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CISLUNAR HABITATION: AN ISU SUMMER SESSION PROJECT

Abstract

NASA's goal is to extend human presence deeper into the solar system and to the surface of Mars. As part of this journey to Mars, NASA will need deep space habitation systems sufficient to support at least a crew of four on Mars-class mission durations. Recognizing this need, the United States through NASA is proposing as a priority objective the development of a human habitation facility able to operate for extended durations in the deep space "proving ground" - the cislunar environment, including L-1, L-2, and Lunar Distant Retrograde Orbits (LDROs).

This proving ground presents an opportunity to advance the development and demonstration of these capabilities and also contribute to continued interest around the world, both within space agencies and the private-sector, in space exploration. NASA is planning a series of missions for this habitat, culminating in a "shake-down cruise" in the cislunar environment by the end of the 2020s. In planning this activity, NASA recognizes both the interest in and ability of potential commercial and international partners in contributing to and building off of or possibly complementing such a capability. This objective is aligned with the 2013 Global Exploration Roadmap, prepared by a coalition of 14 space agencies, which stated that a critical capability for exploration is an "Evolvable Deep Space Habitat in the lunar vicinity that can accommodate life support and other habitation systems to demonstrate their use in an integrated fashion beyond low Earth orbit."

NASA is interested in how to best execute the cislunar proving ground deep space habitation missions within a context of partnership and programmatic innovation. As a result, NASA engaged the faculty and students of the International Space University's Summer Studies Program through a team project that studied these questions. The paper will present the results of this study.