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

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COST ESTIMATION OF ACTIVE DEBRIS REMOVAL

Abstract

The number of debris objects on some low Earth orbit (LEO) regions is high. There is a certain possibility that objects may collide with each other. Huge spent satellites or upper stages can be destroyed so that new debris is created. The new debris may in turn trigger further catastrophic collisions. Simulations show that an instability may exist in the LEO population. Consequently catastrophic collisions may become the driving mechanism for the increase in the number of debris in the future. In addition to the introduction of mitigation measures, active removal of already existing objects may be necessary. Target objects could be selected that pose a high risk. These are long-lived objects in LEO, usually near 800 km altitude, which have a large cross-sectional area and a high mass. For the mission, a removal satellite would be required. The satellite has to perform a rendezvous maneuver, a docking with the target object, and a direct de-orbiting of the target. Cost drivers are derived from the mission requirements for an active removal. The costs for development and production of the satellites hardware as well as for operations are estimated. A long-term simulation of the space debris environment is carried out. The results with or without active removal are examined. The costs of both scenarios are compared.