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EDRS-C – THE SECOND NODE OF THE EUROPEAN DATA RELAY SYSTEM IS IN ORBIT

Abstract

EDRS-C will operate on a geostationary orbit as the second node of the European Data Relay System (EDRS). The EDRS-C satellite, designed by OHB System as prime contractor, has been procured in the frame of a Public Private Partnership (PPP) between Airbus Defence and Space and ESA. The primary objective of the EDRS mission is to provide a data relay service to LEO satellites from GEO orbit by means of optical and RF bands. To this end the EDRS satellites feature laser communication terminals that significantly differentiates them from conventional telecom satellites. The terminal aboard EDRS-C is the Laser Communication Terminal (LCT), designed and manufactured by TESAT Spacecom. EDRS-C is designed and developed by OHB System on basis of the SmallGEO platform. In order to accommodate the LCT on the SmallGEO platform some adaptations to the existing design had been required. The adaptations implied a consolidation of the existing platform design, an extension of its competitiveness with reference to optical payloads, and an important milestone in the development and industrialization of the generic SmallGeo platform product line. This paper presents the design adaptations performed on the SmallGEO platform in order to provide the LCT with an environment that guarantees its full performances. Among the various design aspects that might have impaired the LCT performances, it is worth to highlight the following measures:(a) The thermo elastic deformations (TED) effects have been mitigated by optimizing the accommodation on the spacecraft earth deck. (b) The required pointing knowledge, needed for the for link acquisition and keeping, has been ensured by selecting an AOCS subsystem with higher performances with respect to the standard SmallGEO platform. (c) The fine pointing stability needed by the laser terminal is ensured in two different ways: At design level by filtering the unavoidable continuous vibration sources (RW, SADM); during mission by carefully combining the needed programmable events that may generate pointing degradation (station keeping, antennas repointing) with the operations of the laser terminal but still respecting the availability of the service). (d) The stringent beginning and end of life contamination requirements are met by means of a dedicated cleanliness and contamination control plan.

EDRS-C has recently completed its environmental testing and is scheduled for launch in July 2019. The successfully completed environmental qualification activities as well as micro-vibration testing activities are summarised in the paper.