

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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EVOLUTION OF THE INTERNATIONAL SPACE STATION LIFE SUPPORT AND HABITATION
SYSTEMS FOR DEEP SPACE EXPLORATION

Abstract

As NASA and its international and commercial partners plan for human missions beyond Low Earth Orbit, the International Space Station (ISS) provides an enabling platform for the evolution and testing of human habitation systems critical for those missions. As the only permanently-crewed microgravity platform, the ISS provides the relevant environment necessary to demonstrate performance and long-duration reliability of these systems before deploying them into deep space. For these reasons, NASA is currently executing plans to evolve the ISS life support, environmental monitoring, logistics management, fire safety, and crew health systems into deep space exploration-capable systems. Although the ISS systems have successfully supported the crew of six for more than 8 years on orbit, improvements and additional capabilities are needed to increase reliability, further close the air and water recovery loops, and reduce consumables and dependence on ground resupply. NASA is not alone in its efforts. US commercial space companies have been investing their own resources and partnering with NASA through the NextSTEP Broad Area Announcement habitation initiative. NASA's international partners are also developing capabilities and planning technology demonstrations on the ISS over the coming years. The development of common standards, currently in work through the ISS Exploration Capabilities Study Team and Standards Working Group, will enable systems from NASA, commercial and international partners to be interoperable. This paper will provide an overview of these near-term habitation system development activities and longer-term planning.