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Cybersecurity in space systems, risks and countermeasures (4)

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AI SYSTEMS TO ENSURE CYBER SECURITY IN SPACE

Abstract

The space environment is becoming more congested, complex, and contested, no longer being a sanctuary for space assets. The use of Artificial Intelligence (AI) technologies is on the rise everywhere in the space industry. AI allows the rapid analysis of millions of events and identifies a wide range of threats – from malware exploiting zero-day vulnerabilities to the identification of risky behaviours that may lead to a phishing attack or the download of malicious code. These systems learn over time, they identify new types of attacks, by analyzing the behavioural history of user-profiles, assets and networks and respond on time to deviations from established norms. This paper attempts to answer the question of whether or not AI can be used to prevent cyber attacks in space and explores this new avenue of AI being utilized in the space cyber security domain. This analysis covers different AI approaches and applications used in cyber security, such as Network Security, Vulnerability Management (Proactive versus Reactive), Prevention Control and Phishing Detection (detect, track, react, solve) and behavioural analytics, as well as their limitations within the space sector. Secondly, the paper discusses the potential of AI for being used to breach cyber security, particularly by introducing new attack vectors. Moreover, the paper addresses liability issues as to the use and deployment of AI-based space applications, in particular, concerning cyber security breaches. Finally, this work attempts to highlight the best practices of AI for cyber security in space, discuss a preliminary technical and legal roadmap, take into account the different levels of cyber vulnerability of AI, and discuss short-term and long-term strategies in preventing cyberattacks on AI assets in space. Please note that the present abstract is submitted under the auspices of the Space Generation Advisory Council, as a part of the activities of the Space and Cybersecurity Project Group.