LISA Pathfinder. Data Management Unit

SENER AEROSPACE & DEFENSE / SPACE / ELECTROMECHANICAL SYSTEMS / DEVICES FOR SPACE APPLICATIONS / SPAIN

LISA PATHFINDER. DATA MANAGEMENT UNIT

Cliente: European Space Agency (ESA)

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The Laser Interferometer Space Antenna (LISA) is a joint ESA/NASA mission to detect and observe gravitational waves in space and thus verify Einstein»s General Theory of Relativity.

The LISA core technologies are gravitational reference sensors, reactors that deliver micro-Newton thrust and laser interferometry. These technologies will be tested in space on the LISA Pathfinder Mission, which will comprise two instruments: the LISA Test Package (LTP) and the Disturbance Reduction System (DRS). Both of them will test the key «free-fall control» technology by means of test masses.

Sener performed the design, integration and verification of the **LTP»s Data & Diagnostics Subsystem**, which includes:

- The Data Management Unit (DMU) equipment with integrated software, tasked with:
- Controlling the interferometer»s stability.
- Acquiring the scientific data for monitoring.
- Diagnostic equipment:
- Diagnostic sensors for monitoring the LTP»s payload.
- Sensor and actuation control.

The DMU performs:

- The interface with the satellite»s on-board computer.
- The Data Processing Unit (DPU), the on-board computer that controls the LTP»s

operations.

- Power Distribution Unit (PDU), responsible for the generation and distribution of voltages.
- Data Acquisition Unit, DAU, which acquires the LTP»s environmental parameters (temperature, magnetic fields, and radiation).

CHARACTERISTICS:

- On-board computer based on a TSC695F CPU processor with 64 K x 8 bit PROM memories, 256 K x 32 bit EEPROM and 512 K x 40 bit SRAM, plus two MIL-STD-1553 interfaces and three asynchronous SBDL ports.
- Data acquisition system to take measurements on 12 temperature channels with noise better than 10 µºK/√Hz and 16 analogue channels with a noise better than 230 µV/√Hz at 1 mHz.