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Human Exploration of the Moon and Cislunar Space (1)

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ENABLING LONG DURATION EXPLORATION USING THE LARGE INTEGRATED FLEXIBLE ENVIRONMENT (LIFE) HABITAT

Abstract

Human Exploration embarks on the next challenge of living and working in space beyond low earth orbit by returning to the moon through the Artemis Program. After over 21 years of continuous presence in Low Earth Orbit (LEO), commercial providers are preparing to provide capabilities previously available from only nation states but at most lower costs. National space agencies can now turn their focus to expanding humanity's reach into our solar system to the Moon and Mars. Habitation systems, with increased complexity beyond LEO, are key to enabling a permanent presence on the lunar surface. The design of a surface habitat drives mission duration, crew size, and research.

Sierra Space's softgoods-based expandable LIFE (Large Integrated Flexible Environment) habitat is designed to be adaptable to both orbital and surface space environments to enable life in space. Capable of launching in any 5 meter fairing rocket, LIFE expands to a pressurized volume of approximately 300 cubic meters, or about one third the internal volume of the International Space Station, providing the most habitable volume per unit mass of any approach. The current three floor layout is outfitted with everything a crew of approximately four astronauts would need to live in space and perform science missions. This includes science labs, robotics work stations, medical and sick bay, sleep and hygiene quarters, galley, exercise equipment, Sierra Space's Astro Garden® plant growth system and ample storage room for crew supplies. LIFE is designed to safeguard astronauts from the deep space radiation and hypervelocity impacts on the lunar surface through its multi-layer soft-goods internal outfitting.