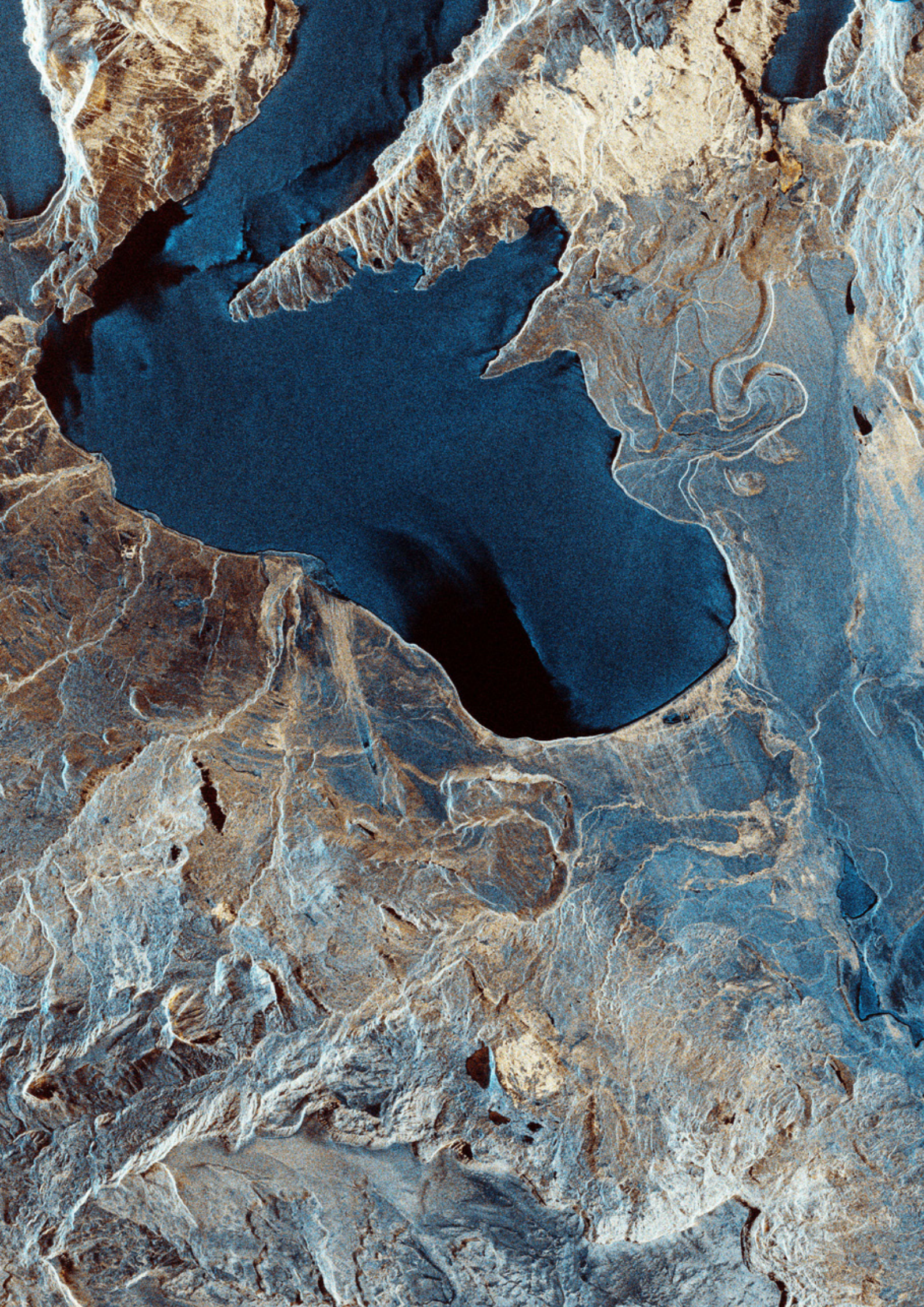

*HIGH VALUE-ADDED TECHNOLOGICAL PRODUCTS AND SERVICES*

YEAR 2025

061125



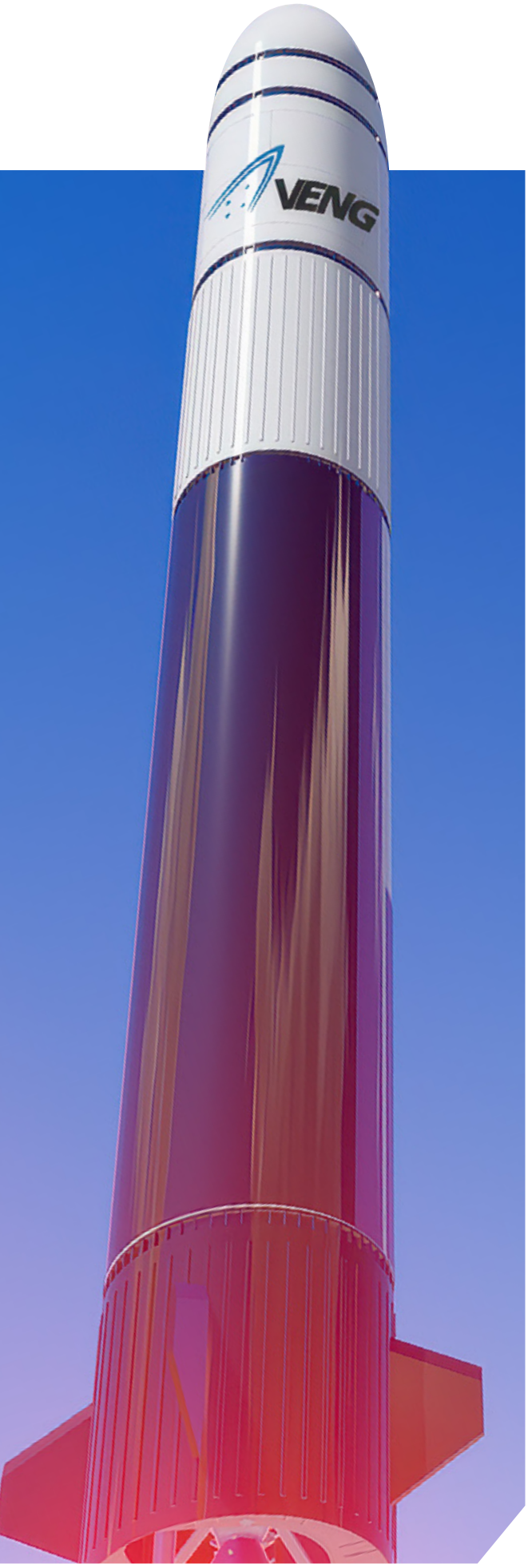
VENG's transformation towards the **New Space** paradigm represents the culmination of years of development and consolidation of capabilities in Argentina's aerospace sector. As a company, we have channeled our experience in satellite engineering, mission operations, and complex systems development to create a portfolio of products and services that embraces the fundamental principles of this new era: accessibility, efficiency, and commercialization.

VENG has developed distinctive capabilities that set us apart in the New Space ecosystem: from the design and manufacturing of high-performance microsatellites to the comprehensive operation of complex space missions. Our mastery of cutting-edge technologies such as attitude control systems, satellite signal processing, distributed architectures, and geospatial analysis platforms, combined with our experience in scientific and commercial payload integration, grants us a unique transformation potential. These consolidated technical capabilities constitute the foundation upon which we are redefining cost, time, and accessibility standards in the space sector.

This evolution positions VENG as a catalyst for the transformation of the space sector in Argentina and Latin America. We convert advanced technological developments into accessible commercial products, eliminating the traditional barriers that limited access to space capabilities.

At VENG, we believe that space should not be the exclusive domain of a few, but rather a tool for economic and social development accessible to a new generation of actors. Our transition towards **New Space** lays the groundwork for Argentina to collaborate as a regional space power, building from national talent and innovation the future of a truly spacefaring Argentina.

Roberto Oscar Yasielski
President, VENG S.A.




# INDEX

## #1 WE ARE VENG



## #2 ACCESS TO SPACE



## #3 SATELLITE PROJECTS



## #4 GROUND STATIONS

## #5 SATELLITE INFORMATION



## #6 SERVICES




VENG

# WE ARE VENG

As part of a very dynamic sector such as the aerospace ecosystem, **VENG** stands as a cornerstone of **technological advancement and space innovation in Argentina**. With over 17 years of experience, the company leads strategic initiatives—including the development of satellite launch vehicles and the operation of ground stations—contributing to the nation's growing capabilities in space access, strengthening national capabilities in space access.

Since our founding, **VENG** has been an essential player in establishing Argentina as a reference in the space sector. Our multidisciplinary team works on integrating advanced solutions aligned with the **New Space** paradigm, fostering competitiveness and international projection in the exploration and application of space technology. Through a forward-looking vision, commitment to excellence and strategic partnerships, from VENG, we continue to expand the horizons of the aerospace industry, driving scientific and technological development with global impact.

**+17**

years of experience

**+380**

staff of collaborators

**+15**

years of **ground stations** operations

**Operation of the ground station in Córdoba**

**2009 - - - - - - TODAY**

**Tierra del Fuego ground station operation and maintenance**

**2018 - - - - - - TODAY**

# ACCESS TO SPACE TRAJECTORY

**2007**

PROBE ROCKET VS-30

**2008**

TRONADOR 1B

**2011**

TRONADOR 4000

**2014**

VEX1A

VEX1B

**2017**

VEX5A

**2023**

RS-2 ENGINE

1ST FRICTION-WELDED TANK

**2024**

RS-3A ENGINE

**2025**

MT-B ENGINE

# SATELLITE MISSIONS TRAJECTORY

**2009**

**ETC**
Operation start

**2011**

**SAC / AQUARIUS**
Completed mission

**LIE**
Stage #2 complete

**2015**

**MOC SAOCOM**

**2016**

**LIE**
Stage #3 complete

**2018**

**SAOCOM 1A**
In orbit

**ETTdF**
Operation start

**2020**

**SAOCOM 1B**
In orbit

**2023**

**ON BOARD COMPUTER**

**2024**

**GENSAR**
Stage A

# OUR LOCATIONS

**TEÓFILO TABANERA SPACE CENTER**

Falda del Cañete, Córdoba

**HEADQUARTERS**

Buenos Aires City

**AUXILIARY INSTALLATION**

Villa Elisa, Buenos Aires

**GROUND STATION OF TIERRA DEL FUEGO**

Tolhuin, Tierra del Fuego

**PUNTA INDIO SPACE CENTER**

Pipinas, Buenos Aires

**MANUEL BELGRANO SPACE STATION CENTER**

Bahía Blanca, Buenos Aires

## Teófilo Tabanera Space Center

- Satellite Mission Control Center
- Ground Station operation Córdoba
- Engineering
- Metal-mechanical fabrications
- Heat treatment
- Image Processing
- Manufacturing, Integration, and Testing

## Manuel Belgrano Space Station Center

- Launching Base
- Engineering

## Ground Station of Tierra del Fuego

- Operation of ground stations

## Punta Indio Space Center

- Engineering
- Production of aerospace vessels
- Metal-mechanical fabrications
- Engine Testing

## Villa Elisa Auxiliary Installation

- Electronic engineering specialized in RF
- Electronic Laboratory

## Buenos Aires City Headquarters


- General Administration
- Engineering

# #2 // ACCESS TO SPACE

We are developing a satellite launcher to provide launch services **from Argentina to the world**, thus joining the small group of countries that master these capabilities and are part of the global expansion of commercial space activity.

# LAUNCH SERVICES

At VENG we develop and operate reliable, accurate and affordable launch solutions. Our launch vehicle, with proprietary technology and two-stage propulsion, allows efficient injection of payloads up to 150 kg into SSO orbits. With optimized infrastructure and competitive costs, we guarantee successful missions with high availability and accuracy.


## THE LAUNCHER

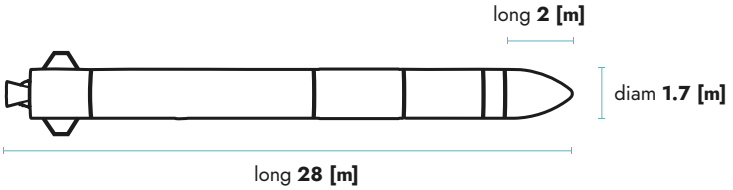
**2nd stage LOX-KER propulsion**

**Friction Stir Welded aluminum core-stage**

**CFRP upper stage**

**Proprietary propulsion systems**

- **+ 200 kg payload to 500 km SSO @ direct injection**
- **High injection and deployment accuracy**
  - Inclination < +/- 0.15°
  - Apogee < 15Km
  - Attitude < 5°
- **High availability**
  - Launcher manufacturing and operations
  - Proprietary spaceports
- **Competitive price: Target 8000 $/kg**
- **Competitive capacities**
  - Ground tracking withproprietary fixed antennas
  - Strategically locatedspaceports for efficient operations to SSO



Access to Space

# SPACEPORT SERVICES

We have the Manuel Belgrano Space Center, strategically located to guarantee safe and efficient launch operations. Our infrastructure allows direct access to SSO orbits, optimized ground tracking and a low-risk launch environment. We provide integral solutions for space missions with high standards of reliability and performance.

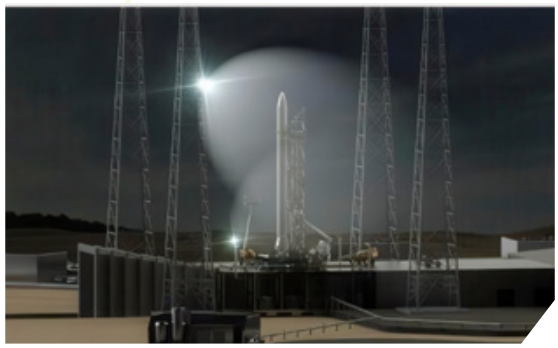

## Efficient and low-risk operations

- Direct launch to SSO
- No dogleg
- Sub-orbital flight over Argentinian sea
- Polygon security

## High availability

- Proprietary launch pad and support facilities

## Low-barriers-to-entry launch operations



**Manuel Belgrano Spaceport**
Bahía Blanca, Buenos Aires, Argentina

# PROPULSION SERVICES

Since our beginnings, one of our main areas of technological development has been the area of liquid propulsion, mainly oriented to the development of propellants for launch vehicles and also small propellants for attitude control of launchers and potential use in the satellite industry.

Regarding small thrusters, we have the heritage of having participated in the development of prototypes of the order of 1, 5 N thrust, monopropellant, at laboratory level, having verified the development capacity of this type of thrusters, being able to adapt to the needs of satellite customers and the space industry in general.

The characteristics of the prototype developed in R+D+i mode are shown below.

## MT-B ENGINE 2ND STAGE

The MT-B is a bipropellant liquid rocket engine with a single regeneratively cooled thrust chamber, powered by an open-cycle gas generator. It was developed as the propulsion system for the second stage of the Tronador TII-250 vehicle. The thrust chamber was manufactured using a combination of additive manufacturing and electroforming technologies.

**IN QUALIFICATION**

| | |
|---|---|
| **Use** | E2 of TII-250 (x1) |
| **Vacuum Thrust** | 4280 Kgf |
| **Propellant** | LOX/RP1 |
| **Specific vacuum thrust** | 366 S |
| **Feed system** | Gas generator cycle |

# LAUNCH VEHICLE ENGINES

Regarding higher thrust liquid propellants, we have an extensive experience of more than a decade in the development of Hydrazine/Nitric Acid and LOx/Kerosene engines for launcher prototypes, having as main milestones the design, manufacturing, testing and integration in the TI, T4000, VEx 1A, Vex1B and VEx5A launcher prototypes.

As a reference, the VEx5A first stage engine is shown, the largest propellant developed to date.

Today we are leading as prime contractor in the design of the thrusters for the Tronador II launcher series, taking care of the complete propulsion value cycle: from the definition of requirements, through design, simulation, manufacturing, testing, qualification and integration in the final vehicle.

This experience allows us to adapt to any propulsion solution required by the customer, both for launchers, satellites and spacecraft in general.

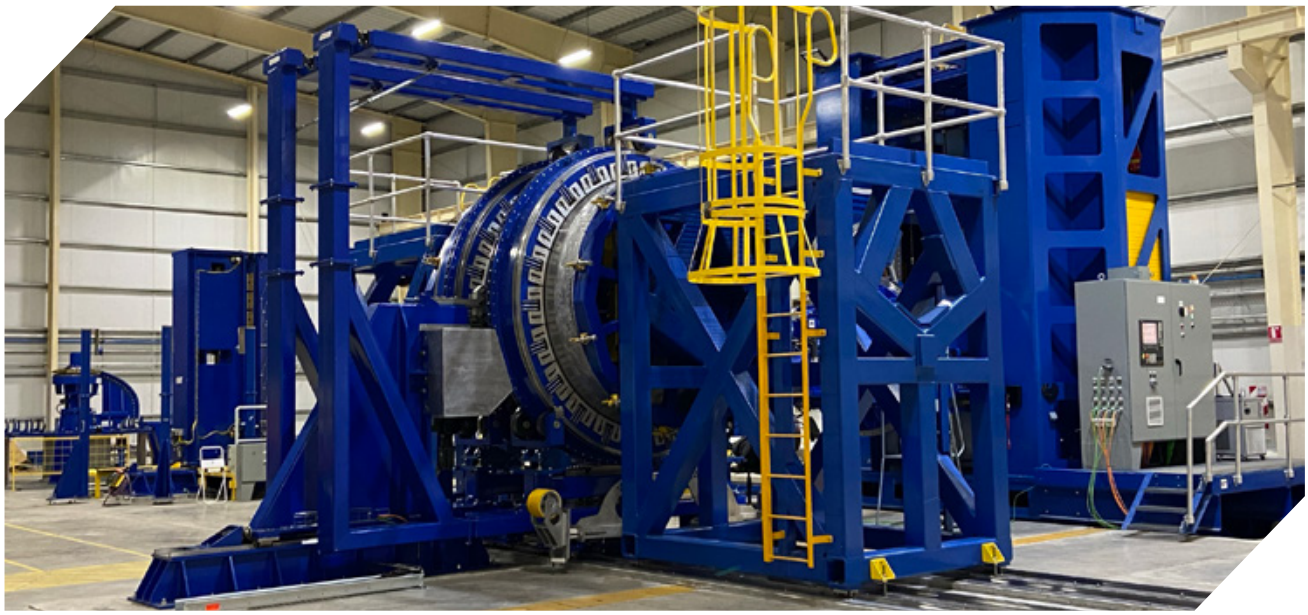
## MCA3 ENGINE 1ST STAGE IN DEVELOPMENT

| | |
|---|---|
| **Use** | E1 of TII-250 (x3) |
| **Thrust to adapted nozzle** | 35750 Kgf |
| **Propellants** | LOX/RP1 |
| **Specific impulse at SL** | 262 S |
| **Feed system** | Gas generator cycle |

## MES3K ENGINE 2ND STAGE

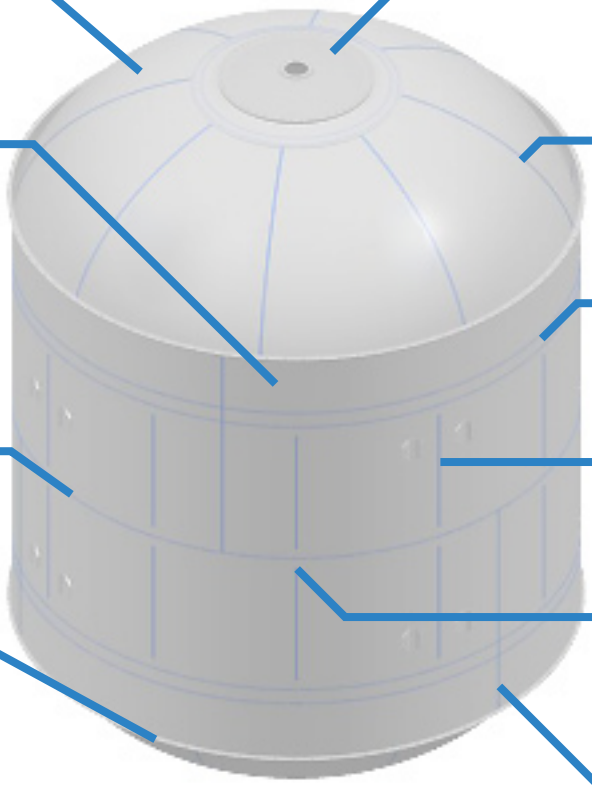
| | |
|---|---|
| **Use** | E1 of VEX1 (x1)E2 of VEX5A (x1)E2 of TII-250 (x1) |
| **Thrust at SL** | 2975 Kgf |
| **Propellants** | MMH/NTO |
| **Specific impulse at SL** | 317 S |
| **Feed system** | Pressurized |

# FRICTION STIR WELDED TANKS



We have the capability to develop pressurized and non-pressurized structures through the **Friction Stir Wielding** (FSW) manufacturing technique. As a last experience, we carried out the design, fabrication and integration of a prototype **first stage tank of the Tronador II-250 launcher**. It is 3.5 meters long, 2.5 meters in diameter and 3.2 millimeters thick and was welded by the **friction-stir welding method** under international standards of the American Welding Society, a technology of unprecedented use in the country. All its components are made of 2219 aluminum for space use. These tanks will simultaneously serve as **fuselage and propellant storage tanks**.

| | |
|---|---|
| **MANUFACTURER** | Nova Tech Engineering Inc. |
| **GEOMETRY** | Longitudinal, Orbital,dome weldings |
| **WELDING JOINTS** | Butt, Lap |
| **MATERIALS** | Aluminum Alloys, others.. |
| **THICKNESS** | 2,4 – 13 mm (Aluminum Alloy) |
| **WELDING LENGTH** | 2600 mm (max) |
| **TOOL RPM** | 5 rpm – 2000 rpm |
| **MAXIMUM FORCE** | 53400 N |
| **MAXIMUM TORQUE** | 450 Nm |



**Cap**
Tank closure element

**Tank Flap**
Extension of the shell that allows attachment to other primary structures

**Wrap**
Cylindrical tank section

**Interface**

**Circumferential Flange**
Dome Welding

**Meridional Welding Segments**

**Circumferential Weld**
Cap/Wrap

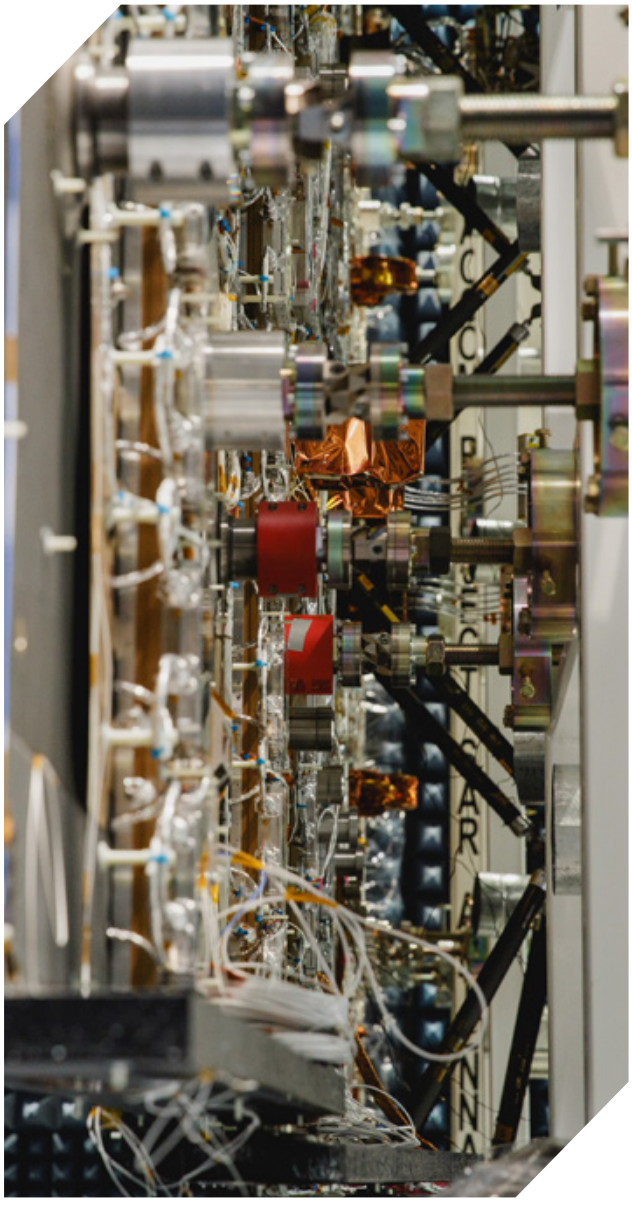
**Longitudinal weld**
Beams/Wrapping

**Circumferential Weld**
Wrap/Wrap

**Longitudinal Weld**
Wrapped/Wrapped


# #3 // SATELLITE PROJECTS

We are specialists in remote sensing through SAR radar instruments. We have the capability to develop, integrate, test and qualify complex satellite subsystems and systems within the most demanding space industry standards. When it comes to satellite missions we can work autonomously with satellites up to 250kg mass, and together with our network of partners we can push the limits of our capabilities.



## OUR HISTORY IN DEVELOPMENT, INTEGRATION AND TESTING FOR THE SATELLITE INDUSTRY

- Technological Demonstrated "TDP" SAC-D Mission, under INVAP and NASA requirements
- D-OBC satellite payload computer
- Ad-hoc antennas for SAOCOM and SABIA-Mar satellite missions
- Various flight and ground electronics subsystems for SAOCOM, SABIA-Mar and other earth observation and communications satellite missions
- **Current development** of new small-SAR constellations, focusing on hi-resolution monitoring and interferometric capabilities.

# FOCUS

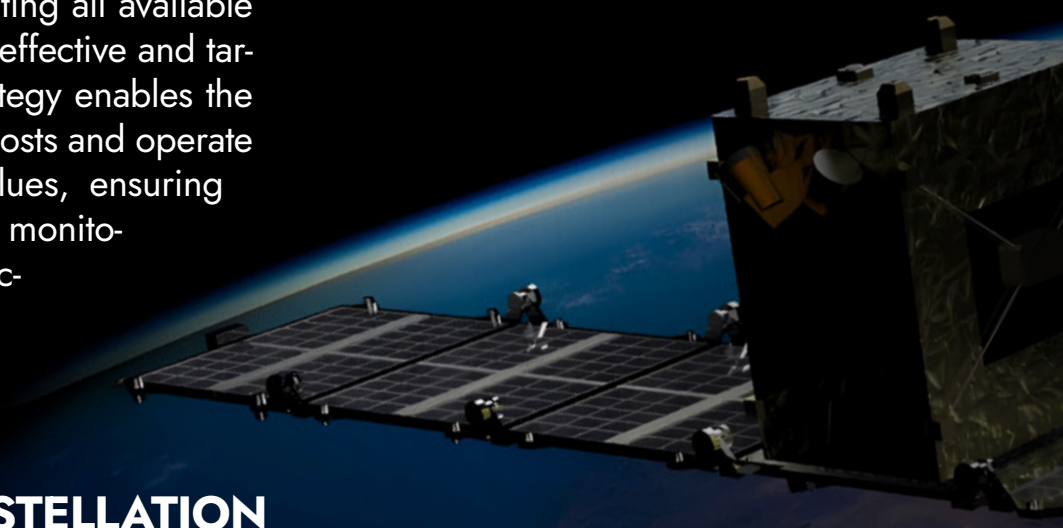
**HIGH-RES INSAR IMAGERY AT LOW COST**

VENG XSAM UNSAM

We develop **FOCUS**, an **advanced X-Band SAR satellite constellation** designed for interferometric analysis. **FOCUS** redefines infrastructure monitoring with a **scalable satellite system**, **millimetric precision, and AI-powered analytics**—ensuring **proactive decision-making** at **disruptive pricing**.

## WHY FOCUS?

The system is named FOCUS to reflect its philosophy of concentrating all available resources on deliver an effective and targeted solution. This strategy enables the constellation to reduce costs and operate at disruptive market values, ensuring precise and accessible monitoring of critical infrastructures worldwide.



## SCALABLE CONSTELLATION

The constellation's size will adjust according to global image demand, enabling efficient scaling and resource optimization to meet market needs.

## SUBSCRIPTION PLAN

The FOCUS system operates on a subscription model, ensuring predictable costs, scalability, and control. This approach enables users to access critical data with minimal entry barriers and complete transparency.

## PRICING

**Disruptive market pricing** through optimization across all key areas.

Leveraging low-cost, COTS (commercial off-the-shelf components), **agile engineering practices, and onboard pre-processing**.

**Streamlining operations** to significantly reduce production and operational costs while delivering **high-quality solutions** at a fraction of traditional prices.

# TECHNICAL FEATURES

| | |
|---|---|
| Satellite weight | **150 kg** |
| X-Band (9.65 GHz) | |
| Orbit altitude | **526 km** |
| Spotlight mode | |
| Incidence angle | **25-36°** |
| Slant range resolution | **0.5-1 m** |
| Slant azimuth resolution | **<1 m** |
| Ground range resolution | **0.8-1.3 m** |
| Optimized capture | **5 x 5 km** |

## Application infrastructure

- Designed for critical infrastructure monitoring.
- Enables early detection of even the smallest changes.
- Supports automated, continuous predictive maintenance.
- Reduces economic, human, environmental, and cultural heritage losses.
- Provides precise data for insurance evaluation and risk mitigation.

## Intuitive and accessible interfaces

The FOCUS system features a user-friendly interface that enables any user—even without technical expertise—to effortlessly access accurate data, interpret alerts, and generate reports, enhancing agile decision-making and proactive risk management.

## Onboard processing

- Optimizes resource usage and reduces costs
- Filters and processes data before transmission
- Minimizes the load on ground systems
- Ensures efficient information management

## X-Band Sar Interferometry Millimetric resolution

- Global coverage for early detection of tectonic shifts, infrastructure degradation, and landslides.
- Reliable under adverse weather.
- Maximum resolution.
- Detects changes at the millimetric level through phase comparison.
- Corrects systematic errors and atmospheric disturbances.
- Optimized for structural and tectonic monitoring.

## Artificial intelligence

- Optimizes constellation scheduling and global target surveys.
- Enhances radar data processing.
- Accelerates data analysis and report generation.
- Improves real-time decision-making while reducing costs.

## BACKING

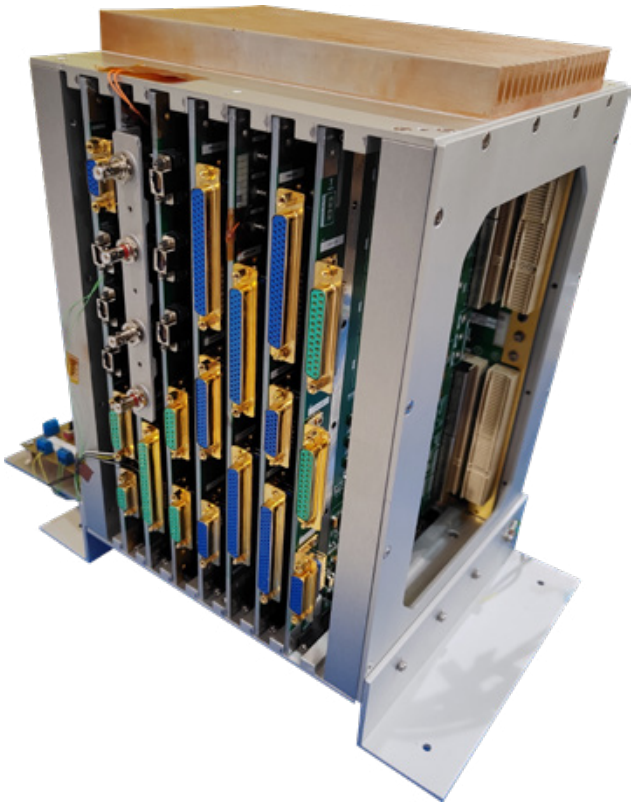
**XSAM** and **VENG** form a strategic alliance, blending technical and commercial expertise for a scalable New Space solution.

Endorsed by **Universidad de San Martín**'s P-ranked incubation program (SCImago).

Incubated at **54LAB**, an innovation hub **backed by the Buenos Aires City Government**.

# ON BOARD COMPUTER

The On Board Computer (OBC), developed jointly by CONAE and VENG, is a complex electronic unit, developed to manage satellite mission instruments, with data transfer rates up to 100 Mbps, in addition to providing general interfaces bi-level RS -422, analog channels for voltages and temperatures acquisition (internal and external housekeeping information) and capacity to command up to 24 heaters, through opto-coupled outputs.



It has a power module, a Single Board Computer module based on the UT699 LEON3-FT 32-bit processor and 6 additional functional modules, all linked through the cPCI 2.2 standard through the use of a Backplane. It also has an additional slot, designed to adapt to the needs of different missions/projects.

# MECHANICAL AND OPERATIONAL FEATURES

| | OBC WITHOUT REDUNDANCY (7 FUNCTIONAL MODULES) | OBC WITH REDUNDANCY COLD STANDBY (14 FUNCTIONAL MODULES) |
|---|---|---|
| **DIMENSION** | 21x27x27 [cm] | 39x27x27 [cm] |
| **MASS** | 7,5 [Kg] | 21 [Kg] |
| **VOLTAGE** | 21-36 [V] | 21-36 [V] |
| **CONSUMPTION** | Rated consumption: 30[W]<br>Maximum consumption: 40[W] | Rated consumption: 30[W]<br>Max.consumption: 40[W] |
| **OPERATION TEMPERATURE** | -10 °C to +40°C | -10 °C to +40°C |
| **LIFE TIME** | 5 years | 5 years |

# COMPONENTS

## POWERBOX

Consists of 2 DC-DC converters that provide 4 regulated secondary voltages (+3.3, +5, +12 and -12V) that the equipment needs from an unregulated primary input supply (redundant or not) that it can vary between 21 and 36 V. It also implements configurable capabilities according to the needs of the specific application:

- Isolation of secondary-primary returns
- Limitation of the in-rush current
- Delay so that not all secondary voltages appear simultaneously
- Configuration as essential load (always powered regardless of which of the primary power lines is active) or not

## INSTRUMENT ACQUISITION

Has the capacity to acquire data generated by up to 4 instruments simultaneously through dedicated LVDS interfaces. The total acquisition speed for the 4 channels simultaneously is up to 200 Mbps.

CCSDS Packets "time-tagging" capability, with an uncertainty of less than 20 [µs]. In addition, this module has 3 Spacewire interfaces for transfer of acquired data at 100 Mbps. This transfer is carried out following the ECSS-E-ST-70-41-C (CCSDS Space Packet Protocol) standard.

## COMMUNICATION

Has 1 MIL-STD-1553 Interface as a Remote Unit (designed for the exchange of telemetry and telecommand), with 1 MIL-STD-1553 Interface as Bus Controller (designed to command other equipment or instruments) and 9 full-duplex UART/RS-422 serial interface ports.

## GENERAL PURPOSE INPUT/OUTPUT

This module has 30 bi-level RS-422 input lines, 22 bi-level RS-422 output lines and 10 open-collector output lines.

## TEMPERATURE CONTROL

Has the capacity to command up to 24 action channels of 1[A] heaters. Each of these outputs is opto-coupled to maintain separation between the primary and secondary return.

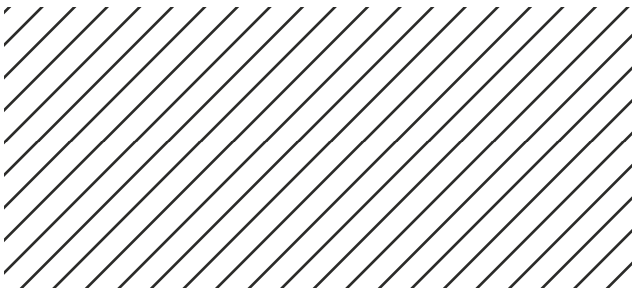
## SINGLE BOARD COMPUTER

Is the main module where processing, management and control activities are carried out. This module has the following blocks:

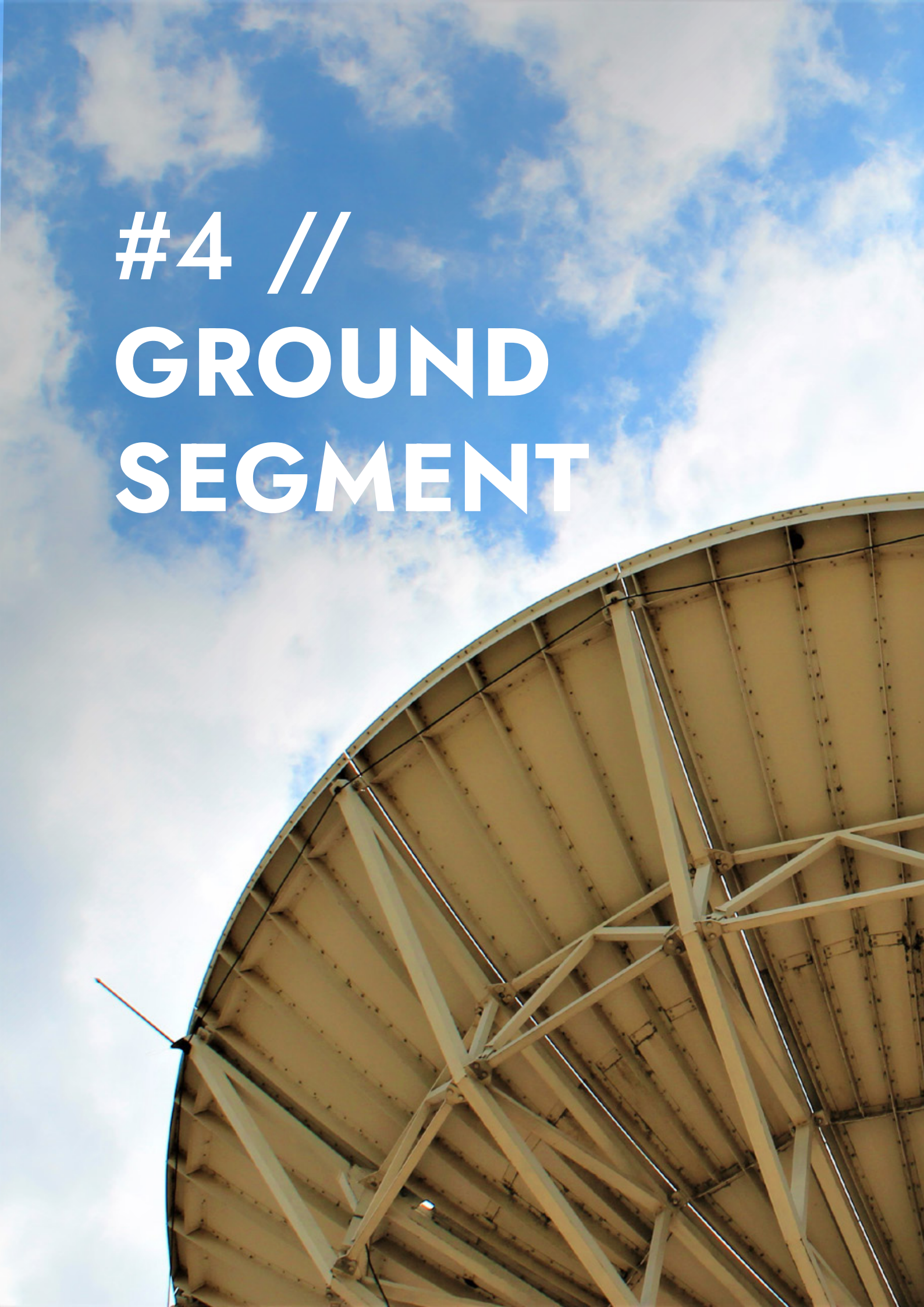
- UT699 LEON3-FT 32-bit processor
- RTEMS 4.10
- 2 redundant bootloader EEPROM memory banks
- 3 redundant banks of Program Flash Memory
- FGPA for the implementation of the interface via cPCI with the other 6 modules
- 3 Spacewire Interfaces
- 2 UART/RS-422 interfaces
- 2 RS-422 inputs for receiving synchronization pulses (PPS-in)
- 6 RS-422 outputs for synchronization pulse distribution (PPS-out)
- Watchdog provided by the capabilities of the UT699

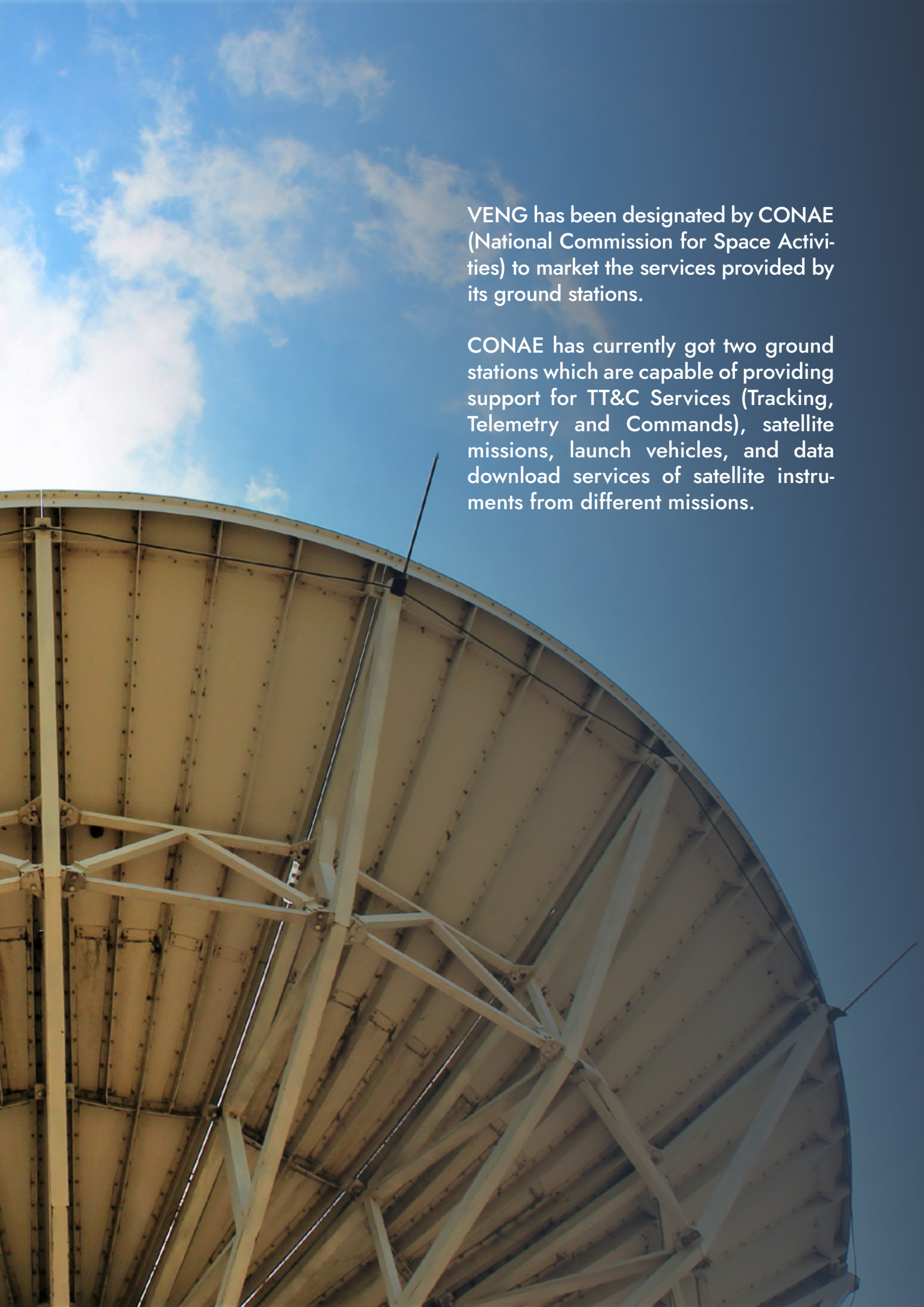
## TEMPERATURE ACQUISITION

Can acquire up to 96 temperature channels with a resolution of 12 bits grouped into 72 external and 24 internal temperature channels (3 channels for the OBC, 7 for calibration and 14 reserved for the expansion slot).



# #4 // GROUND SEGMENT





VENG has been designated by CONAE (National Commission for Space Activities) to market the services provided by its ground stations.

CONAE has currently got two ground stations which are capable of providing support for TT&C Services (Tracking, Telemetry and Commands), satellite missions, launch vehicles, and data download services of satellite instruments from different missions.

# SAOCOM MISSION CONTROL CENTER OPERATION

Welcome to the operational epicenter of the SAOCOM constellation. Since the launch of SAOCOM 1A in 2018, we lead the Mission Center with a specialized focus on Semi-Automated Operations, critical satellite maneuvers and maintenance. Our dedication translates into 24/7 uninterrupted attention and monitoring, backed by a highly available and redundant datacenter.

**34**
daily revisit passes

**SEMI AUTOMATED**
operation of processes

**24/7**
support and monitoring for operating platforms

**+1000**
products generated and published automatically per day

**CRITICAL OPERATION**
of maneuvers and maintenance tasks on satellites

**HIGH AVAILABILITY**
and redundancy data center

We are the vital connection between space and earth, facilitating efficient and reliable operation of the SAOCOM constellation. In every critical maneuver, maintenance and data generation, we are committed to excellence, driving the positive impact of space technology on everyday life and scientific advances.

We have specialized professionals who ensure the accurate execution of more than 1000 satellite scenes generated and published automatically on a daily basis. This capability not only demonstrates our expertise, but also our essential contribution to the field, providing crucial data for various applications.

# GROUND STATIONS

Since 2009 we have participated in the operations of CONAE's ground stations.

Due to the central location of the Cordoba Ground Station with respect to the country's territory, it is possible to regularly acquire satellite data from all of Argentina, Chile, Bolivia, Paraguay and Uruguay and a very important area of Peru and Brazil.

The Tierra del Fuego Earth Station is the southernmost in the continent with TT&C and data download capabilities.

## STRATEGICALLY LOCATED IN THE SOUTHERN HEMISPHERE

### CORDOBA

Latitude: 31° 31′ 29,9501″S (-31,524986)
Longitude: 64° 27′ 45,8611″W (-64,462739)
Altitude: 730 m

### TIERRA DEL FUEGO

Latitude: 54° 30′ 37.6151″S (-54.510448)
Longitude: 67° 06′ 56.0343″W (-67.115565)
Altitude: 146 m146

### ANTARCTICA

COMING SOON

## CORDOBA GROUND STATION

The Cordoba Earth Station (ETC) is located at the Teofilo Tabanera Space Center (CETT) and carries out the activities of reception, processing, publication and storage of satellite information generated by different Earth observation satellites.

**Antenna dimensions**
3.6; 5.4 (mobile); 7.3 and 13.5 m

**Services**
- TT&C in S-Band
- X-Band data download

## TIERRA DEL FUEGO GROUND STATION

The Tierra del Fuego Earth Station is located near the town of Tolhuin and is equipped with two parabolic reflector satellite antenna systems.

**Antenna dimensions**
7.3 and 13.5 meters

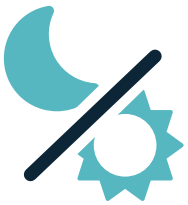
**Services**
- TT&C in S-Band
- X-Band and Ka-Band data downloads

# GROUND SEGMENT SERVICES

**Fully automatic.** Transfer from one satellite to another in **30 seconds**. Product catalog available **one hour** after satellite pass. Over **100 gigabytes** of data downloaded per day.

**HIGH POWER AVAILABLE**

**HIGH AVAILABILITY OF CONNECTIVITY**



**7X24 SERVICE ALL YEAR ROUND**

## FEATURES OF OUR SERVICES

**SITES PREPARED FOR GROUND STATIONS**

**SAFE AREAS**

**ON-SITE TECHNICAL SUPPORT**

**BACKED-UP ELECTRICAL SYSTEM**

**HIGH SPEED INTERNET**

# GROUND STATION ENGINEERING

Engineering for the development of ground segment infrastructure. Development of specific software for mission control centers and Ground Stations.

**KNOW HOW**

**INTERNET SERVICE**

**SERVERS**

**MAINTENANCE**

# ANTENNA SPECS


| | S-BAND | S-BAND |
|---|---|---|
| **Location** | Cordoba | Cordoba |
| **Dish Diameter** | 3,6m | 5,4m |
| **Brand** | Scientific Atlanta | ViaSat |
| **Tx Frequency Range** | 2025 MHz to 2120 MHz | 2025 MHz to 2120 MHz |
| **Rx Frequency Range** | 2200 MHz to 2300 MHz | 2200 MHz to 2300 MHz |
| **Antenna Gain** | 35,36 dBi | 37,4 dBi |
| **G/T** | 12,43 dB/°K min | 16,0 dB/°K a RHCP |
| **Tx Polarization** | Lineal | RHCP/LHCP selectable |
| **Rx Polarization** | RHCP/LHCP simultaneous | RHCP/LHCP simultaneous |
| **Tx Power** | 2W to 200W selectable | 2W to 200W selectable |
| **EIRP** | 54,5 dBW @ 200W | 58 dBW @ 200W |
| **Beamwidth** | 2,7° Nominal | 0,82° Nominal |

| | X-BAND | X-BAND |
|---|---|---|
| **Rx Frequency Range** | 8025 MHz to 8400 MHz | 8025 MHz to 8400 MHz |
| **Antenna Gain** | 46 dBi | 51,8 dBi |
| **G/T** | 25,68 dB/°K | 31 dB/°K |
| **Rx Polarization** | RHCP | RHCP/LHCP simultaneous |
| **Beamwidth** | 0,7° Nominal | 0,4° Nominal |

| | S-BAND | S-BAND |
|---|---|---|
| **Location** | Cordoba | Cordoba |
| **Dish Diameter** | 7,3m | 13m |
| **Brand** | Datron | Datron |
| **Tx Frequency Range** | 2025 MHz to 2120 MHz | 2025 MHz to 2120 MHz |
| **Rx Frequency Range** | 2200 MHz to 2400 MHz | 2200 MHz to 2400 MHz |
| **Antenna Gain** | 41,05 dBi | 45 dBi |
| **G/T** | 18,94 dB/°K | 24 dB/°K |
| **Tx Polarization** | RHCP/LHCP selectable | RHCP/LHCP selectable |
| **Rx Polarization** | RHCP/LHCP simultaneous | RHCP/LHCP simultaneous |
| **Tx Power** | 3,2W a 100W selectable | 2W a 200W selectable |
| **EIRP** | 58,9 dBW to 100W | 62 dBW to 200W |
| **Beamwidth** | 1,3° Nominal | 0,8° Nominal |

| | X-BAND | X-BAND |
|---|---|---|
| **Rx Frequency Range** | 8025 MHz to 8400 MHz | 8025 MHz to 8400 MHz |
| **Antenna Gain** | 54,5 dBi | 59,3 dBi |
| **G/T** | 30,87 dB/°K | 37,5 dB/°K |
| **Rx Polarization** | RHCP/LHCP selectable | RHCP/LHCP selectable |
| **Beamwidth** | 0,3° Nominal | 0,19° Nominal |

## S-BAND

| | |
|---|---|
| **Location** | Tierra del Fuego |
| **Dish Diameter** | 7,3m |
| **Brand** | ViaSat |
| **Tx Frequency Range** | 2025 MHz to 2120 MHz |
| **Rx Frequency Range** | 2200 MHz to 2400 MHz |
| **Antenna Gain** | 41 dBi |
| **G/T** | 18,91 dB/°K |
| **Tx Polarization** | RHCP/LHCP selectable |
| **Rx Polarization** | RHCP/LHCP simultaneous |
| **Tx Power** | 3,2W to 200W selectable |
| **EIRP** | 58 dBW @ 200W |
| **Beamwidth** | 1,2° Nominal |

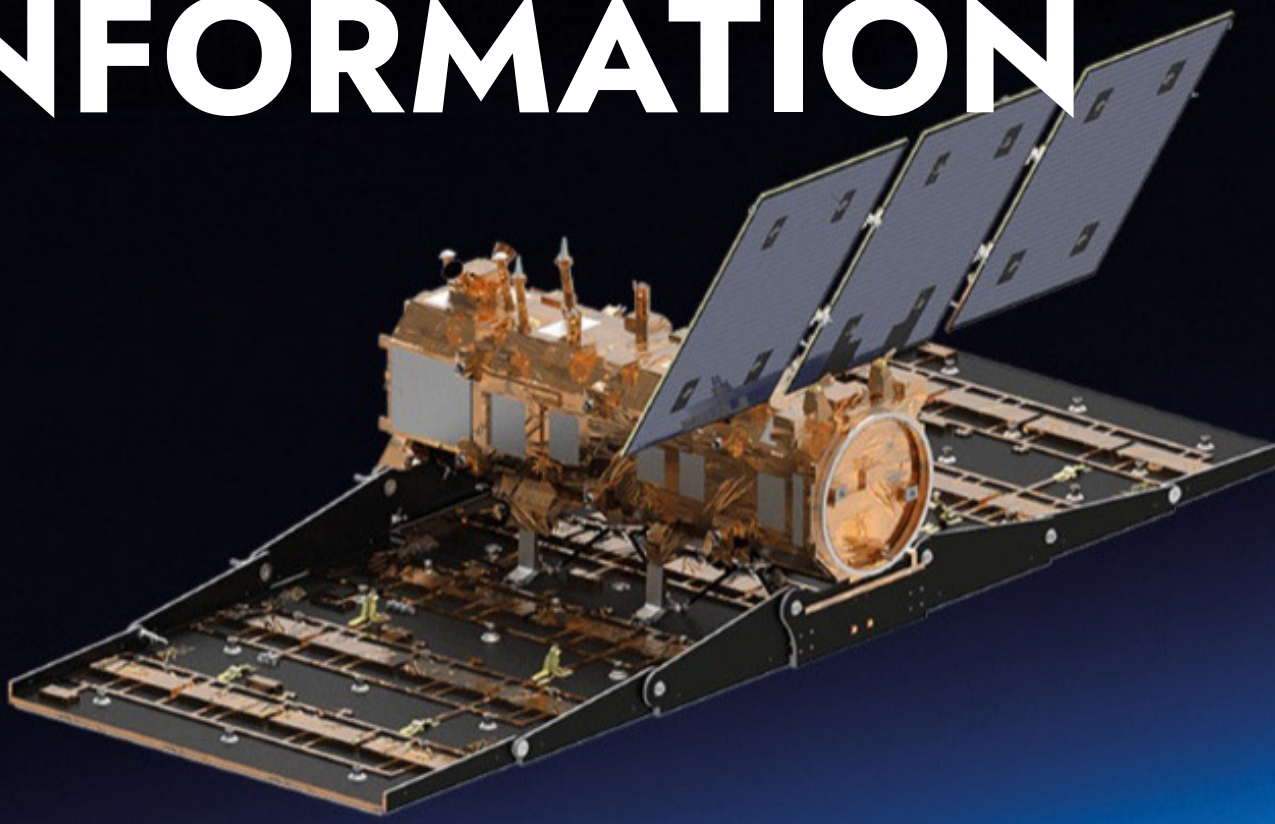
| | KA-BAND | X-BAND |
|---|---|---|
| **Rx Frequency Range** | 25.5 GHz to 27 GHz | 8000 MHz to 8500 MHz |
| **Antenna Gain** | 59,8 dBi | 53.7 dBi |
| **G/T** | 36,77 dB/°K | 32.5 dB/°K |
| **Rx Polarization** | RHCP/LHCP simultaneous | RHCP/LHCP simultaneous |
| **Beamwidth** | 0,1° nominal | 0,3° nominal |

COMING SOON

| | S-BAND | S-BAND |
|---|---|---|
| **Location** | Tierra del Fuego | Antarctica |
| **Dish Diameter** | 13,56m | 6,1m |
| **Brand** | ViaSat | ViaSat |
| **Tx Frequency Range** | 2025 MHz to 2120 MHz | 2025 MHz to 2120 MHz |
| **Rx Frequency Range** | 2200 MHz to 2300 MHz | 2200 MHz to 2300 MHz |
| **Antenna Gain** | 45 dBi | 41,7 dBi |
| **G/T** | 24,56 dB/K° | 18,3 dB/°K |
| **Tx Polarization** | RHCP/LHCP selectable | RHCP/LHCP selectable |
| **Rx Polarization** | RHCP/LHCP simultaneous | RHCP/LHCP simultaneous |
| **Tx Power** | 2W to 660W selectable | 2W a 200W selectable |
| **EIRP** | 69,2 dBW @ 660W | 58,1dBW @ 200W |
| **Beamwidth** | 0,71° Nominal | 1,6° @ 2,2 GHz |

| | X-BAND | X-BAND |
|---|---|---|
| **Rx Frequency Range** | 8025 MHz to 8400 MHz | 7800 MHz to 8500 MHz |
| **Antenna Gain** | 59,5 dBi | 52,5 dBi |
| **G/T** | 38,16 dB/°K | 30,66 dB/°K |
| **Rx Polarization** | RHCP/LHCP simultaneous | RHCP/LHCP selectable |
| **Beamwidth** | 0,18° Nominal | 0,38° Nominal |

# #5 //
# SATELLITE INFORMATION



We provide products and services of the highest technology using information from the **SAOCOM® satellite constellation** (L-band quadruple polarization synthetic aperture radar).

We provide solutions to governments and industries such as Mining, Oil & Gas, Agriculture, among others, **favoring management based on risk assessment and decision making**.

We offer high availability services **focused 100% on customer needs**, accelerating the process of early adoption for incorporation into business models.

# L-BAND SAR TECHNOLOGY

**SAOCOM®** is a constellation that consists of two quadruple polarization L-band SAR satellites which observe the Earth's surface night and day, regardless of weather conditions.

By working in L Band, the satellites can obtain information by **penetrating the vegetation cover and soil, thus capturing moisture information**. Other applications include ship detection, soil moisture mapping, change detection for the Mining and Oil & Gas industries, and forecasting for wheat spike fusarium, among many others.

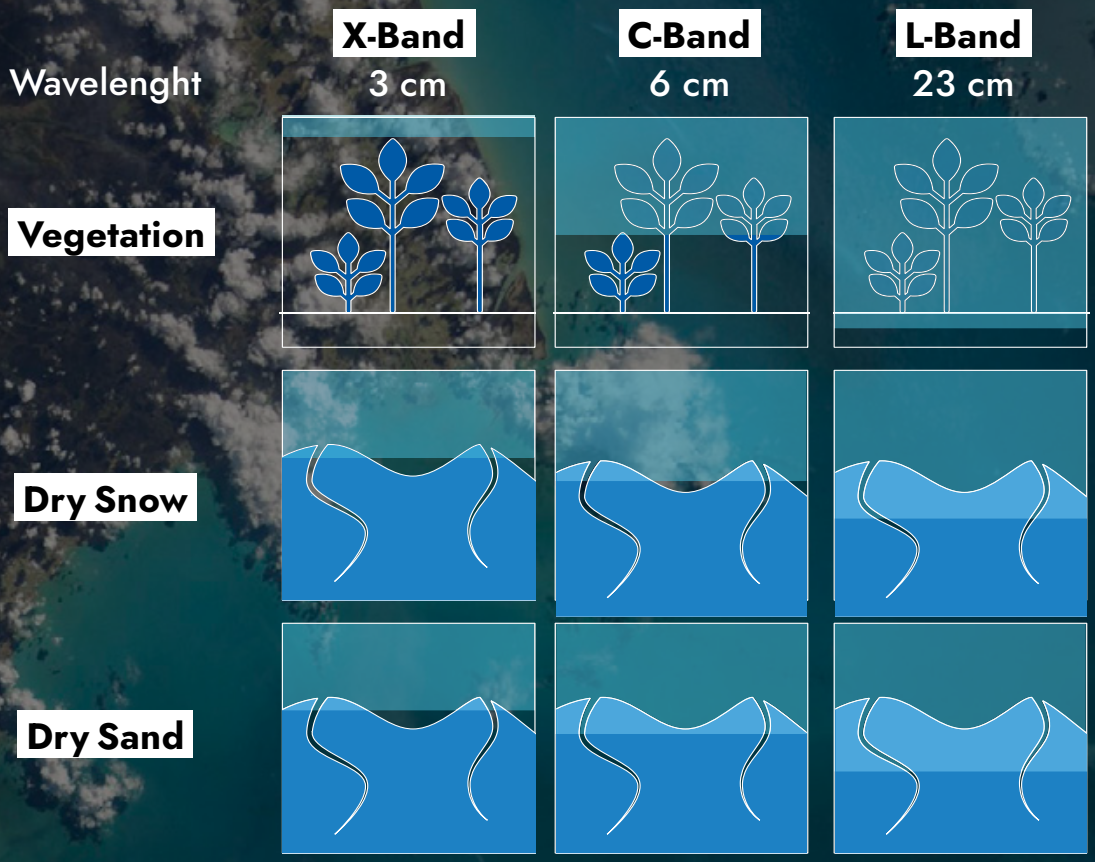
**REVISIT TIME**
8 days (1A + 1B)

**BEST RESOLUTION**
10 mts

**QUAD POLARIZATION STRIPMAP**
40 x 74 km ≈

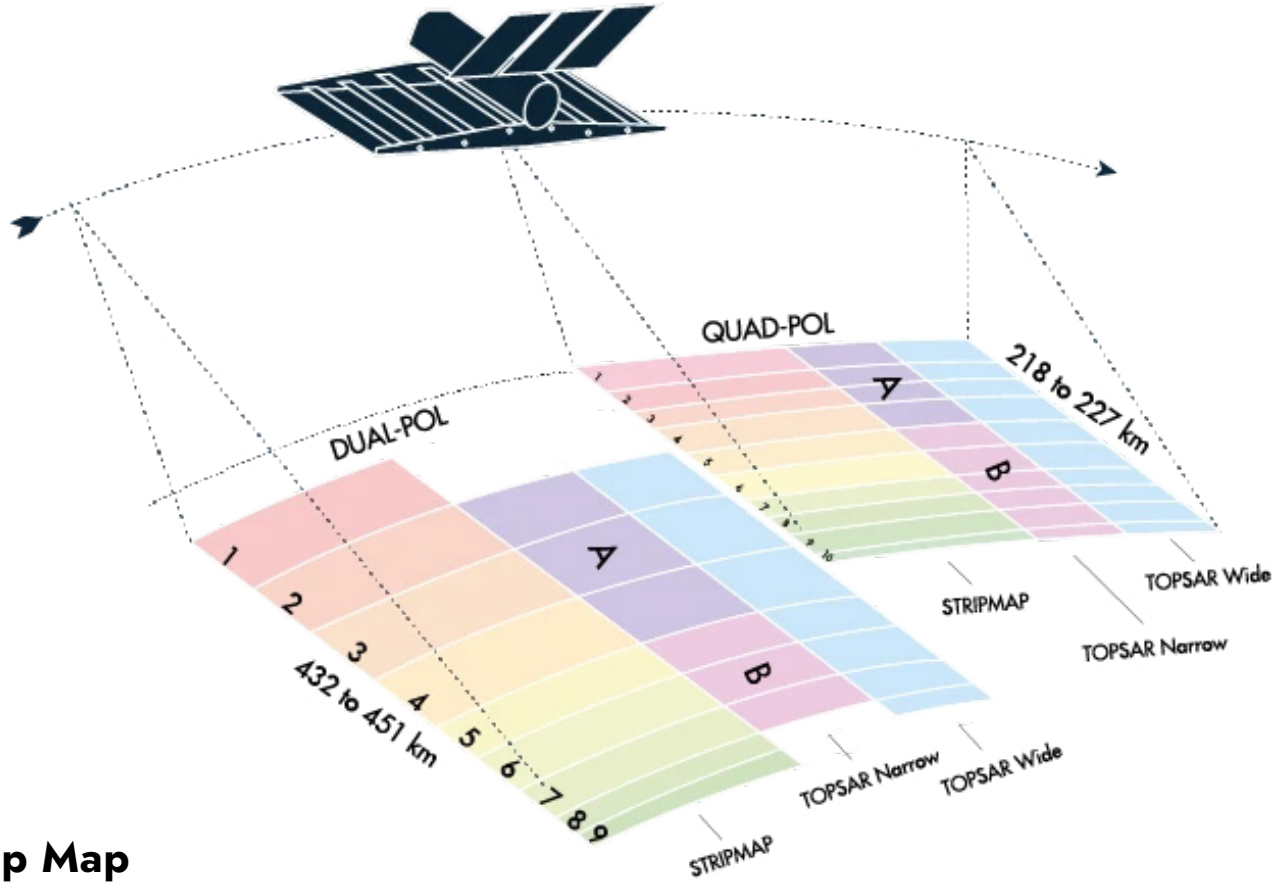
**TOPSAR**
350 x 445 km ≈

**ANGLE OF VIEW**
from 20,7° to 50,2°




| AREA | OIL & GAS | MINING | AGRICULTRE | INFRASTRUCTURE | ENVIROMENT | FORESTRY | DAMS | INSURANCE | GOVERNMENT |
|---|---|---|---|---|---|---|---|---|---|
| 5–7 HOUR DELIVERY TIME | ✦ | | | | | | | | ✦ |
| MONITORING SERVICES | | ✦ | | ✦ | | ✦ | | | ✦ |
| SHIP DETECTION | ✦ | | | | | | | | ✦ |
| OIL SPILL DETECTION | ✦ | | | | | | | | ✦ |
| SOIL MOISTURE MAPPING | | | ✦ | | | | | | |
| INTERFEROMETRIC STUDIES | ✦ | ✦ | | ✦ | | ✦ | ✦ | | ✦ |
| CHANGE DETECTION | ✦ | ✦ | | ✦ | | ✦ | ✦ | ✦ | ✦ |
| TAYLOR-MADE SOLUTIONS | ✦ | ✦ | ✦ | ✦ | ✦ | ✦ | ✦ | ✦ | ✦ |

# ACQUISITION MODES




## Strip Map

Simple, Double or Quadruple Polarization

Radar points to a given fixed direction while picks up a continuous band corresponding to narrower scannings and with more space resolution.

## TOPSAR Narrow

Simple, Double or Quadruple Polarization

Radar changes its pointing along the trace to pick up several brands, covering a greater scanning width with less space resolution than in the StripMap case.

## TOPSAR Wide

Simple, Double or Quadruple (complete) or Compact

Radar changes its pointing along the trace to pick up a greater number of bands, covering a greater scanning width with less space resolution than in TOPSAR Narrow case.

## Simple Polarization

HH VV

The system issues and receives in the same linear polarization.

## Double Polarization

HH VV VV y VH

The system issues in a linear polarization and receives in two linear polarizations simultaneously.

## Quadruple Polarization

HH VV VV and VH

The system issues alternately in both linear polarization and simultaneously receives in them.

## Compact Polarization / CL-POL

RIGHT-H and RIGHT-V

LEFT-H and LEFT-V

System transmits a circular polarization (right or left) and receives in two polarizations simultaneously.

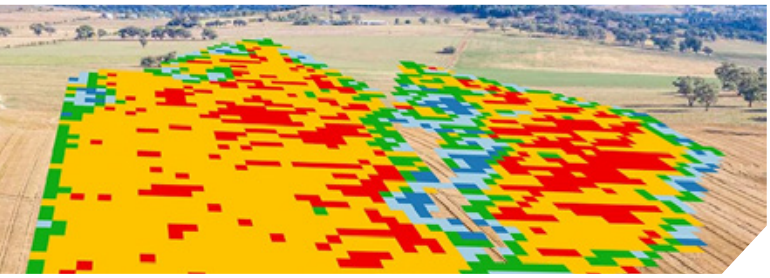
| Acquisition Mode | Nominal Resolution (Rng x Az) [m] | | Nominal Size of the Scene (Rng x Az) [km] | Polarizations |
|---|---|---|---|---|
| | Product L1A | Products L1B, L1C y L1D | | |
| STRIPMAP **SP** | 10 x 5 | 10 x 10 | 40 x 74 | HH o VV |
| STRIPMAP **DP** | 10 x 5 | 10 x 10 | 40 x 74 | HH+HV o VV+ VH |
| STRIPMAP **QP** | 10 x 6 | 10 x 10 | 20 x 74 | HH+HV+VH+VV |
| TOPSAR Narrow **SP** | 10 x 30 | 30 x 30 | 150 x 222 | HH o VV |
| TOPSAR Narrow **DP** | 10 x 30 | 30 x 30 | 150 x 222 | HH+HV o VV+ VH |
| TOPSAR Narrow **QP** | 10 x 50 | 50 x 50 | 100 x 222 | HH+HV+VH+VV |
| TOPSAR Wide **SP** | 10 x 50 | 50 x 50 | 350 x 445 | HH o VV |
| TOPSAR Wide **DP** | 10 x 50 | 50 x 50 | 350 x 445 | HH+HV o VV+ VH |
| TOPSAR Wide **QP** | 10 x 100 | 100 x 100 | 220 x 445 | HH+HV+VH+VV |

SP: Single Polarization // DP: Dual Polariation // QP: Quad Polarization

# SOIL MOISTURE AMBIENT MAP

SAR scenes obtained by the SAOCOM constellation allow us to develop multiple georeferenced soil moisture products, which allow for bare soil moisture estimation.

Below you will find a sample from a mining exploitation through heap-leaching.



## PRODUCTS AND SERVICES

- SOIL MOISTURE AMBIENT MAP
- RELATIVE SOIL MOISTURE AMBIENT MAP
- SOIL MOISTURE TIME SERIES

## BENEFITS: MINING

- It will give you the confidence of having valuable information to prevent tailings dam slope failures.
- It will give you the possibility to avoid losses in your profits due to leaching failures.

## BENEFITS: AGRICULTURE

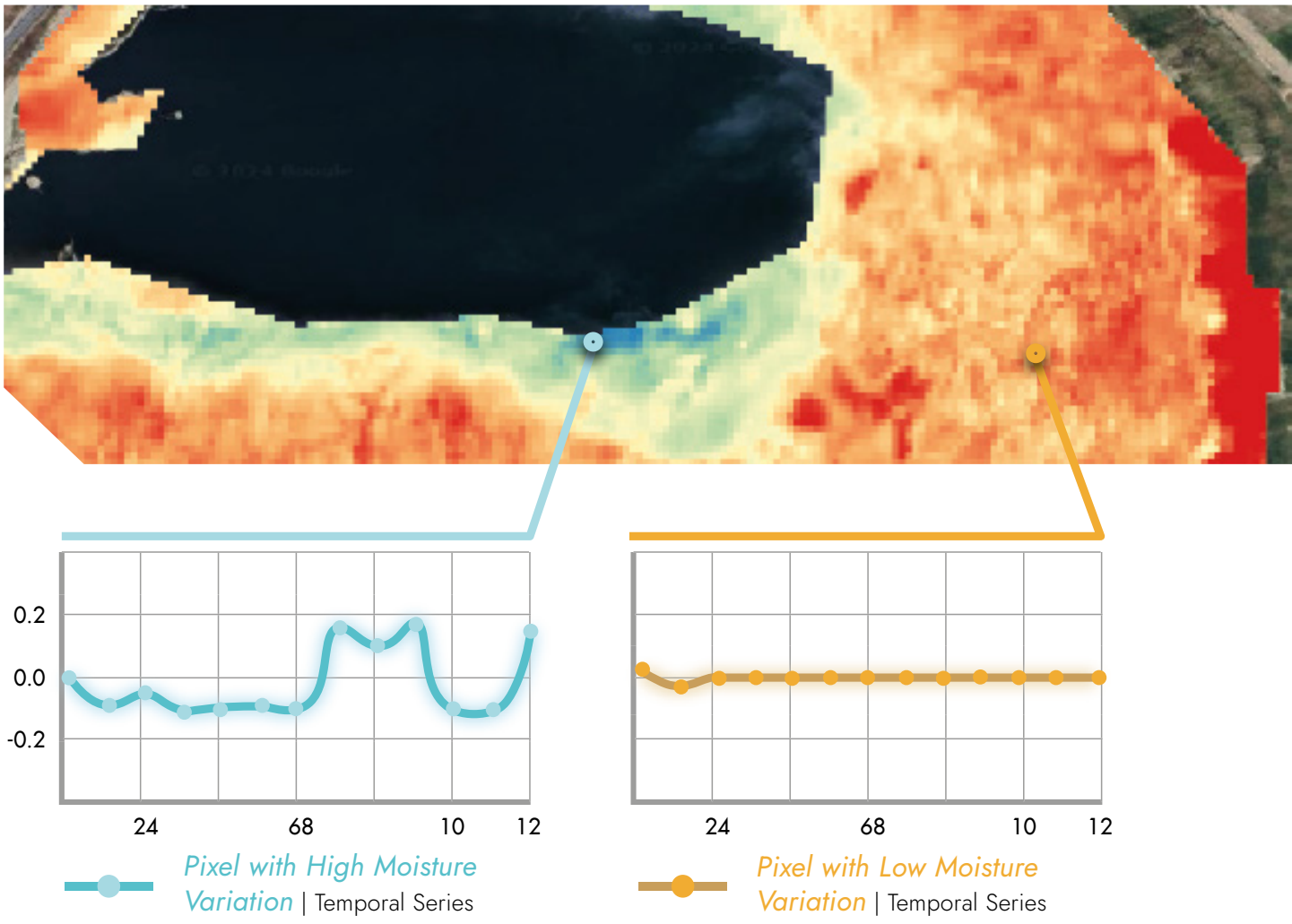
- Compare pixel-by-pixel soil moisture information from week to week.
- Detect notable changes in soil moisture at any site

# SOIL MOISTURE VARIATION DETECTION

The soil moisture variation analysis is a fundamental tool for detecting possible anomalies related to this variable in a region of interest.

Below is shown a product generated in an area where two locations were analyzed: a first zone colored in red, where a low soil moisture variation was observed, and, on the other hand, a second zone colored in blue indicating a higher soil moisture variation.
To the right, a time series analysis is presented for each zone.

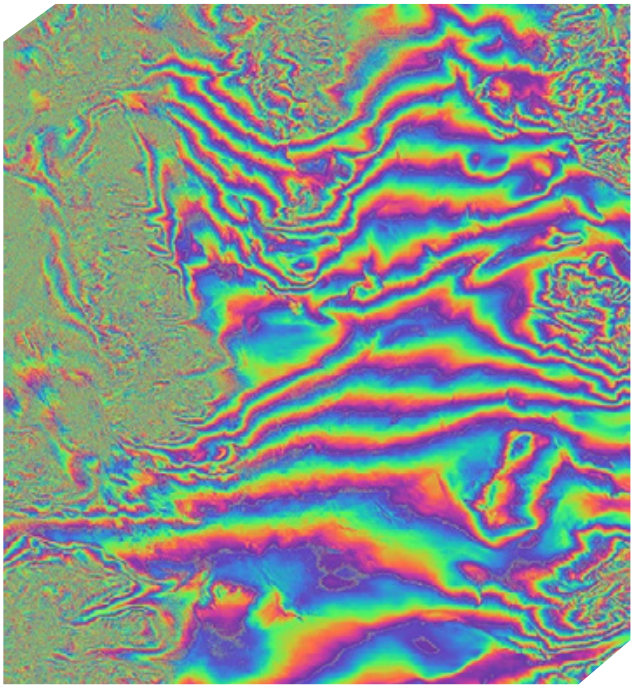
This solution uses scenes from the SAOCOM constellation to provide a detailed analysis of the temporal evolution of soil moisture in an area of interest.



# SAR INTERFEROMETRIC STACKS

For interferometric studies, in-depth knowledge and powerful processing software are required. However, this is not enough; as data input, it is necessary to have series of SAR images of the target on different dates, respecting a series of very important requirements.

We provide these scene sets in compliance with the customer's requirements, delivering on time and on budget through a business model that always favors the customer, understanding the complexity of the global interferometric business.

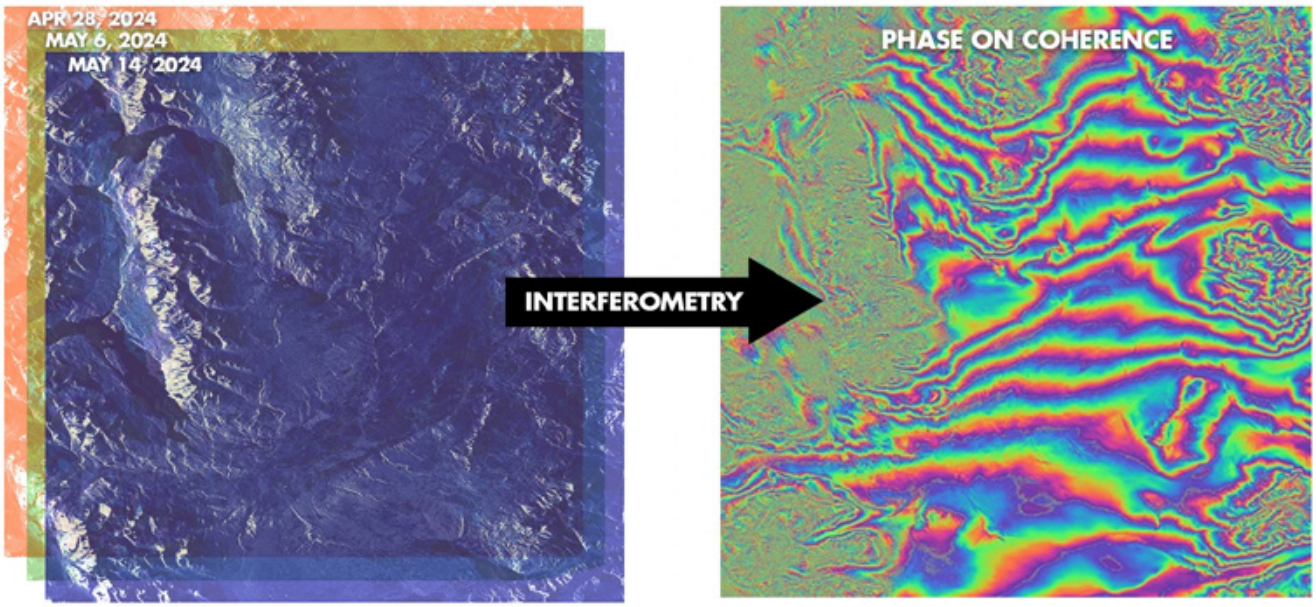


The product consists of a set of scenes acquired under the requirements for use in SAR interferometry:

- Weekly, biweekly, monthly and annual sampling under the same observation angle
- Stripmap Scenes
- Business model oriented to VENG absorbs the risk that the baseline is not in accordance with the customer's requirement. If the baseline is not as agreed, the scene is not charged or delivered
- Great stack discounts
- Ascending and descending orbit

Example table of internal evaluation of Baseline Perpendicular for Interferogram generation:

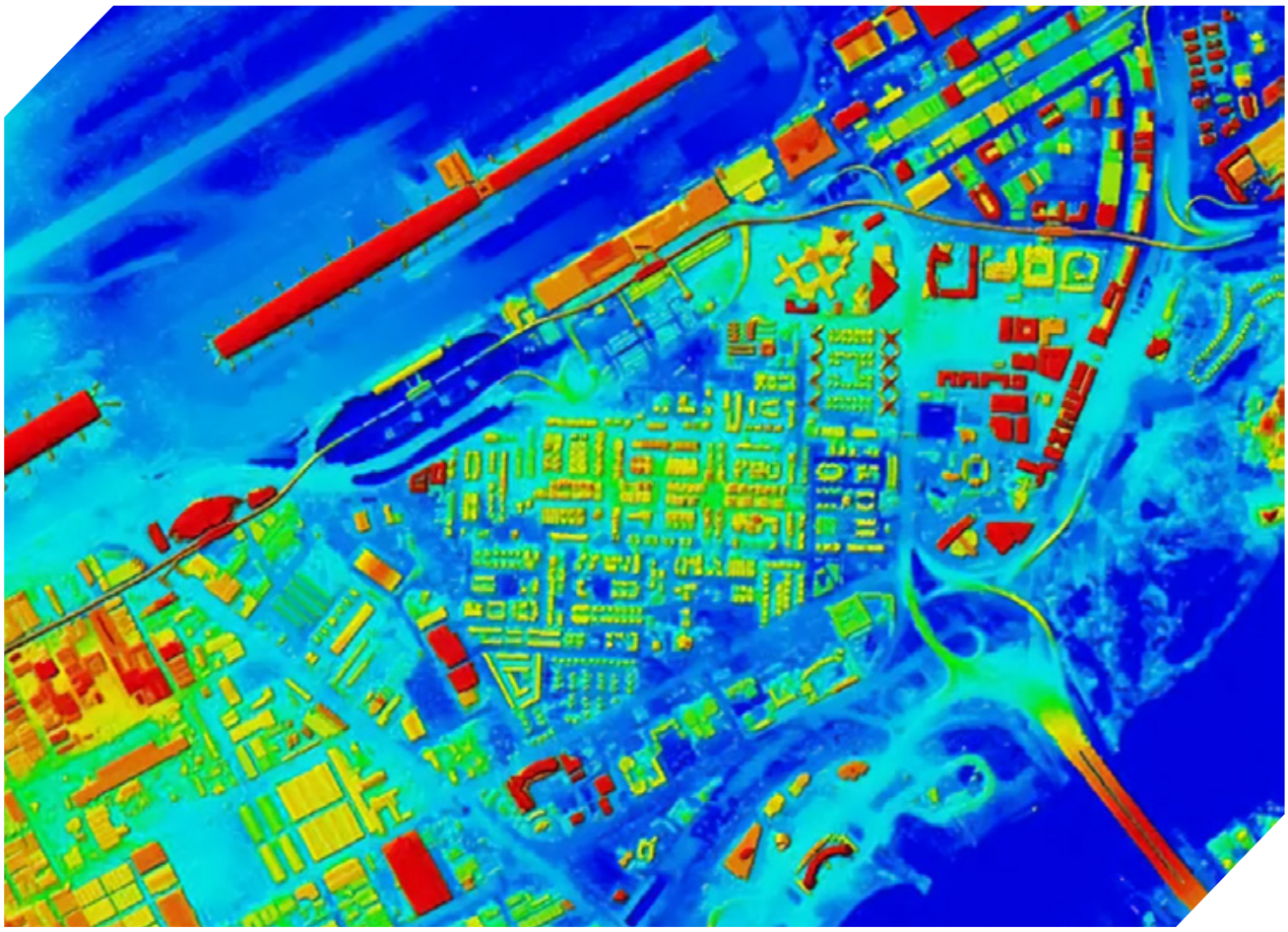
| TYPE | MASTER | SLAVE | SLAVE |
|---|---|---|---|
| **Date** | Apr 28, 2024 | May 6, 2024 | May 14, 2024 |
| **B. Temp [days]** | 0 | 8 | 16 |
| **B. Geom [m]** | 0 | 270,82 | 468,62 |
| **Bperp [m]** | 0 | 185,5 | -456,19 |
| **H. Ambiguity** | 0 | -288,28 | 117,22 |
| **Parallel [m]** | 0 | 19,731 | -10,725 |
| **Look Angle [°]** | 0 | 32,32 | 32,32 |
| **Geo Coherence** | 0 | 0,982815 | 0,95764 |



# SAR SCENES FOR MACHINE LEARNING

We offer our customers a service that provides **SAOCOM data** from hundreds or thousands of scenes in order to **train machine learning models**. This service allows to freely choose the targets and to balance the number of scenes desired for each target with respect to the number of temporal samples on each target.

- Service that provides SAOCOM information to train Machine Learning models
- Offers hundreds or thousands of satellite scenes
- Allows to choose targets and to balance the number of scenes per target and time samples
- Very low price per scene



## USES

- Training Machine Learning models in satellite Earth observation
- Combine information with other satellites

### Governments

Monitoring and analysis of strategic territories

### Companies

Bi-weekly monitoring/monitoring of operating areas

## EXAMPLES OF USE

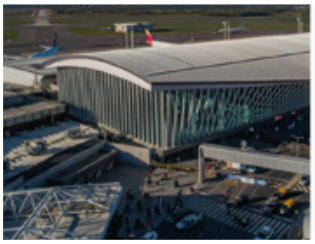
- Scene packages of airports, dams, nuclear power plants, mines, oil wells, ports, cities, forests, etc.
- **Example:** 12 scenes per airport distributed over time (one per month).

## FEATURES

### Unique service with SAR information in L-Band

### Model training

Urban areas (airports, critical infrastructures, highways) and vegetation areas (forests, jungles, etc.).



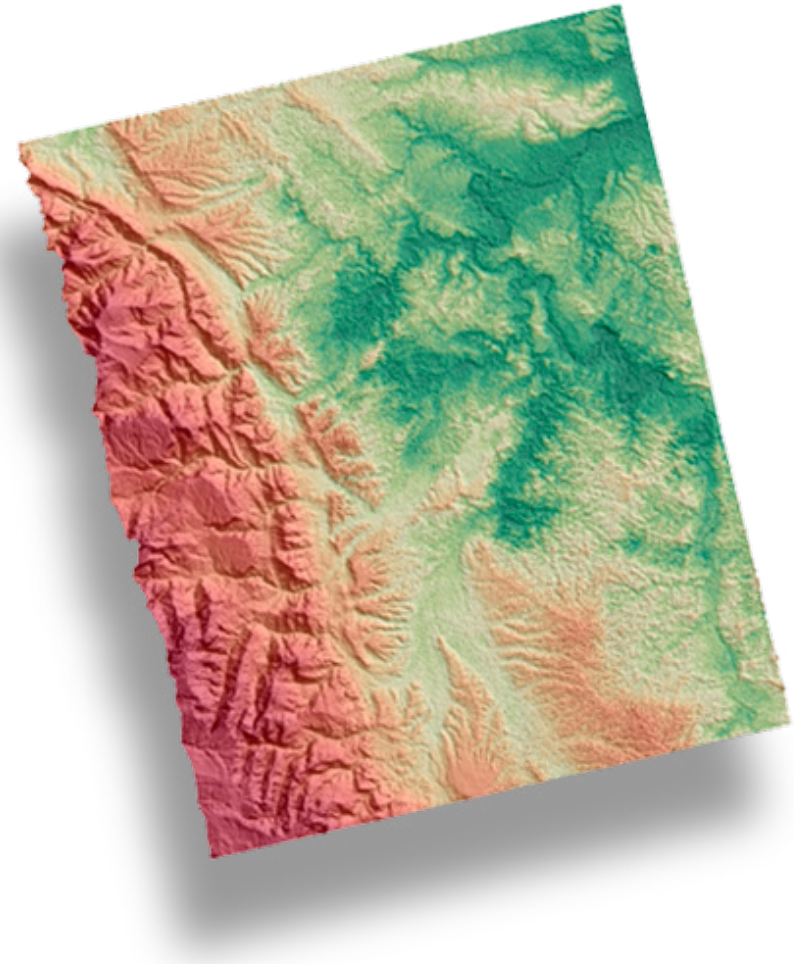
### Soil moisture analysis

Irrigation, fire risk, biomass, etc.

# DIGITAL ELEVATION MODEL (DEM)

**SAOCOM® Constellation** digital elevation models provide **high quality and highly representative terrain height data** due to their capacity to penetrate clouds and vegetation.

**DEMs** are obtained with archival as well as future **SAOCOM®** images, thus ensuring past and current models.

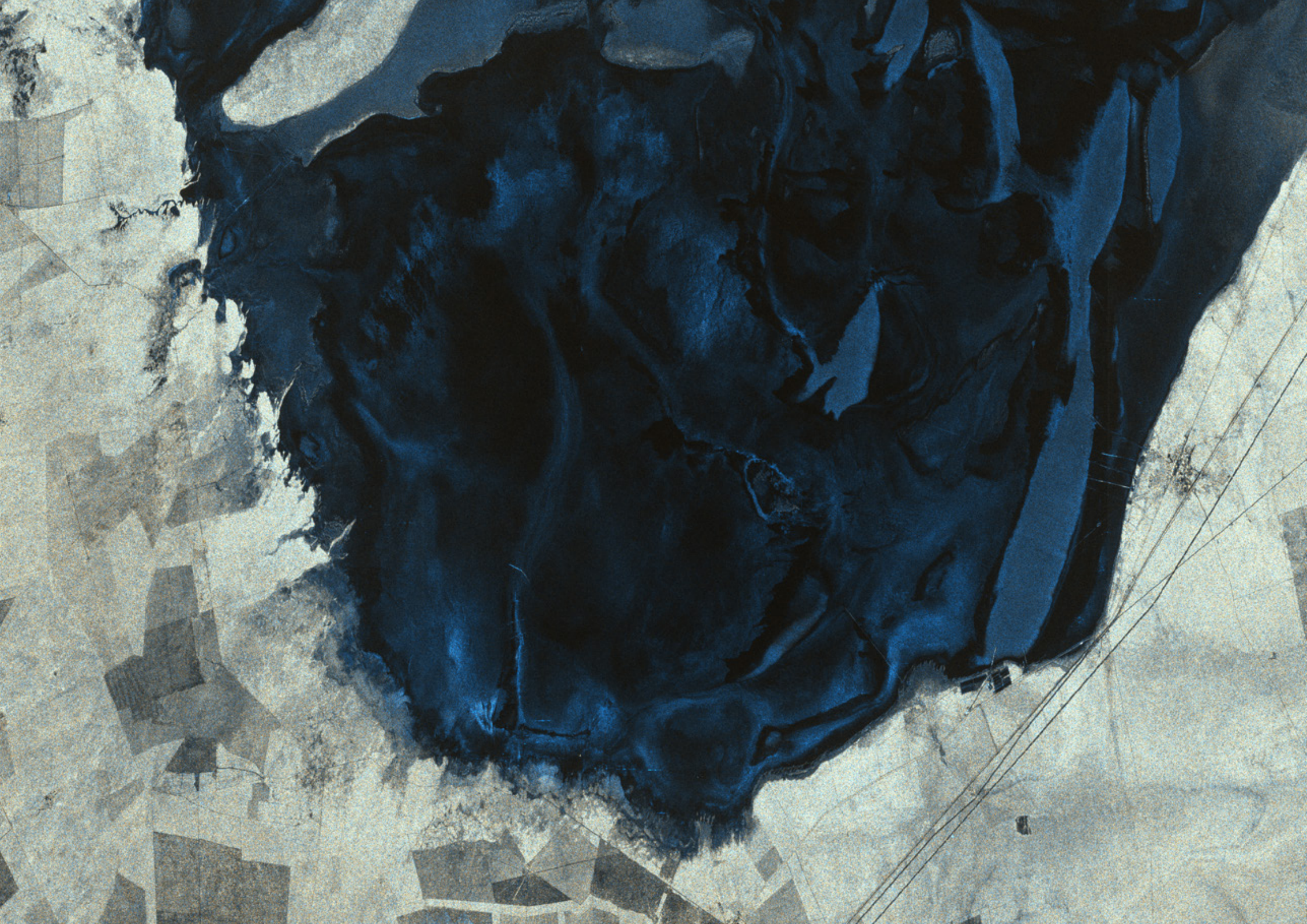


Prospecting and exploration

Watershed modeling

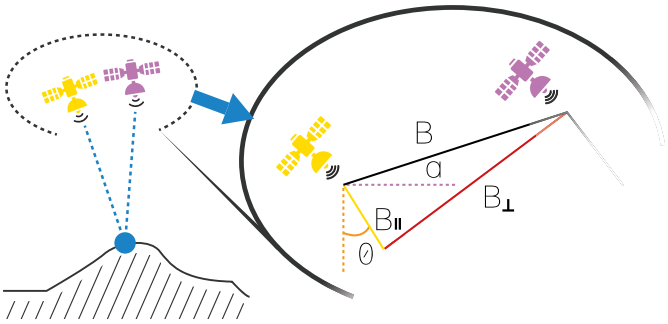
Infrastructure projects

Water and geological risk identification



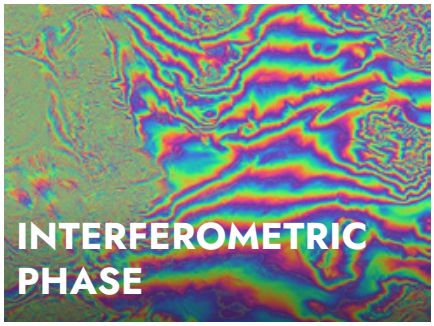
# INTERFEROMETRY

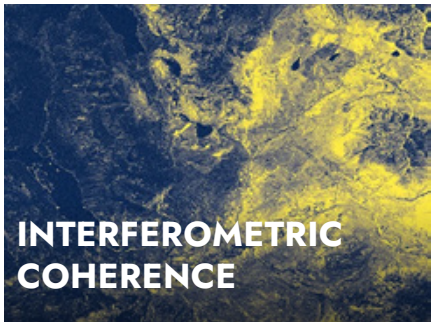
Interferometry is a technique that, from two or more **SAR (Synthetic Aperture Radar)** satellite images, makes it possible to obtain **highly accurate** ground displacement measurements.

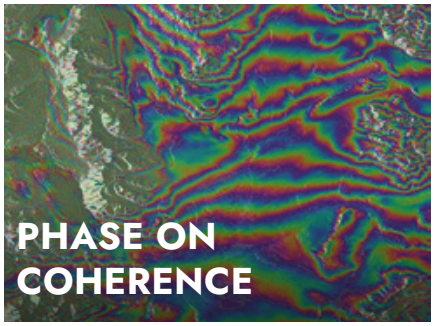



## PRODUCTS & SERVICES

We offer quantification and qualification service of ground displacement services for monitoring and **early warning**. The study is carried out within a certain period of time and the differential interferometry technique is used for this purpose.



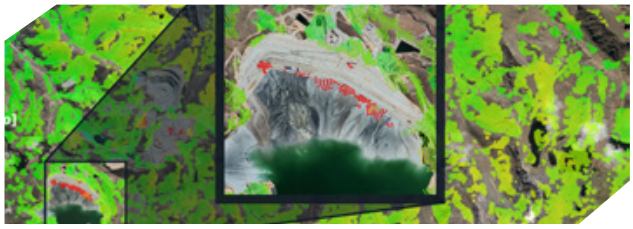



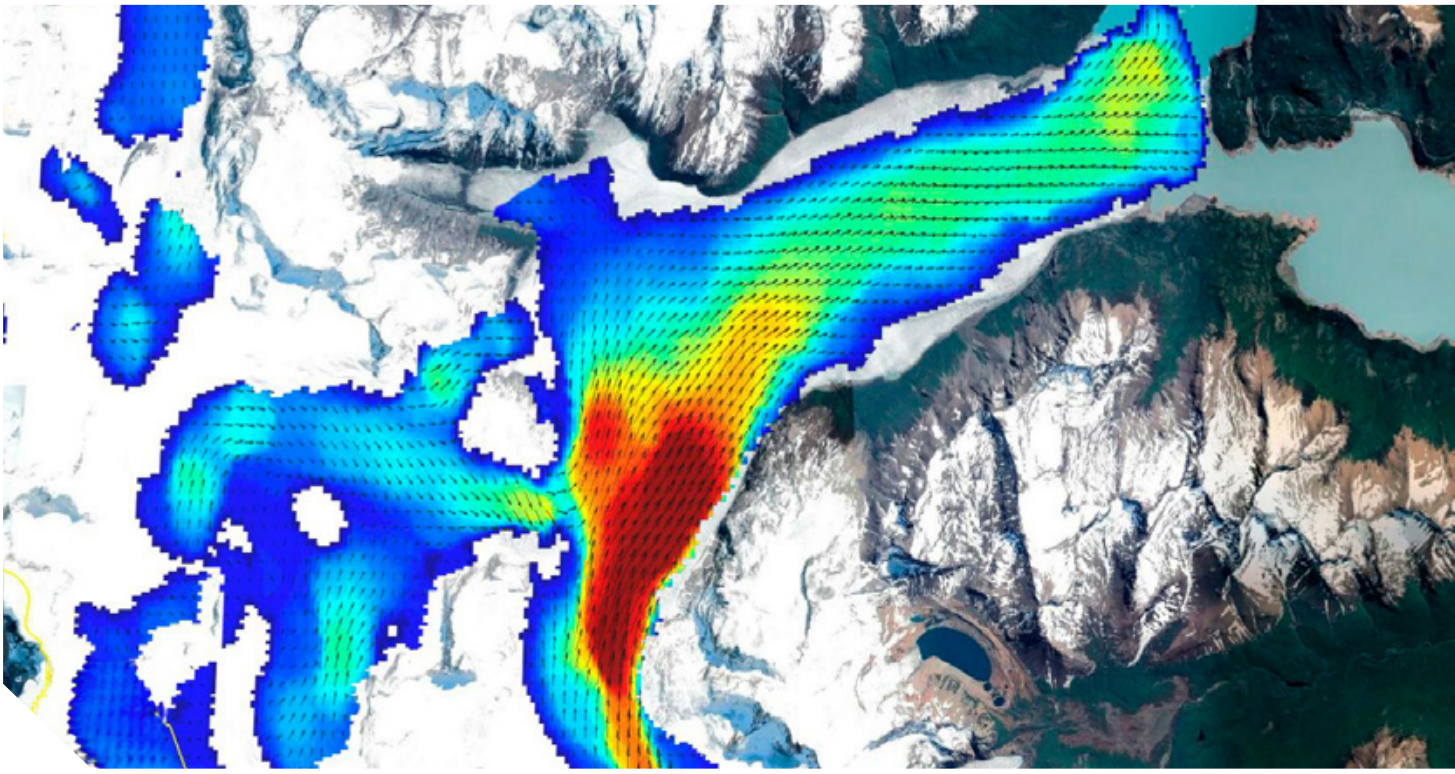

## DIGITAL ELEVATION MODEL (DEM)

- Prospecting and Exploration
- Watershed Modeling
- Infrastructure Projects
- Water and Geological Risk Identification

## DISPLACEMENT VELOCITY MAPS SERVICE (DVMS)



- Monitoring of basin exploitation by fracking
- Pipeline health monitoring due to subsidence or crumbling
- Infrastructure monitoring



## PIPELINE MONITORING

Pipelines, used to transport oil, gas, and water, are works of great linear extension that reach thousands of kilometers. Along this path, they pass through different type of soils such as sand, mud, clay or different types of sedimentary, metamorphic or igneous rocks. In addition to that, changes in aquifers and reservoirs produce movements on ground over which pipelines are laid down.

**Differential interferometry (DInSAR)** allows monitoring at centimetric and sub-centimetric levels with a temporal **periodicity of 8 days** in the case of the **SAOCOM®** satellites. Thus, it is possible to identify areas where changes in the ground may represent a risk of pipeline damage.

# OIL&GAS BASIN MONITORING

Fluid injection/extraction operations generate volumetric variations in the basins and, therefore, changes in the height of the surface cover. These changes can be difficult to measure due to the large surface area of the basins in which the operations take place. However, differential interferometric techniques (DInSAR) makes possible to measure surface height variations with centimetre and sub-centimetre precision.

In this way, it is possible to estimate volumetric changes in the basin and associate them with fluid extraction and injection processes. These data are of interest to monitor the infrastructure of the operations in order to prevent higher structural damages and to contrast injection/extraction values with volume changes in the basin to lower environmental risks. By means of the SAOCOM® constellation, it is possible to carry out these studies with a periodicity of 8 days.

# SUBSIDENCE IN CIVIL WORKS ANALYSIS

High-rise buildings, bridges, tunnels, dams, routes, among others, are construction works that are settled on the ground. Extraction of fluids or solids in sub ground layers produces settlements which eventually lead to changes in upper layers of the land cover where the aforementioned construction works are located. Therefore, even foreseeing

all the construction factors, it is necessary to analyze sudden or high-value changes to safeguard infrastructure avoiding both human and economic losses.

The displacement measured by interferometric techniques achives centimetric and sub-centimetric precision over large remotely observed areas. Measurements that, in the case of the SAOCOM® satellites are possible at 8 days intervals. Therefore, by means of SAR measurements and the differential interferometry technique, it can be performed a continuous temporary analysis of ground movements and works that settle on it. Thus, it is possible to anticipate potential risks of damage to the structures.

## SLOPE STABILITY MONITORING

Mining activities are related to several anthropic and geophysical phenomena which tend to modify ground stability, such as changes in rocks due to the mining activity itself, heavy vehicles traffic, tensions of the faults and slopes wash in tailings dams, among others.

All of these, lead to the necessity of **ongoing monitoring to set early warnings** in order to prevent possible accidents which may be a risk for people, environment and mining operation.

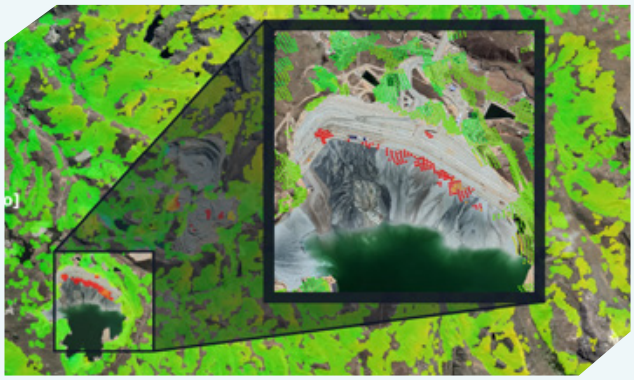
Nevertheless, high-precision measurements over time, result expensive and, in some cases, logistically difficult to obtain. However, **differential interferometry (DInSAR)** is an excellent alternative which allows to measure ground displacement with centimetric and sub-centimetric Precision at 8 days intervals in the case of the **SAOCOM®** satellite constellation.

# MONITORING OF POTENTIAL LANDSLIDE AREAS

Landslides represent a major risk for human settlements. Examples are the tragedies in Italy in 1963 and Sierra Leone in 2017, where thousands of human lives were lost. It is important to consider that landslides increase their probability of occurrence due to rainfall and earthquakes. Therefore, it is essential to monitor critical areas where geological and environmental risk factors are combined to generate early warnings.

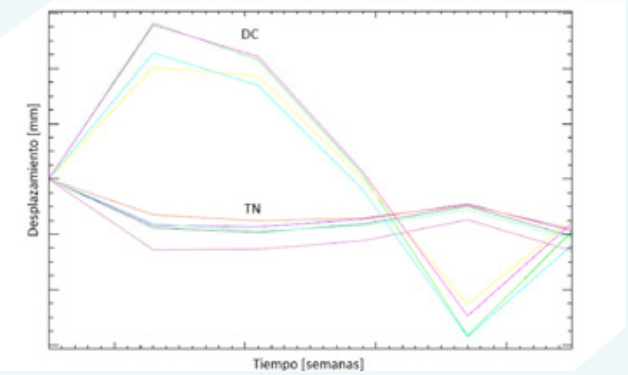
In this sense, monitoring by **Differential Interferometry or DInSAR**, allows to obtain **periodic ground displacement data** in centimeter and sub centimeter order with which **potential risks can be estimated** and thus generate **early warnings**. The **SAOCOM®** Constellation sensors can take samples every 8 days over a study area and represent a great advantage for displacement monitoring since, in addition, they have **greater penetration capacity** over vegetation than other sensors.

## BENEFITS



Ground displacement velocity at particular measurement points

Temporal evolution of displacement on individual points at tailings dam and natural terrain




## MONITORING OF POTENTIAL LANDSLIDE ZONES

**Infrastructure monitoring**

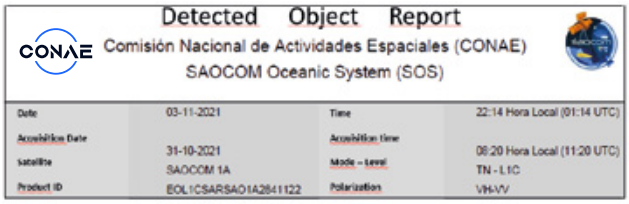
**Tailings dam monitoring**

# SHIP DETECTION

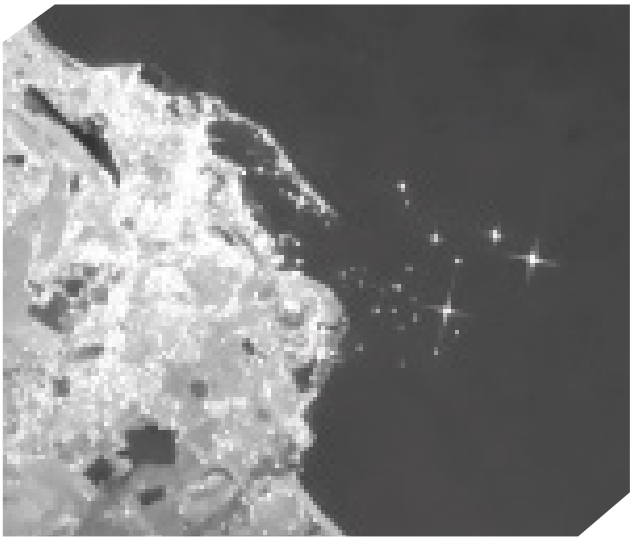
We provide, in an area chosen by the client, a report that shows all detected vessels with their respective geo reference (lat / long). In addition, this report includes a thumbnail image of the detected vessel's profile that assists in the identification of the type of vessel.

This report can be generated within hours of satellite acquisition, facilitating its use for cross-checking data with the **Automatic Identification System (AIS)** that all ships with a declared position have. If a ship without **AIS** data is detected by **SAOCOM®**, it is known to be an undeclared ship.

We prepare the report in different formats at the client's request, **covering areas as extensive as the client requires.**


Detected Object Report
Comisión Nacional de Actividades Espaciales (CONAE)
SAOCOM Oceanic System (SOS)

| | | | |
|---|---|---|---|
| Date | 03-11-2021 | Time | 22:14 Hora Local (01:14 UTC) |
| Acquisition Date | 31-10-2021 | Acquisition time | 08:20 Hora Local (11:20 UTC) |
| Satellite | SAOCOM 1A | Mode – Level | TN - L1C |
| Product ID | EOL1CSARSAO1A2841122 | Polarization | VH-VV |

## RAPID MONITORING OPTION

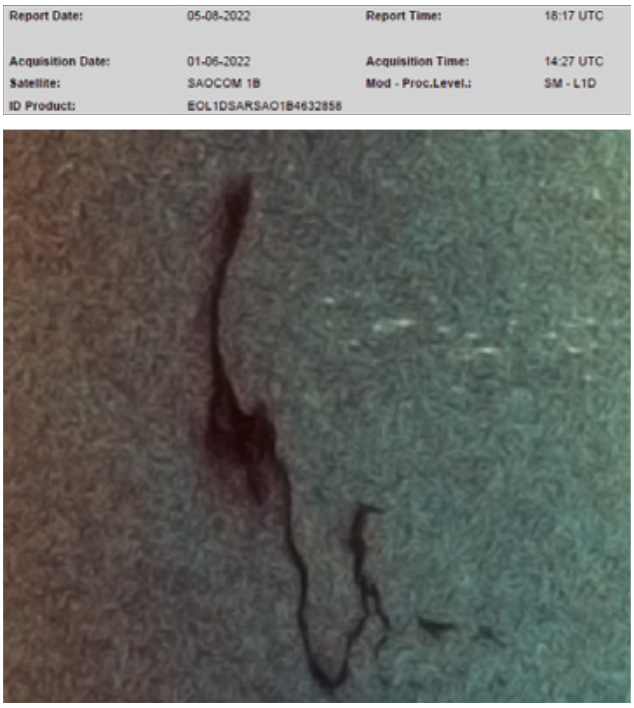
- **Delivery time**
  3 hours after acquisition
- **Frequency of acquisition**
  2 products per day
- **Delivery method**
  FTP + email
- **Satellite inputs**
  SAOCOM1A & SAOCOM1B

# OIL SPILL DETECTION

The oil spill detection service provides, in an area chosen by the client, **a report that shows all the oil spills detected** with their respective geo-reference (lat/long). In addition, this report includes a thumbnail image of the oil slick profile, assisting in the evaluation of the **potential environmental impact**.

This report can be generated within hours of satellite acquisition, facilitating its use for monitoring the spill, **especially to detect its origin, morphology and course depending on ocean flows**. Generally, based on the area detected, an estimate of the volume of oil spilled can be made (this estimation is not part of the report).

We shape the spring in different formats at the customer's request, **covering areas as large as the customer requires**.




## RAPID MONITORING OPTION

- **Delivery time**
  3 hours after acquisition
- **Frequency of acquisition**
  2 products per day
- **Delivery method**
  FTP + email
- **Satellite inputs**
  SAOCOM1A & SAOCOM1B

# RAPID MONITORING OPTION

- The Rapid Monitoring Service offers the possibility of activating desired acquisition windows.
- Each acquisition window, which can be requested with at least 24 hours of anticipation, has a 5-day activity term. The maximum number of acquisitions per window is 12.
- The service has a fixed monthly fee, wich includes 1 (one) activation window and the possibility of activating more windows (by request).
- If the customer wishes to activate more windows in the same period, he/she can request it.

## MORE APPLICATIONS

- Mining, Oil & Gas Monitoring
- Drinkable Water Urban Leakage Detection
- Flood & Drought Monitoring
- Agricultural Data Monitoring

# CUSTOMER ORIENTED OFFICE

**2**
calendar days prior to the date and time of purchase

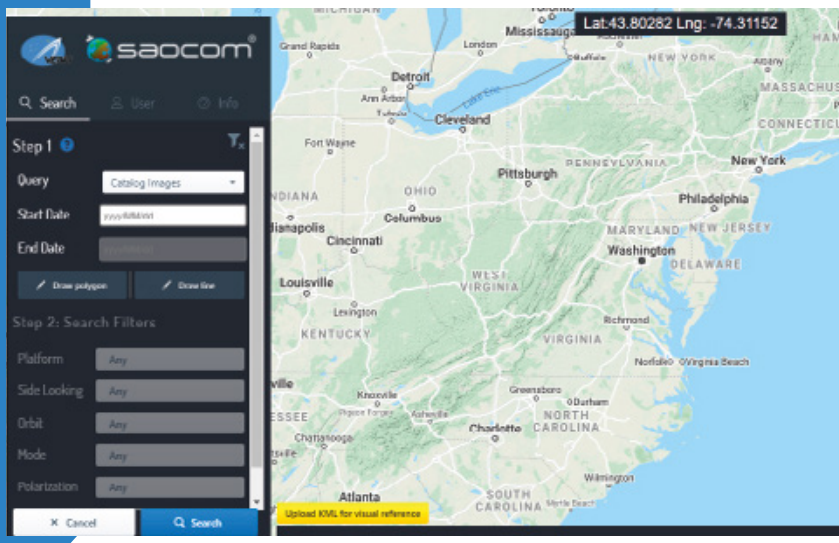
**24**
hours of monitoring to obtain a new acquisition

**24**
hours from receipt of order to deliver catalog orders

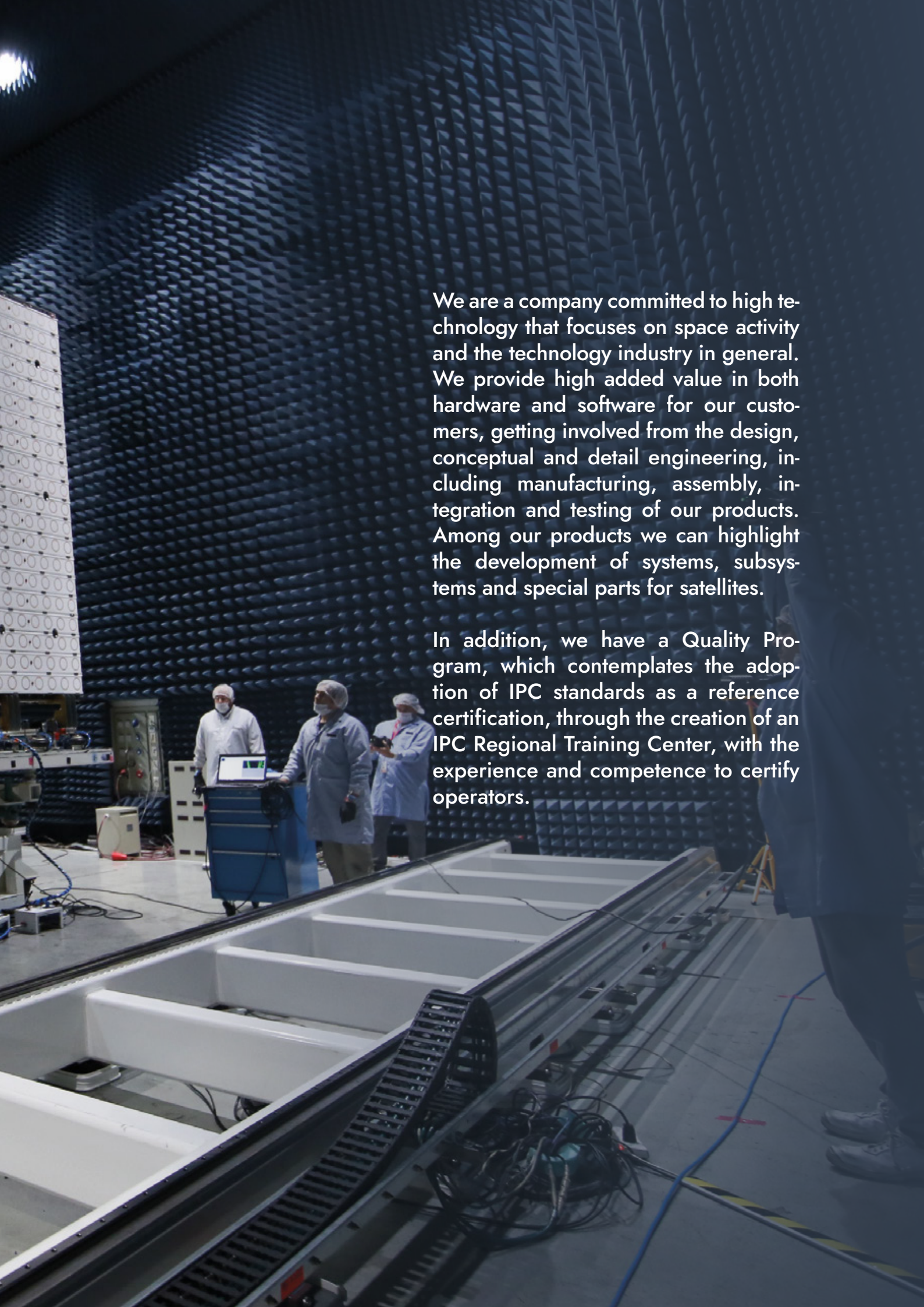
## SAOCOM SEARCH AND QUOTATION PLATFORM

WWW.SAOCOM.COM.AR

- EASY-TO-USE
- CATALOG IMAGES
- FUTURE IMAGES




# #6 // SERVICES



We are a company committed to high technology that focuses on space activity and the technology industry in general. We provide high added value in both hardware and software for our customers, getting involved from the design, conceptual and detail engineering, including manufacturing, assembly, integration and testing of our products. Among our products we can highlight the development of systems, subsystems and special parts for satellites.

In addition, we have a Quality Program, which contemplates the adoption of IPC standards as a reference certification, through the creation of an IPC Regional Training Center, with the experience and competence to certify operators.

# FACILITIES

**LaIEM**
**Mechanical Integration & Testing Facility**

## LEM
Mechanical Testing Facility

## LaIMe
Mechanical Integration Facility

## LEA
Laboratory of spatialization and Assurance

## LaRF
RF Testing Facility

## LaIEE
Electronic Integration & Testing Facility

## LaTVC
Thermal Vaccum Testing Facility

## LaMA
Antenna Testing Facility

## LaCEM
Electromagnetic Compatibility Testing Facility

## LaREs
Space Coating Facility

**Support Services**

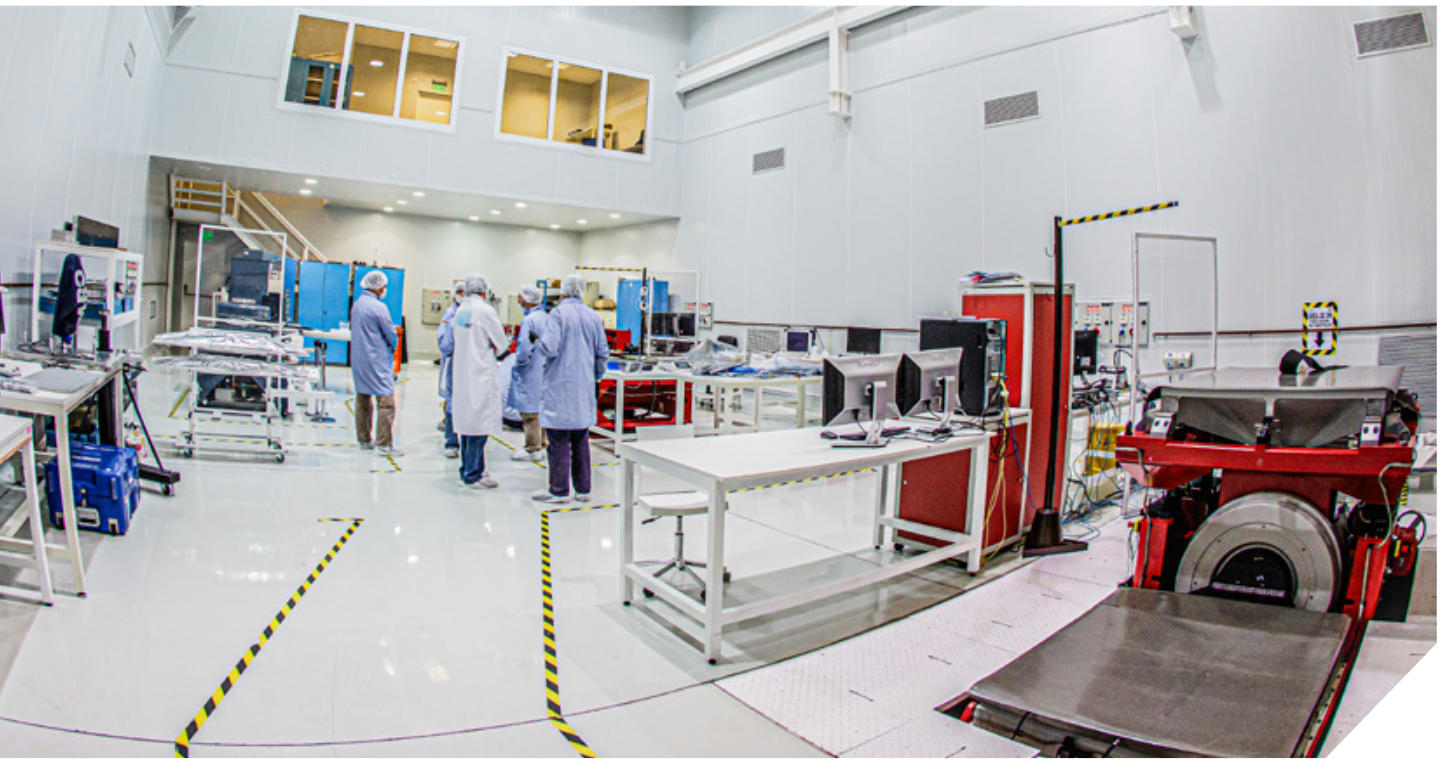
QA & PA

Configuration Control

IT

Software

# MECHANICAL INTEGRATION AND TESTING SERVICES



The Mechanical Integration and Testing Laboratory offers mechanical vibration testing, strain gauge measurements, accelerometer calibrations, design and high-level engineering consulting services required by the aerospace and defense industry, and can be extended to the automotive industry, medical equipment and industry in general.

From the space point of view, the stresses that the equipment (satellites, rockets and parts of these) will undergo during the most critical stage of their flight from the structural point of view are reproduced. This stage is the launch, when the launcher begins its race into space to put them into orbit, and during which these elements are subjected to great mechanical stresses (transmitted through the structure) and acoustic stresses (transmitted through the structure and the surrounding environment).

To reproduce these vibrations, special equipment called shakers are used to achieve two objectives: on the one hand, to qualify the parts by subjecting them to stresses greater than those they are expected to receive during flight, to ensure that the design is adequate. On the other hand, acceptance tests are also performed on components to be flown, to ensure that no errors have been made during their manufacture or assembly.

## TESTINGS

| | | |
|---|---|---|
| Planning and development of mechanical vibration | Design and validation of MGSEs (mechanical support equipment) | Numerical, modal and structural simulation to predict the behavior of the parts to be tested |
| Analysis of test results | Accelerometers calibrations | Mechanical stress and strain testing using strain gauges (strain gauges) |
| Engineering consulting services | Free fall tests | |

## FEATURES

- Air treatment that guarantees a 100 K type environment, with a quantity of 100,000 particles per cubic foot of air (Fed-std-209E standard) and with controlled temperature and humidity (Temperature: 22±/- 3 °C, relative humidity: 55 ± 10%), complying with the ISO 8 standard (ISO14644 standard) of the "European Cooperation for Space Standardization" (ECSS).

- Laboratory equipped with "work islands" around each shaker, allowing integration and test preparation tasks to be performed at the foot of the machine, with an overhead crane for handling larger loads.

- Control room isolated from the testing sector, to provide greater comfort to personnel in the operation, at the same time reinforcing hearing protection and preventing impact risks due to detached parts.

- "Satellite" testing room, without air treatment conditions, equipped with a shaker of lower load capacity and an Instron machine for tensile tests. This room is used for mechanical testing of parts or devices that do not require a controlled environment, or are not admissible in a clean room.

# EQUIPMENT

## SHAKERS

The equipment called shakers (electro-mechanical vibrators) have a similar operation to a loudspeaker used to listen to music. They are composed of a fixed part and a mobile part, but unlike the speaker, these equipments do not have the membrane to produce waves in the air and generate the noise. For vibration tests, the less noise generated, the better, although a lot of noise is generated anyway. That is why, when the tests are performed, the laboratory personnel work with the gates closed and use ear protectors.

The characteristics and capabilities of this equipment can be represented by the force and acceleration that each can develop. The laboratory has available equipment ranging from 5.12 kN force at 111gr to 105kN force at 150g.

**LDS V9-HBT 1220**

| | |
|---|---|
| **SYNUSOIDAL FORCE** (peak) | 105 kN |
| **ACCELERATION** (sinusoidal peak) | 150 g |
| **RANDOM FORCE** (ms) | 105 kN |
| **INTERNAL LOAD SUPPORT** | 1800 kg |
| **ACCELERATION** (random rms) | 70 g |
| **VELOCITY** (sinusoidal peak) | 3.0m/s |
| **DISPLACEMENT** (peak-peak) | - 76.2mm |

## LDS V875-HBT 600

| | |
|---|---|
| **SYNUSOIDAL FORCE** (peak) | 35.6 kN |
| **ACCELERATION** (sinusoidal peak) | 112 g |
| **RANDOM FORCE** (ms) | 35.6 kN |
| **INTERNAL LOAD SUPPORT** | 600 kg |
| **ACCELERATION** (random rms) | 100 g |
| **VELOCITY** (sinusoidal peak) | 1.8m/s |
| **DISPLACEMENT** (peak-peak) | - 76.2mm |

## UNHOLTZ-DICKIE S-452/ST

| | |
|---|---|
| **SYNUSOIDAL FORCE** (peak) | 26.7 kN |
| **ACCELERATION** (sinusoidal peak) | 120 g |
| **RANDOM FORCE** (ms) | 26.7 kN |
| **INTERNAL LOAD SUPPORT** | 272 kg |
| **ACCELERATION** (random rms) | 100 g |
| **VELOCITY** (sinusoidal peak) | 3.4m/s |
| **DISPLACEMENT** (peak-peak) | - 51mm |

## LDS V780

| | |
|---|---|
| **SYNUSOIDAL FORCE** (peak) | 5.12 kN |
| **ACCELERATION** (sinusoidal peak) | 1088 m/s2 |
| **RANDOM FORCE** (ms) | 4.23 kN |
| **INTERNAL LOAD SUPPORT** | 100 kg |
| **ACCELERATION** (random rms) | 490 m/s2 |
| **VELOCITY** (sinusoidal peak) | 1.90 m/s |
| **DISPLACEMENT** (peak-peak) | - 25.4 mm |

## TESTS

| | | |
|---|---|---|
| Random, sine and shock tests | Sinusoidal sweep test | Quasi-static test (sine burst) |
| Resonance search, monitoring and evaluation (RSTD) | Random-on-random trials (ROR) | Sine-on-random assays (SOR) |
| Shock Response Spectrum Synthesis (SRS) | Fatigue tests | Time Waveform Replication (TWR) |
| | Vibration tests according to MIL-STD, DIN, ISO, IEC, SAE | |

## CALIBRATORS

**B&K TYPE 3629**

- Vibration transducer
- Calibration system

# ELECTRONIC INTEGRATION AND TESTING SERVICES

The Electronic Integration Laboratory is an operational area where the production of electronic boards (assembly and soldering of components), integration of cable bundles (harness) and electronic assemblies is carried out by highly qualified personnel, certified by the high reliability soldering standards of the European Space Agency (ESA) and the Association of Electronic Connection Industries (IPC).

The products produced include all the electronics for the SAR antennas of the SAOCOM 1A and 1B satellites, electronics for parts of the SABIA-Mar project, specific components for military aircraft, interconnection cables for satellites and launchers, as well as products for the hydrocarbon industry.

## TESTS

| Aerospace quality manual welding | High quality SMT soldering | Aerospace-quality harness assemblies |
|---|---|---|
| Integration, Fabrication, Modification and Repair of Electrical and Electronic Equipment/ Parts | Assembly of electronic boards in cabinets | Integration of electronic equipment racks (Example: EGSE Rack Integration) |
| Component assembly and PCB soldering | Qualified work under Electronic Equipment or Electronic Consulting Standards | Repair or replacement of components on Electronic Boards (PCBs) |

## FEATURES

- Air treatment system that guarantees an environment with a quantity of 10,000 particles per cubic foot of air (Standard: Fed-std-209E / ISO14644) and with controlled temperature (22°C ±3°C) and humidity (55% ±15%).
- Pre-room with the same air quality characteristics that serves as an interface between room 10,000 and room 100,000.
- Processes supervised by qualified inspectors.
- Complex manual assembly, integration and assembly work.
- Production capacity with different quality grades (commercial, aeronautical, military, aerospace).

# EQUIPMENT


## SIENNA 325D LASER CABLE STRIPPING MACHINE

The SIENNA 300 series systems are table-top systems suitable for processing wires and cables with higher strength and hardness, insulating materials as well as the more standard wires and cables used in the manufacture of electronics products.

## PCB INTEGRATION AND CABLE MANUFACTURING

The products produced include all the electronics for the SAR antennas of the SAOCOM 1A and 1B satellites, electronics for parts of the SABIA-Mar project, specific components for military aircraft, interconnection cables for satellites and launchers, as well as products for the hydrocarbon in-

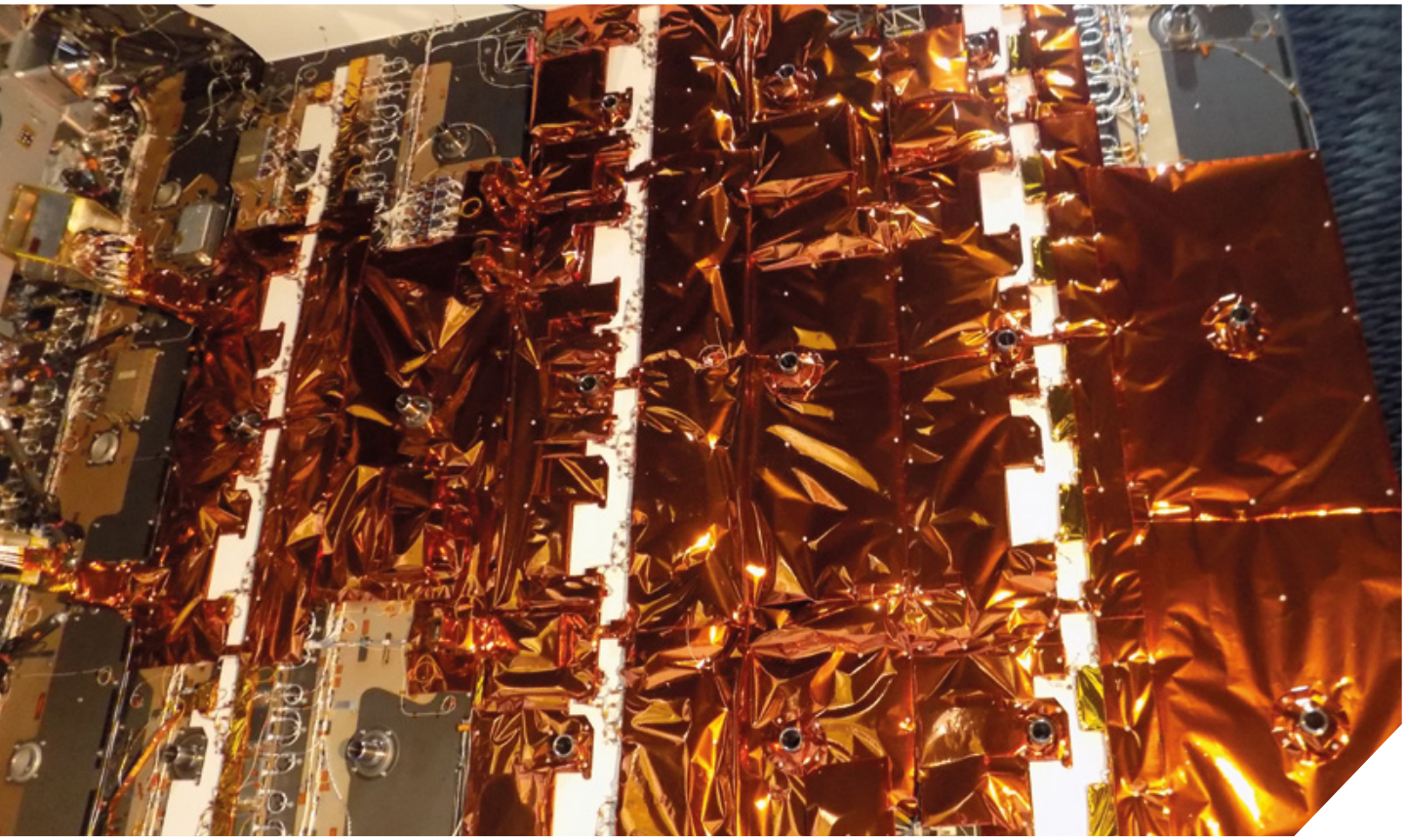
## CNC MILLING MACHINE FOR DOUBLE LAYER PCB PROTOTYPING (LPKF ROUTER SYSTEM)

The LPKF ProtoMat X60 are specially designed circuit board plotters ideal for most in-house prototyping applications where speed and safety are essential, including multilayer and RF applications. These circuit board plotters feature particularly large working areas, perfect for antennas, sensors, sign etching, depaneling and large circuit board substrates.

## CABLE TENSILE TESTING MACHINES (PULL TEST)

The pull test consists of applying an axial stress to a specimen until it breaks. The strain rate applied must be low in order not to distort the result. During the tensile test, the force and extension of the specimen are measured.

# SPECIALTY COATINGS SERVICES



In the Special Coatings Laboratory, processes related to thermal control coatings are developed, whether they are of the specific thermal paint type or multi-layered stacked coatings (MLI). Tailor-made preparation processes are carried out, as well as activities to ensure the quality of the environment and the inputs used.

These coatings, as components of the passive thermal control of a satellite or part of it, play a very important role given the extreme working conditions required by the space environment (high vacuum and wide thermal range). In this context, the coatings act as protection for the hardware on which they are applied, functioning as a heat shield or as a radiation medium to dissipate excess heat.

## TESTS // SERVICES

- Thermal analysis and design to adopt the optimal solution for the product in terms of coatings.
- Development of ad hoc processes for paint application (aeronautical or space) and final acceptance of treated parts.
- Design and manufacturing of MLI (multi-layer stacking).
- Thickness measurements of dry coatings on ferrous, non-ferrous and non-metallic substrates.
- Salt spray testing.
- Adhesion tests.
- Measurement of thermo-optical properties.

## FEATURES

- Air treatment that guarantees a 100 K type environment, with a quantity of 100,000 particles per cubic foot of air (Fed-std-209E Standard) and with controlled temperature and humidity (Temperature: 22 ± 3 °C, relative humidity: 55 ± 10 %), complying with the ISO 8 standard (ISO14644 standard) of the "European Cooperation for Space Standardization" (ECSS).
- 3 internal rooms with independent environmental control: a room type 100K with temperature, humidity and particle control for preparation activities; a room with temperature and humidity control, equipped with a suction front for painting activities; and another room type 100K with a wide range of temperature and relative humidity control, for customized curing of paints.

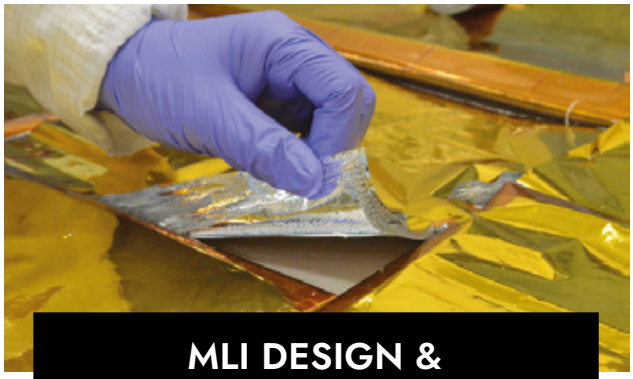
- Specific equipment for the preparation and treatment of high performance coatings: deionizer for obtaining high purity water (18 Megaohm), ball mill for grinding solid compounds, controlled paint storage system (safety cabinets and freezer), spraying equipment with HVLP technology, airbrushes for rework and adjustments, 3D printer for prototyping and manufacturing of process support devices.

# EQUIPMENT AND CAPABILITIES

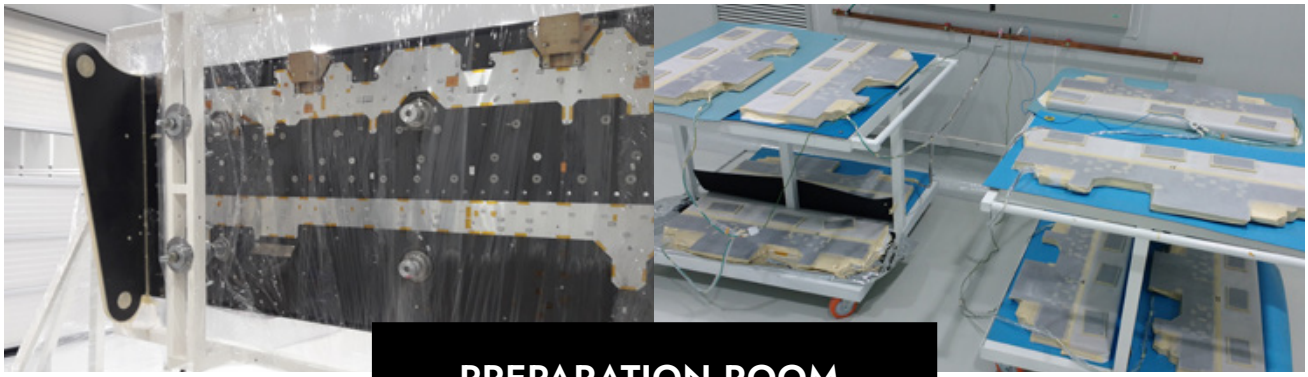
THERMAL-CONTROL COATING APPLICATION

CURING ROOM

MEASUREMENT OF THERMOPTIC PROPERTIES

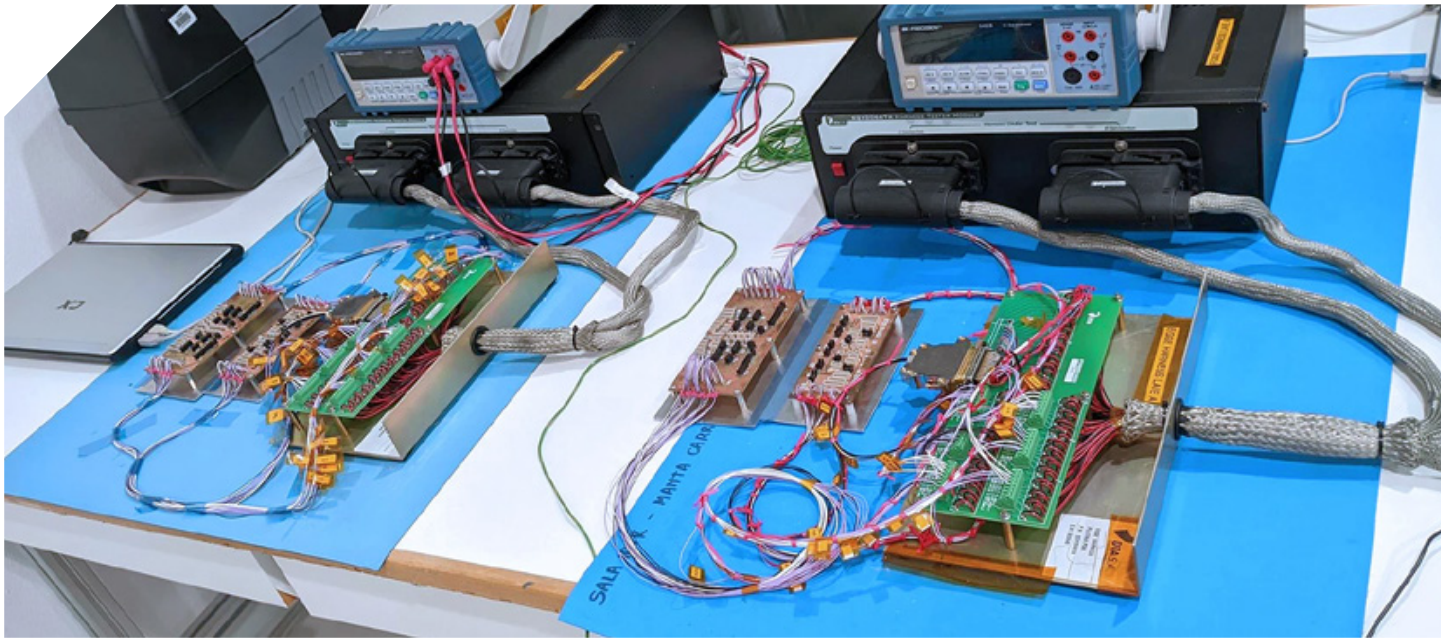


MLI DESIGN & MANUFACTURING



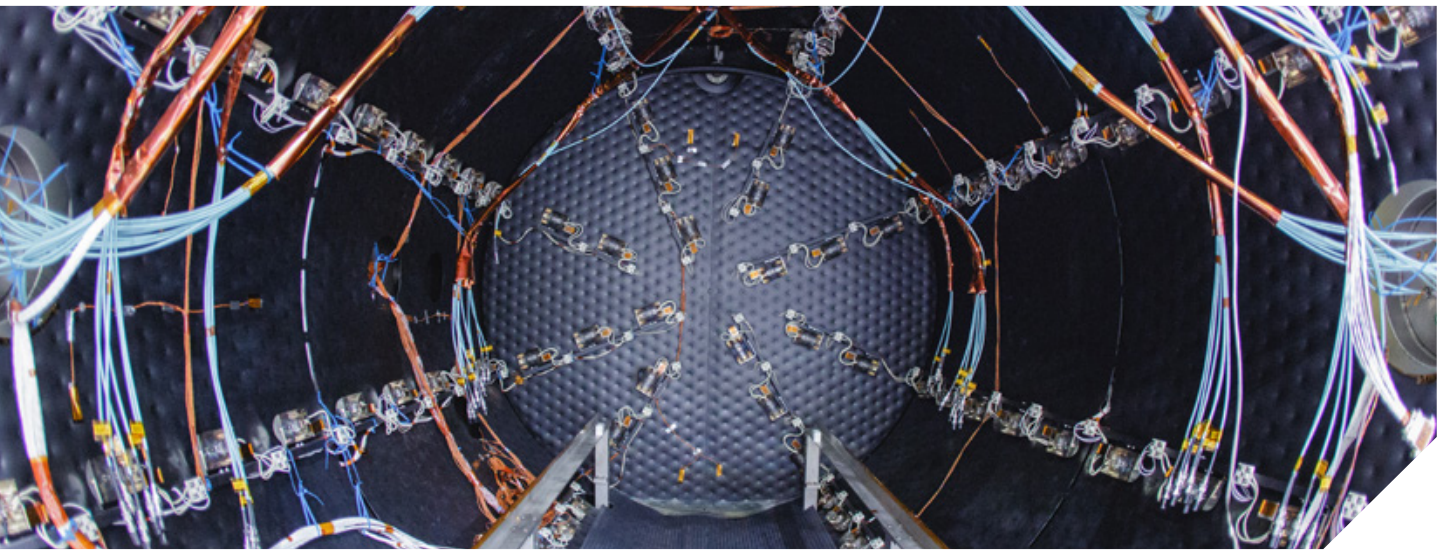
PREPARATION ROOM

# RF TESTING FACILITY



| | | |
|---|---|---|
| Performance Testing | Functional Test | **Radio Frequency Test (<50ghz)**<br>Noise figure measurement<br>False measurement<br>Pulsed radiofrequency signal test<br>Characterization of active/ passive devices (filters, amplifiers, others)<br>Environmental characterization test |
| Debug, Nonconformities | Calibrations | |
| MIL-1553 V&V | Grounding, Bonding and Insulation Tests | |

# INTEGRATION AND THERMAL TESTING SERVICES



In this laboratory, thermal and humidity tests are performed under vacuum or ambient conditions (atmospheric pressure). These tests make it possible to simulate the extreme conditions of the service environment of the assemblies or their components, in order to characterize their behavior or to guarantee their operation.

Thermal vacuum tests are part of the environmental tests that satellites must comply with in order to meet mission requirements and are therefore of utmost importance in the manufacturing cycle of any space part or component. Chambers that simulate space environment conditions, called thermo vacuum chambers, are used.

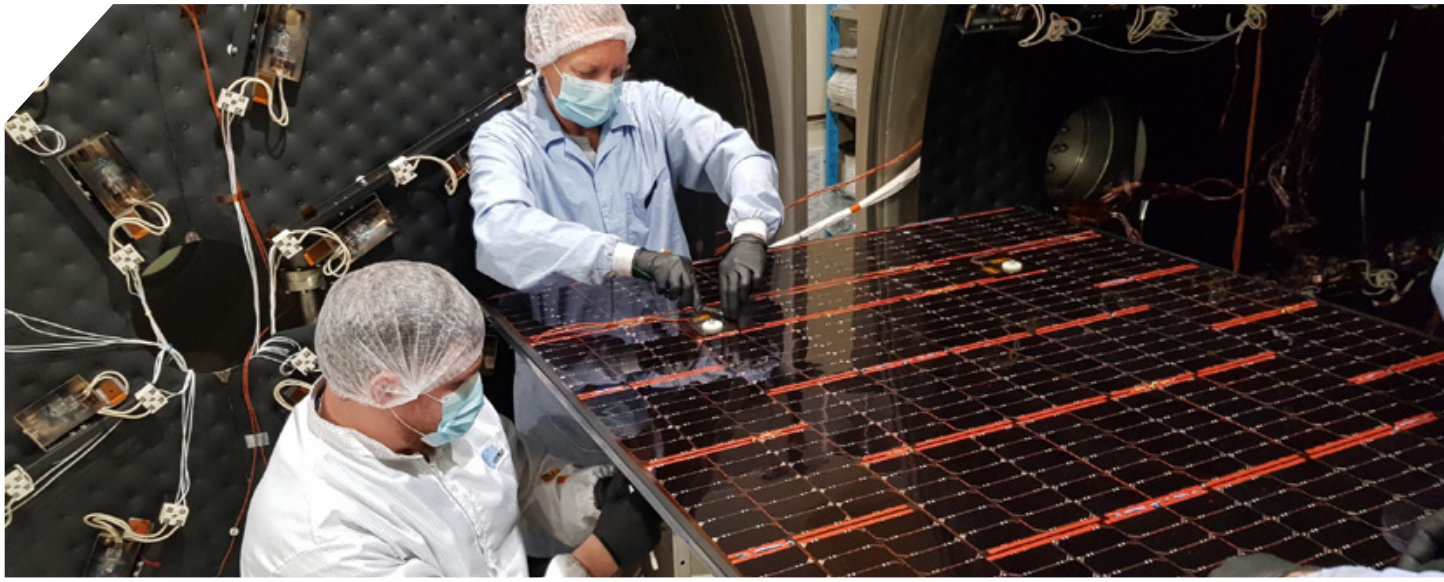
The tests performed on the ground consist of placing the satellite or part of it inside these chambers under high vacuum conditions and exposing them to different thermal conditions. The satellite has to be prepared to withstand abrupt temperature changes without altering its performance.

In addition, this laboratory integrates thermal components, such as temperature sensors, thermostats or heaters, which are responsible for controlling that the different elements of the satellite do not operate outside the critical ranges expected in flight.

# TESTS // SERVICES

| Thermo-vacuum tests | Environmental thermal cycling tests | Thermal shock test |
|---|---|---|
| Moisture testing | Integration of active thermal control elements | Bakeout (decontamination bakeouts) |
| Numerical simulation to predict the behavior of the devices under test | Engineering consultancy for test definition and planning | Calibration of temperature sensors |

Design of thermal MGSEs (mechanical support equipment) and thermal setups (equipment to set specific test conditions)



## FEATURES

- Air treatment ensuring a 100K type environment, with a particle count of 100,000 particles per cubic foot of air (Fed-std-209E standard) and with controlled temperature and humidity (Temperature: 22 ± 3 °C relative humidity: 55 ± 10 %), complying with ISO 8 (ISO14644 standard) of the "European Cooperation for Space Standardization" (ECSS). (ECSS).

- 2 internal rooms with independent environmental control: both rooms type 100K with temperature, humidity and particle control for preparation and integration activities.

- 3 thermo-vacuum chambers of different sizes adaptable to each device to be tested, with an operating range between -190°C and 130°C, controlled with halogen lamps or resistors for heating and liquid nitrogen for cooling; reaching a vacuum level in the order of $1x10^{-6}$ mbar in any of them, with the use of a 3-stage pumping system. More than one thousand temperature sensors available for monitoring the tests.

- 2 Environmental chambers for thermal cycling tests with temperature control between -75°C and 180°C and humidity between 5%RH and 98%RH.

- Laboratory equipped with "work islands" around each chamber, which allow performing integration tasks and preparation of tests at the foot of the machine, also having a bridge crane for handling larger loads.

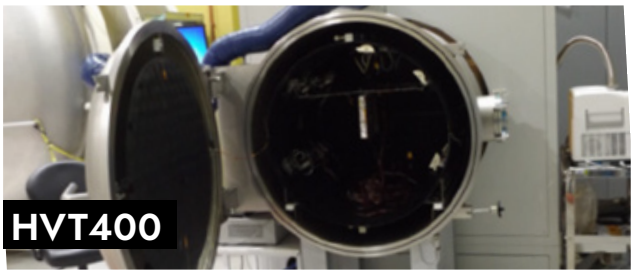
- Control room isolated from the test sector, to monitor the tests with each of the thermo-vacuum and environmental chambers, providing greater comfort to the personnel in the operation and at the same time preventing risks associated with the work.

- Standard equipment for the calibration of temperature sensors, with an operating range between -100°C and 155°C.

- Permanent oxygen level monitoring system throughout the laboratory for the use of liquid and gaseous nitrogen, and a centralized alarm system that warns of a nitrogen leak.

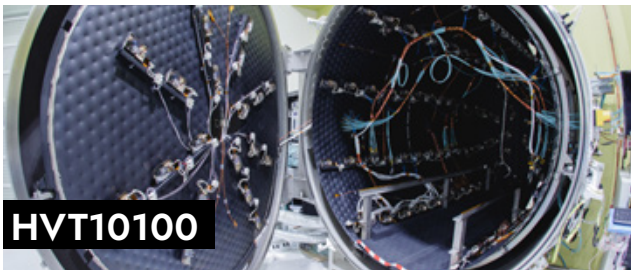
- Controlled stock system for the storage of components and supplies.

# EQUIPMENT



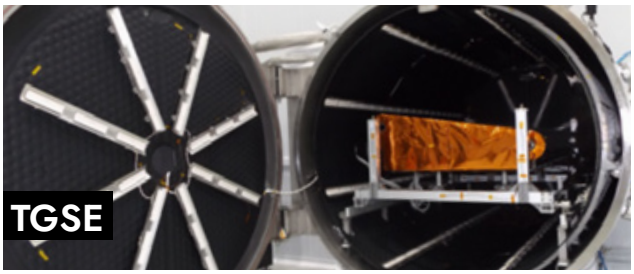
## HVT400

| | |
|---|---|
| **USEFUL VOLUME** | 316 liters |
| **USEFUL MEASUREMENTS** | 710 mm diameter<br>800 mm depth |
| **LAST PRESSURE** | 1x10-6mbar |
| **TEMPERATURE RANGE** | -190°C / 130°C |
| **MAX. WEIGHT (DUT)** | 40 kg |



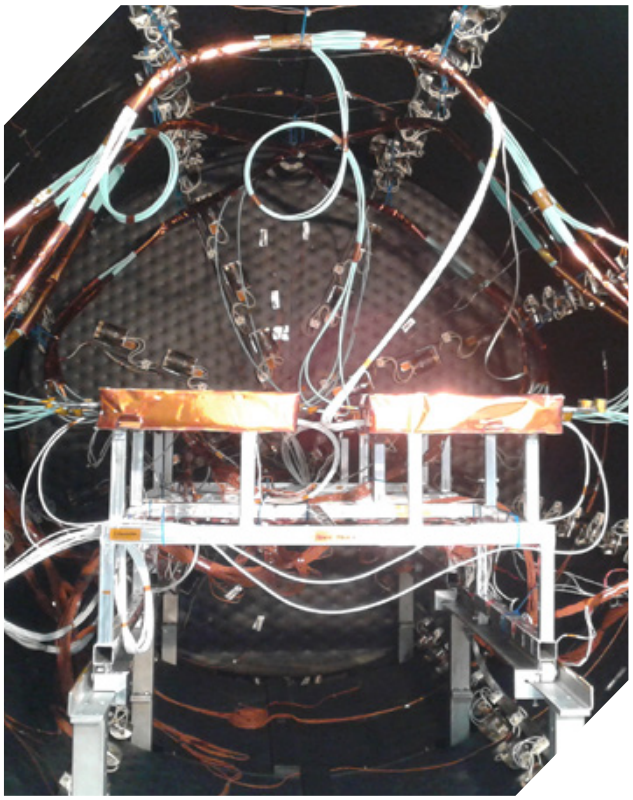
## HVT10100

| | |
|---|---|
| **USEFUL VOLUME** | 9500 liters |
| **USEFUL MEASUREMENTS** | 2050 mm diameter<br>3030 mm depth |
| **LAST PRESSURE** | 1x10-6mbar |
| **TEMPERATURE RANGE** | -190°C / 130°C |
| **MAX. WEIGHT (DUT)** | 200 kg |

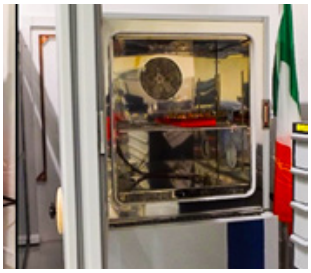


## TGSE

| | |
|---|---|
| **USEFUL VOLUME** | 31230 liters |
| **USEFUL MEASUREMENTS** | 2560 mm diameter<br>5000 mm depth |
| **LAST PRESSURE** | 1x10-6mbar |
| **TEMPERATURE RANGE** | -190°C / 130°C |
| **MAX. WEIGHT (DUT)** | 500 kg |




DY500



| | |
|---|---|
| **USEFUL VOLUME** | 454 liters |
| **USEFUL MEASUREMENTS** | 880 mm width<br>580 mm depth<br>890 mm high |
| **LAST PRESSURE** | -75°C / 180°C |
| **TEMPERATURE RANGE** | 5% / 98% |
| **MAX. WEIGHT (DUT)** | 50 kg |

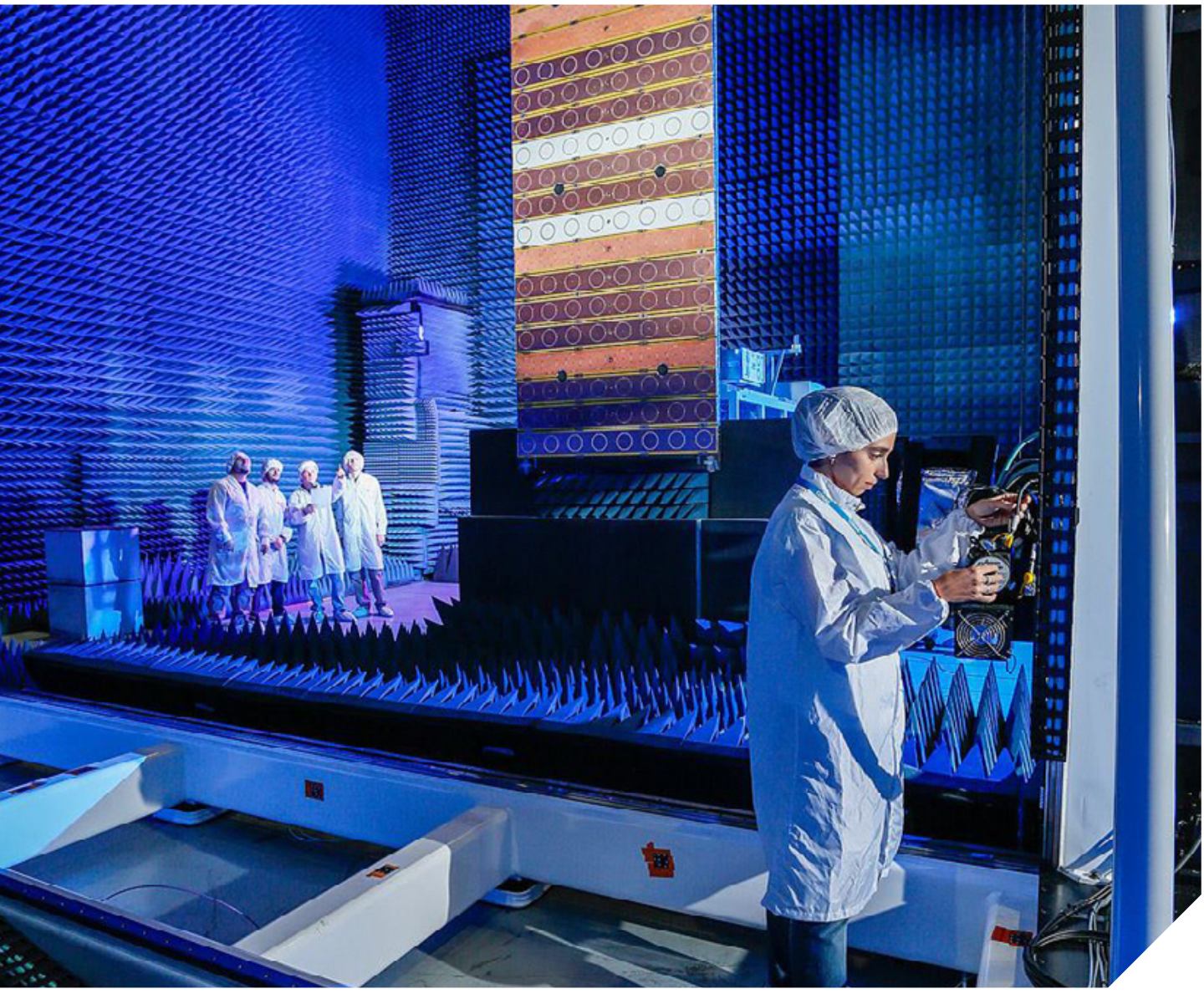

DY1400

| | |
|---|---|
| **USEFUL VOLUME** | 1368 liters |
| **USEFUL MEASUREMENTS** | 1000 mm wide<br>1342 mm deep<br>1020 mm high |
| **LAST PRESSURE** | -75°C / 180°C |
| **TEMPERATURE RANGE** | 5% / 98% |
| **MAX. WEIGHT (DUT)** | 50 kg |

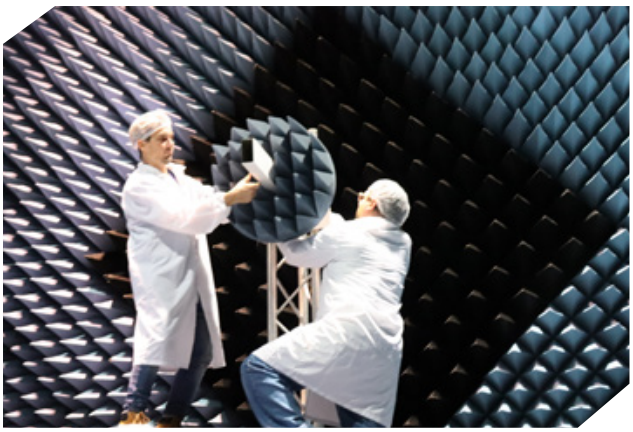

**TEMPERATURE CALIBRATOR**

| | |
|---|---|
| **OPERATING RANGE** | -100°C to 155°C |

# ANTENNA DESIGN AND TESTING SERVICES

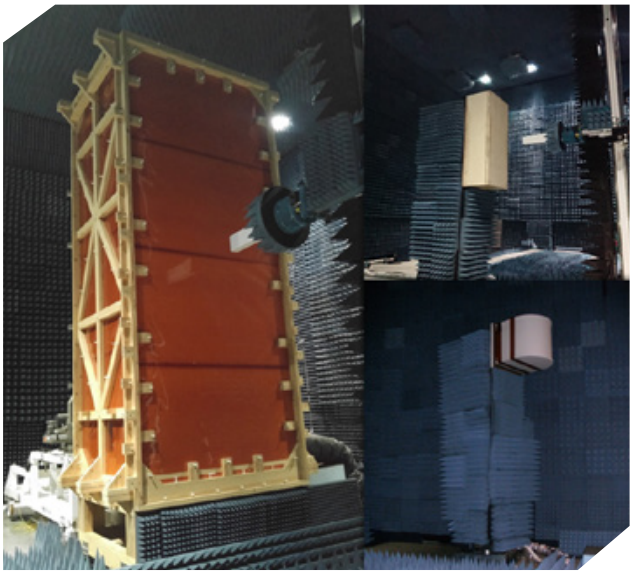


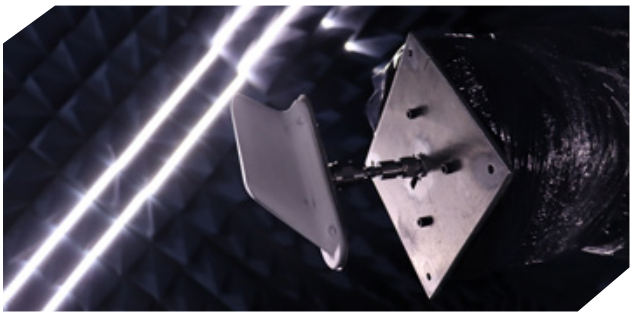
In the Antenna Design and Testing Laboratory facilities, tests related to the functional parameters of the antennas can be performed, such as: radiation properties, S-parameters, power, among others. In addition, the available Anechoic Chambers are also suitable for acoustic tests. In terms of development, design and construction of antennas are available options.



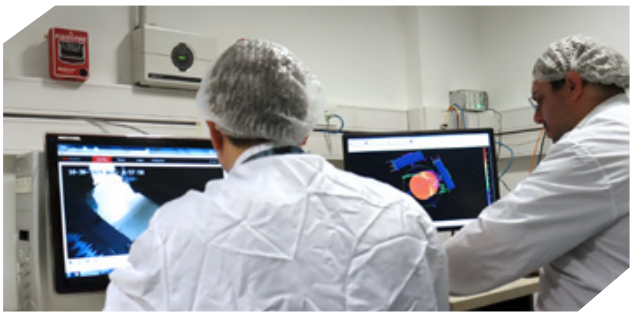
**LaMA has 3 Anechoic Chambers of different sizes**, equipped with high quality measuring instruments, which allow performing different types of tests according to the requirements requested by the customers. The coordinate systems that can be used are *Planar, Cylindrical and Spherical*.

In addition, it is able to perform tests at different temperatures by inserting the antennas inside the **Cámaras Térmicas** available in the laboratory. In particular, for cylindrical coordinates and small or medium-sized antennas (dimensions up to 1.5 m x 0.5 m x 0.5 m), the thermal measurement range is from -100°C to 100°C; while in the planar system and for large antennas (up to 1.5 m x 3.5 m x 1 m), the same is from -60°C to 70°C.





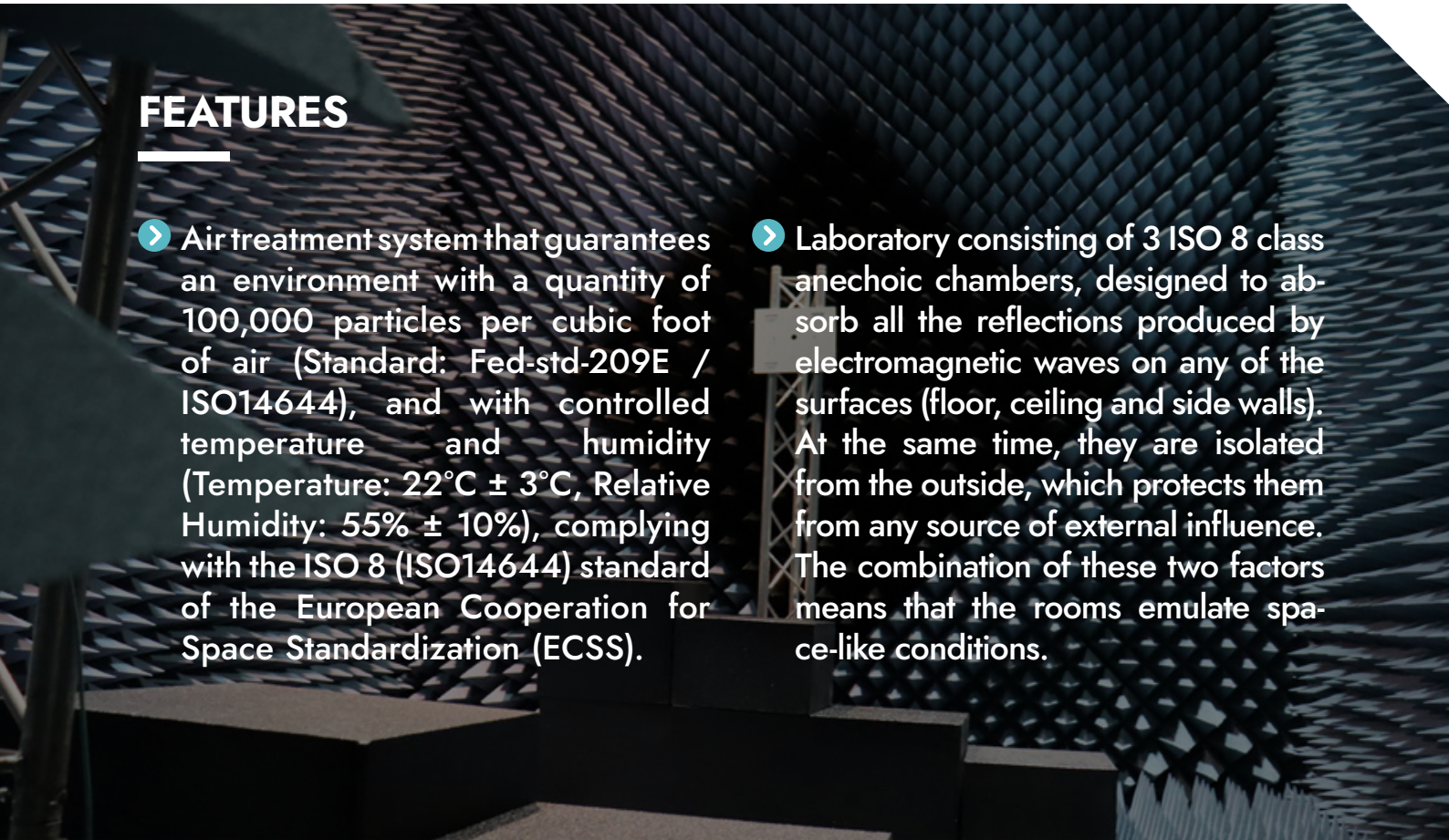
In the case of **Power Handling** tests, the available frequency range is between 800 MHz and 3 GHz.



**Antenna designs and analysis** are performed with commercial software using finite element methods applied to electromagnetic structures.

## ACTIVITIES // SERVICES

| | | |
|---|---|---|
| Radiation testing between 300 MHz and 40 GHz | High power testing between 800 MHz and 3 GHz | Radiation tests in spherical configuration: 360° x 360° |
| Radiation tests in cylindrical configuration: 5.4 m x 360° | Radiation tests in planar configuration: 11 m x 5.4 m | Radiation vs. temperature tests from -100°C to 100°C (maximum range) |
| S-parameter measurements | Acoustic testing | |



## FEATURES

- Air treatment system that guarantees an environment with a quantity of 100,000 particles per cubic foot of air (Standard: Fed-std-209E / ISO14644), and with controlled temperature and humidity (Temperature: 22°C ± 3°C, Relative Humidity: 55% ± 10%), complying with the ISO 8 (ISO14644) standard of the European Cooperation for Space Standardization (ECSS).
- Laboratory consisting of 3 ISO 8 class anechoic chambers, designed to absorb all the reflections produced by electromagnetic waves on any of the surfaces (floor, ceiling and side walls). At the same time, they are isolated from the outside, which protects them from any source of external influence. The combination of these two factors means that the rooms emulate space-like conditions.

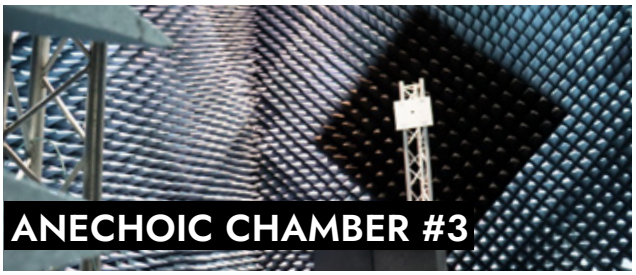
# EQUIPMENT


### Dimensions: 12.5 m x 13.5 m x 8.5 m (depth x width x height)

It has a Near Field System Inc. (NSI-MI) measurement system, which is composed of angular displacement axes in Azimuth, Pol and Phi, and linear displacement in X, Y, Z.


### Dimensions: 4.9 m x 2.6 m x 1.6 m (depth x width x height)

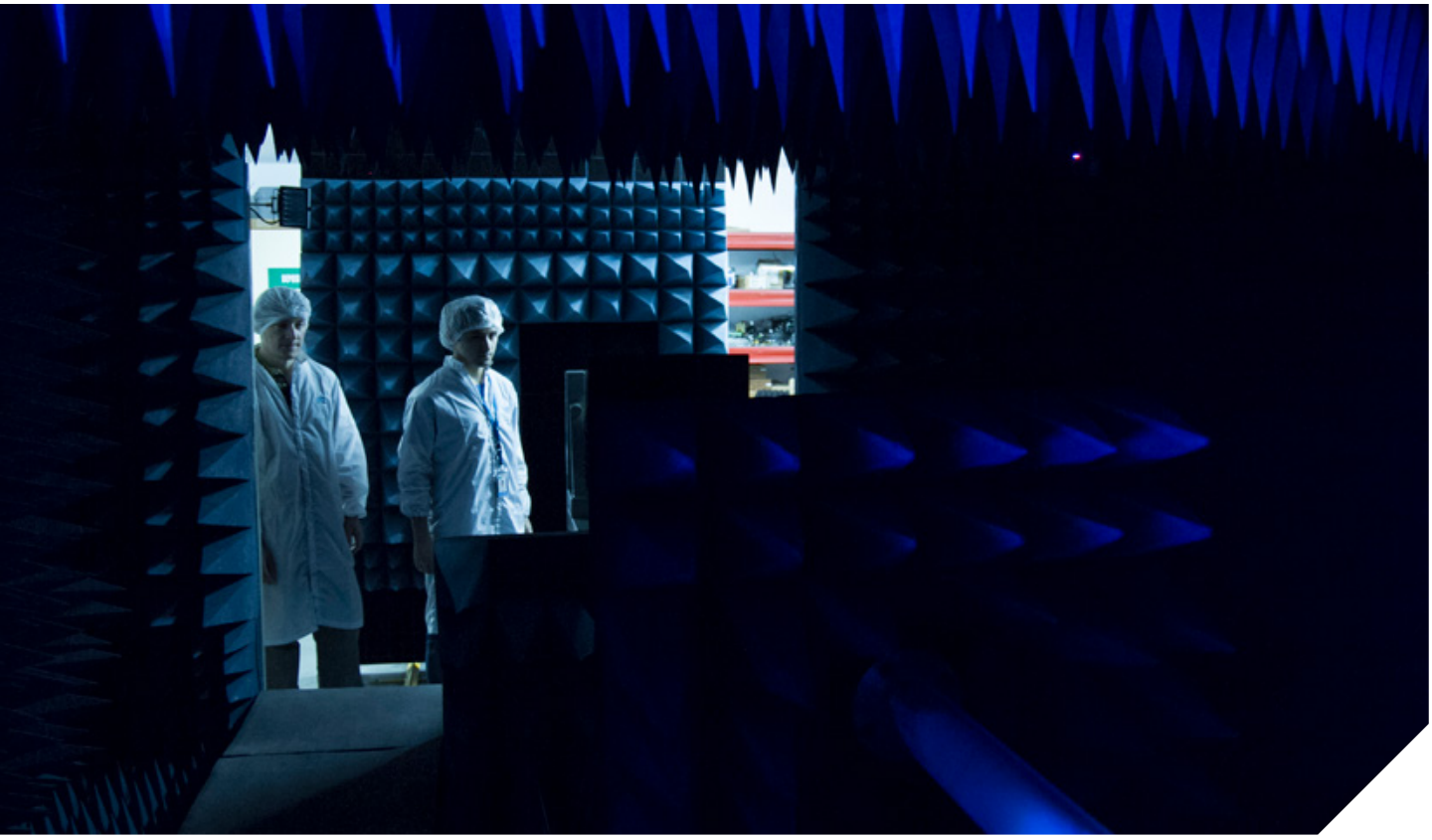
It has a Near Field System Inc. (NSI-MI) measurement system, composed of angular displacement axes, in Azimuth, Pol and Phi.




### Dimensions: 7.23 m x 5.95 m x 7 m (depth x width x height)

It has a **Vector Network Analyzer** that is mainly used in this chamber for antenna calibration (Brand: Agilent, Model: N5245A).

# ELECTROMAGNETIC COMPATIBILITY SERVICES



LaCEM performs all electromagnetic compatibility testing, analysis, measurement, evaluation and reporting services in a complete and reliable manner.

Electromagnetic compatibility testing (EMC) is essential to ensure that electronic devices and systems can operate correctly in an electromagnetic environment and avoid unwanted interference that may affect their operation or that of other nearby devices. These tests are governed and regulated under strict standards such as IEC (International Electrotechnical Commission), for the industrial and scientific part, MIL-STD (military standard) for the aerospace part, etc.

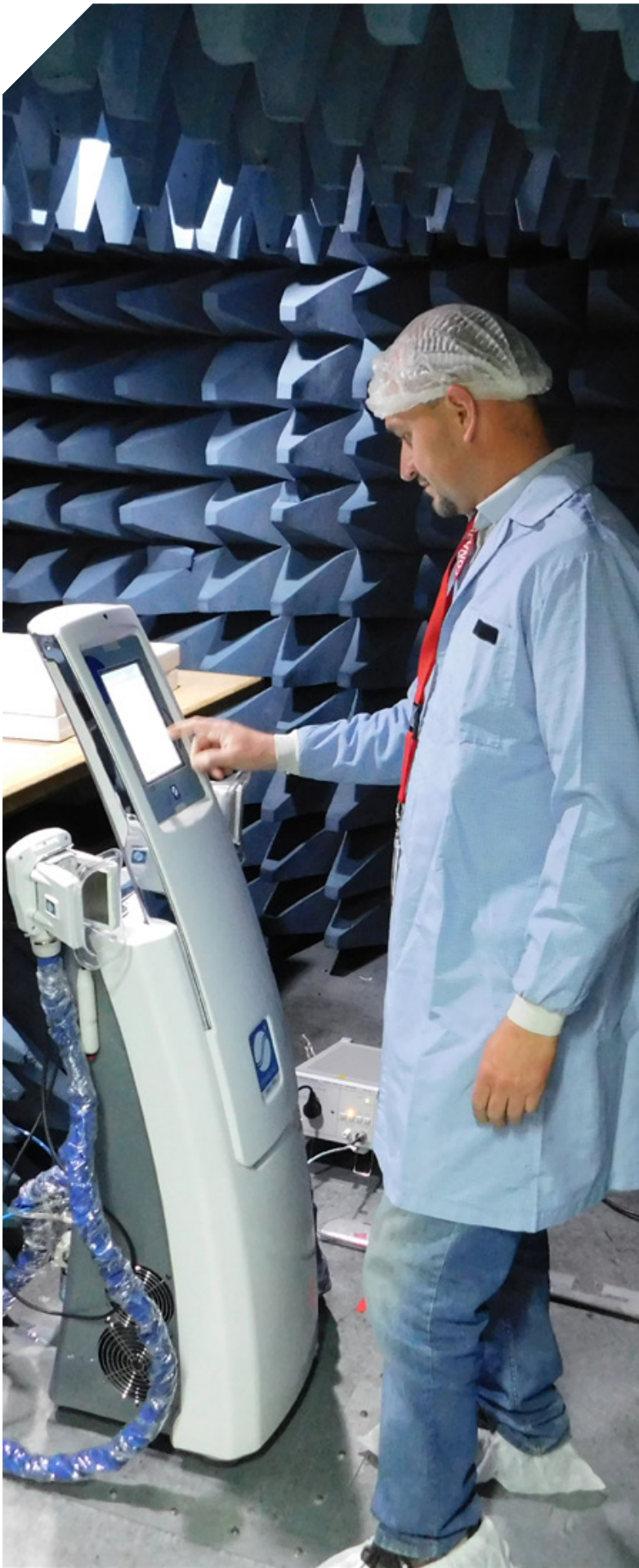
# TESTS

**Emission test (conducted and radiated)**
This test is performed to measure the amount of electromagnetic energy that a device emits. The amount of energy is measured at different frequencies to ensure that it does not exceed the limits set by regulatory agencies.

**Immunity test (conducted and radiated)**
This test is performed to measure the ability of a device to resist the effects of electromagnetic interference from its environment. The device is subjected to a variety of interference conditions, such as radio waves, magnetic fields and electrical transients to measure its resistance.

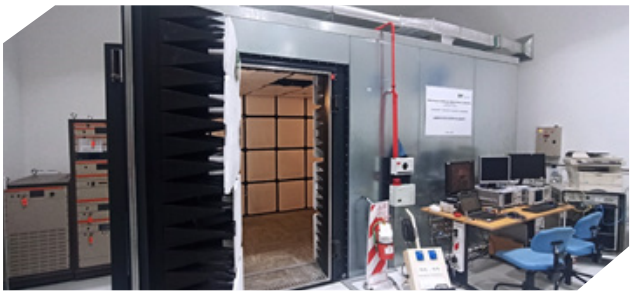
**Electrostatic discharge test**
This test is performed to measure the ability of a device to withstand electrostatic discharge (ESD) and prevent failure or damage. The device is subjected to high voltage discharges to verify its resistance capability.

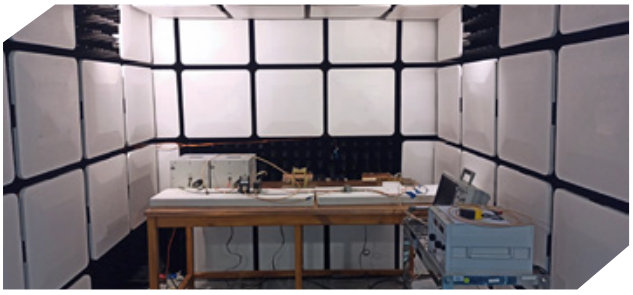
In addition, pre-compliance tests are performed, providing assistance and advice to industries that manufacture equipment with electronic systems, in order to guide them in the solution of design and development problems through tests, to comply with the required standards and thus be able to market the products they manufacture.



## EQUIPMENT

The laboratory consists of two semi-anechoic chambers. One of the chambers is located in a class 100,000 room, with a frequency range from 9KHz to 18GHz, with amplitudes up to 200V/m. The other chamber is 1m for subsystems, with a frequency range from 10K to 18Ghz with field amplitudes up to 100V/m.





## SERVICES

| | | |
|---|---|---|
| Emissions conducted | Conducted susceptibility | Radiated emissions |
| Radiated susceptibility | Grounding | Bonding |
| Isolation | ESD | Inrush (In voltage and current) |
| BCI | Spurious | Safety |
| | Thermography control | |

# WE OFFER TESTING FOR THE FOLLOWING STANDARDS

# PRECISION METROLOGY SERVICES

Spatial quality precision metrology service and solutions, with the ability to measure and align complex parts/structures under the highest quality standards.


## FARO LASE TRACKER VANTAGE

It is an extremely accurate, portable coordinate measuring machine that enables you to build products, optimize processes, and deliver solutions by measuring quickly, simply and precisely.

**Distance measurement performance**

**Resolution**
0,5µm

**Precision (MPE)**
16µm + 0,8µm/m

**Angular measurement performance**

**Angle precision (MPE)**
20µm + 5µm/m

**Precision Level Accuracy**
±2 arc sec

# GEODETIC SYSTEMS V-STARS M PHOTOGRAMMETRY

V-STARS M employs multiple cameras and operates as a portable optical coordinate measurement machine (CMM) to provide 3D coordinate measurement in real-time, in both stable and unstable environments, at a rate of up to 10 points per second. V-STARS M employs two or more custom-built digital cameras, presently either INCA4 or DynaMO high-speed, high resolution cameras, to make accurate, real-time measurements of static or dynamic objects, through use of wireless operated tactile probes, retro-refective targets or projected PRO-SPOT points.

## INCA4

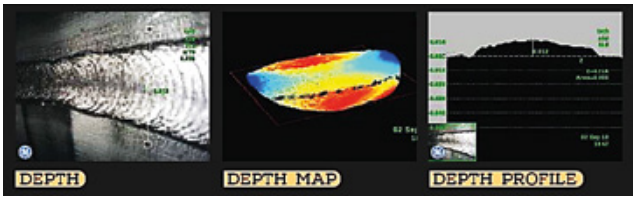
**Accuracy**
9µm+9µm/m o 1:90.000

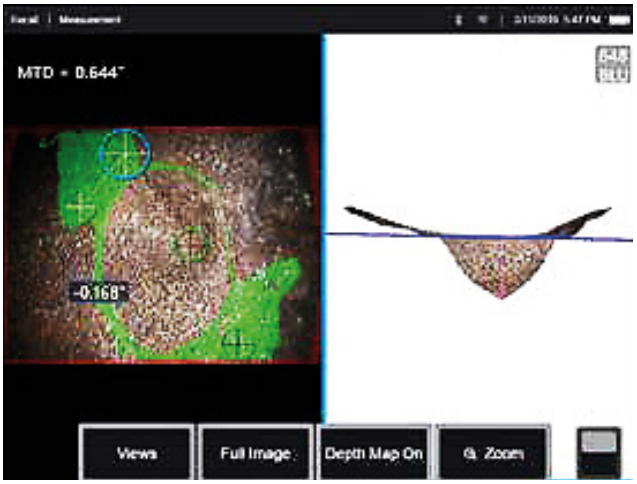
## Dynamo D5

**Accuracy**
14µm+14 µm/m or 1:60.000

## PRO-SPOT

**Point density**
600 to 23.000 pts




# MENTOR VISUAL IQ

These videoscopes allow mapping, measuring and analyzing 3D indications and improving probability of detection (POD) by verifying the job in real time. Mentor Visual iQ provides the processing power to operate 3D phase measurement and 3D stereo measurement with point cloud analysis.

### Diameter Probe

4.0 mm (0.16"), 6.1 mm (0.24"),

8.4 mm (0.33)

### Image Sensor

1/6" Color Super HAD™ CCD camera

(6.1) 1/10" (4.0 mm)

### Pixel Count

440,000 pixels


Leica

# MECHANICAL ENGINEERING

The Aeronautical Mechanical Engineering team of VENG has extensive experience linked to the flow of MAIT (Manufacturing, Assembly, Integration and Testing) of space systems, based on the main standards of this industry, such as NASA and ESA. Notwithstanding the specificity of these disciplines, it has been possible to transfer this knowledge to other sectors, such as general industry, aeronautics and nuclear.

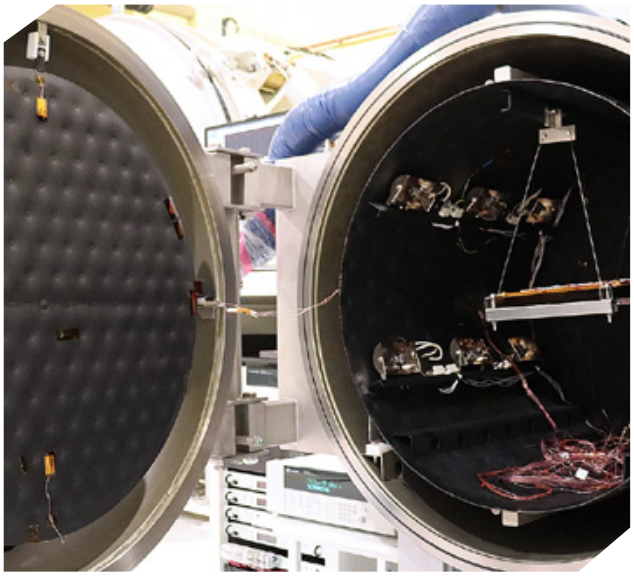
The team has outstanding professionals in the design and analysis of mechanical and thermal specialties; using state-of-the-art tools, such as SolidWorks and Ansys software. In addition, it is highly skilled in the elaboration of test plans, in order to close the verification and validation cycle of the designed systems.

## INDUSTRIAS

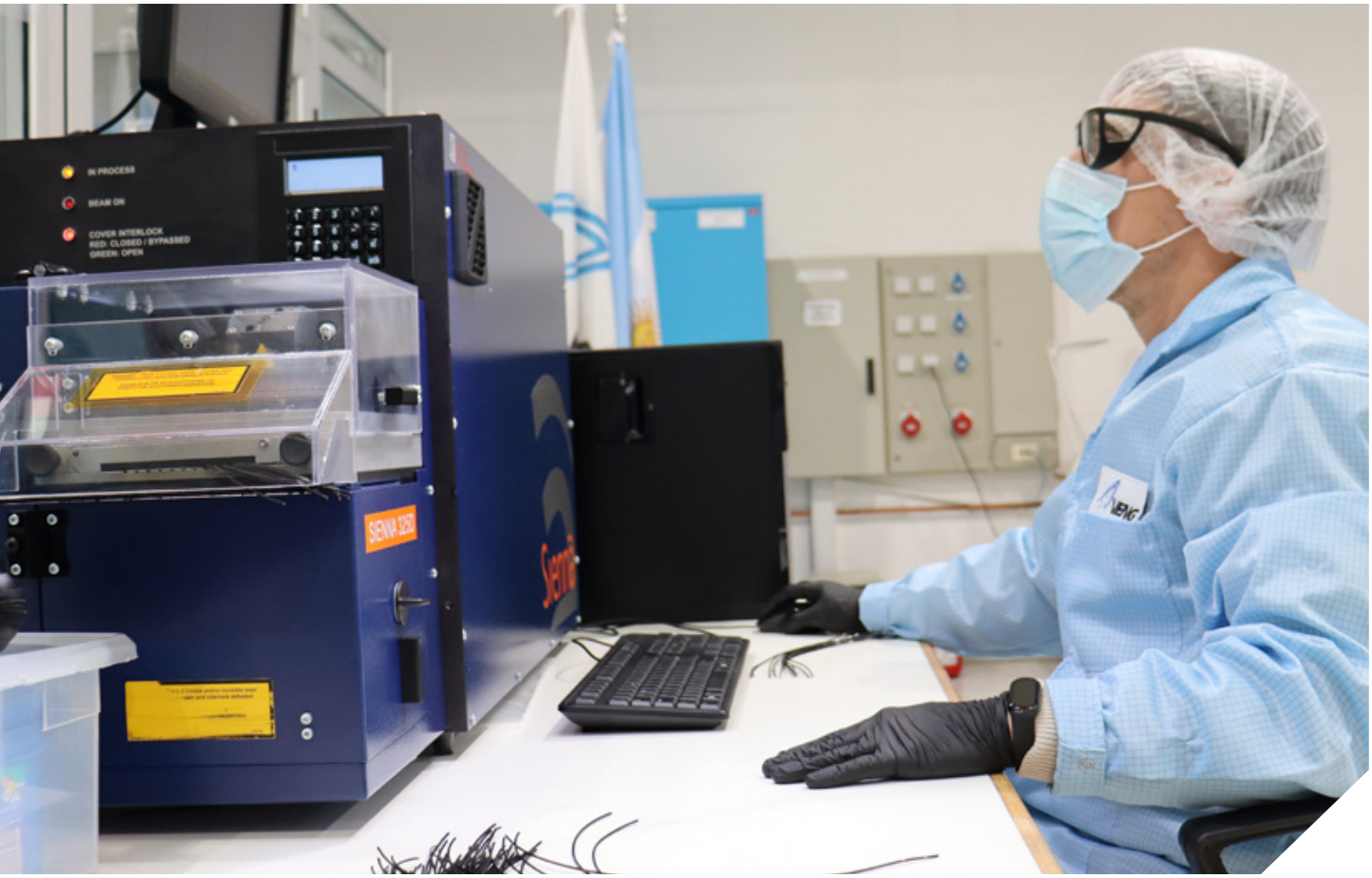
- Aeronautics
- Space
- Oil & Gas
- Nuclear
- General Industry

# SERVICES

- Mechanical design of devices and structures associated with different industries.
- Design of thermal control systems for the aerospace industry.
- Thermal and structural analysis through computational simulation.
- Design and implementation of manufacturing, assembly and integration processes for mechanical and thermal subsystems.
- Design of test plans for verification and validation of systems.



# ELECTRONICS ENGINEERING




The electronics engineering team has extensive experience in the design of satellite instrument systems and subsystems, with a primary focus on SAR missions, such as the successful SAOCOM missions and the upcoming Sabia-Sea mission. In addition, we have applied our knowledge and experience in a variety of industries, including aeronautics, petroleum and Oil & Gas, as well as projects related to radar, defense and special process automation.

For the management of our designs we adhere to the engineering standards established by ESA and NASA, adapting them to the specific needs of each project. For PCB design, we have engineers certified by IPC standards for space applications, guaranteeing excellence in every detail. We are currently in the process of obtaining ISO 9001 certification, which is expected to be completed by the end of 2024.

As for our tools and technologies, we work with state-of-the-art software, including LabVIEW, Altium, Feko, ANSYS and SolidWorks, among others. In addition, we have multipurpose equipment, such as NI PXI modules, which allow us to carry out functional tests and rapid tests efficiently.

## INDUSTRIES

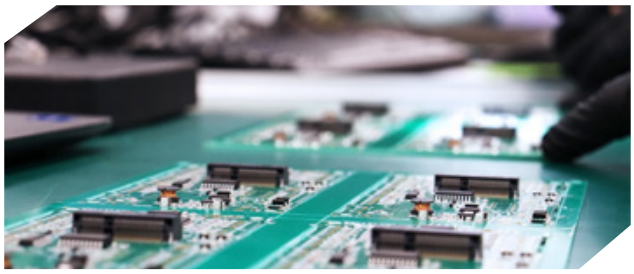
- Aeronautical-Military
- Aerospace
- Oil & Gas
- Defense
- Diverse industries (Automotive, IT, food, agriculture, etc.)

## SERVICES

- Analysis, design and implementation of electronic hardware devices with commercial, industrial, military and aerospace quality.
- Specialized design of PCBs for high reliability projects based on IPC standards, for military and/or aerospace applications.
- Analysis, design and implementation of firmware, software and embedded software for digital and high speed applications.
- Analysis, design and implementation of electronic systems for product testing.
- Research of electronic systems for implementation of custom applications.

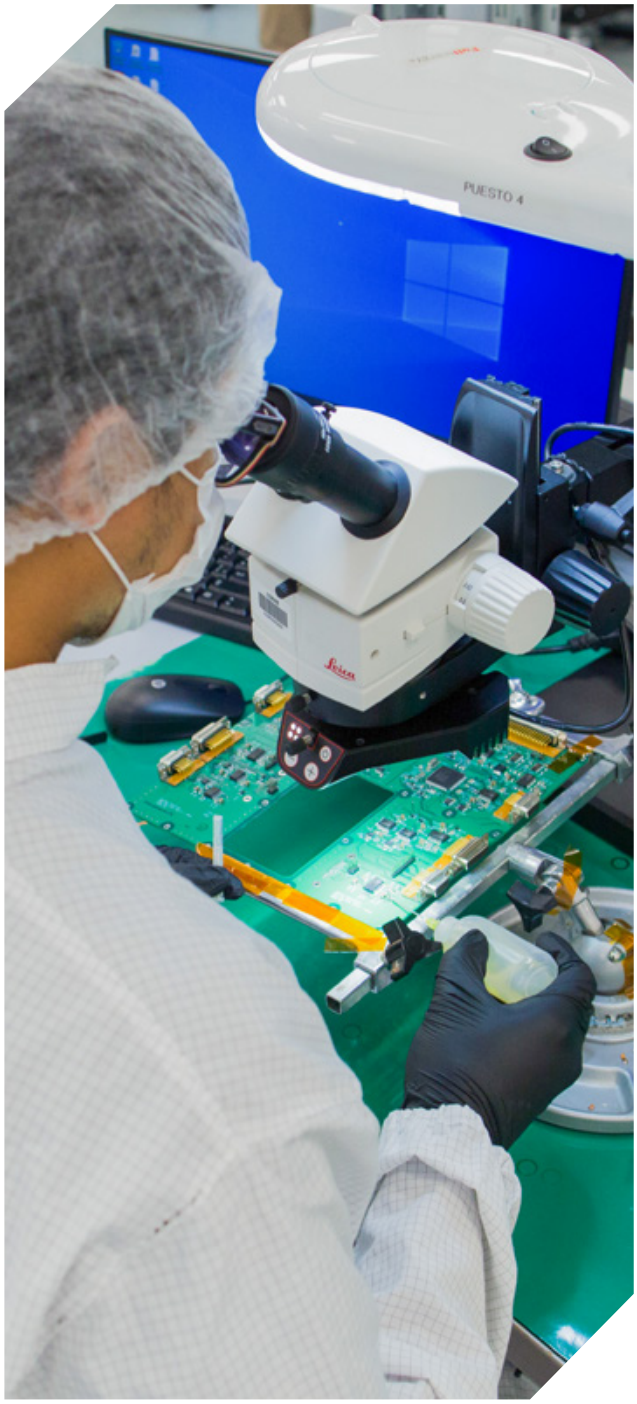
# SURFACE-MOUNT TECHNOLOGY (SMT)

We offer a high quality electronic board assembly service, suitable for both industrial and space applications. We are guided by IPC standards, from industrial standards IPC-A-610 and IPC-J-STD-001 to the most stringent space requirements.



We have automated SMT technology and manual soldering technology for both surface mount and insertion, which allows us to adapt to various assembly needs. Each plate is inspected and validated to ensure durability and reliability, meeting the most demanding customer and regulatory requirements.

With high quality automated SMT (Surface-Mount Technology), we have the capacity to assemble electronic boards, adapted to the specifications of each customer and ensuring maximum durability and reliability. We use advanced machinery to achieve maximum precision and reliability in each project.




## JUKI G TITAN

Equipped with automatic paste dispensing system for uniform and precise application.

| | |
|---|---|
| **PCB SIZE** | Min. 50mm x 50mm<br>Max. 510mm x 510 mm |
| **ADJUSTABLE INSOLE FRAME SIZE** | Min. 470 x 370mm<br>Max. 737 x 737mm |
| **PUNE HEIGHT** | 0.4mm to 6mm. |

## VAC745

Vapor-phase soldering machine with a specialized vacuum system to remove porosities from the solder. This system significantly improves reliability by eliminating air bubbles and ensuring homogeneous heat distribution, ideal for sensitive components and complex assemblies.

## JUKI RS-1R

Capable of placing up to 50,000 components per hour, equipped with an adaptable 8-nozzle placement head, allowing fast and accurate assembly of various components.

**One LNC-120 multi-nozzle 3D laser alignment system with eight nozzles**

| | |
|---|---|
| **PUNE HEIGHT** | 1mm, 6mm, 12mm, 20mm, 25mm |
| **PCB SIZE** | 370mm W x 650mm L (Max) |

| | |
|---|---|
| **PCB SIZE** | 600 x 500 mm |
| **DOBLE LAYER** | |

**Leaded and lead-free soldering capability**

# MANUAL WELDING AND AEROSPACE QUALITY INSPECTIONS

## CAPABILITIES

- Electronic Manufacturing Engineering
- PCB design review, for implementation of inspections and workmanship requirements
- Manual SMD Soldering and Insertion

## INSPECCIONES

- Visual Inspection
- RX Inspection
- Solderability Test

## REFERENCE STANDARDS

- IPC 610, J-STD- 001, IPC 620, IPC 7721/11, IPC A 600
- J-STD-001 Spatial Appendix
- 
- ECSS-Q-ST-70-08, ECSS-Q-ST-38, ECSS-Q-ST-70-61

# SPECIAL MACHINING

## VERTICAL CNC LATHE


| | |
|---|---|
| **DISTANCE BETWEEN ENDS** | 1250mm |
| **MAXIMUM TURNING DIAMETER** | 1250mm |
| **MACHINABLE HEIGHT** | 1500mm |
| **MACHINABLE DIAMETER** | 1500mm |
| **MAX. WEIGHT** | 6 Tn |
| **AXIS Z** | 900mm |


| | |
|---|---|
| **BED DIAMETER** | 3000mm |
| **CONE** | BT 50 |
| **PROGRAMMABLE DIVIDING CHUCK** | 0° — 360° |
| **MAX. MACHINABLE DIAMETER** | 3400mm |
| **MAX. MACHINABLE HEIGHT** | 2000mm |
| **MAX. WEIGHT** | 22.000kg |
| **FIXED TOOL POST** | 90° |
| **DIVIDING TOOL POST** | 0° — 90° |

## HORIZONTAL CNC LATHE

ACRA FEL 6080 CN

| | |
|---|---|
| **DISTANCE BETWEEN ENDS** | 2250mm |
| **MAX. Ø ADMISSIBLE ON BEDPLATE** | 1500mm |

## WIRE CUT MACHINE

AGIE CHARMILLES CUT 30P

| | |
|---|---|
| **U-V =** | +/- 50mm |
| **WORKING VOLUME** | 1030x800x350mm |
| **MAX WEIGHT** | 1 Tn. |
| **X AXIS** | 600mm |
| **Y AXIS** | 400mm |
| **Z AXIS** | 350mm |

## ELECTRO-EROSION MACHINE

AGIE CHARMILLES FORM 30

| | |
|---|---|
| **WORKING VOLUME** | 1200x800x500mm |
| **MAX. WEIGHT** | 1 Tn. |
| **MAX ELECTRODE WEIGHT** | 100 Kg. |
| **X AXIS** | 600mm |
| **Y AXIS** | 400mm |
| **Z AXIS** | 400mm |

# CNC MILLING CENTER

## HAAS VM6

| | |
|---|---|
| **BED DIMENTIONS** | L1626mm x 813mm |
| **MAX. HEIGHT** | 762 y 300 mm |
| **MAX POWER** | 30 Hp |
| **MAX SPEED** | 12000 rpm |
| **MAX WEIGHT** | 1814kg |
| **CONE** | BT40 |

## HAAS VF3YT

| | |
|---|---|
| **BED DIMENTIONS** | L1372mm x 635mm |
| **MAX. HEIGHT** | 749mm |
| **MAX POWER** | 30 Hp |
| **MAX SPEED** | 8100 rpm |
| **MAX WEIGHT** | 1588k |
| **CONE** | BT40 |

# SPECIAL WELDING: FRICTION STIR WELDING CENTER (FSWC)

A solid-state welding process where a non-consumable tool is used to join two parts without melting the part material. This allows very high joint efficiencies to be achieved in alloys where conventional welding (melting) degrades the mechanical properties by a high percentage. Friction stir welding is therefore widely used in the space, naval and military industries to weld mainly aluminum alloys.

| | |
|---|---|
| **MANUFACTURER** | Nova Tech Engineering Inc. |
| **GEOMETRY** | Longitudinal, circumferential welds |
| **JOINTS** | Stopper, Overlapped |
| **MATERIALS** | Aluminum alloys |
| **THICKNESS** | 2,4 mm – 13 mm |
| **WELDING LENGTH** | 2600 mm (max) |
| **TOOL RPM** | 5 rpm – 2000 rpm |
| **MAXIMUM LOAD** | 53400 N |
| **MAXIMUM TORQUE** | 450 Nm |

## AUTOMATIC GTAW WELDING MACHINE // AMI M415

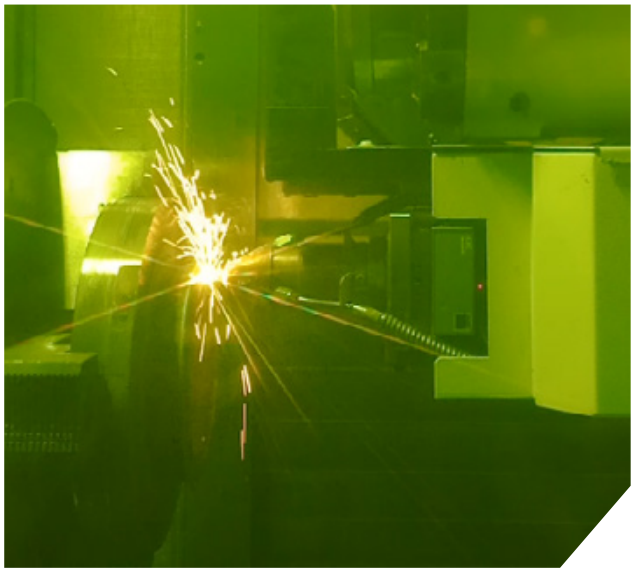

| | |
|---|---|
| **OUTPUT CURRENT RANGE** | 5A – 400A |
| **CURRENT TYPE** | Continuous or Pulsed Direct Polarity |
| **AUTOMATIC ARC CONTROL** | 5VDC – 25VDC |

### WELDING HEAD - AMI MODEL 15

| | |
|---|---|
| **CONTRIBUTION FEED RATE** | 5 – 200rpm |
| **TRANSFER SPEED** | 0,1 – 20rpm |

# DEVELOPMENT OF ADDITIVE MANUFACTURING PRODUCTS

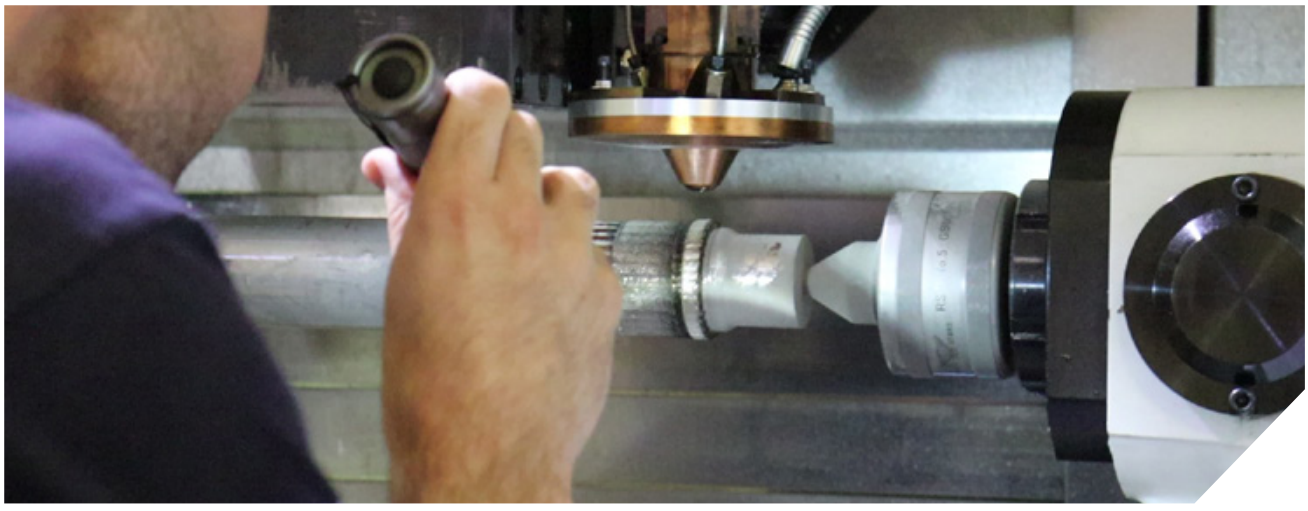
Additive manufacturing services, ranging from state of the art 3D metal printing (DMD) to electroplating facilities. This state of the art manufacturing service allows as to develop complex metal components with a high manufacturing efficiency.



## 3D DMD ADDITIVE

OKUMA MULTUS U4000

| | |
|---|---|
| **MAX. DIAMETER** | 650 mm |
| **MAX. LENGHT** | 112 g |
| **STANDARD SPINDLE SPEED** | 4.200 [3.000] rpm |



# CARBON FIBER WINDINGS

Design services and winding of composite materials. With the capacity to manufacture large pieces, of about 1500 mm in diameter and 9000 mm in length, with optimal mechanical vs weight performance.

## RACKS FOR GAS STORAGE

These RACKS provide a solution to contain and transport 18 to 36 kg of H2 at ambient temperature, storing the gas at a pressure of 400 bar.

# SPECIAL HEAT TREATMENTS

High quality Brazing and Heat Treatment services in controlled atmosphere and high vacuum environment. This service ensures space industry grade quality mechanical properties and surface finish.

## SERVICES

| | | |
|---|---|---|
| Non-conventional welding process. Brazing | High temperature (1370°c) and high vacuum (1×10-⁶mbar) furnace | Work in controlled atmosphere (NG2) or vacuum |
| Customized temperature profiles for different heat treatments | Process monitoring and post-processing of data | |

# VERTICAL VACUUM FURNACE

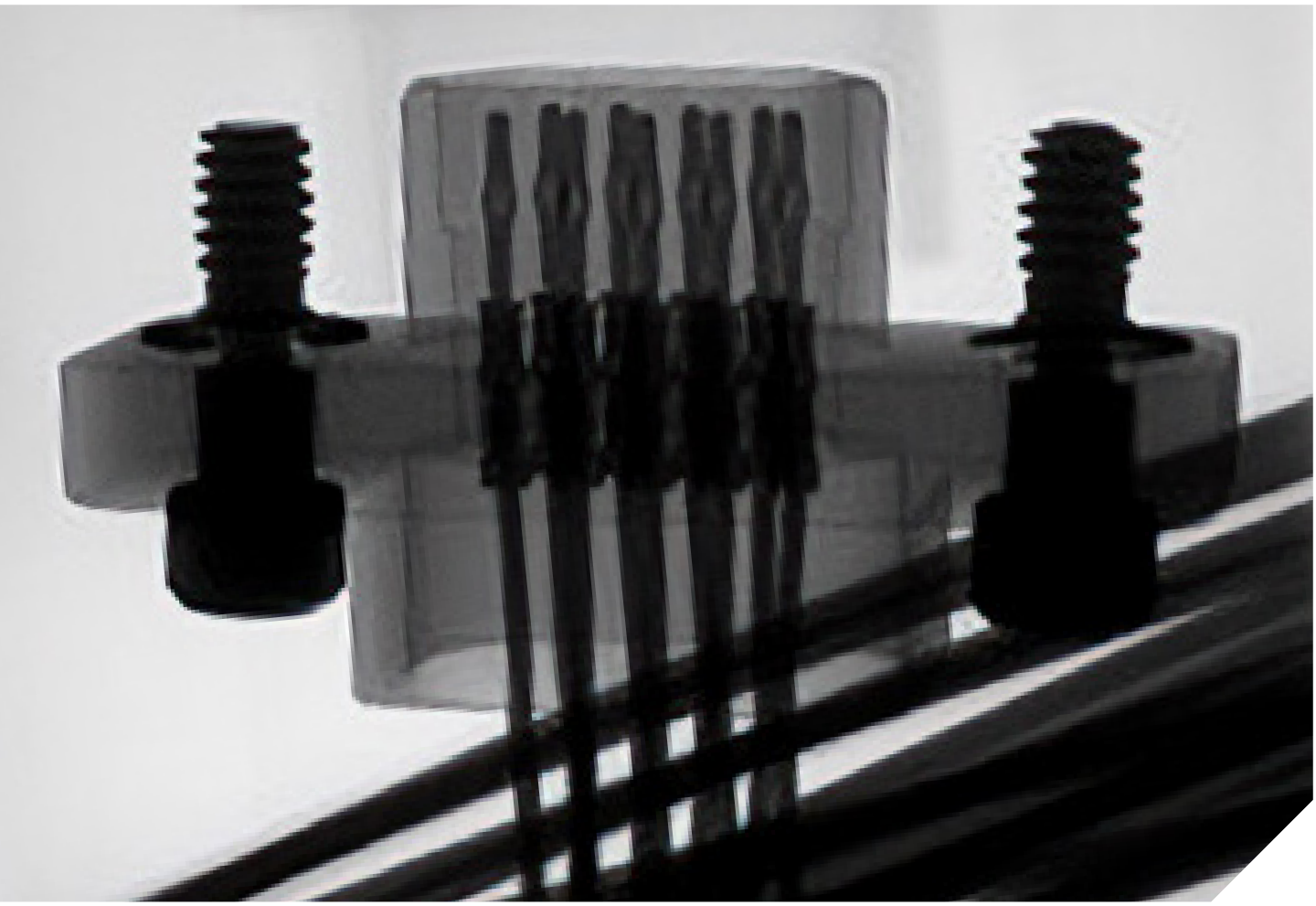
TAV V12

| | |
|---|---|
| **CHAMBER DIAMETER** | 1200mm |
| **HEIGHT** | 1500mm |
| **WEIGHT CAPACITY** | 1500kg |
| **MAX. TEMPERATURE** | 1370°C |
| **VACUUM PRECISION** | ±5°C. Vacuum 5 x10-6 mBar |
| **PROTECTIVE GAS SHIELD** | N 6,5 Bar |
| **HEATING POWER** | 260 KW |

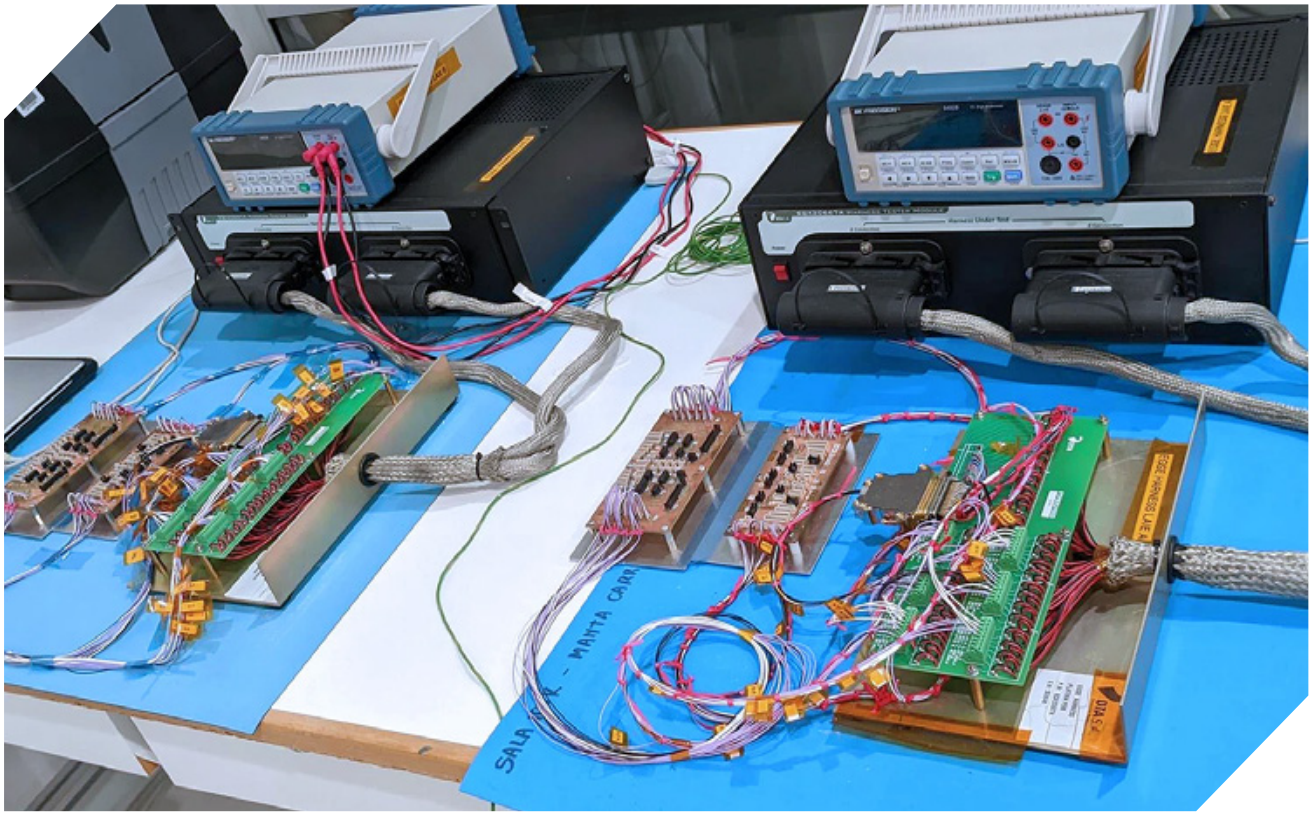
# HARNESS

We are a leading company in manufacture of harnesses for Power, Radiofrequency and Control applications. Several of our productions are supplying satellites with excellent results, as we have developed high-quality solutions for projects of national importance, such as SAOCOM and SABIA-Mar from CONAE, as well as for private customers looking for reliable and efficient results.

Our team of highly trained professionals, working together with the Quality area of the company under ECSS and IPC standards, uses advanced technologies and top-quality materials to guarantee the reliability and efficiency of all our products. We manufacture by welding and crimping, and we have different cable stripping methods: mechanical, thermal and laser, which adapt to all types of cables and sheaths.



We strive to deliver superior quality results to our clients, so we maintain our focus on innovation and continuous improvement, to offer products that meet your expectations.

We also have equipment and processes to carry out pull tests that guarantee the integrity of the batches according to requirements, and we can offer RX images as a complement to the manufacturing reports, including continuity and isolation test using specific EGSEs . Everything can be developed in our ISO 7 or ISO 8 Clean Rooms, as well as we can manage RF test in our Anechoic Chambers.

# AERONAUTICS



We are pleased to introduce one of our first innovative products for the aviation industry: the Fatigue Meter, a device similar to the electromechanical types used in the market, but with an advanced electronic design of the latest technology with better features and a more reliable system.


The Fatigue Meter is an autonomous system that aims to register accelerations of the aircraft frame or center of gravity to monitor the structural life consumed during flight.

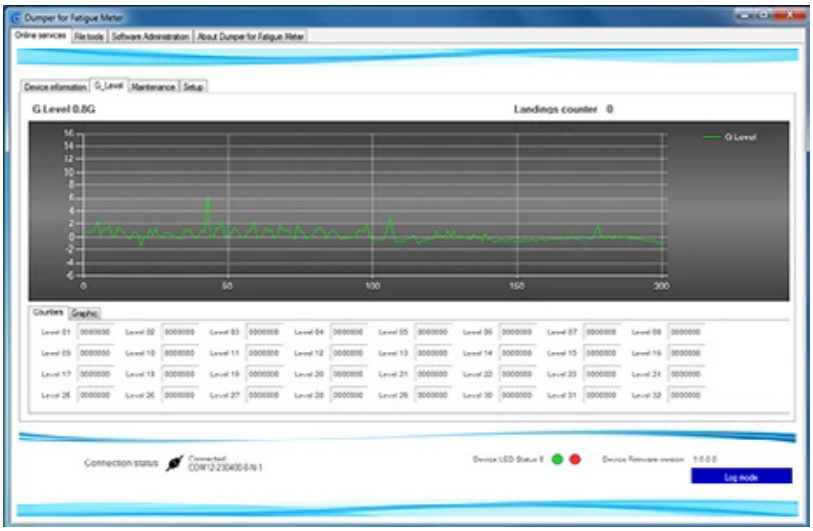
For this, it counts and registers the g values to which the aircraft is subjected, due to the acceleration or deceleration of the flight. Analysis of the 'g's recorded indicates the fatigue load in the structure of the aircraft and the collected data can be used to form realistic statistics and make informed decisions.

# MILITARY GRADE CERTIFICATIONS

| | | |
|---|---|---|
| **Enviromental**<br>MIL-STD-810H | **EMC/EMI**<br>MIL-STD-461G | **DC Power**<br>MIL-STD-704F |
| **Safety**<br>SAE ARP-4761 | **Packaging**<br>MIL-STD-2073-1E | **Identification**<br>MIL-STD-130N |
| | **Software**<br>DO-178C | |

# SOFTWARE

- Configure all the parameters of the equipment.
- View all data from current and previous records.
- Verify the functional status of the system and show the following parameters:
  - Sensor reading indicated in G
  - Battery voltage



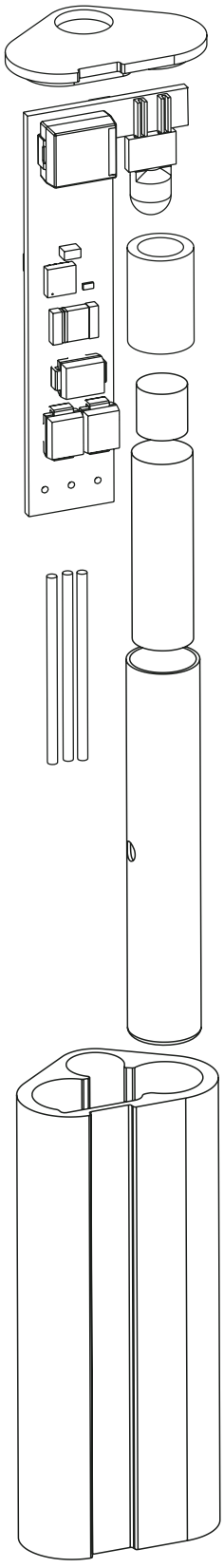
# ELECTRONIC DETONATOR FOR THE OIL INDUSTRY

It is intended for perforation applications in conventional and unconventional wells. It is highly versatile as it can be used from 2 ¾" lateral port tandems or any modular gun. VENG's EDS allows for the individual selection of the detonator to be used, with the capability to initiate ETACORD 80 RDX detonating cord.

It was designed and manufactured to work in accordance with API-RP67 recommended practices and falls within the Group 2 electric detonators.

# EDS VENG IS BASED ON API-RP67 STANDARD

- A control unit to operate from 1 up to 16 devices that allows the operator to control each device/detonator from a safe distance.
- A communication medium between the control unit and the detonator.
- Detonators with the ability to be connected in Daisy chain and controlled remotely and individually.
- A system verification/testing unit without detonation capability.



# ELECTRICAL FEATURES TESTS

- **Radiated Susceptibility (RF-SAFE)**

  Tested at 200V/m in the range of 100MHz to 6GHz. Safe and functional.

- **Direct Current**

  Tested at 220V AC – 50Hz. Safe.

- **ESD**

  Tested under HBM IEC model +/- 25KV; 150pF; 330 Ohm.Safe and functional.

## MECHANICAL FEATURES TESTS

### Temperature

150°C during 1 hour. Safe and functional.

### Tensile strength

31N of traction between the detonator body and the cables.

### Fluid inertization

Tested 2min@2bar. Chemical and electronic fluid sensitive.


## OPERATIVE FEATURES DESIGN

### Power supply voltage

28V+/-4V DC exclusive to VENG Firing Panel.

### Primary charge

150mg PbN6

### Secondary charge

600mg RDX

### Plastic chassis

50mm in length; with integrated holes for detonating cord passage.

### Storage

4 year under storage conditions of -40°C to +70°C and RH ≤65% with frequent ventilation.

www.veng.com.ar

veng-argentina

veng_argentina

veng_argentina

## Commercial Contact

**Services**
sales.sp@veng.com.ar

**Ground Stations**
sales.gs@veng.com.ar

## Institutional Affairs

relaciones.institucionales@veng.com.ar