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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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ECONOMIC ASPECTS OF SPACE DEBRIS MITIGATION: OECD INPUTS

Abstract

International organisations and national administrations have carried out extensive work on the legal and technical aspects of space debris and the congestion of low-earth orbits. With this paper, the OECD Space Forum brings in some complementary perspectives on the economics of space debris and discusses measures that could be used in space debris mitigation, based on experiences from other policy domains. A key objective is to identify approaches that could increase compliance with national and international guidelines and legal frameworks. The paper further outlines an ongoing international project with universities around the world to extend our knowledge on the costs of non-action.

Space debris already generate costs for operators, but the main risks and costs lie in the future. The Kessler Syndrome, referring to a situation where the generation of debris spins out of control, could significantly affect certain orbits and important space applications, notably for weather forecasting, climate monitoring, earth sciences, and potentially, satellite communications. Under this scenario, socio-economic impacts could be severe and disadvantage certain groups and regions, such as rural areas and countries with limited ground infrastructure.

Although national and international mitigation measures exist, operators' current compliance with these measures is not sufficient to stabilise the orbital environment. This is due to multiple legal and technological challenges. To address the issue of non-compliance, this paper looks at the range of policy solutions used to address marine and terrestrial pollution, such as taxes, tradable permits, financial security mechanisms, and voluntary agreements. Furthermore, it identifies some necessary technological advances, such as strengthening space situational awareness capabilities and making orbit clearance procedures more affordable and reliable for operators.

Finally, to better underpin future policy decisions, progress needs to be made in the area of cost estimation and modelling. For this reason, the OECD Space Forum has launched an international and multi-disciplinary effort with universities to extend the knowledge base on the valuation of space infrastructure and the impacts of debris.

This paper is the result of work conducted by the OECD Space Forum and their eleven partnering organisations: Canadian Space Agency (CSA); French Space Agency (CNES); German Aerospace Center (DLR); Italian Space Agency (ASI); Korea Aerospace Research Institute (KARI); Netherlands Space Office (NSO); Norwegian Space Agency (NOSA) and the Ministry of Trade, Industry and Fisheries; Swiss Space Office (SSO); UK Space Agency (UKSA); National Aeronautics and Space Administration (NASA); and European Space Agency (ESA).