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TACKLING THE LEGAL AND POLICY HURDLES OF ACTIVE DEBRIS REMOVAL: ADDRESSING THE USE OF AI AND AUTONOMOUS TECHNOLOGIES.

Abstract

The recent report from the Inter-Agency Space Debris Coordination Committee (IADC) highlights that despite potential widespread adoption of debris-mitigation guidelines, the debris population could grow further due to collisions with existing space debris, even in the absence of new space launches. Consequently, there is an increasing need for space debris remediation. However, while active debris removal (ADR) may offer a solution, its viability requires careful consideration due to critical legal and policy challenges, especially considering the possible integration of AI and autonomous technologies. This paper contends that the widely celebrated existing international legal framework for outer space inadequately addresses two major risk categories associated with ADR. The general provisions of the UN space treaties, along with the voluntary nature of the UN Long-Term Sustainability Guidelines and UN Space Debris Mitigation Guidelines, fail to effectively manage the civil risks posed by ADR technologies. For instance, the framework currently does not adequately address the critical liability, responsibility, and control issues related to ADR, such as those associated with capture mechanisms. Furthermore, the framework fails to address security risks associated with ADR and rendezvous and proximity operations (RPO) by insufficiently promoting transparency in surveillance and tracking of space activities and debris. This paper further highlights how these challenges are exacerbated by the integration of AI and autonomous technologies in both existing and proposed ADR missions, which seek to introduce capabilities like independent space debris tracking and potential autonomous piloting. While civil risks in ADR are being addressed through state-to-state agreements and commercial contracts specifying liability and indemnity, ADR's complex national security risks cannot be adequately handled through such contracts. In such circumstances, whilst proposing a comprehensive legal framework may seem attractive, the paper warns against prematurely establishing legal structures for advanced technologies, citing lessons from the UK's Automated and Electric Vehicles Act 2018 (AEVA 2018). Instead, it advocates a multifaceted approach to address the legal and policy challenges of ADR. This involves building trust and confidence through a bottom-up approach, drawing on the work of the Consortium for Execution of Rendezvous and Servicing Operations (CONFERS), and addressing the impact of AI and autonomous technologies. Only then can the international space community contemplate translating these norms into a harmonised, internationally binding legal framework, fostering innovation and investment in space debris remediation while addressing critical issues in ADR.