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D-ORBIT INVOLVEMENT IN THE ESA CLEANSAT PROGRAM: AN AUTONOMOUS
DECOMMISSIONING SYSTEM FOR SATELLITE CONTROLLED RE-ENTRY

Abstract

In October 2016, D-Orbit from Italy was contracted by the European Space Agency to study an autonomous decommissioning device based on solid propulsion technology, able to provide satellites with a controlled atmospheric re-entry at their end-of-life. This activity is part of the ESA CleanSat program, that is the technologic and programmatic response to support European industry complying with the worldwide market demand for Space Debris Mitigation (SDM)-compliant solutions for Low Earth Orbit (LEO) spacecraft. Through the CleanSat Program, ESA aims to implement a coordinated approach involving system integrators, subsystem and equipment manufacturers in the development of technology building blocks to support the evolution of the Low Earth Orbit (LEO) spacecraft in compliance with the SDM. The present paper presents the main results of the two CDF sessions performed by D-Orbit and ESA in ESTEC, Noordwijk, with the supervision of the European Large System Integrators (i.e. Airbus Defence and Space, OHB, and Thales Alenia Space), which gave requirements and provided inputs and comments throughout the duration of the activity. This paper summaries the work performed regarding the design of the Autonomous Decommissioning System, with particular focus on the design and operations architecture, which are described and duly justified with analyses, design choices, and trade-off. The roadmap for future will be also discussed, in order to provide future spacecraft of this important technology and eventually to offer it in the commercial market to satellite operators.