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FINDING SOLUTIONS FOR WATER AND RESOURCE MAPPING ON THE MOON: THE SPACE
ANTS INITIATIVE

Abstract

The Artemis missions underscore the necessity of In-Situ Resource Utilization (ISRU) for sustainable lunar exploration. This paper presents the conceptual design of the SPACE ANTS (Autonomous Non-stop Terramapping System), a groundbreaking method for the autonomous mapping of lunar resources, with a particular emphasis on water detection. This system comprises a network of robotic 'worker ants' that operate from a central 'hive' unit. Each ant is a robust module equipped with advanced sonar for subterranean water detection, LiDAR for surface analysis, and a spectroscope for identifying mineral resources. The data collected by these ants are processed by the 'queen', an AI-driven central computer that coordinates the fleet's activities. This system is designed to withstand the harsh lunar environment, including mitigating the effects of radiation, and provides continuous, real-time data crucial for In-Situ Resource Utilization (ISRU). SPACE ANTS stands to revolutionize our understanding of lunar geography and resource distribution, paving the way for sustainable human presence on the Moon. This presentation will delve into the SPACE ANTS system's capabilities, design, and its potential to enhance lunar exploration and future settlement.