EARTH OBSERVATION SYMPOSIUM (B1)
International Cooperation in Earth Observation Missions (1)

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FIRE MONITORING CONSTELLATION FOR AUSTRALIA WITHIN THE GERMAN FIREBIRD MISSION

Abstract

Fire is one the major controlling agents in determining vegetation and landscape structure of different ecosystems throughout the world (Bond, Woodward and Midgley 2005). Each year a vast amount of biomass are burning worldwide affecting large areas. These fires are damaging local to regional ecologies, farming and plantation areas for food production and economies and infrastructure, as well as increasing the risk to human health and safety. Especially in Australia, South America, South Africa fires in populated and unpopulated areas often raged out of control. Remote Sensing techniques from satellites have made considerable progress in detection, monitoring and assessment of (wildland) fires worldwide. So called Fire Disturbance Essential Climate Variables (ECV), which consists of the variables Burned Area, Active Fire and Fire Radiative Power (FRP), can be derived directly from remote sensing systems. The German Aerospace Center (DLR) has implemented the so called FIREBIRD Mission in orbit. It is a constellation of two satellites, the TET (Technology ErprobungsTräger - launched 2012) and the BIROS satellite sensor system (Bispectral Infrared Optical System- launched in 2016), both are heritage of the BIRD (Bi-Spectral and Infrared Remote Detection) sensor system, that has been launched in 2001 already. These two satellites are equipped with a dedicated IR–Sensor system especially for the detection and analysis of small fires. In this paper a concept to extend the German FIREBIRD Mission with an additional satellite called AIROS (AustralianInfraredOpticalSystem) is proposed. Based on the space-proven small satellite bus system (BIRD, TET, BIROS) this satellite will utilize updated German IR-detector technologies, thereby reducing on-board resourcing demands while enhancing the instruments overall performance. The data- mission concept includes a downlink and processing facility in Australia for the 3 satellites. This paper also will present the first test results of the data downlink of the FIREBIRD Mission (TET and BIROS) over Australia and data processing examples of fire relevant ECVs, combined with the Geoscience Australia's Sentinel Hotspots System. FIREBIRD infrared data has "fire-magnifying-glass" capabilities in comparison to the HIMAWARI-8 and MODIS, since it provides significantly higher resolution and higher sensitivity than these commonly used satellites. The paper will also describe the development of a custom feed designed to be fitted to commercial groundstations. It is based of an offset

configuration, providing S-band capability to existing antennas allowing direct reception of the FIREBIRD downlink.