Paper ID: 85769
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IAF SPACE EXPLORATION SYMPOSIUM (A3)
Interactive Presentations - IAF SPACE EXPLORATION SYMPOSIUM (IP)

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C.A.R.V.E.R

Abstract

C.A.R.V.E.R (Construction Assemble Recollection Variant and Enhancement Rovers) is an innovative project aimed at establishing a sustainable presence on the Moon. It involves deploying four space rovers, a 3D printer, and piezoelectric crystals to facilitate construction activities and resource utilization. Upon landing, these rovers will autonomously assemble the 3D printer, which will play a crucial role in constructing the Lunar Collection Truck (L.R.T). Once operational, the L.R.T will collect and process lunar regolith to supply material for the 3D printer, enabling on-site construction activities.

The recharging system for the rovers utilizes piezoelectricity, harnessing materials that generate electric charge in response to pressure. This innovative approach ensures continuous operation of the rovers without the need for external power sources. Furthermore, the rovers are divided into four units with specific functions, including monitoring, parts collection, assembly, and exploration, to maximize efficiency and effectiveness in lunar operations.

The Lunar Collection Truck is designed to withstand the harsh lunar environment, with construction materials such as titanium and a ceramic coating. It features an adapted suspension system and a heating ramp to facilitate the collection of frozen water and other essential materials. Additionally, it is equipped with solar panels and a power station to provide energy for its operations.

The regolith separation and processing system is comprehensive and involves various steps, including preliminary composition analysis, mechanical, chemical, and thermal separation methods, and in-situ recycling. This systematic approach ensures the efficient extraction and utilization of valuable resources from the lunar regolith while minimizing waste and environmental impact.

Overall, the C.A.R.V.E.R project represents a significant step forward in lunar exploration and utilization, offering a sustainable approach to construction and resource utilization on the Moon. By leveraging innovative technologies and systematic methodologies, this project paves the way for long-term human presence and exploration beyond Earth.