

IAF SPACE EXPLORATION SYMPOSIUM (A3)  
Late Breaking Abstracts (LBA) (LBA)

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LUNAR ROCKS IDENTIFICATION TO SUPPORT ROBOTICS OFF-GNSS LOCALIZATION  
METHODS**Abstract**

Robotic exploration and localization on the lunar surface pose unique challenges due to the absence of a global navigation satellite system (GNSS) similar to Earth. To overcome this limitation, alternative localization methods must be employed. Lunar rocks, comprising various minerals and geological formations, can serve as distinct visual markers, enabling robots to accurately determine their position and orientation relative to the lunar surface. This abstract presents the utilization of lunar rock identification as a means to enhance robotics off-GNSS localization methods on the Moon. It analyses a methodology that combines visual analysis, machine learning, and computer vision techniques to identify and classify lunar rocks based on their unique physical characteristics for accurately determining the position of the robot. By leveraging visual analysis and machine learning techniques, robots can utilize the unique characteristics of lunar rocks to navigate and explore the lunar surface autonomously, enabling successful and efficient scientific missions.