

Lunar Exploration (2)
Lunar Exploration (5) (5)

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TURNING THE MOON INTO SWISS CHEESE: THE DANGERS OF LUNAR ORBITAL DEBRIS
AND THE NEED FOR RESPONSIBLE MANAGEMENT NOW

Abstract

Orbital debris around the Earth is becoming more of a problem with every launched object, but fortunately Earth's atmosphere allows for disposal by burning up many objects at End of Life. Unlike Earth, our Moon does not have an atmosphere, so imagine if we begin to leave "dead" objects in its orbit, especially when lunar activities are set to increase significantly. Because the debris cannot burn up like it does in Earth's atmosphere, uncontrolled Moon debris will likely crash to the surface with more velocity than a bullet. As plans for the upcoming decade include dozens of lunar surface assets, robotic and crewed, all precious and fragile, such debris impacts are not an acceptable risk. Scientists and policy makers must work together to create a set of guidelines and rules for debris disposal at the Moon that considers several key factors: planetary protection, asset protection, human protection, reuse of materials, and finite space. The authors will present the science of impacts of objects on the Moon and examples of the destructive consequences of such impacts. The authors will also suggest methods and approaches to Moon debris mitigation including End of Life guidelines, notification requirements, controlled impacts, and specified surface graveyards. Finally, the paper will examine the requirement of international cooperation and coordination for regulation. Failing to create guidelines and rules before the Moon debris issue becomes overwhelming and dangerous is not an option.