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Policy, Legal, Institutional, Economic and Security Aspects ofDebris Mitigation, Debris Remediation and STM (1-A6.8)

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AN OPERATOR'S PERSPECTIVE ON REGULATORY, POLICY AND SECURITY ASPECTS OF RENDEZVOUS AND PROXIMITY OPERATIONS (RPO)

Abstract

In March 2021, Astroscale launched ELSA-d, the world's first commercial demonstration of an end-of-life (EOL) remediation spacecraft. ELSA-d not only helped prove essential technical capabilities, it also provided a unique opportunity to explore some of the non-technical aspects of these types of mission. As the ELSA-d mission comes to a close and we look to upcoming on-orbit servicing (OOS) activities, including active debris removal (ADR) activities, it's important we reflect on what was learnt, and how this can be used in the future. As such, this paper discusses the regulatory, policy and security aspects of these types of missions.

OOS and ADR missions fall under the broader category of Rendezvous and Proximity Operations (RPO), activities where two spacecraft - or a spacecraft and uncontrolled/unprepared space object - purposely move close to one another to perform one or more activities. This might include non-contact inspection, docking to re-orbit or de-orbit, life extension and many more. ELSA-d, which involved two spacecraft initially docked together – a Servicer and a Client – provides a good example.

From the initial licensing of ELSA-d by the UK Space Agency to ongoing reporting of the mission through public information and third-party Space Situational Awareness (SSA), transparency of operations is key. Soon, Astroscale will be launching our ADRAS-J service to inspect a Japanese upper stage and, in the longer term, we will be launching our ELSA-M servicer to de-orbit multiple failed spacecraft in LEO, as well as our LEXI servicer to extend the life of existing spacecraft on GEO. Astroscale will not be alone in these types of mission, and those that follow need sensible policies and regulations to enable safe and successful commercial missions. Industry led initiatives such as the Space Safety Coalition (SSC) and Consortium for Execution of Rendezvous and Servicing Operations (CONFERS) are essential in developing these standards and practices.

Furthermore, as the orbital environment gets ever more contested and congested, developing international behaviours is essential to mitigate the risk of miscalculation and misunderstanding of activities in orbit. Astroscale's missions are (and will) provide useful practical example of what these behaviours should look like and why.

This paper first reviews the ELSA-d mission, and considers current regulations and policies from an operator perspective. We consider how these might apply in future RPO missions, commenting on future best practices and standards. Finally we consider these types of missions in terms of developing responsible international behaviours.