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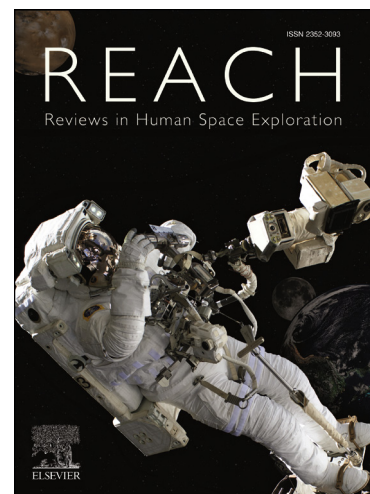
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Lunar Habitats: A Brief Overview of Issues and Concepts

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ABSTRACT

A summary of the lunar environment is provided as background to the issues that await resolution by structural engineers who will design habitats for long-term stays on the Moon, initially by pioneering astronauts, and eventually by people who will call the Moon their home. Key environmental concerns are the radiation and micrometeoroid environment, the hard vacuum, and the lack of atmosphere. The lunar dust poses a carcinogenic hazard, as well as an existential threat to engineered systems. Structures need to be designed with an eye to the psychological wellbeing of the inhabitants. This review provides an introduction into some of these aspects of lunar habitat design.

1. WHY THE MOON, AND HOW

The case for the permanent manned return to the Moon – as a destination in its own right, and as a platform for the human and robotic exploration of the solar system – is clear [1].

The Moon is our closest planetary body, roughly three days' flying time away, with almost instantaneous communication with Earth. The rival Mars is essentially as hostile to human life as the Moon, but also requires about a year of travel time from Earth, with a significant communications delay. A strategic view of space exploration and settlement places the Moon and Mars in their proper order, based on their proximity to Earth.

While space activities during the Apollo program of the 1960s were purely a government-led effort supported by American industrial might, today we see the beginnings of a transition to where commercial interests are staking claims to the space economic sector beyond the needs of the government. This is evident in the emerging space tourism market, commercial launch systems that service the government and private sectors, the International Space Station, and privately financed space-based science.

Without a doubt, governments are still the largest customers. This will change as launch costs decrease, a space/lunar infrastructure is created, space resources

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