

16th IAA SYMPOSIUM ON SPACE DEBRIS (A6)

Mitigation and Standards: status, lessons learnt and future with smallsats and constellations (4)

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APPLICATION OF A DEBRIS INDEX FOR GLOBAL EVALUATION OF MITIGATION
STRATEGIES**Abstract**

The current debris mitigation guidelines are formulated by considering single objects, so they cannot dynamical account for variation in the space traffic or for the current actual level of implementation and success of post-mission disposal manoeuvres. They are formulated from a resource consumer's perspective.

To address this limitation, the concept of space traffic management based on the environment capacity was proposed to take the perspective of the space environment or resource. Following this approach, a mission (single or multiple satellites and launch vehicles) is evaluated, before its launch, not only with respect to existing mitigation guidelines, but also with respect what can be accommodated by the environment (e.g. not exceeding a defined risk level) considering objects already in orbits and other planned future missions. In this way, similarly to the approach used by the ITU for frequency allocation, each mission can use a share of the environment capacity through a process that may define, for example, a maximum capacity consumption per year.

In order to implement such a scheme, a measure of the debris environment criticality is required. Different formulations for such a metric have been proposed and, in particular, in the present work, the ECOB index is applied. The work will give a brief overview of the most recent changes in the formulation of the index and will discuss examples of applications to the current environment. Different PMD and future launch traffic scenarios will be analysed. In this context, the evaluation provided by the debris index will be compared to the one of other global indicators (e.g. expected number of catastrophic collisions). A comparison with operational data from ESA collision avoidance service will be also presented.

Finally, it will be analysed how such an index can be connected to the concept of the environment capacity and a concept for its inclusion within a space traffic management process will be formulated.