

**tecnobit**  
grupo oesía

**Spanish  
Aerospace  
Technology**

**Establishing our future**



## Information technology

Big Data, Cloud, Cybersecurity, Smarts Cities, Digital Health and the most advanced services in IT consultancy for leading the digital transformation of companies and administrations.

## Industrial

Cutting edge products in sectors such as Avionics, Optronics, Secure Communications, Tactical Communications, Smart Displays, Space ...



Security and Defense



Aerospace

High technology products designed and manufactured in Spain

Value chain activities

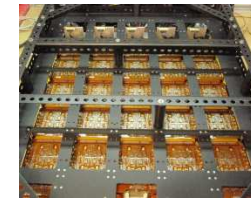


Our staff is based on **multidisciplinary teams** with deep technological knowledge that allows us to face **complex challenges**.

Examples: Displays, PRS Galileo, IRST Eurofighter

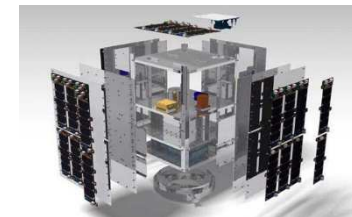
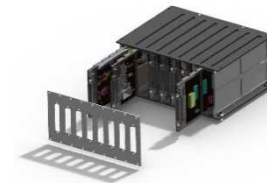
- Initial Space activities derived from decades of gathering knowledge & background in Aerospace through our several avionics products
- 2009 TECNOBIT started its space activities with a first ESA Contract: "Electronics for Airbus DRA ELSA Antenna within Hispasat AG-1 Programme"

- 2 PROCESSOR BOARDS ICUB-3FT: LEON3-FT RTAX Processor and MIL-STD-1553B Bus Interface
- 2 POWER SUPPLY UNITS
- 3 DISTRIBUTION BOARDS Based on Flexible circuitries.
- 27 Radio Frequency Control Boards
- Antenna size: Approx.. 1m x 1m

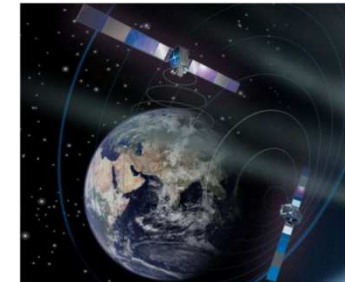


- 2012 second ESA contract: "Flight HW (6 boards) for the UPMSAT II Satellite"

- 1 PROCESSOR MODULE: OBC
- 1 POWER SUPPLY MODULE: PSU
- 1 BATTERY CHARGER MODULE: CM
- 1 ADQUISITION MODULE: DAS
- 1 POWER DISTRIBUTION UNIT: PDU
- 1 Backplane for Space app. (X-trapping)



- Today, TECNOBIT is already involved in several programmes and it is starting new space business approach which will allow company to grow in this market
- In particular, TECNOBIT has ongoing business in:
  - GOVSATCOM PRECURSOR PHASE I (SPAINSAT NG): signed as supplier for our customer Airbus Defence and Space, TECNOBIT is contributing to the preliminary architecture for the Array Antenna Electronics
  - GOVSATCOM SPAINSAT NG PHASE II: TECNOBIT is part of the industrial consortium and develop and supply the Radio Frequency Control Boards HW for the Airbus Defence and Space ELSA+ Array Antenna



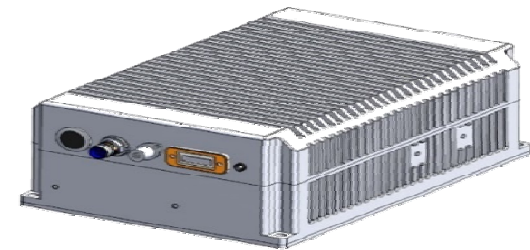
- TECNOBIT is also involved in the new approach Space 4.0 also known as “New Space Approach” which is the great upcoming challenge
  - Traditional ESA’s normative and procedures will be an alternative for space service providers. However, this will not be the only way to proceed. There are many private companies working on space technologies based on the a new approach which will allow SAT Services Providers to afford new markets demands through this new paradigm
  - TECNOBIT has signed and is now involved in a project for develop and produce new space based HW based on New Space Approach for an international customer.



- Multi-constellation GNSS Receiver Prototype
  - Galileo PRS, Galileo OS and GPS
- Objectives in the design of the Current Version:
  - Gathering of the advanced technology needed to process PRS signal
  - Obtain a functional prototype
    - Acquisition & tracking algorithms
    - Navigation Algorithms
    - Security and Cryptography PRS Standards
      - » Without physical security implemented
  - Flexible platform easily modifiable



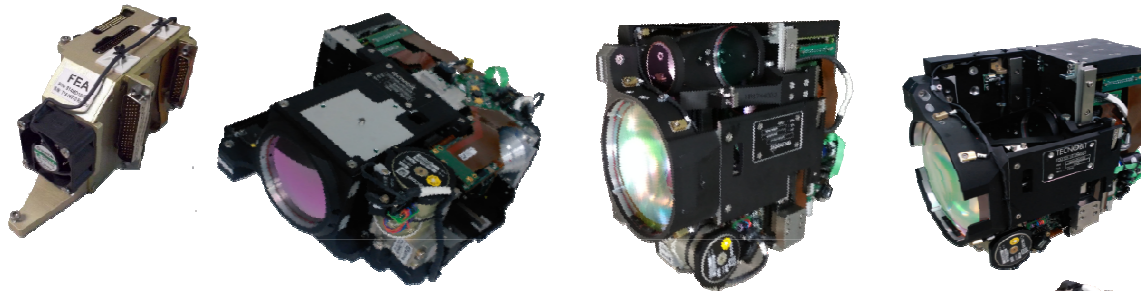
- PRESENCE is evolving into a new receiver PRESENCE2 with the following characteristics:
  - Small Form Factor to be embedded in Platforms
  - All In View Satellites
  - Advanced Acquisition & Tracking Algorithms
    - E1 & E6
    - Sideband/fullband
    - PRS FAUs
  - Implementation of all security measures included in the **CMS Protection Profile & Council Security Rules:**
    - **CCN** (Spanish NSA) participating in the Security Architectural Design
    - **Objective is** to be certified



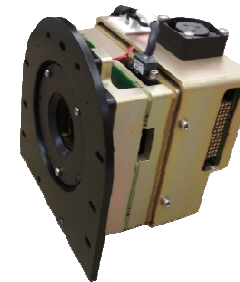
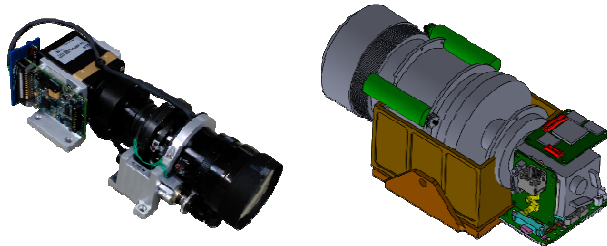
- Target Platforms:
  - 8x8 Armored vehicle
  - F110 Frigate



- Imaging
  - Cooled MWIR Detector “Engines” for OEM integrators



- Uncooled LWIR Detector “Engines” for OEM integrators
- Visible Band Camera

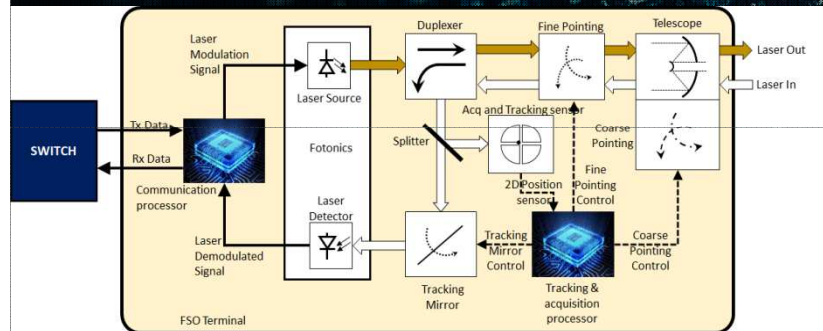


- Video, signal processing and tracking
  - IRST (Infra Red Search and Track)
  - Independently from the energy source (IR or visible) Tecnobit has developed a sophisticated high power processing electronic system able to:
    - Scan the surrounding
    - Detect features by proper segmentation and blob recognition
    - Track the selected feature among a number of them, distinguishing between several features from frame to frame
    - Highly power computing system based on state-of-the art SoC

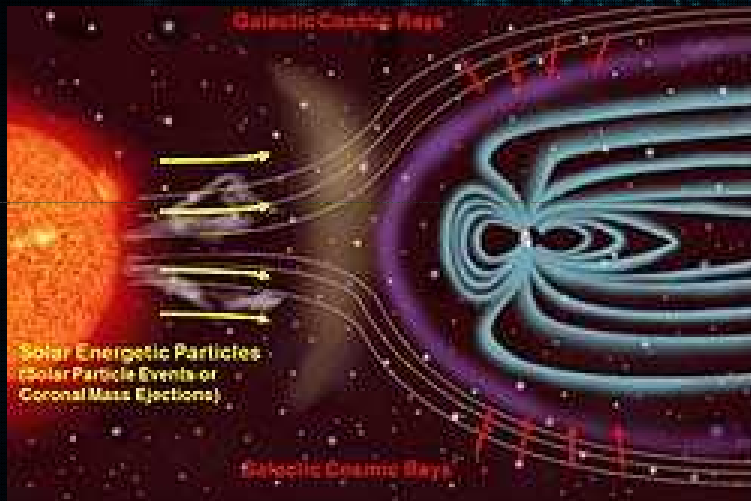




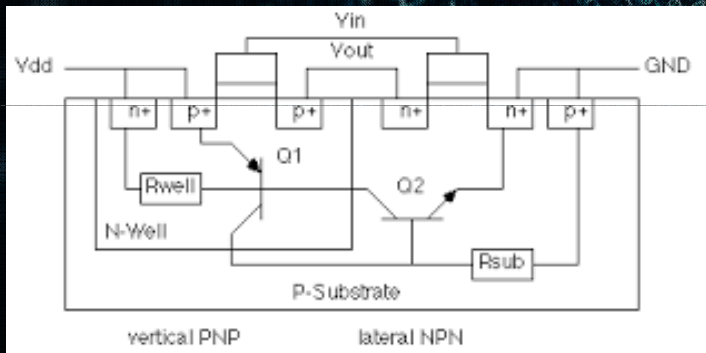
- FSO allows for a new era in global communications
  - +10Gbps to integrate 5G, IoT, Machine Learning, institutional / governmental communications, etc. worldwide
- Profit based on reduced costs
  - Strong use of COTS components in flight
  - Reduced deployment costs
    - Smallsats allow multi-satellite launches
    - Affordable replacement
- But profit bases on minimum guarantees of reliability
  - Monitor health of COTS components
  - Protect COTS components
  - Ensure availability and moderate lifetime



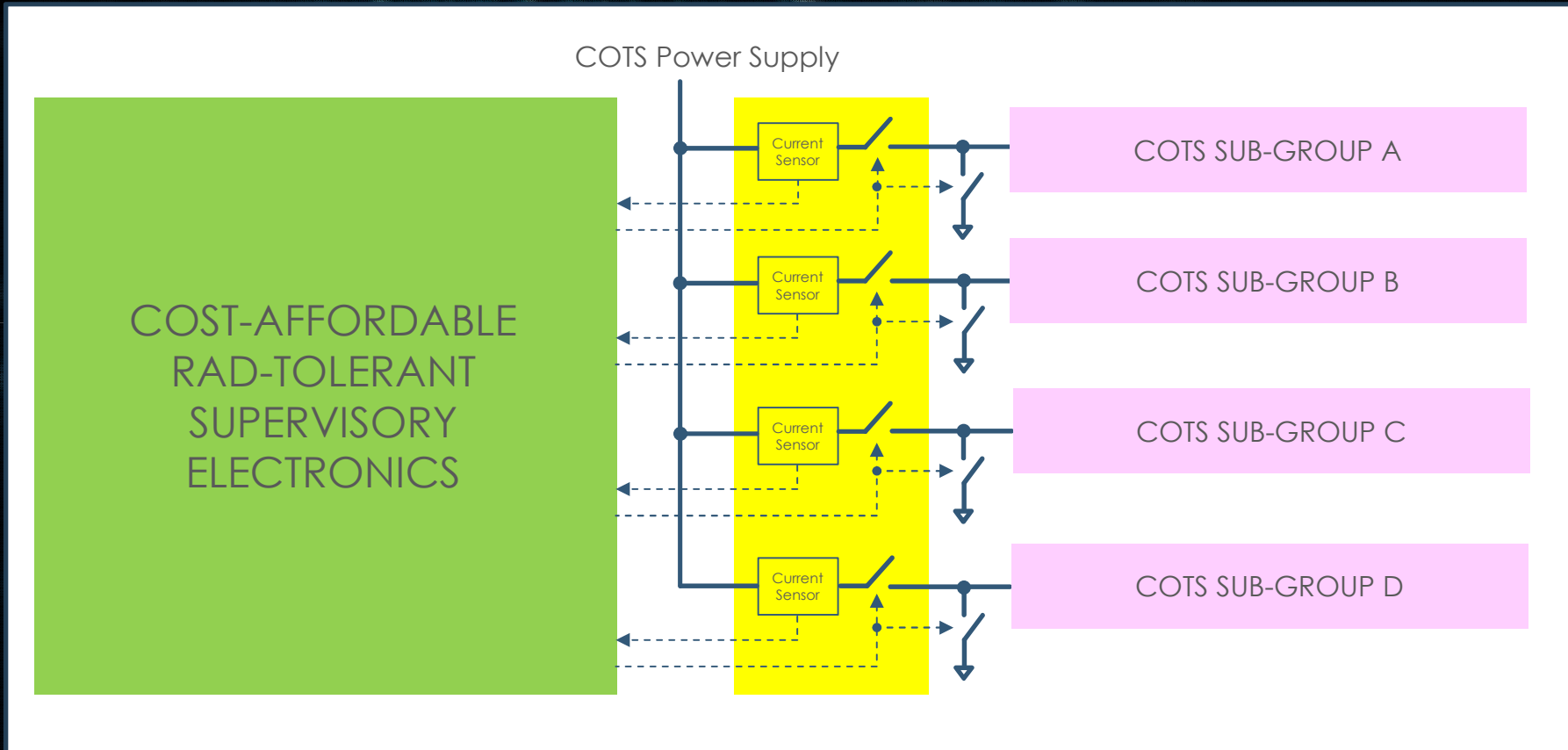
- Main electronics devoted to:
  - Manage link establishment and tracking
  - Access beam position sensors and apply servo action on optical bench mirrors and coarse pointing assembly to achieve perfect alignment
  - Access wavefront sensors and apply servo action on adaptive optics to reduce effects of atmospheric aberrations
  - Convert between optical link bitstreams and Gigabit Ethernet bitstreams (bridge)
- Supervision and protection electronics devoted to:
  - Monitor consumption of devices susceptible to latch-up
  - Rapid reaction under latch-up
  - Reporting the health status



- Space radiation may cause malfunction of COTS devices
- Total Dose (TID) is cumulated radiation producing drift of parameters of electronic devices, not necessarily causing damage
- Single Events Effects (SEE) are caused by neutrons, protons or heavy ions that may or may not cause permanent damage of COTS components
- TID can be fixed with shielding
- SEE are hardly fixable with shielding
  - Selection of components with known tolerance to the environment particle energy
  - Soft mitigation measures in case of non-damaging events
  - Hard mitigation measures in case of damaging events



- Latch-Up is the most frequently addressed SEE in protection mechanisms
- Impact of high energy particle activates a dormant switch of the CMOS structures that may cause overcurrent and eventually destruction of the IC
- Immediate reaction is needed to first disconnect the supply, and then unbias all inputs for a short period
- Supervisor must be able to disable protections to avoid nuisance reactions
- Most suited are supervisory systems able to adapt the overcurrent threshold on-the-fly



Questions?



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