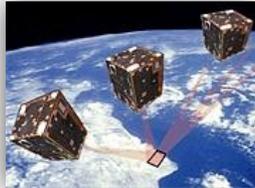




Small Instruments and Advanced Sensors



Company Overview



Systems

- Microsatellites



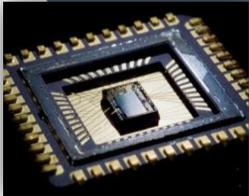
Sub-Systems

- Small instruments
- Sensors and Detectors
- Electric Propulsion (HET, FEPP)
- AOCS



Equipments

- Spacecraft Electrical Power
- Control Electronics for Complex Systems
- Spacecraft Data and Communications
- Electrical Ground Support Equipments



Microelectronic Devices

- Rad tolerant Analog, Digital and Mixed-Signal ASICs
- Digital IP Cores for Complex FPGAs

Italian Medium Enterprise with more than **200 high qualified employees** and **state-of-the-art facilities**

Strong Heritage in Design, Development, Production and Qualification of **Instruments, Electronics and Microelectronics Systems** compliant with high reliability standards.

Turn-key **Microsatellites based Solutions for Earth Observation and Science Applications and Services**, with the support of selected partners.

Quality Assurance Certifications:
EN 9100, ISO 14001, SA8000

Plants and Facilities

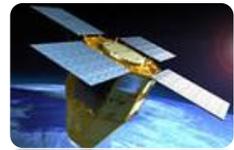
- Headquarters in Modugno (BA) – *Design, Engineering and Production*
- Premises in Pisa – *Design and low volume production*
- 10000 m² new Headquarters under construction in Bari



- Qualified production line for space activities
- Large area class ISO 8 Clean Rooms
- Automatic Assembly Line
- Anechoic Chamber
- Mechanical Test Facilities
- Thermal Chamber
- X-Ray Machine



Main Space Programs and Customers



MUSIS CSO



SENTINEL 1



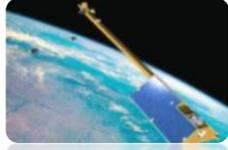
SENTINEL 3



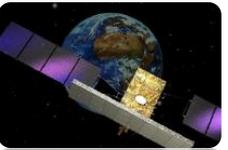
AMS01/AMS02



EarthCARE



SWARM



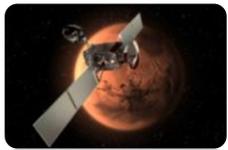
COSMO 2nd Gen



Curiosity



CALET



ExoMars



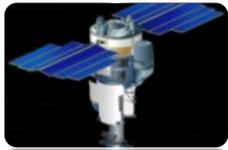
ASTRO-H



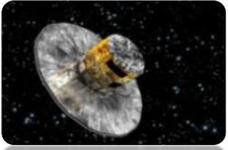
INTEGRAL



Orion MPCV



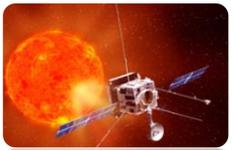
PAMELA



GAIA



ATV



Solar Orbiter



ASIM



MTG



ICESAT-2

Extensive heritage in a wide range of solutions that have been delivered to the most important Space Players in Europe and all around the world



Small Instruments and Advanced Sensors

The development of **Small Instruments for Earth Observation and Science** is a process ambitiously undertaken by SITAEL. Thanks to the unique and specialized skills of its staff, SITAEL has been involved by its customers, not only in the production of sub-equipment, but also in the **payload integration** process.



Small Instruments and Advanced Sensors

In the past SITAEL has been involved by its customers, not only in the production of sub-equipment, but also in the payload integration process. Two important cases of success are represented by **PAMELA Experiment** where SITAEL developed the entire power supply system and several data acquisition boards, taking care also of the whole payload integration and the **AMS-01/AMS-02 Experiment**, where SITAEL developed 80% of the electronics for all the AMS-02 sub-detectors (TOF, TRD, Tracker, ECAL, RICH)



SHIRA - ELISIR

Earth Observation Payload composed by Panchromatic Chamber and Hyperspectral Optical Instruments in the frequency range from infrared up to thermal infrared



SSOA - Advanced Optical Sensors

New generation advanced Silicon Photomultipliers (SiPM) modules for innovative spectroscopic analysis

SSCAM – Attitude Control Systems for Microsatellites

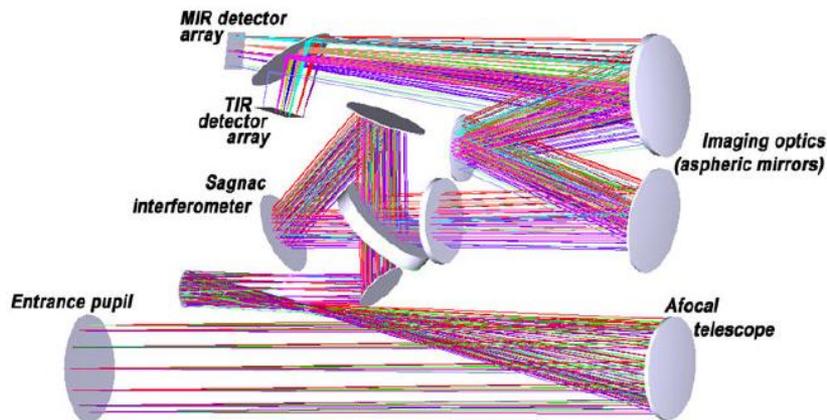
Study and Development of Sensors and Actuators for Attitude Control of Microsatellites

SHIRA - ELISIR

SITAEL is developing, in the frame of the phase 0/A/B1 study for an EO satellite called SHIRA, a high-resolution thermal infrared payload called "ELISIR".

ELISIR is a image spectrometer operating with high spectral resolution in the infrared band, in Sagnac common path triangular stationary configuration.

This interferometric configuration presents a reduced number of optical elements and has no moving parts thus offering the possibility to realize a sensor extremely compact and lightweight that requires modest absorptions the electric power.



The use of an interferometer leads the following advantages:

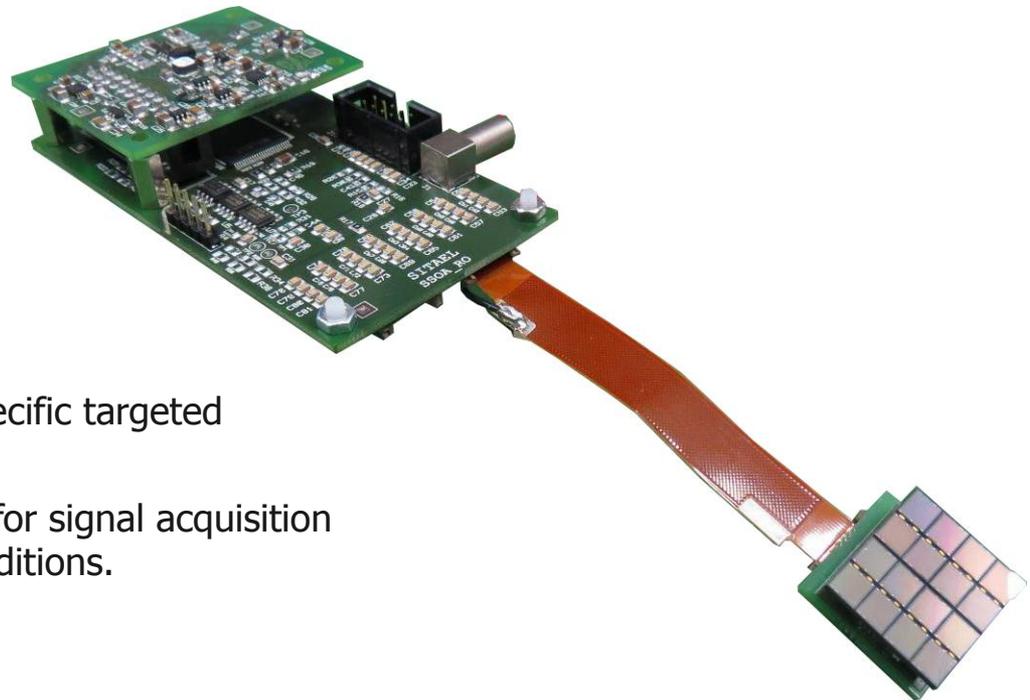
- High spectral resolution of reflectance and/or emissivity of the observed areas.
- Improved accuracy in temperature spectra and emissivity determination through the appropriate image processing and data acquisitions.
- Enhanced capabilities in the determination of atmospheric absorbers characteristics in order to correct the atmospheric effects on captured images.

SSOA - Advanced Optical Sensors

SITAEL developed a prototype of an advanced instrument based on new generation Silicon Photomultipliers (SiPM) modules for innovative spectroscopic analyses in Earth Observation remote sensing applications.

The main features are the following:

- Magnetic Field Immunity
- High sensitivity
- High frequency
- Low volume (1 cm³)
- Low power (uW)
- Sensor customization versus the specific targeted application
- Configurable integrated electronics for signal acquisition and control of sensor operating conditions.



SSCAM – Attitude Control Systems for Microsatellites

Nowadays, more and more satellite applications utilise scientific instrumentation located on low-orbit small satellites. This is increasing the request for small size satellites, with low costs for development, manufacturing and operation.

In orbit satellite orientation is a fundamental aspect of its operational functionality.

The **Attitude and Orbital Control System** is the responsible for the satellite orientation; it includes:

- the sensors to determine the satellite orientation,
- the actuators able to manoeuvre the satellites,
- the SW installed on the on-board computer (OBC)
- some external electronics including simple controlling functions able to autonomously maintain the satellite orientation if the OBC is not working in the right way.

SITAEL is involved in the **SSCAM** (Studio di Sistemi di Controllo di Assetto per Minisatelliti) project focused on study and development of component technologies for Attitude and Orbital Control System:

- **Magnetic sensors and actuators**
- **Sun-sensor**
- **Cold gas propulsion system**

In particular, the project is addressing micro-satellites with 100-150 kg of mass for low-cost missions on low Earth orbit.



***Thank you for your
attention!***



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