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UNDER THE BACKGROUND INFLUENCE (UTBI) EXPERIMENT ON-BOARD ISS

Abstract

UTBI (Under The Background Influence) experiment was a High Energy spectrometer based on a room temperature solid state detector which was in operation on board the International Space Station (ISS) in 2006 on the scope of the ASTROLAB mission (ESA).

The UTBI instrument is based on a COTS Semi-Insulating Cadmium Zinc Telluride (CdZnTe) detector grown by the High-Pressure Electro-Dynamic Gradient (HP-EDG) technique. The crystal volume is 15 x 15 x 7.5 mm³ and with a Co-Planar Grid (CPG) electrode configuration. The Analog Front End Electronics (AFEE) is integrated in a commercial ASIC for noise reduction purpose and designed for a large energy range (30 keV-6 MeV). The instrument electronics are designed with COST electronic components and the main characteristics are within the ESA contest maximum restrictions of 2 kg mass, 20x20x20 cm³ volume and no telemetry capability.

The UTBI experiment unit lifted off from the Baikonur Cosmodrome on September 18th, 2006 on board the Russian Soyuz TMA-9 (ISS flight 13S), to the ISS. The Soyuz spacecraft docked with the ISS on September 20th, 2006. The UTBI experiment unit was set up and switched on by the European astronaut Thomas Reiter inside the Russian "PIRS" docking module of the ISS on September 28th. The UTBI experiment unit was recording the radiation events for sixteen days until it was switched off on October 13th. The data memory cards were retrieved by the STS-116 Space Shuttle which landed on December 22nd, 2006 at Kennedy Space Center.

The calibration was performed in two phases: the first one at detector level by means of NIM instrument at developer site and a second one at instrument level prior of the delivery at ESTEC. Both calibrations were performed by means of low intensity radiation sources.

The calibration and mission data has been analysed and the results will be presented.