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RANGE SAFETY IN A LUNAR CONTEXT: LEGAL AND POLICY ISSUES

Abstract

While there is fairly robust discussion of lunar “safety zones” given the non-appropriation principle enshrined in the Outer Space Treaty, that discussion has focused primarily on safety of activities, equipment, and facilities in general. Lunar launch and landing pose special concerns given the need for appropriate range safety protocols in that context. With the predicted increase in lunar activities, both as the objective and as a waypoint for missions to Mars and beyond, it is essential to address legal and policy concerns related to these activities.

There is significant practice of range safety in a terrestrial context. Safety protocols to protect persons and property include exclusion from the immediate vicinity of the launch site and also exclusion from the relevant airspace and maritime area that could conflict with the launch or be subject to falling debris in the case of a launch abort or incident. These protocols include significant coordination with civil aviation authorities as well as coast guard personnel.

In a lunar context, the potential for regolith to be thrown significant distance during nominal launch or landing is significant given the lack of gravity and atmosphere. Such regolith can be extremely damaging. Additionally, in the case of an incident or abort, the physical range of potential consequences will be even greater.

Range safety protocols will be essential to safeguard lunar activities. This paper will address the legal and policy challenges to implementation of robust lunar range safety. There is a delicate balance of international obligations contained in the Outer Space Treaty, namely the non-appropriation principle in Article II, and the due regard principle in Article IX. Article X enabling launch observations and Article XII mandating allowance of reciprocal visits to lunar facilities can help to mitigate these difficulties as well. Rescue provisions contained in the Outer Space Treaty and Return and Rescue Agreement are relevant in the case of a mishap.

Determining liability under the fault-based standard for damage caused either by nominal lunar operations or incidents that may occur during launch and landing further complicate the picture. A common understanding of procedures for range safety can reduce the likelihood of conflict arising either regarding operations or as a consequence of damage caused. Geopolitical tension and the prospect of escalation will complicate addressing these crucial safety matters, but properly applied legal tools engaging cooperation of states active on the Moon can ensure safety and stability of lunar operations.