IAF SPACE EXPLORATION SYMPOSIUM (A3)
Space Exploration Overview (1)

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THE LUNAR OPEN ARCHITECTURE: TOWARDS A SHARED ROADMAP OF LUNAR EXPLORATION

Abstract

The last decade has seen an increased interest in a return to the lunar surface, bolstered by the discovery of a resource-rich environment. The presence of lunar volatiles, water ice, and elements such as Helium-3 confirmed by missions in the last decade has enticed a diverse set of actors to set their sights back on the Moon, this time to establish a sustainable presence through in-situ resource utilization (ISRU). This paper presents a comprehensive review of the factors remaining in unlocking ISRU of lunar resources, bolstered by analyses facilitated by the Lunar Open Architecture (LOA), a platform currently under development.

The Lunar Open Architecture is a curated, dynamic, and interactive tool aiming to represent existing lunar exploration roadmaps and extend them into the 21st century. Proposals for space exploration architectures abound. Tracking the evolution of missions, technologies, and business plans is near impossible. Without a robust method to concretize and formalize the architecture for lunar exploration, achieving sustainable exploration remains difficult. With this knowledge-sharing tool and associated participation architecture network, we aim to increase transparency and promote coordination among groups working in lunar exploration. In this paper, we utilize LOA to examine and analyze the ISRU value chain. In doing so, we uncover and discuss potential roadblocks to information sharing in the industry, and strategies we are employing in the development of this tool to increase transparency to promote coordination among groups working towards lunar exploration. We also discuss the need for increased information sharing among the networks of the space industry, and salient issues of trust and cooperation as we move towards a shared future on the lunar surface.