

24th IAA SYMPOSIUM ON HUMAN EXPLORATION OF THE SOLAR SYSTEM (A5)
Interactive Presentations - 24th IAA SYMPOSIUM ON HUMAN EXPLORATION OF THE SOLAR
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LUNAR EXPANDABLE ASTRONAUT PORT (LEAP)

Abstract

The Lunar Expandable Astronaut Port (LEAP) is designed as a part of the part of RASC-AL competition for the phase 2 of Artemis mission to support crew of 2 astronauts for a 30 consecutive days mission. LEAP is conceptualized as a Durable Low-Mass Lunar Surface Habitat with approximately of 6000kg weight in total. Overall Artemis, 2024, plan involves conducting operations on and around the Moon that will help study the possibility of increased mission durations, study starting points for a human settlement on the Moon, incorporate recent TRL developments and extrapolate experiences to be applied on the first human mission to Mars. LEAP is a creative design of a mobile surface habitat meant to be used to support human missions, EVAs and research with adequate protection from radiation and micrometeoroids and is fully compliant with Artemis mission vision. The key features of the LEAP habitat are its self-deployable capabilities readying the habitat before the crew arrives on site assuring safe and appropriate accommodations for the mission. The habitat expandability capabilities aim to offer the mission increased possibilities as a result of the increased volume. Moreover, the LEAP habitat is also conceptualized as a possible starting unit of a habitat settlement capable of ensuring future expansion for a surface colony of complete or semi self-sustaining communities, built incrementally and taking advantage of the systems and subsystems pre-integrated within the habitat as a starting hub. This integration of habitable systems will pave the way for a future permanent human presence on the Moon. For the delivery of the LEAP habitat to the surface of the Moon, it is determined that — although the habitat design is able to accommodate to variouslanders — at this time the best option is the Dynetics lander concept. Given that the LEAP design also derives from a horizontal cylindrical geometry similar to the Dynetics pressurized crew cabin, this lander provides the capability to deliver the LEAP habitat to the surface of the moon in the most efficient way possible. Keywords: Self deployable lunar habitat, expanadable, suitports, Human centric design.