

SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FAR FUTURE (D4)
Poster Session (P)

Author: Mr. Hiroaki Shioi
University of Tokyo, Japan

Mr. Philipp Maier
Germany

Ms. Carmen Ricote Navarro
Germany

Mr. Thomas Sinn
University of Strathclyde/Advanced Space Concepts Laboratory, United Kingdom

ARTIFICIAL METEOR SHOWERS AS AN EXAMPLE FOR A SECONDARY BUSINESS CASE FOR
ACTIVE DEBRIS REMOVAL**Abstract**

Following the growing consensus on the necessity of active debris removal (ADR), numerous publications have analyzed potential technical solutions and political and legal challenges associated with the removal of space debris. Several proposals also suggest organizational frameworks under which active debris removal or more integral approaches including debris mitigation and space situational awareness could be implemented. However, most proposals encounter an essential difficulty: the high cost of removing a sufficient amount of debris that is estimated to prevent cascading effects. The issue is further complicated by the distribution of debris and value in near-Earth space: while most commercial value is located in geosynchronous orbit, the space debris problem is most severe in a region of low Earth orbits which are mainly used by governments and inter-governmental organizations. The revenue made in the most debris-threatened region is comparatively small; consequently commercial interests in removing debris from said region are scarce. Some researchers have proposed to view debris removal as an extension, or a secondary objective for on-orbit servicing in order to profit from commercial incentives created by servicing to develop the necessary technology. The idea presented is to find further potential synergies with commercially viable strategies or secondary objectives of debris removal that could support the funding and in effect decrease the cost of ADR. Specifically, the paper will analyze the technical feasibility and the economic potential of using controlled reentry of space debris to create artificial meteoric showers for large regional events such as the Olympic Games, royal jubilees or world cups. Depending on the size of the space debris object, long lasting bright artificial meteoric showers over the entire night sky can be created. The paper will summarize the available space debris, outline possible rendezvous strategies and capture mechanisms as well as expected luminosity of the re-entering space debris. Based on the technical analysis, an assessment of economic feasibility and potential contributions to the cost of ADR will be conducted.