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Cyber-based security threats to space missions: establishing the legal, institutional and collaborative framework to counteract them (2)

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AI IN SPACE: POTENTIAL, CHALLENGES, AND THE IMPORTANCE OF REGULATORY GUIDELINES

Abstract

Over the past few decades, the introduction of Artificial Intelligence (AI) into our daily lives has marked a progressive technological advancement. Initiated in the 1950s, this journey has seen the development of new forms of programming that have given rise to modern machine learning and deep learning programs, fundamental to current AI systems. The drive for profit maximization by large corporations has led to investments in AI, sparking a race for innovation. AI applications promise significant improvements in various sectors, including healthcare, energy consumption reduction, autonomous satellite navigation, and automated agriculture. In this article, we will examine the potential and challenges of AI, focusing on systems specialized in cyber-attacks on orbiting devices and the related legal discipline. We will explore the weaknesses of satellite computer systems, still not adequately equipped to face this new AI-based cyber threat. We will analyze the technical and design challenges that may limit the effectiveness of such systems and the possible negative consequences of the misuse of AI technologies for nefarious purposes by malicious actors. AI has developed in an unregulated context; however, the EU legislature has introduced the Ai Act 2023, the world's first regulation aimed at addressing the main issues of this technology. Nevertheless, the careless use of these technologies can give rise to issues requiring careful consideration and measured responses. For AI to truly improve our society, it is essential to adopt a responsible approach and ensure safe use for all users. Threats arising from the misuse of technologies can extend beyond national or terrestrial boundaries, as modern satellite systems are not yet ready to face AI-based cyber-attacks. In this context, it is important to consider the differences between the approaches of the US and the EU in addressing AI-related challenges, which differences can provide food for thought in the development of UNOOSA guidelines to regulate AI discipline also in its space applications. Looking to the future, we hope that AI continues its journey towards progress, and that through constant dialogue between science, ethics, and society, these technologies contribute to the continuous improvement of our world by promoting responsible and mindful use of AI, offering innovative and sustainable solutions to the challenges that lie ahead.