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Contribution of Moon Village to Solving Global Societal Issues (2)

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LUNAR EXPLORATION VEHICLE

Abstract

This presentation introduces a groundbreaking project focused on developing a lunar exploration vehicle tailored for swift ground movement and equipped with advanced imaging capabilities. The vehicle incorporates video recording, aerial photography, and surface analysis tools utilizing modern electronic observation and soil analysis systems, including multispectral and hyperspectral sensors. Traditional lift-based vehicles or aerostats are deemed impractical due to the Moon's lack of atmosphere. Propulsion alternatives such as liquid or cold gas mono/bipropellant rocket engines and electric thrusters are considered, but current technologies lack the necessary thrust-to-weight ratio for efficient lunar exploration. To overcome these challenges, a novel spring propulsion device has been designed. Launched from the main lunar vehicle, this device utilizes gyroscopes and a gimbal suspension system to maintain a fixed position through high inertia generated by electric motors or magnetic systems. Three pistons support the gyroscopic system, providing controlled inclinations and compensating for energy loss due to friction, allowing for rebounds to achieve greater altitudes. A microprocessor governs the entire system, controlling pistons and gyroscopes, calculating movement through a radio positioning system, and managing the payload. The vehicle is powered by rechargeable batteries, recharged by surrounding photovoltaic panels, ensuring extended autonomy. The vehicle's mobility and positioning capabilities, combined with low power consumption, enable it to return to the main module. An auxiliary chemical propulsion system can be added for longer jumps, improved stability, and recovery in case of accidental overturning, marking a significant advancement in lunar surface exploration mobility and data collection capabilities.