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TECHNOLOGICAL EXPERIMENTS ON THE DLR-BIROS SATELLITE FOR THE NEXT
GENERATION OF EARTH OBSERVATION MISSIONS

Abstract

The German BIROS Satellite (Bispectral InfraRed Optical System) approach is based on DLR proven technology gained during the BIRD mission, which was launched in 2001 and was primarily used for observation of fires and volcanic activity until 2004. BIROS Satellite Bus segments are will be based on the satellite bus as developed for the first German “Technologie Erprobungs Träger (TET-1)” satellite. Together with the TET-1 Satellite (launched in 2012) BIROS (launch in 2016) will be a part of a two-satellite-constellation “FIREBIRD” especially for active fire observation: BIROS will carry different other new technological experiments related to approaches for the next generation of remote sensing satellites. Especially in the field of space-born disaster warning systems, micro satellite systems have to be more and more dynamically in different senses: High agility and fine pointing platform suitable for multiple data takes e.g. for swath with extension and high dynamic availability in sensor commanding for data takes and flexible information-distribution to ground for disaster warning. For trying to give a contribution of for these general challenges of remote sensing systems hardware and software experiments form different DLR institutes will be integrated in the BIROS satellite: - New High-Torque-Wheels for a high agility will be developed and accommodated in BIROS payload compartment together with a cold-gas propulsion system. A PICO satellite form a German University (carry a camera and a GPS receiver) will be separated later in the mission life time from the BIORS satellite with a SPL-(Single Pico Launcher Adapter) to evaluate principles in using fore-field sensors for optical pre-detection. The Pico Satellite as a target will also be used for optical navigation experiments form BIROS and from ground by verification with the GPS receiver and under using an inter satellite link between the PICO satellite and the BIROS satellite. - In cooperation with the DLR Institute of Communications and Navigation the satellite BIORS will test high speed optical downlinks of image data up to 1Gbit/ s. For experiments of the disaster warning system on-board detected hot-spots could be send with a geo-location flexible form a hardware- modem over a relays satellite directly by E-Mail to the users. This opens although the way for a flexible on-board planning (software experiment). This paper will give an overview of the technological experiments of BIROS, which are demonstrating the feasibility of new approaches for the next generation for optical remote sensing Missions.