Space Debris Scavenging

Abstract

As mankind continues to launch more and more satellites, orbital debris is becoming an increasingly larger problem for spacecraft operators. Minute space debris between the range of 400-600km in Low Earth Orbit (LEO) will continue to stay in orbit for hundreds or even thousands of years. It is now of prime importance to implement a removal mechanism for such potentially threatening debris to manmade satellites like ISS and man himself. This paper proposes a novel strategy to remove space debris in Low Earth Orbit (LEO).The target is to capture wreckage size between the ranges 0.1mm-10cm. For this purpose, junk box has been conceptualized as part of the satellite system. The use of existing snake arm technology has been suggested. The dual robotic arms implemented in the system, one shall carry positive plate and other an electronic gun to capture the debris. The captured debris shall get collected in the junk box and then the system switches to its disposal mechanism. The paper investigates the applicability of the proposed scavenging technique. With a high technology readiness level, the system is cost effective and highly efficient.

Keywords: debris, LEO, Electron gun, junk box