

Designing and Costing the Concept of Servicer Satellites That Can Be Used to De-Orbit Space Debris

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Abstract : Today the major threat to our existing and future satellites is space debris; the collision of bodies like defunct satellites with any other objects in space, including the new age ASAT (anti-satellite) weaponry system, are the main causes of the increasing amount of space debris every year. After analyzing the current situation of space debris, low earth orbit is found to be having a large density of debris as compared to any other orbit range; that's why it is selected as the target orbit for space debris removal mission. In this paper, the complete data of 24000 debris is studied based on size, altitude, inclination, mass, number of existing satellites threaten by each debris from which the rocket bodies are the type of wreckage found to be most suited for removal. The optimal method of active debris removal using a robotic arm for capturing the body to attach a de-orbit kit is used to move the debris from its orbit without making the actual contact of servicer with the debris to reduce the further the threat of collision with defunct material. The major factors which are brought into consideration while designing the concept of debris removal are tumbling, removal of debris under a low-cost mission and decreasing the factor of collisions during the mission.

Keywords : de-orbit, debris, servicer, satellite, space junk

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