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# SPACE DEBRIS REMOVAL USING ECOLOGICAL MISSIONS

**Abstract**

Now a days, Space debris increasingly threatens the provision of satellite services that have become integrated into the operations of the global economy. On the Other hand, the active removal of space debris and the retrieval of failed satellites by spacecraft are other possible measures to make cleaner space environment. Active space debris removal missions are a necessary way to control and reduce debris growth, in order to permit future sustainable space activities. While studies suggest that annually removing as few as five massive pieces of debris in critical orbits could significantly stabilize the space debris environment, countries in space race have hesitated to develop space debris removal systems due to high costs and classic free rider problems.

The following countermeasures are therefore being considered as for reducing the amount of space debris.

- Designing space systems so that they do not become space debris; that is, positive end-of-life processing of satellites and the establishment of proper disposal procedures for rocket upper stages.
- Processing existing debris that has no self-removal capability; that is, the removal of large-size satellite remnants from economically and scientifically useful orbits to disposal orbits.

Our paper proposal can be classified **as a momentum exchange method, and in particular it can be thought as a drag augmentation system, refuel**. The mitigation of space debris by increasing drag on debris and deorbiting into the earth surface using **polyurethane spray over debris which increases atmospheric drag and make the bodies that can be pushed away towards grave yard orbits with the help of electrospray ion thruster propulsion system**. After placing our satellite in an orbit it sense the debris using proximity determination system. When debris comes near to our satellite at the distance of less than 20 cm the polyurethane is sprayed on the debris which makes the **expansion of the polyurethane size 20 times volume greater** which helps to increase wet surface on the debris. After completion of polyurethane, it will be **accelerating towards space station which can be refueled and reappearance for new mission, this shows the ecological**. The advantages of our proposal is **low cost, less risk and possibility of removing multiple debris with more and ecological reusable mission**.

*Keywords*: *Electrospray ion thruster, Polyurethane spray, Momentum exchange method, Drag augmentation, Refuel*