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LUNAR OASIS: DESIGNING INDIA'S FIRST LUNAR ANALOGUE HABITAT IN THE WHITE DESERT

Abstract

As humanity's collective interest in lunar exploration intensifies, the imperative to establish sustainable habitats on the moon becomes increasingly apparent. However, before venturing into lunar construction, a critical preliminary step involves designing and testing self-sustaining analogue habitats that mimic lunar conditions. In 2021, our studio embarked on India's first lunar analogue expedition, commencing with the design and implementation of our inaugural lunar analogue habitat in the White Desert. Building upon this foundation, our subsequent lunar analogue habitat was developed in 2023, marking significant strides in our understanding and capabilities in simulating lunar environments. This paper presents a comprehensive examination of the parameters and requirements essential for creating a stimulating lunar habitat in the White Desert of India. Through meticulous study and analysis, we identify key factors such as thermal regulation, radiation shielding, life support systems, and energy sustainability crucial for lunar habitat design. Leveraging insights from our initial lunar analogue expedition, the second phase of this paper delves into the invaluable lessons learned and challenges encountered during our foray into lunar habitat design and simulation. In the third part of the paper, we will showcase the floor layout, modular habitat design, and renders. Drawing from our experiences, we elucidate the iterative process of refining habitat designs, optimizing resource utilization, and enhancing operational efficiency in preparation for future lunar missions. Our findings contribute to the broader discourse on lunar exploration and habitat development, providing valuable insights and methodologies for advancing the frontier of space habitation.