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Cybersecurity in space systems, risks and countermeasures (4)

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CYBERATTACK IN SPACE: TOWARDS A SUSTAINABLE DATA GOVERNANCE FRAMEWORK FOR OUTER SPACE

Abstract

The rapid development and increasing use of space-based technologies -such as those for telecommunication, broadcasting, forecasting, Earth observation, and scientific research- have led to a significant rise in the volume of data generated and transmitted from space. However, this growth has exposed critical vulnerabilities in the governance of space data, raising concerns about their security, quality, and ethical use. Cyberattacks targeting satellites and other space assets can have severe consequences for communication, navigation, and national security. Despite the essential role of space data, their protection remains insufficient, as there is currently no comprehensive framework to ensure data security, integrity, and accuracy in space. This paper examines the challenges associated with space data, including data breaches and cyberattacks, while proposing a way of addressing these challenges by implementing a data governance framework in outer space. It focuses on the risks resulting from the absence of strong data security measures and the lack of universally recognized regulations or standards that promote the ethical, legal, and sustainable use of space data. By drawing on examples of international and regional law such as the EU's NIS2 Directive for Network and Information Systems (EU Directive No. 2022/2555), which is the first to include space industry entities as critical entities to implement cybersecurity risk management measures and incident address mechanisms, this paper highlights the need for similar frameworks that could address the specific challenges of space data governance. The proposed solution is twofold: first, to establish a governance structure that ensures the security, quality, availability, and usability of space data; and second, to promote fairness, transparency, and accountability in their use. A sustainable approach to data governance in space must not only address existing security gaps but also prepare for the growing need for responsible management as space becomes more commercialized and interconnected. The paper argues that without a proactive and resilient data governance framework, the risks of misuse, data breaches, and cyberattacks will increase, jeopardizing the future of space exploration and its safe and sustainable use for humanity. In conclusion, the paper calls for international cooperation in establishing legal and technological standards for space data governance, with a focus on governance sustainability and the preservation of space as a global commons.