20th IAA SYMPOSIUM ON SPACE DEBRIS (A6)
Political, Legal, Institutional and Economic Aspects of Space Debris Mitigation and Removal - STM Security (8-E9.1)

Author: Mr. Jonathan Mitchell
New Zealand Space Agency, New Zealand, Jonathan.Mitchell@mbie.govt.nz

Dr. Darren McKnight
LeoLabs, United States, darren@leolabs.space
Mr. Tim Searle
New Zealand Space Agency, New Zealand, tim.searle@mbie.govt.nz
Mr. Adam Marsh
LeoLabs, United States, amarsh@leolabs.space
Ms. Erin Dale
LeoLabs, United States, emdale@leolabs.space

ORBITAL DEBRIS COMPLIANCE CONTINUUM – REGULATION AS A SERVICE

Abstract

Debris mitigation guidelines have notoriously not been satisfied by the majority of satellite operators. This is largely due to the fact that there are no ramifications for lack of compliance. However, first there must be a continuous and deliberate effort to monitor and document space operator performance before there is any chance for enforcement. This paper details the regulatory compliance application that the New Zealand Space Agency and LeoLabs have co-developed as a template for potential use globally. The initial regulatory dashboard initiated in 2019 is described and lessons learned from the initial design are shared. In 2022, this initial framework was updated with a "compliance continuum" approach where the sequence of requirements of the UN mitigation guidelines are built into the regulatory tool to create a simple, efficient, and traceable application. This sequence includes debris generation during deployment; limiting explosion potential; keeping collision risk with large and small debris within limits; post-mission disposal within 25-yr at an acceptable level of reliability; and managing reentry risk. This approach has also focused help to integrate new technologies more quickly into the regulatory regime to enable safer space operations for all. For example, an examination of the pivotal constraint for the 25-yr rule (i.e., mass margin for space systems) has been completely revolutionized by the advent of reliable, inexpensive, and small electric propulsion systems. Specifically, electric thrusters have enabled satellites in LEO to satisfy a 1-yr post-mission disposal rule with smaller mass margins than were available at the turn of the century to satisfy a 25-yr rule. It is hoped that this development will lay the foundation for better enforcement of these guidelines more uniformly around the globe.