

SPACE LIFE SCIENCES SYMPOSIUM (A1)

The International Space Station in LEO and the Deep Space Habitat in Cis Lunar Space as platforms for simulated Mars voyages (4)

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THE SMALL STEP BEFORE THE GIANT LEAP: CIS-LUNAR HABITAT AS POST-ISS DEEP SPACE ANALOG FOR MARS EXPEDITIONS

Abstract

The International Space Station is undoubtedly necessary in our preparations for deep space exploration missions, but it alone is not sufficient. NASA in particular is evaluating and validating preventative and restorative measures on ISS. These measures are intended to reduce the risks to astronauts on upcoming exploration-class deep space missions. The ISS may also permit integrated validations of several technological and operational solutions in a 'Mars voyage-like' setting if ISS systems and operations can accommodate it.

The next step could be to confirm the lessons learned on ISS at a venue beyond low Earth orbit before they are applied to expeditions to Mars and beyond. The universe has generously provided us with that next step: the Moon. It permits relatively convenient access, including speedy returns to the safety of Earth if needed, while being sufficiently distant to impose serious constraints on preparations, engineering, operations and support that qualitatively, if not quantitatively, mimic the requirements of exploration missions beyond the Earth-Moon system.

This presentation will briefly review the biomedical lessons of ISS for exploration-class missions, then will discuss how those lessons can be applied in the more rigorous environment of the proposed cis-lunar habitat in a stable orbit of the Moon or in its proximity. Finally, it will describe application of the knowledge and techniques from ISS and the cis-lunar habitat to a Mars mission.