

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

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## THE DEVELOPMENT STATUS OF 'ROGER'

**Abstract**

NASA and ESA simulations have each shown that implementing debris mitigation measures on new satellites in isolation is not a sufficient solution to the space debris problem. Rather, the removal of 5 to 10 large objects per year out of critical LEO orbits is required to overcome the cascade. Thus, by actively removing the heavy debris, the root cause of the problem can be addressed to secure space for the future. Alternative 'sweeper' type concepts to clear the small debris are expensive and do not translate well from current competencies or to future programmes. A heavy active debris removal (HADR) system is therefore considered the most effective solution.

EADS Astrium Space Transportation has undertaken significant research into a series of different HADR solutions. This paper covers the ongoing technology development of and feasibility studies into a key EADS Astrium ST technology known as 'ROGER'. 'ROGER' is comprised of a large net and tether, deployed to catch heavy debris such as satellites and spent rocket stages. It is of interest due to its inherent simplicity and robustness: the system is capable of capture and stabilisation with the spacecraft far from the target, versatile so as to address a diverse range of uncooperative targets, whilst minimising the risk of further debris production.

Following a series of paper studies to determine potential mission architectures and analyses on AOCS feasibility, EADS Astrium ST has now designed and built a prototype of the net system and in May 2012, shall investigate the viability of the deployment mechanism in the Bremen Drop Tower. In September, the capability for a series of net prototypes to close around a target in low gravity shall be examined during a parabolic flight campaign, in preparation for a refined design and an in-space demonstration.