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SUSTAINABILITY OF THE 'SPACE SECURITY' CONCEPT WITH PROGRESSIVE DEVELOPMENT OF TECHNOLOGY - EXAMPLE OF MEGA-CONSTELLATIONS

Abstract

In order to achieve security in outer space it is necessary to avoid presence of unjustifiable man-made or natural threats to space assets. Importance of space security is becoming even more critical due to the rapid development of technology and in parallel, heavily reliance of modern societies on space assets and their various applications.

In general, security can be regarded as 'state of being secure, especially secure from danger or attack'. Following initial definition, space security can be interpreted as concept of aiming to reduce threats and risks to satellites and space assets. Even though 'space security' is generally understood as lowering the risk from military attacks and arms races or conflicts, essential part of space security would represent as well reducing probability of threats to satellites, such as collisions and harmful interference.

With rapid development of technology, balance between efficiency and commercial interests on one hand and concept of space security on the other is a difficult one to obtain; main challenge today is to continue promoting innovation while being able to keep the same level or even minimize risks.

Due to the fact that cyber-related vulnerabilities of space assets are a major concern, in this paper it will be reflected upon a new commercial space trend, mega-constellations and its impacts upon concept of 'space security'. Mega constellations are highly controversial in almost all aspects – from issue of already incredible congested LEO up to problematic space debris mitigation solutions. Even though highly debatable, it is obvious that there are series of advantages that can be used and implemented with mega-constellations.

This paper elaborates in details impacts of mega-constellations upon sustainability of the 'space security' concept, primarily in light of harmful interference. It is noticeable that advantages and disadvantages of mega-constellations' implementation are heavily interconnected. One of main mega-constellations opportunities is considered to be wide application of IoT that unfortunately can have influence one of the biggest mega-constellation disadvantages – threat of potential harmful interference (E.g. cyber-attacks on satellite services and products through IoT equipment). Aim of the paper is to raise a question of sustainability of the concept of 'space security' with 'too rapid' development of technology and in parallel, disability to follow these changes from regulative and security aspects.