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ROVER MISSION DESIGN FOR STUDY OF WATER AT LUNAR SOUTH POLE

Abstract

Space has been an intriguing subject for humans for centuries. As technology has evolved over the time, we have begun to explore the vast space beyond the realms of our home planet. Moon being the closest celestial body becomes the first place to wander for our species. As we look forward to human space settlements in the coming time, studying the available resources on Moon become a necessity. The presence of resources and the possibility of human settlement on the Moon provides an opportunity to use robotic machines on the lunar surface. For the last few decades, various missions have been carried out to improve our understanding about the grey rock. Data collected from the previous lunar missions have confirmed the presence of water on the lunar surface. This paper presents the design of a rover mission model for performing excavation and in-situ resource utilization on the Lunar surface, which aims to study water present at the lunar south pole. Reviewing the lunar resources, evidence of water in different forms, selection of sub system and payloads, rover operation protocols, financial budgeting and other critical parameters, we have proposed a possible lunar exploration mission which could help providing scientific data for future human settlements on Moon. Our rover design consists of four major payloads including Robotic Arm, Neutron Spectrometer, Bio Sensor and Combined Atomic Force Microscopy with Raman Spectroscopy payload. The complete system uses solar panel as the source of power. Apart from the primary payloads onboard the rover, we have mentioned secondary payloads ideas that could be used in future lunar exploration missions