

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

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DESIGN AND ANALYSIS OF ELECTRO-DYNAMIC TETHER MICRO-SATELLITE FOR ACTIVE
SPACE DEBRIS MITIGATION

Abstract

Electro-dynamic tethers offer high performance as propellantless deorbiting systems and are among the main candidates for the implementation of active debris removal. After a preliminary review of the current space debris population in Low Earth Orbit, the fundamental aspects of Electro-dynamic Tethers (EDTs) are described. Issues about tether impact risk with other debris and tether maneuverability are also discussed. When the electro-dynamic tether is deployed, the Lorentz force generated by conductive cable cutting the earth's magnetic field produces an electro-dynamic drag leading to a fast satellite orbital decay. This paper presents a study of the process of de-orbiting using electro-dynamic tether system and introduces the research progress of BUAA micro-satellite (BUAA-SAT). A design of de-orbiting system suitable for micro-satellite is put forward. Establish a de-orbiting model and forecast the de-orbiting time by numeric simulation. The simulation results show that the electro-dynamic tether can greatly reduce the de-orbiting time.