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DEVELOPMENT (D3)Strategies & Architectures as the Framework for Future Building Blocks in Space Exploration and
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ADAPTING LUNAR TECHNOLOGIES FOR THE MARTIAN ENVIRONMENT

Abstract

This abstract presents the work of an international team SEEDS XVI, which brings together students from Toulouse (France), Turin (Italy) and Leicester (ENGLAND). The goal of this project is to modify and adapt lunar technologies to the martian environment in the optic of the first human colonies in 2040.

The overarching goal is the strategic transfer to Mars of technologies developed for human lunar exploration, highlighting a synchronized and progressive approach to planetary exploration. In that manner, the Moon and Mars both have different characteristics which implies the modification of the lunar technologies. Tools built for the Moon can hold promise for Martian exploration, but direct adaptation isn't always feasible. The different environments, ranging from Mars' thinner atmosphere, colder temperatures, and dust storms present significant challenges.

Lunar tools, often designed for tasks like drilling and sample collection, might offer a foundation for Martian applications. However, the harsh Martian environment will need robust modifications. Similarly, its design, focused on lunar dust, might need changing to withstand the martian dust storms. Therefore, material changes to handle the harsher environment and design alterations to combat wind, dust, and different gravity are likely necessary. Ultimately, leveraging existing lunar knowledge can provide a valuable head start, but thorough testing and adaptation are crucial for ensuring mission success.