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SPACE DEBRIS SYMPOSIUM (A6)
Mitigation and Standards (4)

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IMPLEMENTATION OF DEBRIS PREVENTION AND REDUCTION MEASURES BY AN INDEPENDENT PROPULSIVE DECOMMISSIONING DEVICE

Abstract

The proliferation of uncontrolled space debris around the Earth is jeopardizing space travel and space missions in general by rising operators' costs, increasing risks of orbital activities and potentially influencing human society.
In order to respond to the need of satellite operators which have both the obligation and the economic interest to safely and properly remove their satellites at the end-of life, D-Orbit has developed a propulsive pack, denoted as Decommissioning Device, based on solid rocket motor technology to be installed on satellites and launcher stages before launch in order to guarantee a safe, quick and controlled post-mission disposal. The Decommissioning Device is designed to be flexible and modular, and thus can be adapted to different mission profiles and different orbits. It only weights a few percent of the mass of the satellite and is able to perform the removal maneuver in a few hours, compared with up to several weeks of most of the procedures currently in place. The Decommissioning Device is designed to be independent from the satellite, this means that it is able to work and remove the satellite even if this is experiencing a major failure or it is not nominally responding to commands from Earth.
Post-mission decommissioning maneuvers are usually rather complex and lost-lasting: it takes up to several weeks to be completed and it is most of the times performed by the station keeping thrusters, which are designed for performing much less demanding tasks. Furthermore the decommissioning is carried out at the expense of the station keeping fuel, thus reducing the operational life up to several months and potential extra revenues for the operators.
In addition, if the satellite is malfunctioning, the decommissioning maneuver might not be possible: this unfortunate event could result in polluting the orbital slot and jeopardizing future operations by other satellites in the same position.
This paper will describe why a space debris mitigation approach based on an independent propulsive device has several operational advantages, can help satellite operators to mitigate the issues highlighted above, allowing in addition to save costs, operate in a safer orbital environment and be compliant with international regulations and guidelines in terms of space debris mitigation. The Decommissioning Device developed by D-Orbit will also be described in details, including operational and safety features.