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Political, Legal, Institutional and Economic Aspects of Space Debris Mitigation and Removal - STM Security (8-E9.1)

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OVERVIEW OF SPACE DEBRIS MITIGATION AND REMOVAL GOVERNMENTAL STRATEGIES AND THEIR IMPACT ON SSA MARKET TRENDS

Abstract

With an estimated 750,000 debris objects larger than 1cm in Earth orbit according to ESA, the space environment is becoming increasingly crowed. Due to an increased risk of collision, space debris has become one of the principal threats to satellites increasing concern amongst both public and private stakeholders. Looking forward, the coming decade is likely to amplify this issue. Apart from a number of deliberate collision events created by antisatellite weapon tests in orbit, the quantity of space debris is very likely to increase due to the rising number of space assets launched yearly. The world is currently on the cusp of a mega-constellation revolution, with multiple projects announced or being implemented such as SpaceX's Starlink or OneWeb's constellations. If even only a fraction of all projects is realized, by the end of the decade the number of satellites in orbit will rise exponentially.

To face this issue, a number of international organizations and countries have developed legal tools to ensure space debris mitigation and remediation. However, most of these measures are either non-binding or too general to effectively ensure a global and long-term sustainable use of Earth's orbit.

While the overexploitation of orbits increasingly threatens human activities in space, it also encourages investments in the Space Situational Awareness (SSA) market. As of now, governments are the main customers of SSA services to increase their space domain awareness for national and security reasons, to protect their satellites, as well as to ensure the protection of economies and critical infrastructure which are increasingly reliant on space assets. For these reasons, the number of countries investing in SSA is on the rise. If initially only major space powers were interested, new players are now beginning to invest in similar capabilities, including the EU, India, Australia, amongst others. Rising government investments and an increasing reliance on private sector SSA capabilities are resulting in the rise of commercial SSA stakeholders and the emergence of a significant market.

This paper will provide an overview of the different governmental tools implemented to ensure space debris mitigation and removal (i.e. legal measures, policies, budgets) and their impact on the SSA market. It will assess existing SSA capabilities and strategies analyzing the key differences between each country's method and strategy in how they approach the sector. This paper will also highlight current and future market trends for the SSA sector and discuss some variables that might dramatically impact the sector in the following years such as the proliferation of mega-constellations projects, regulatory reforms or technology breakthroughs.