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Post Mission Disposal and Space Debris Removal 2 - SEM (6)

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REMOVEDEBRIS, MISSION ACCOMPLISHED AND LESSON LEARNT

Abstract

The RemoveDebris mission has just been completed, deorbiting the mothercraft that completely burnt-up during re-entry. This mission has given the first successful in-orbit demonstration of two technologies for the capture or large space debris, namely a net and a harpoon. The net was used to capture a CubeSat that was previously released from the mothercraft to be the test target for this method of capture. Before being enveloped by the net the CubeSat deployed some inflatable structures to increase its size and become more representative of large space debris (e.g. old defunct satellites). The harpoon was tested against a target made of material representative of old satellite structures, and fixed at the end of a deployable boom. Both technologies were successfully demonstrated, and extended videos that captured the in-orbit experiments were recorded and downloaded. In addition, the mothercraft also released a

second cubesat that enabled verification of the functionality of a lidar camera on board the mothercraft, and related software. This second CubeSat carried a GPS and other equipment to determine its position and attitude, thus enabling to verify the estimations produced by using the lidar camera. The last step to complete the mission was to deorbit the mothercraft by deploying a dragsail. The latter presented some anomalies during its deployment, with no significant increase in the rate of altitude decrease. The article will deal with the lesson learned, which subsequently enabled two new dragsails to be developed and successfully deployed in orbit, as well as briefly summarize the whole mission.