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SPACE DEBRIS SYMPOSIUM (A6)
Political, legal, Institutional and Economic Aspects of Space Debris Mitigation and Removal (8)

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SPACE DEBRIS MITIGATION AND NANO-SATELLITES: LEGAL CONSIDERATIONS AND THE NEED FOR AN INNOVATIVE POLICY

Abstract

Nano-satellites are small size, lightweight satellites which are being currently used for scientific-educational purposes while the scope of their application is expanding towards commercial use as well. They are typically launched into low Earth orbit as an auxiliary payload, thereby reducing the cost of their launch, while being depended on orbital parameters of the primary-payload customer in the launch. One of the challenges associated with these satellites with respect to debris mitigation and remediation is their un-controlled (de)-orbiting process. Since most types of nano-satellites lack any onboard propellant systems, they are unable to change their orbit, thus, being subject to naturally decay. Recognizing the need to adhere to international guidelines on debris mitigation and remediation, some innovative solutions are developed in order to improve the ability to control de-orbiting and to affect shorter orbital life for the satellites. Companies such as ISIS are working on systems and solutions for orbital lifetime reduction such as inflatable 'aerobrakes' and rocket engines for de-orbiting. While such innovative technical solutions are essential in order to optimize the use of nano-satellites, there is a need to address the challenge from a policy-regulatory perspective as well. It is suggested that in order to achieve optimized adherence to soft-laws and regulations there is a need to strive towards a specific international guideline-type of debris mitigation and remediation policy designated to be applied by the small-sat international community. Such policy should be based on existing rules, however, inter alia, taking into account the following characteristics of nano-satellite missions:

• Low budget mission and hence low budget for implementing debris mitigation procedures; • Short operational life in low orbits; • At most, limited ability to make maneuvers towards a grave-orbit or to lower orbits, accelerating the decaying process; • Lack of awareness to soft-law and policy relating to debris mitigation and remediation among developers and users; • An emerging insurance market for nano-satellite missions; • Multiple entities involved in the launch, and in the selection of the missions' orbit, namely: developers (in many cases universities and governmental bodies), owners, launch brokers and launch service providers.

The aim of the paper is to raise awareness with respect to the above, suggesting key elements to be considered at international policy level, in order to meet the challenges of peaceful and debris-responsible use of outer space utilizing nano-satellites.