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SDM MEASURES AND DEVELOPMENT FOR THE PRIMA FAMILY PLATFORMS

**Abstract**

The aspects related to end of life satellite disposal are becoming an emergent factor for the Satellite design activity. The Italian Space Agency (ASI) and Thales Alenia Space Italy (TAS-I) are collaborating to identify and apply design solutions to new platforms and satellite design, in order to achieve the maximum Space Debris Mitigation (SDM) and guarantee an efficient End of Life (EoL) disposal.

The large number of potential solutions for SDM include minimum noninvasive satellite design measures, as well as, complete SDM oriented satellite design, even for non-autonomous/assisted controlled reentry cases.

One option, considers accommodation of Corner Cube Reflector (CCR), in specific location of the satellites. This solution based on the assembly of a prism with orthogonal reflecting surfaces, permits to precisely measure the satellite ranging but also to estimate attitude, position and velocity vector information of a satellite, even when the satellite is no longer communicating with Ground (GND), as in case of anomaly. In fact all GND Laser ranging stations, as the ASI station in Matera (IT), will be able to track it, thanks to the signal reflected by the CCR to the same location on GND that has generated it.

Satellite Position and Velocity (PV) information are typically generated on board, gathered from Star Trackers and Global Navigation Satellites System receiver, and transmitted to GND. The CCR adoption however will be useful for all spacecraft in not nominal operating conditions, and during disposal phases permitting to estimate the orbital ephemerides, and possibly also satellite attitude parameters with proper CCR position. Being completely passive, for LEO application those are very compact in size and mass.

In addition to the "Design for Demise" approach, ASI and TAS are also considering to prepare future satellites for possible in orbit satellite retrieval, by adopting a "standard" mechanical interface on the PRIMA platforms. These "grabbing points" could be placed on minimum impact side of the satellite to not interfere with the Satellite appendages, offering a potential capture device on a preferred side of the spacecraft.

The evolution of the platforms are attentively followed by both ASI and TAS-I to cope with technology progress, newly designed missions and responsible clean space approach.