

SMALL SATELLITE MISSIONS SYMPOSIUM (B4)
Design and Technology for Small Satellites (6A)

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TUBSAT – A RELIABLE AND COST EFFECTIVE MICRO SATELLITE PLATFORM

Abstract

The TUBSAT (Technische Universität Berlin Satellite) program has a remarkable track record: seven satellites have achieved a total of 40 years in orbit since 1991. In addition the TUBSAT approach as well as specific technologies are being used by many current and future micro satellite missions. Examples are the Indonesian 2nd generation program (double launch scheduled for 2011) and the TUBSAT derived reaction wheels used in the ORBCOMM OG-2 program.

TUBSAT missions can not only build on special system design technologies but also on a vast inventory of advanced subsystems as well as optical payloads which have been developed in house. Among them is a star tracker family that started with the first star tracker on-board a micro satellite (TUBSAT-A in 1991). High-performance reaction wheels and fibre-optical laser gyros that never failed in a mission are another example to be presented. One outstanding subsystem is the high-resolution (6m GSD) real-time video payload. These payloads allow a specially developed operation mode to be found only in TUBSAT missions – the Interactive Attitude Control. The operator controls the satellite in real-time enabling him to search specific areas in detail in order to identify and scan targets with unknown position. Utilization ranges from rescue mission and disaster monitoring to security applications.

Key element of TUBSAT know-how is how to use commercial of the shelf elements and insure the long mission life TUBSAT is known for. We will presents the characteristics of the system design that leads to such a successful design. Yet another highlight is the high-precision attitude control system (ACS) and the stability of the platform. It allows TUBSAT to carry high resolution imagers with up to 1.5m GSD, making TUBSAT the most cost effective platform for high resolution earth observation.

Due to the unparalleled TUBSAT approach governed by the University environment, the platform is especially suited for Hands-On Training and Technology Transfer Programs. 3 out of the 7 missions have been initiated together with such a program. The ongoing LAPAN-TUBSAT (2007) mission will be presented as one very successful project. The training program enabled LAPAN (Indonesian Space Agency) to start an independent micro satellite programme.

To facilitate the success of TUBSAT and the TUBSAT Training Programme a dedicated company was founded. Berlin Space Technologies (BST) is a spin-off by senior staff of TUB. BST will act as a system company for future TUBSAT missions and implement them in cooperation with TUB.