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IDENTIFICATION AND MAPPING THREATS OF SPACE DEBRIS ON MOON SURFACE AND ITS
IMPACTS ON LUNAR ECONOMY

Abstract

As per The COPUOS (Committee on the Peaceful Uses of Outer Space) Moon Agreement, (formally known as the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, is an international treaty that was opened for signature in 1979 and entered into force in 1984.) establishes a legal framework for the Moon and other celestial bodies, including rules for their exploration, exploitation, and use. The main goal of the agreement is to ensure that the Moon and other celestial bodies are used only for peaceful purposes and for the benefit of all countries and humankind. Under the Moon Agreement, states are required to conduct their activities on the Moon in accordance with international law, to avoid harmful interference with other activities on the Moon, and to take measures to protect the environment of the Moon and other celestial bodies. As space rapidly becomes more accessible and activities begin to ramp up, two clear goals have clearly emerged– establishing a permanent presence on the Moon and developing a self-sustaining lunar economy. A lunar economy will undoubtedly have far-reaching effects on various aspects of society; primarily touching the economic, political, and scientific spheres. The detection and management of space debris on the lunar surface have become increasingly critical as the exploration and commercialisation of space have accelerated. As human activity on the Moon continues to increase, so does the risk of space debris impacts, which can cause significant damage to equipment and infrastructure. The threat posed by space debris to the lunar surface is a significant concern for the scientific community. The accumulation of debris particles on the Moon's surface and the constant bombardment by micro-meteoroids and space debris can have long-term implications for the stability of the lunar environment and the success of future lunar exploration missions. Therefore, it is critical that the international community continues to collaborate and develop new technologies and techniques to mitigate the impact of space debris on the lunar surface. To address this challenge, various techniques and technologies have been developed to detect and track space debris on the Moon's surface. Which ranges from Lunar Surface Remote Sensing to Computer Vision and Machine learning algorithm. In the direction of developing and sustaining key components of Lunar Economy this paper will suggest potential threats and short coming impacts relevant to Space Resources Utilisation.