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CONSTRUCTING NASA'S CREW HEALTH AND PERFORMANCE EXPLORATION ANALOG
(CHAPEA): A 3D-PRINTED HABITAT BY ICON/BIG

Abstract

In 2020 ICON Technology, Inc. was awarded a subcontract through Jacobs supporting NASA's Crew Health and Performance Exploration Analog (CHAPEA) to deliver a 3D-printed habitat, referred to as Mars Dune Alpha, at NASA's Johnson Space Center. The 1,700 square-foot structure simulates a realistic Mars habitat supporting long-duration, exploration-class space missions. As a functional analog habitat, Mars Dune Alpha advances the technology readiness of multiple gaps relevant to construction of pressurized surface habitats. These include: the integration of Earth-brought elements such as airlocks, hatches, and a medical pass-through window, the integration of modular flooring and outfitting elements for the habitat interior, as well as the integration of mechanical, electrical, and plumbing utilities. Now that construction of the habitat has been completed in May 2022, this paper reviews lessons learned and identifies opportunities for how Earth-based analog studies may best inform future large-scale additive manufacturing applications on the Moon and Mars.