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Author: Dr. Marco De Tata
OHB System AG-Bremen, Germany

Mr. Willem Bode
OHB System AG-Bremen, Germany
Dr. Hendrik Lübberstedt
OHB System AG-Bremen, Germany
Dr. Alexander Schneider
OHB System AG-Bremen, Germany

ELECTRA: HIGHLY VERSATILE AND EFFICIENT SMALL GEO PLATFORM

Abstract

OHB is designing and developing the SmallGEO satellite product line to efficiently serve small geostationary missions with a launch mass up to 3.5 tons. The first mission Hispasat 36W-1 was successfully delivered on station to the end customer after launch in January 2017. The EDRS-C, Heinrich Hertz, 6x MTG and Electra are all satellites currently in development at OHB based on the SGEO platform.

Electra is the full-electric evolution of the SmallGEO family. It is being developed in a public-private-partnership with ESA and SES.

The first Electra satellite takes advantage of the flexibility of the SGEO platform: it will have a launch mass in the range 2-3.5 t including a payload mass of up to 800 kg, a payload power of up to 10 kW, and up to 5 kW of heat rejection capability at end of life.

After launcher injection in GTO, the transfer phase to the GEO slot as well as station keeping in GEO is performed entirely by the EPPS. Due to propellant mass savings, Electra more than doubles the payload mass capacity and power compared to full chemical configurations at similar launch mass. Simultaneous operation of two thrusters allows orbit raising within a few months. A major advantage of performing the GTO Transfer with EP is the high flexibility of the system to accommodate a broad spectrum of different launch and transfer scenarios. The tank capacity allows for up to 20 years GEO operations.

The redundant set of two-times-two 5-kW class Hall-Effect-Thrusters is mounted on two articulated EP booms. This configuration has been extensively analysed and found to compare favourably against competing configurations using individually gimballed thrusters.

The design configuration has gone through the Platform Preliminary Design Review (P-PDR) at the end of Phase B1 (2014), while currently in Phase B2/C/D/E it has passed a System Design Consolidation Review (SDCR, 2016) and a Platform Accommodation Review (PAR, 2017). The development is now headed to the Platform Critical Design Review (P-CDR, 2019). In parallel, the platform units are being procured, while the test campaign of the EM satellite test bench is ready to be started. The SES mission implementation is foreseen mid 2019, after closure of P-CDR with launch by end 2022.

The paper deals with the general technical description of the satellite platform. The programmatic aspects and the state-of-art of the platform development will be presented as well.