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SPACE DEBRIS SYMPOSIUM (A6)
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SPACE DEBRIS REMOVAL

Abstract

As mankind continues to launch more and more satellites, orbital debris is becoming an increasingly larger problem for spacecraft operators. Space debris is not a new problem for scientists, but rather one, like climate change, that has recently come to light due to the increase in rate at which the change is occurring. Since 1957, about 5,000 space launches have led to an in-orbit population today of approximately 22,000 track-able objects, with sizes larger than 10 cm. Due to relative orbital velocities of upto 56,000 km/hr, centimeter-sized debris can seriously damage or disable an operational spacecraft, and collisions with objects larger than 10 cm will lead to catastrophic fragmentations, releasing hazardous debris clouds.

We are proposing to combine mostly available technologies in a new way for scavenging the space yard. In this paper we are proposing an idea to remove space junks in Low Earth Orbit (LEO) using Electromagnetic plates and Electron-gun technique. Our target is to capture the small junk which involves materials of sizes between the ranges 0.4 to 10cm. In our system we are going to use junk box that has been designed. It consists of new snake robotic arm technology. On the skin of the robot, there are sensors that are connected to detect the debris and onboard camera is also used to avoid the collision with working models. There are two robotic arms used, one that has electromagnetic plates to capture metallic junk and another that has electronic gun to capture nonmetallic debris. Electron gun is also used to reduce the speed of small debris. After capturing, the debris will get collected in the junk box and the same procedure shall be repeated till the junk box is filled completely.

Currently as space debris is the burning issue, we have proposed a debris scavenging method that is very efficient and conceptually rudimentary. Moreover, this is a very cost effective method, as easily available technology will be used for transportation of junk box to space.