

## SPACE DEBRIS SYMPOSIUM (A6)

(joint session with Space Security Committee): Policy, Legal, Institutional and Economic Aspects of Space Debris Detection, Mitigation and Removal (8)

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BUSINESS AND ECONOMIC CONSIDERATIONS FOR SERVICE ORIENTED ACTIVE DEBRIS  
REMOVAL MISSIONS

**Abstract**

Active debris removal missions have been suggested as the most effective means to limit future growth in orbital space debris. The prediction of debris collisions is an inherently statistical process, with the selection of which debris to remove based on the mass of an object and its probability of suffering a catastrophic collision with another object. Thus active removal missions can only remove objects based on the likelihood and consequence of it being involved in a collision, but cannot predict exactly if and when such an object would actually suffer a collision. This in turn means that to have any meaningful impact on the future debris growth, a high number of debris must be removed each year over a period of several decades, and this therefore represents a potential for a long term financial commitment. An analysis of the likely near to medium term impacts on a typical satellite operator in LEO, shows that although debris is an operational concern, it is not currently a criticality. Therefore large scale private sector funding of removal missions seems unlikely, and the most likely framework for these activities will need to be via some form of a state led intergovernmental organisation that acts as an anchor customer for active debris removal services. An analysis of the cash flow of a theoretical active debris removal business shows that significant savings in total costs can be made by splitting the removal of debris between controlled re-entry (for heavier objects) and controlled re-orbit to higher graveyard orbits for smaller objects. A total analysis over a 20 year period, shows that with the operating assumptions made in the study, the total price that would need to be paid out to the services business has a present value of 800M (discounted at 7