in particular: Liquid oxygen/methane propulsion systems and dust mitigation technologies. This paper will share the status of the ongoing roadmapping activity of the

ISECG agencies and an outlook towards the next iteration of the GER that is currently foreseen in the 2017 timeframe.