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MITIGATING SPACE DEBRIS THROUGH RISK ASSESSMENT FRAMEWORKS

Abstract

Currently, 34,000 defunct objects larger than 10 cm orbit the Earth. As society's interest in global broadband internet and rocket launches increases, enforcing space debris removal will become imperative for space activity to remain sustainable.

The only legally binding international agreements that may be relevant to space debris are the 1967 Outer Space Treaty (OST), the 1972 Liability Convention (LC), and the 1975 Registration Convention. However, none explicitly define the term space debris nor address the responsibility of states to remove it. Thus, it is unclear whether launching states are liable for any ensuing damage caused by their own debris. Since the OST establishes space as a global commons, the phenomenon of "tragedy of the commons" becomes increasingly salient as states find it cheaper to leave their space debris untouched rather than removing it. While Article III of the LC places fault on the launching state for damage to a space object or to persons on board a space object, there is no minimum standard for establishing fault if a debris removal mission accidentally generates more debris.

In 2002, the Inter-Agency Space Debris Coordination Committee (IADC) became the first to first publish guidelines for space debris mitigation. Nevertheless, as of 2015, only 60% of the total payload mass nearing end-of-life in low Earth orbit is compliant with these guidelines; without enforced guidelines, these numbers continue to decline.

This paper aims to develop risk assessment frameworks for assigning liability in space debris mitigation projects. If a party participates in willful blindness i.e., launches a project that they know, or can reasonably predict, to create a greater than tolerable amount of space debris, they should face greater liability than low-risk projects. Parties would be required to calculate the projected amount of space debris caused by their project before launch and would be responsible for tracking any debris created via satellite imaging. This paper also offers frameworks for joint projects; in international collaborative space projects, it should be mandatory for states to devise agreements on the exact standards of space debris liability prior to launch. Following current legal protocol, these agreements will supersede the general provisions of the LC. Should space debris result from a collaborative project without the involved parties establishing said special agreement, both parties will become subject to consequences determined by an intergovernmental body.