

INTA Contribution to MXGS Instrument for the ASIM Payload

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INTA is a partner of the Spanish consortium on the MXGS (Modular X-Ray and Gamma-Ray Sensor) Instrument, part of the ASIM (Atmospheric Space Interactions Monitor) ESA Mission to be assembled on the Columbus Module of the ISS (International Space Station).

MXGS is designed to detect Terrestrial Gamma Flashes (TGF) due to high energy phenomena in the upper atmosphere layers, which sources and physics are the mission objectives. Low and Medium energy detectors with space heritage (two detectors assemblies, one with CZT and another of BGO detectors), and a code mask at front of the instrument, provide imaging capabilities for TGF location. All instrument subsystems are mounted in the mechanical housing. A variable environment due to the ISS orbit and attitudes, with tight temperature requirements, are challenging the instrument thermal control. Mass and envelope budget are the constraints for the structural, integration, tests and verification activities.

During Phases C/D, INTA is responsible for the Product Assurance (PA) on the Spanish contribution; Assembly, Integration, Verification and Test (AIVT) activities; the Thermal Control Subsystem development; and also participates in the Scientific Program definition.

The Payloads and Instrumentation Area at INTA has developed a flexible thermal control subsystem by means of LHP (Loop Heat Pipes) and AGHP (Axial Groove Heat Pipes) in the MXGS assembly. Some conclusions from the thermal analysis are shown, together with test results of the LHP Technological Model developed during the Phase B studies, and the advantages of such kind of thermal design.

The wide experience in Product Assurance and Safety for space projects is another key contribution from INTA in this program, especially for materials, processes and parts selection.

Finally, the assembly and integration process at INTA involving several European Universities and Institutions, together with the STM (Structural Thermal Model) and PFM (Proto Flight Model) test campaigns, becomes a challenge before the planned launch in Year 2014.