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Post Mission Disposal and Space Debris Removal (1) (5)

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REMOVEDEBRIS PRELIMINARY MISSION RESULTS

Abstract

The RemoveDebris spacecraft has been shipped to the Kennedy Space Center in December 2017 and it is currently scheduled for launch to the ISS on the 2nd of April 2018, on board a Dragon capsule (SpaceX CRS-14 ISS re-supply mission). A few weeks later, depending on the ISS internal operation schedule, the satellite is going to be deployed in orbit via the NanoRacks Kaber. The satellite will perform demonstrations of four key technologies, to be used at different stages of a typical ADR: Vision Based Navigation (VBN) as a tool to observe and quantify the relative dynamics between an uncooperative debris and the platform preparing for its retrieval; two technologies for debris capture, namely a net and a harpoon, and finally a de-orbit sail will be deployed, to increase the platform drag, thus reducing its speed; and orbit altitude until it burns into the Earths atmosphere.

The mission is due to terminate by Q4 2018, and therefore in this article, besides giving a brief overview of the craft development, we expect to be able to report on the LEOP and some of the in-orbit demonstration activities.

The mission consists of a main mini satellite platform of approximately 100kg mass that once in orbit will release two 2U cubesats which will act as space debris. One of the cubesats, will be observed using the VBN to prove its hardware and algorithm. The second cubesat, after ejection, will become a representative target for the net capture experiment i.e. a net will be launched by the platform to envelope and capture the cubesat. A small panel of HB material, analogous to that used in standard satellites construction, will then be deployed (using a deployable boom) and it will be the target for the harpoon experiment (i.e. a tethered harpoon is going to be fired by the satellite platform to hit this panel). The last experiment to be performed will be the drag sail. During a real mission this would be the last phase, when the platform and the debris that it has captured are deorbited together, destroying them burning into the atmosphere.

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