

SPACE DEBRIS SYMPOSIUM (A6)
Space Debris Removal Concepts (6)

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ACTIVE DEBRIS REMOVAL WAY FORWARD

Abstract

The remediation of debris is becoming a major and important topic for space users and stakeholders. In particular the increasing population of small untrackable debris particularly in the well populated and economically important LEO regions such as SSO poses a major problem to operational viability of satellites. Active removal and safe disposal of large bodies such as spent stages and disused satellites will bring two benefits. It removes the root cause of small debris, i.e. large debris disintegrating into smaller debris by collisions (Kessler cascade effect) as well as removing large objects that may well re-enter uncontrolled over populated areas with potential hazard. Some initiatives are launched in Europe, such as ESA's Clean Space initiative, DLR's DEOS, CNES's OTV, as well as European Union FP7 Space work program 2013. Through its involvement, Astrium has developed ideas, concepts and initiated technologies that will be pivotal to future large Active Debris Removal missions. This presentation is summarizing the ideas end technologies under developments. It presents as well the technical and programmatic challenges that need to be overcome. These include amongst others:

- Major advances in key fields such as the development of critical technologies for the remover vehicle as well as the entire ground based support infrastructure. Use of already existing European competencies such as in autonomous rendezvous are a great asset here. However much more work needs undertaken in the critical areas of rendezvous and capture of uncooperative targets, their processing, disposal as well as ground based assets to detect and monitor debris.
- A stepped approach is described towards realising an operational system which can remove multiple targets within one mission, essential to amortise costs per target and make the system viable. As results of trades and system level studies innovative concepts will be highlighted to remove large debris ranging from defunct satellites to spent rocket bodies.