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STANDARDIZED PASSIVE DEORBITING DEVICE FOR MULTIPLE CUBESAT CLASS SC: FROM 1U TO 12U

Abstract

During last decade the evolution of commercial nanosatellites has pushed spacecraft developers towards the realization of larger cubesat class platforms. Among these, 6U cubesats have slowly acquired a big portion of the market above all for the possibility to integrate larger payloads and increase the performances of the service offered. Nonetheless, the consequent increase in the mass injected into LEO orbits has not pushed towards the adoption of valid solutions for space debris mitigation, that still constitutes a critical problem for space missions. Multiple deorbiting devices have been however designed and in some case tested in orbit in order to provide a ready and affordable solution for next future when a strict mitigation regime will be required. Among these there is ARTICA deorbiting device (Aerodynamic reentry technology in Cubesat applications), in orbit tested during 2017 on board a 3U Cubesat platform. The native system, designed for 1U to 3U Cubesats, requires therefore to evolve following the trend of commercial nanosatellite platforms. A study on the possibility to exploit the system for new SC form factors such as 6U or 12U cubesats has been carried out and consequently a revolutionary version of the system has been designed and prototyped. The innovative architecture permitted to reach a more compact device, standardized and compatible for the whole range of Cubesats size from 1U to 12U without posing limits or modification to satellite bus. The same principles of autonomy and plug and play approach still apply. The indipendence of the system makes possible to use it in an hypothetical active debris removal mission attaching it to the debris to be deorbited. The system offers a 2.5m2 sail stored in a ultra-compact autonomous device of 0,18 U (95x95x19 mm3). Performances, test results and details of the system will be presented in the paper.