

IAF SYMPOSIUM ON INTEGRATED APPLICATIONS (B5)
Satellite Commercial Applications (3)

Author: Mr. Björn Danziger
Berlin Space Technologies , Germany

Mr. Matthias Buhl
Technische Universität Berlin, Germany

LEOS-50 PLATFORM EVOLUTION

Abstract

The LEOS-50 platform of Berlin Space technologies is based on the 30-year tradition of building small satellites in Berlin. It has been used for three successive missions since 2013. This paper aims to give an overview on the initial design of the platform and its capabilities as well as an insight on the design iterations based on the lessons learned from previous missions. The LEOS-50 platform is the latest Generation of Berlin built micro satellites. It has been designed to cater to missions between 50 and 100kg mass. Its first use was for the Hyper Spectral Satellite Kent Ridge 1 from Singapore which was launched in 2015. Designed as a multi mission platform one of the notable features of LEOS is the strict electrical separation between payload and bus. Bus and payload are only connected by the fingertips. There are no connections beyond the command line and bus voltage connection. To supply the required voltages and generate the interfaces a payload management unit (PPDH) has been implemented. This has several advantages: it enables to upgrade payload capability while the bus stays the same. It also allows keeping the processing efforts low (power) in the bus and concentrate the high-performance computing in the payload. This system design has been proven very successfully for the LEOS-50. While the first generation had only an electrical separation but payload and bus shared one unified housing the second generation also enforces a physical separation. This doubles the payload volume compared. Another advantage is the faster payload integration. NExSat a satellite using the second-generation Design is currently under manufacturing for an international customer. NExSat will also demonstrate a new multi-spectral payload that allows 5m GSD and 150km swath. The 3rd generation of LEOS-50 is another step up. It allows to carry payloads with 1.5m GSD and increases payload a volume by 30 percent (to 600x600x400mm). It is currently being used for an mission that carries an off-axis three mirror anastigmat (TMA) with 200mm aperture. The paper will also give an outlook towards the LEOS-100 platform. While occupying the same volume the bus is much more advanced in several ways: it offers a propulsion system with 500m/s delta-v, payload volume of 600x600x600mm, 100W payload power and 320Mbit/s data. LEOS-100 is currently under design. First mission is a very high earth observation with 70cm GSD (at 500km orbit native before post processing) slated for a Launch in 2020.