Paper ID: 73836
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20th IAA SYMPOSIUM ON SPACE DEBRIS (A6)
Interactive Presentations - 20th IAA SYMPOSIUM ON SPACE DEBRIS (IP)

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ACTIVE DEBRIS REMOVAL IN GROWING GLOBAL TENSIONS

Abstract

The number of objects in space has been growing rapidly, further contributing to large numbers of space debris objects. Potential collisions between satellites and debris, and even debris-on-debris collisions, are becoming more common. While debris mitigation and space traffic management can help to limit future growth, active debris removal (ADR) will be necessary to reduce current risks. Both ESA and NASA have conducted analyses that suggest that active debris removal is essential to the long-term sustainability of the outer space environment. While the U.S has lagged behind in funding and development of ADR capabilities, the United Kingdom, European Union, and Japan have emerged as early leaders in this area. Commercial entities such as Astroscale have made significant progress in developing and testing ADR technologies and in establishing initial agreements with a number of nations.

There has been impressive technological development in this area, but there are a number of fundamental policy and international relations issues that need to be addressed in order to ensure the success and sustainability of active debris removal activities. For example, the creation of debris is a negative externality of space activity and the market has failed to provide a sustainable economic incentive to develop these capabilities. While direct government funding is helping to promote near-term development, there is little commercial incentive to invest in ADR without government willingness to commit to long-term funding or to regulate or tax ADR. In this paper, we discuss economic models for active debris removal, challenges of international ownership and liability, security concerns, and domestic regulation. In each case, we provide insight into concepts, debates, and key concerns voiced in the international community. We also seek to illuminate potential solutions. Taking this holistic approach, we provide an understanding of the breadth of international political and policy issues critical to active debris removal and suggest a path forward.