

SPACE DEBRIS SYMPOSIUM (A6)
Mitigation, Standards, Removal and Legal Issues (4)

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ACTIVE DEBRIS REMOVAL: EDDE, THE ELECTRODYNAMIC DEBRIS ELIMINATOR

Abstract

We propose a low-cost solution for LEO space debris removal. The ElectroDynamic Debris Eliminator (EDDE) can affordably remove nearly all the 2,465 objects of more than 2 kg that are now in 500-2000 km orbits. They have more than 99

Most LEO debris is in a few narrow inclination clusters. After releasing one object, EDDE can climb and torque its orbit to reach another object in a cluster within a few days, while actively avoiding other catalog objects. Binocular imaging allows accurate relative orbit determination from a distance. Capture uses lightweight expendable nets and real-time man-in-the-loop control. After capture, EDDE drags its payload down and releases it and the net into a short-lived orbit safely below ISS. EDDE can sling debris into controlled reentry, or can attach an adjustable drag device to the net before release, to allow later adjustment of payload reentry location.

Up to 12 EDDEs can be launched on any EELV with enough unused launch capacity, because two 100-kg EDDEs can share a single ESPA slot. A dozen EDDEs could remove nearly all 2020 tons of LEO orbital debris in 7 years. The estimated overall program cost is 45 – 110*Kperobject, or*55-130 per kilogram.