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LUNAR SCIENTIFIC RESEARCH BASE (LSRB) AN ANALOGUE HABITAT PROPOSAL FOR  
FUTURE MANNED MISSIONS

**Abstract**

To establish a sustainable presence of astronauts for lunar settlement NASA Artemis aims to be launched by the year 2025. Incorporating space architecture systems with advanced studies adapting to modern times infrastructure for Artemis lunar base camp concept. In preparation for deep space human missions developing a simulated habitat in an extreme environment encountering similar challenges improves the credibility of the concept. The structural behaviors from the Self-deployable Habitat for Extreme Environment (SHEE) model is adapted to an innovative concept supporting technical aspects. Space active sustainability and developing mechanism applications tailored to the needs of aerospace-based systems. The objective of the proposal is to develop a human-centric analog habitat for the lunar surface exploration phase. The inclusive structure is a cylinder vertical volume integrating a combination of modular segments of primary hard shells and secondary origami-inspired structure (hybrid). This will be a geometric mixing of layers connected with other geometrics for circularity and fluidity. The prototype is developed as per the payload system criteria of SpaceX starship HSL which enables feasible transportation for remote destinations. The kinematics of the modular segment are also discussed. The spatial orientation of LSRB is planned considering the ICEE (Isolated confined extreme environment) for a human-centric model and mission functionality. Thermal insulation and human ergonomics of the system are also included in the research work. In addition to improving psychological behavior for long-term missions some of the exclusive features of habitat are neuroarchitecture in their workplace with a combination of natural lighting, plant wave sensors, circadian light system, metaverse technology, selection of biophilic design to integrate natural elements into the interior structure (take astronauts back to their roots). The vision of the proposal is to plot sustainable analog habitats for future manned deep space missions. LSRB includes a study on foldable mechanisms, deployment procedures on extreme environmental conditions, human ergonomics, psychological improvement technologies and structural aspects for analog habitat.