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

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A SURVEY OF THE IMPLEMENTATION OF DEBRIS MITIGATION MEASURES IN SPACECRAFT

Abstract

Over the past decade a variety of space debris mitigation guidelines and standards have been published at national, regional and international level. Unfortunately, during this time the population of debris in low Earth orbit has also grown substantially. To prevent further significant deterioration in the near Earth environment it is important that manufacturers and operators throughout the space industry are able to adhere to the guidelines and standards as far as possible. However, there is currently very little information in the public domain from which a systematic evaluation can be made to understand if this is the case.

To assess how well debris mitigation measures have been adopted across the industry, a survey is being performed as part of a project called ACCORD (Alignment of Capability and Capacity for the Objective of Reducing Debris). Funded by the European Commission's Seventh Framework Programme, the key objective of ACCORD is to support research and development efforts by providing a coherent and rigorous mechanism for communicating the efficacy of current debris mitigation practices, and identifying opportunities for strengthening the capability of industry to implement mitigation measures. To perform the survey, two questionnaires have been constructed – one intended for organizations involved in the design of spacecraft, and the other for operators. Each questionnaire has been designed to collect data on the main categories of debris mitigation, namely: limiting the release of space debris during normal operations, avoiding accidental break-ups, preventing collisions, and post-mission disposal. Responses to the survey have been compiled from a variety of manufacturers, operators, space agencies and launch licensing authorities around the world.

This paper presents a preliminary analysis of the data collected so far. For example, the survey has already provided useful feedback on the challenges that manufacturers and operators face when trying to accommodate debris mitigation measures. The data also reveals trends on how the implementation of such measures has changed over time, and identifies the importance of the role played by the particular characteristics of a spacecraft, such as its size and orbit. These analyses are an essential input to subsequent activities within ACCORD, most notably the formulation of an environmental impact rating system. The aim of the rating system is to provide a simple means of quantifying the ability of a spacecraft to implement debris mitigation measures, whilst taking into account the environmental effectiveness of those measures. This will be the subject of another paper.