

SPACE DEBRIS SYMPOSIUM (A6)
Space Debris Removal Issues (5)

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THE E.DEORBIT ESA CDF STUDY: A DESIGN STUDY FOR THE SAFE REMOVAL OF LARGE
SPACE DEBRIS

Abstract

In the period June to September 2012 the European Space Agency conducted a pre-assessment study in order to produce preliminary system designs for capturing a large space Debris, identify their required technology roadmaps, and investigate their applicability to other ESA missions. The study was carried out by an interdisciplinary team at the ESA's Concurrent Design Facility (CDF), in the frame of the Branch 4 of the Clean Space initiative, dealing with the development technologies Active Debris Removal (ADR). The main tasks that the CDF team had to carry out were to: • Assess the feasibility of a mission for the controlled de-orbiting and re-entry of a large target in Sun Synchronous Orbit, using technologies already analysed in previous CDF studies performed at ESA • Perform a System level conceptual design of the spacecraft with the participation of all discipline specialists • Trade-off different mission scenarios • Assess programmatic, risk and cost aspects of the various alternatives • Consolidate the Technology road maps in line with the programmatic aspects of the mission • Evaluate the applicability of the technologies to different categories of satellites and debris remediation mission The target debris was supposed to be of 8 tonne mass class, uncooperative with a (near) Sun Synchronous Orbit. The long term attitude stability of the target debris is unknown and therefore multiple scenarios had to be taken into account. Furthermore the risk of break-up and exploding of the target was assessed as it was assumed that the target won't be passivated.