

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

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DEBRIS MITIGATION CAPABILITY AND CAPACITY TO REDUCE ORBITAL DEBRIS

Abstract

Mitigation measures to restrict the creation of space debris will play a key role in the management of the future space debris environment and the sustainability of outer space activities. As part of ongoing work in the European Union Framework 7 Alignment of Capability and Capacity for the Objective of Reducing Debris (ACCORD) project, we review and quantify the capacity of commonly adopted mitigation measures to reduce debris creation in the long-term, thereby enabling the requirements for space debris remediation to be better understood. Mitigation measures investigated are drawn from the Inter-Agency Space Debris Coordination Committee (IADC) Space Debris Mitigation Guidelines and include: limiting the release of mission related objects, passivation of spacecraft at end of life, post-mission disposal and collision avoidance of active satellites. The University of Southampton's evolutionary model, the Debris Analysis and Monitoring Architecture to the Geosynchronous Environment (DAMAGE), was used to perform multiple, long-term projections of objects > 10 cm. From this data, it was possible to quantify the capacity of the mitigation measures to reduce debris in each of the following regions: low Earth orbit (LEO), medium Earth orbit (MEO) and geosynchronous Earth orbit (GEO) regions. The effectiveness of each mitigation measure was investigated individually, and in combination with other measures, relative to a non-mitigation scenario. This comprehensive analysis provides for the first time a clear quantification of the benefits of different mitigation measures. The results will be used in conjunction with those from a survey of industrial capability, conducted as part of the ACCORD project, to provide a coherent and rigorous mechanism for communicating the efficacy of current debris mitigation practices and for strengthening European and international capability.