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Policy, Legal, Institutional and Economic Aspects of Space Debris Detection, Mitigation and Removal
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POLITICAL AND INSTITUTIONAL CHALLENGES TO GLOBAL SPACE DEBRIS MITIGATION

Abstract

Nearly 2,000 operating satellites, tens of thousands of pieces of trackable debris, and millions of pieces of untrackable debris, are currently in Earth's orbit and their interactions have the potential to limit future space activities. As the cost of building, launching, and operating spacecraft decreases, satellites are launched by States and companies new to utilizing space at an increasing rate, more often than not without a debris removal plan to enact when a satellite is no longer operational. Traditional actors such as the major spacefaring States of China, Russia, and the United States are still responsible for the majority of activity and debris on orbit, but the population of orbiting objects is predicted to increase conservatively by two-fold before 2030 as a result of mega-constellations being developed by multiple commercial entities.

Currently, the public tracking database of record is operated by the United States Department of Defense. This service offers basic orbital parametric data for approximately 23,000 objects and issues conjunction warning messages to domestic (U.S.) and international satellite operators. However, this monitored population of objects is only a fraction of the total population and already the system produces hundreds of conjunction warning messages every day due to imprecise data, increasing the opportunities for false positives. Precise and accurate positional data of space objects does not currently exist in a comprehensive public form, but is vital for the sustainable use and growth of the amount of objects in Earth's orbital domain.

This paper recognizes space debris detection, removal, and mitigation as a global issue and recommends international coordination and management. From this position, it seeks to identify the most prominent institutional and political obstacles to the comprehensive management of debris. First, it will discuss the necessity of engagement between space-faring States and industry and the challenges associated with this interaction. Second, it will address obstacles that may occur at the international level from the simultaneous development of various States' domestic policies and regulations. Lastly, it will examine the role of international standardization bodies and the potential challenges arising from utilizing these institutions for debris mitigation.