
VENG

INDEX

Satellite Information Based Solutions Office

— sales.sat@veng.com.ar

— +54 9 11 4031-9801

— 9am (UTC-3) to 5pm (UTC-3)

Satellite Projects Office

— sales.sp@veng.com.ar

— 9am (UTC-3) to 5pm (UTC-3)

Ground Segment Services Office

— sales.gs@veng.com.ar

— 9am (UTC-3) to 5pm (UTC-3)

WE ARE VENG

VENG is an argentinian company of Technological Services and Developments of High Added Value that specializes in the space activity.

We offer engineering and manufacturing services **aimed at solving complex problems (R + D + I) for the space and high-tech consumer industries**.

Within the National Space Program, **VENG is the executive branch of CONAE's Access to Space policy**. Its **VISION** is to position itself as a launch service provider from Argentina to the world. It is currently executing the development of the **Tronador II Project** as its main contractor.

+16 years of experience

+475 staff of professionals and technicians

+14 years of ground station operations

- 2009 — NOW: Córdoba Ground Station Operation
- 2018 — NOW: Tierra Del Fuego Ground Station Operation and Maintenance

MILESTONES

ACCESS TO SPACE

2008
TRONADOR 1B

2009
CUVS30

2010

2011
TRONADOR 4000
SAC D / AQUARIUS
completed mission

2012

2013

2014
VEx 1A
VEx 1B

2015

2016

2017
VEx 5A

2018
SAOCOM 1A
in orbit

2019

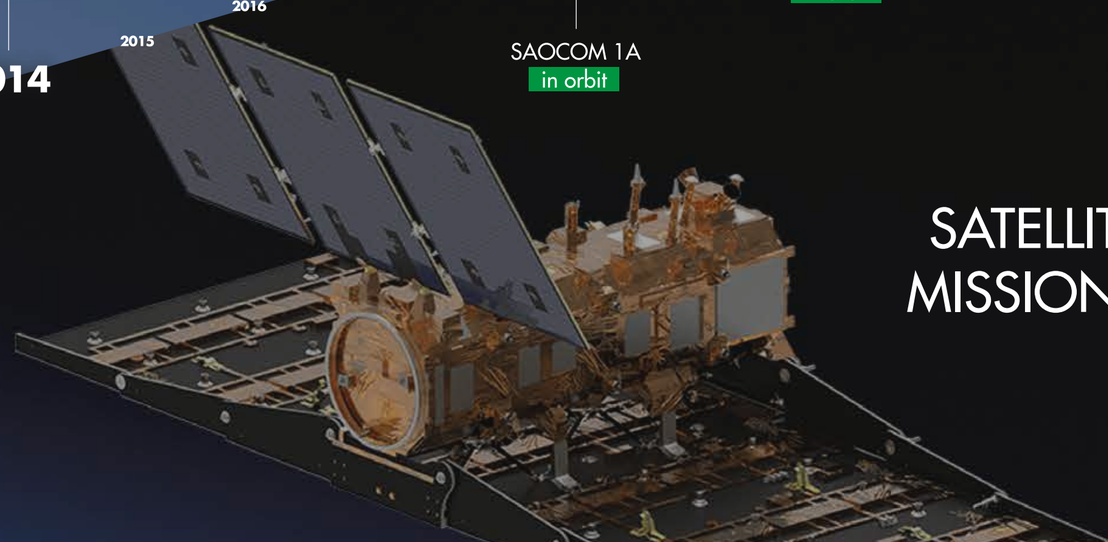
2020
SAOCOM 1B
in orbit

ONGOING PROJECTS

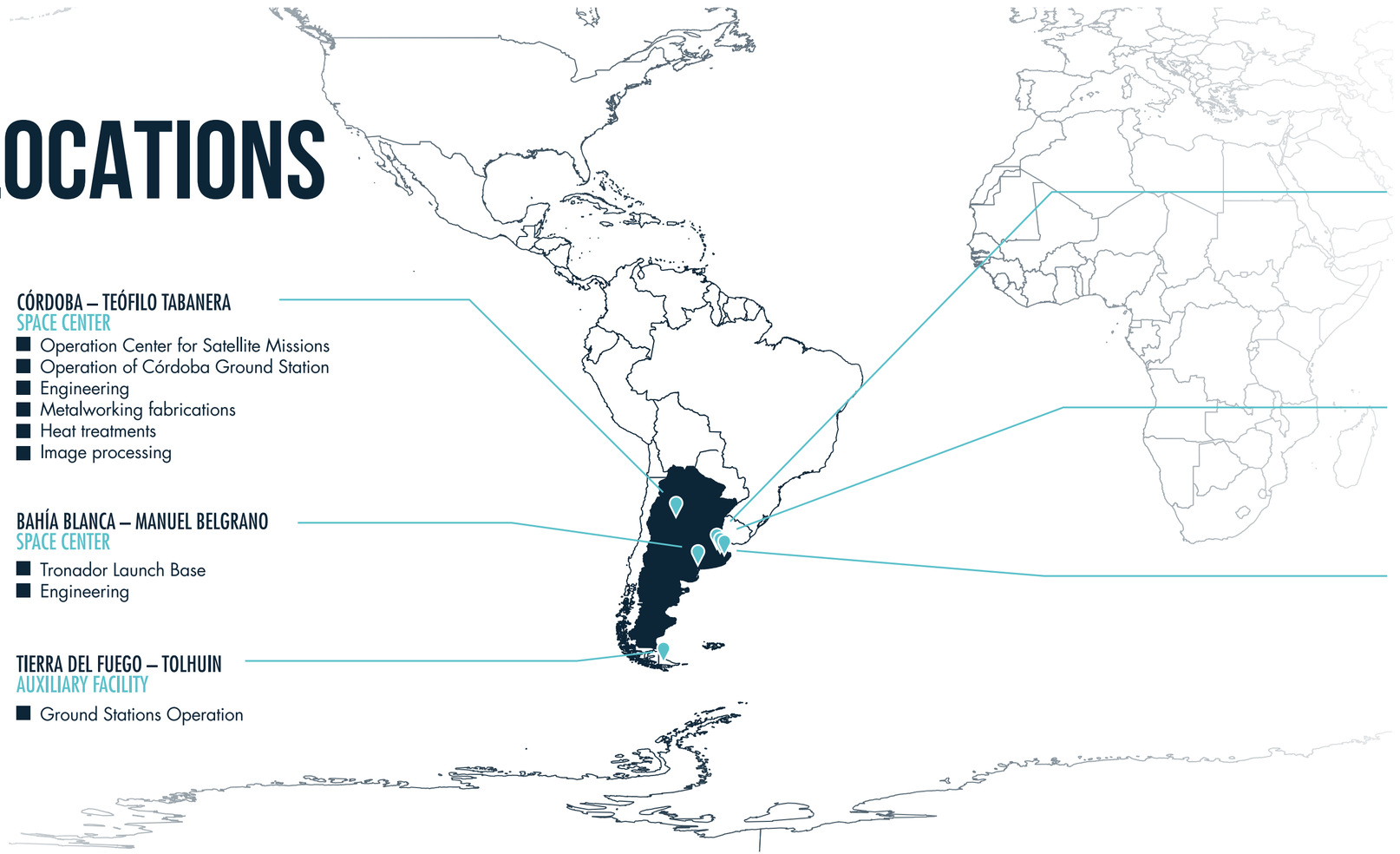
TRONADOR II
satellite launcher

SABIAMAR
ongoing mission

SATELLITE MISSIONS



OUR LOCATIONS



CÓRDOBA – TEÓFILO TABANERA
SPACE CENTER

- Operation Center for Satellite Missions
- Operation of Córdoba Ground Station
- Engineering
- Metalworking fabrications
- Heat treatments
- Image processing

BAHÍA BLANCA – MANUEL BELGRANO
SPACE CENTER

- Tronador Launch Base
- Engineering

TIERRA DEL FUEGO – TOLHUIN
AUXILIARY FACILITY

- Ground Stations Operation

BUENOS AIRES CITY
HEADQUARTERS

- General Management
- Engineering

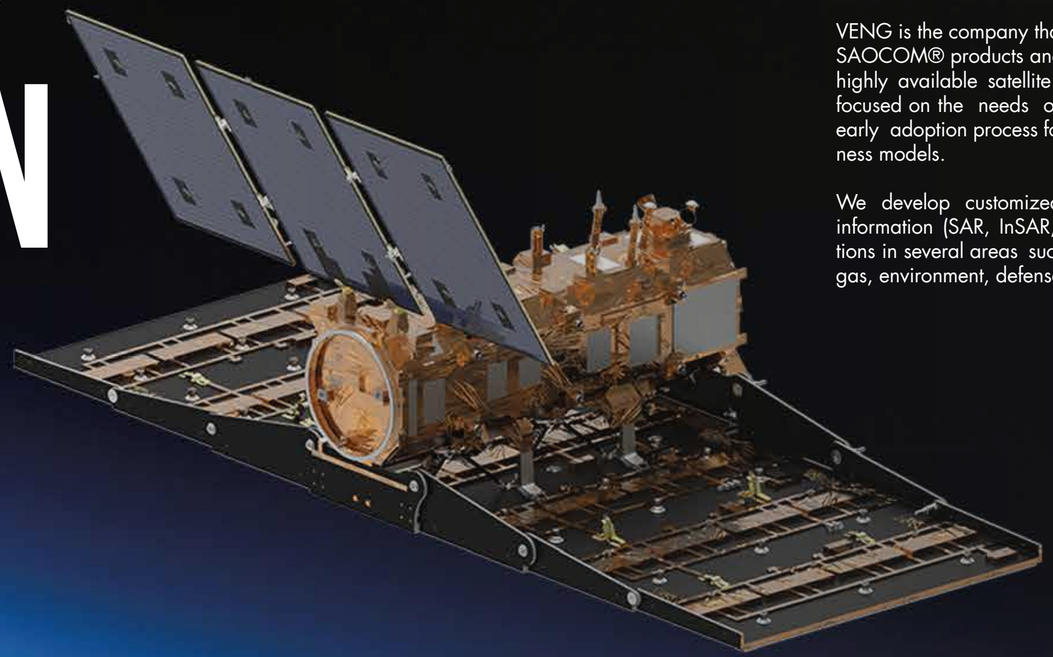
LA PLATA – VILLA ELISA
AUXILIARY FACILITY

- Electronic engineering specialized in RF
- Electronic laboratory

BUENOS AIRES – PUNTA INDIO
SPACE CENTER
AUXILIARY FACILITY

- Engineering
- Production of aerospace containers
- Metalworking fabrications
- Engine Testing

SATELLITE INFORMATION



SAOCOM® (Argentine Satellite of Observation with Microwaves) is a constellation that consists of two Earth observation satellites owned by CONAE® (National Commission for Space Activities).

VENG is the company that CONAE® designated to bring SAOCOM® products and services to the market, offering highly available satellite image services that are 100% focused on the needs of clients, thus accelerating the early adoption process for its incorporation into their business models.

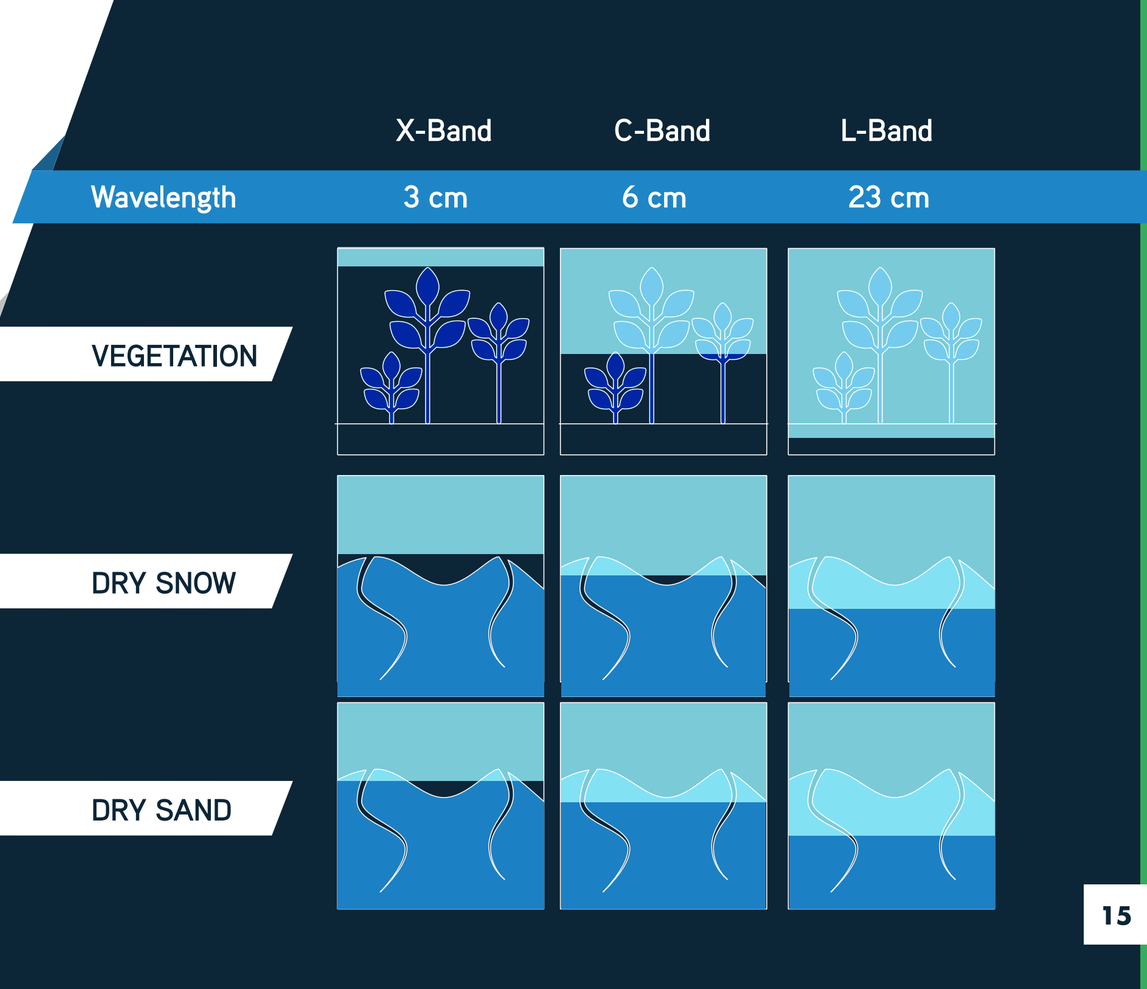
We develop customized solutions combining satellite information (SAR, InSAR, optical and more) for applications in several areas such as agriculture, mining, oil & gas, environment, defense and many others.

L-BAND SAR TECHNOLOGY

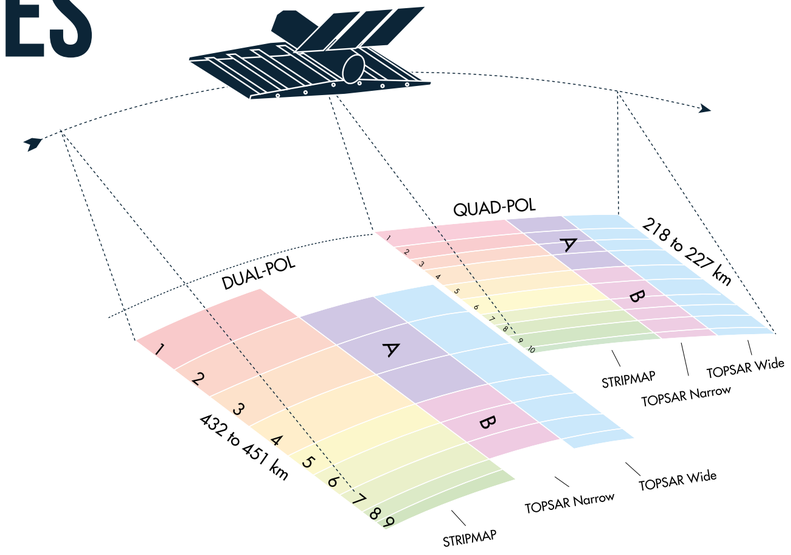
SAOCOM® is a constellation that consists of two quadruple polarization L-band SAR satellites which observe the Earth's surface night and day, regardless of weather conditions.

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 ≈
TOPSTAR: 350 x 445 km ≈
ANGLE OF VIEW: From 20,7 to 50,2 deg



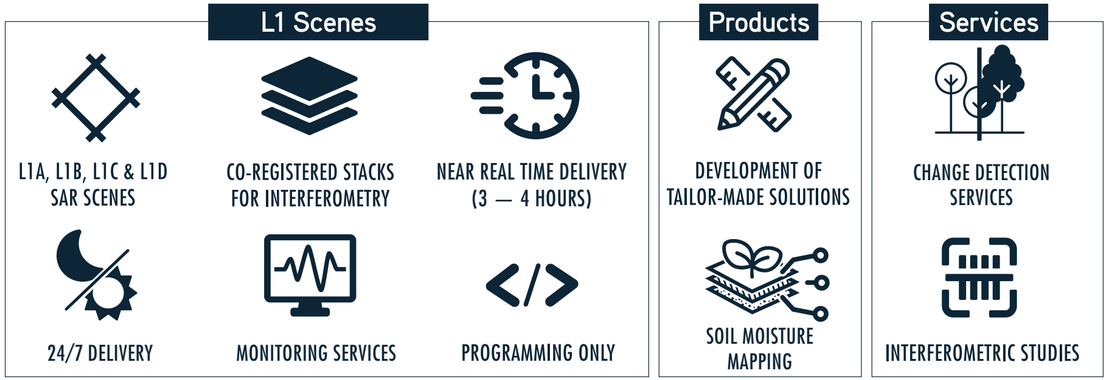
ACQUISITION MODES



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 Polarization, QP: Quad Polarization

PRODUCTS & SERVICES



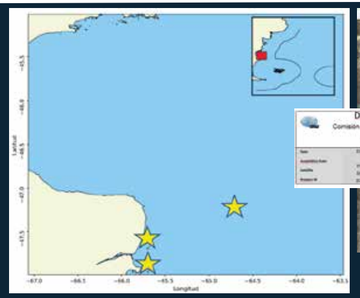
INDUSTRIES

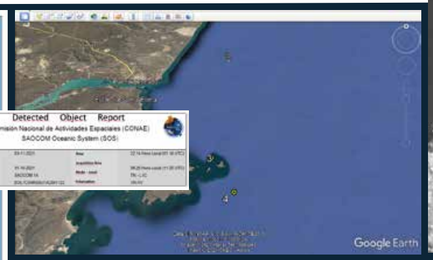
AREA	5–7 hour delivery time	Monitoring Services	Ship Detection	Oil Spill Detection	Soil Moisture Mapping	Interferometric Studies	Change Detection	Taylor-Made Solutions
OIL & GAS	✦		✦	✦		✦	✦	✦
MINING		✦				✦	✦	✦
AGRICULTURE					✦			✦
INFRASTRUCTURE		✦				✦	✦	✦
ENVIRONMENT								✦
FORESTRY		✦				✦	✦	✦
DAMS						✦	✦	✦
INSURANCE							✦	✦
GOVERNMENT	✦	✦	✦	✦		✦	✦	✦

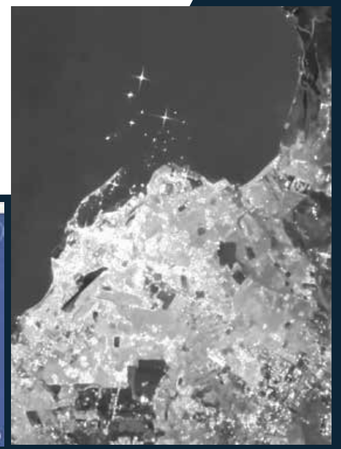
RAPID MONITORING OPTION

SHIP DETECTION

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







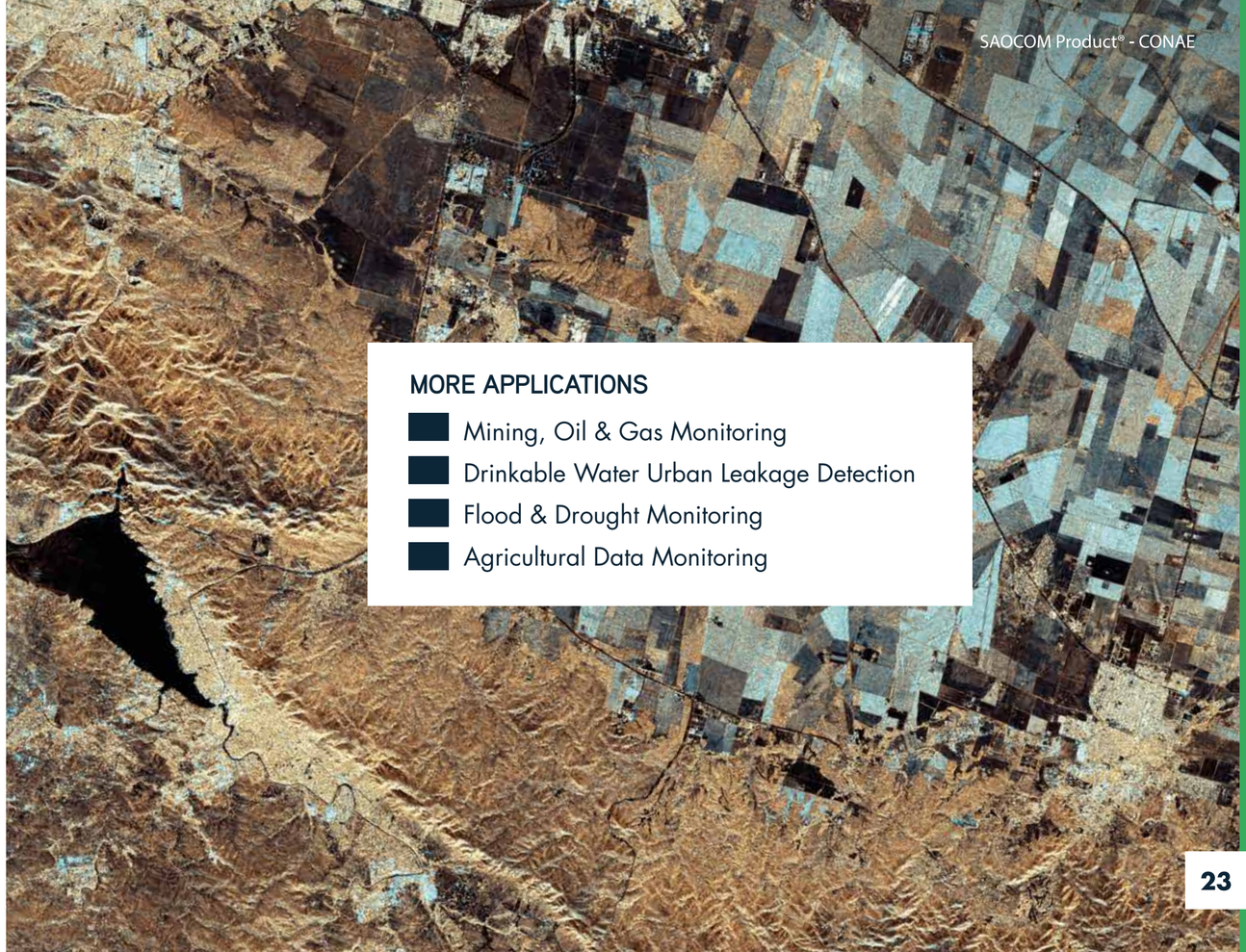
RAPID MONITORING OPTION

OIL SPILL DETECTION

- **Delivery time:** 3 hours after Acquisition
- **Maximum 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).



MORE APPLICATIONS

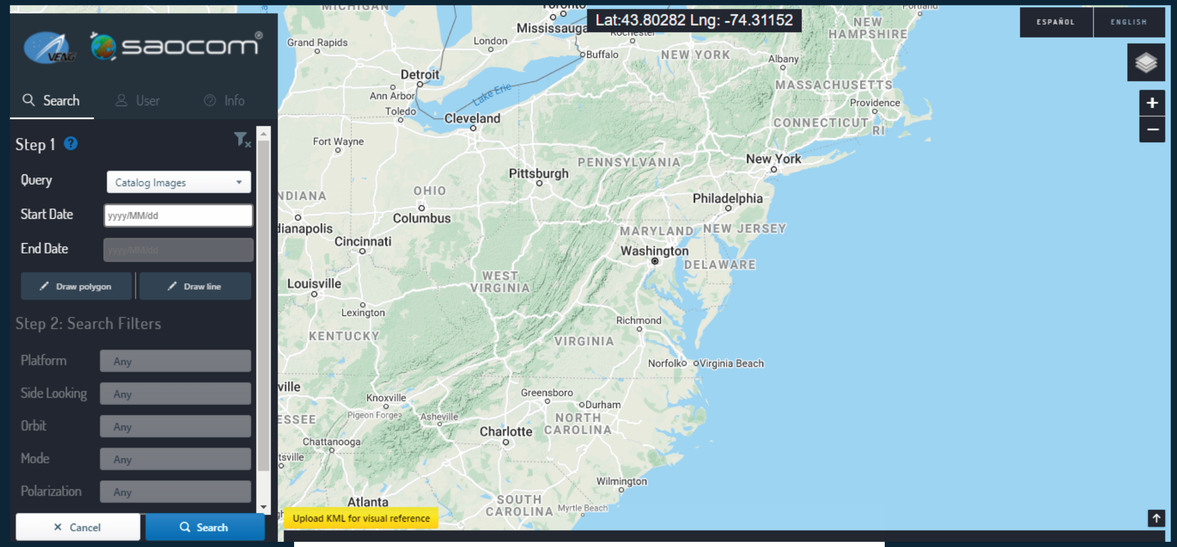
- Mining, Oil & Gas Monitoring
- Drinkable Water Urban Leakage Detection
- Flood & Drought Monitoring
- Agricultural Data Monitoring

CUSTOMER ORIENTED OFFICE

2
calendar days
in advance of acquisition date & time
(assuming confirmed order reception)

24
hours after sensing
to get a new acquisition

24
hours after order reception
confirmation to deliver catalog requests



SAOCOM.COM.AR

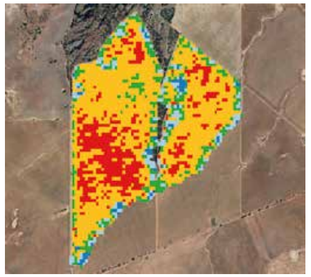
EASY-TO-USE

CATALOG IMAGES

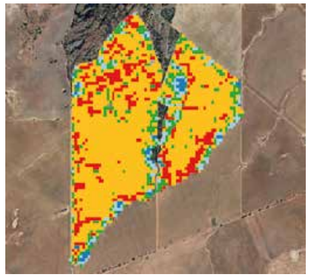
FUTURE IMAGES

USE CASES - AGRICULTURE

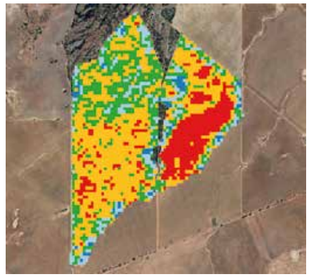
SOIL MOISTURE AMBIENT MAPS



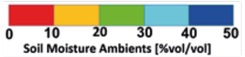
DATE: 30/6/2021
22:39:36



DATE: 16/7/2021
22:39:36



DATE: 1/8/2021
22:39:35



APPLICATION: AGRICULTURE

Soil moisture is a critical parameter for deciding on the seeding dates, as it allows one to verify the natural and artificial irrigation performance. It is also a great source of data for crop analysis as well.

DESCRIPTION

A set of three images of the same crop field, taken at 16-day intervals.

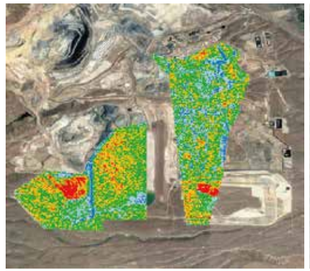
SPECIFICATIONS

- **Humidity Ranges:** 5-10, 10-20, 20-30, 30-40 40-45 %vol/vol
- **Spatial Resolution:** 30 meters
- **Temporal Resolution:** 8 days
- Measurement on soil with known crop
- Product based exclusively on SAOCOM data
- Customer calibration required

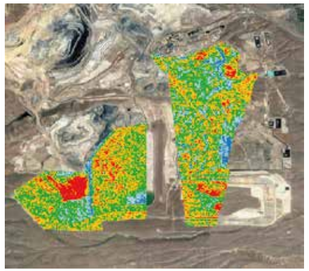
USE CASES - MINING

HEAP LEACHING:*

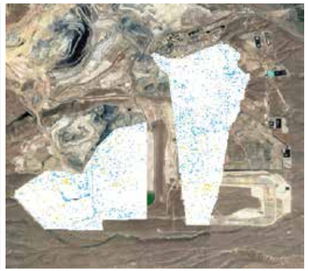
RELATIVE SOIL MOISTURE AMBIENT MAPS



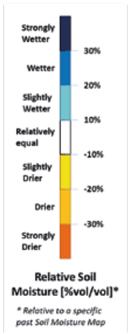
REFERENCE SCENE
DATE: 16/05/2022



RELATIVE SCENE
DATE: 24/05/2022



RELATIVE MAP (REFERENCE – RELATIVE)
DATE: 16/05/2022



*Gold, silver and others

APPLICATIONS

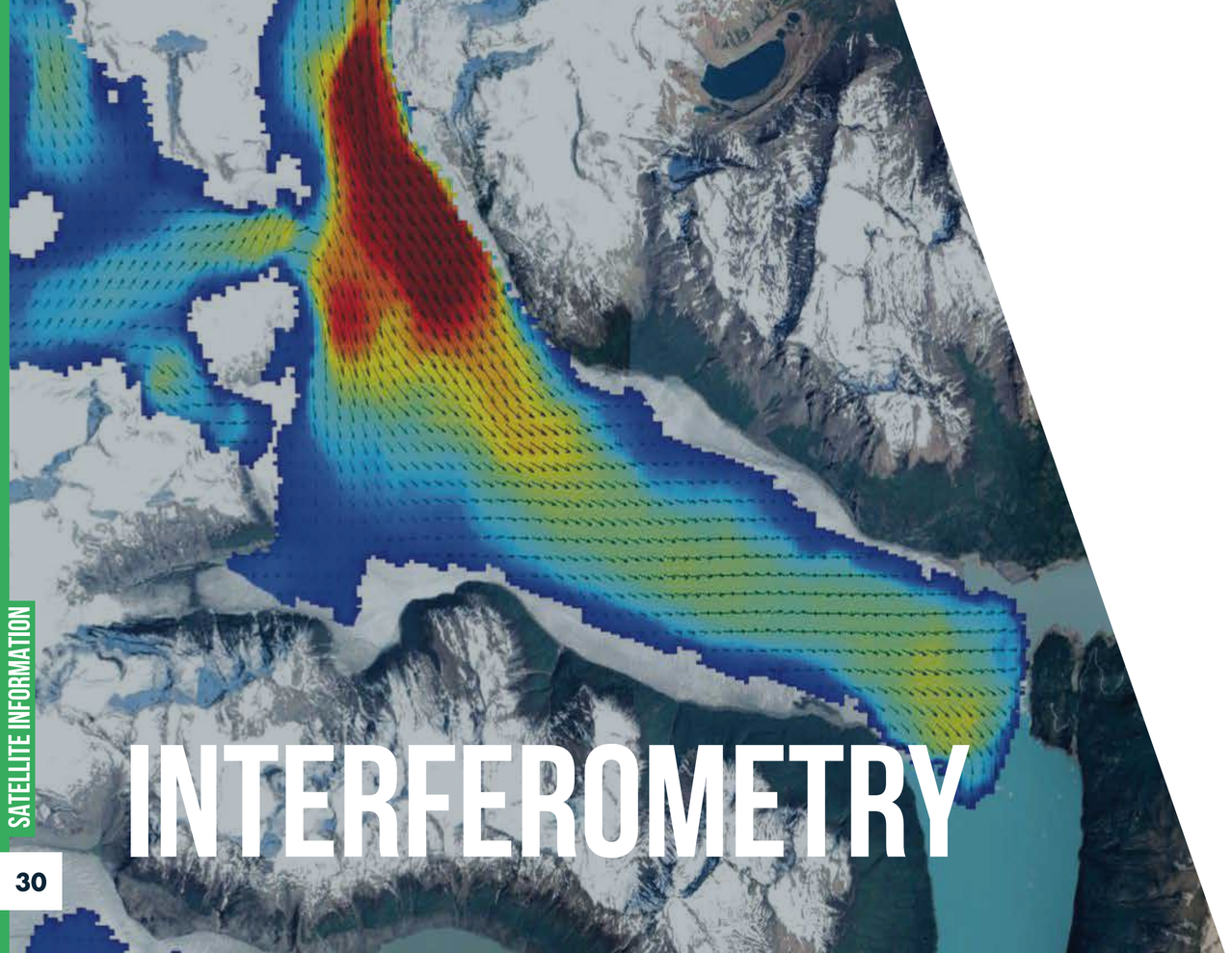
Soil Moisture Ambient Maps allow us to gather information about evapotranspiration of fluids in the heap leaching process so as to fine tune each flow. This enables us to compare the state of gold and silver mining through weeks, months, and seasons.

DESCRIPTION

In the first two scenes of the set above, soil humidity at two different moments (reference and relative), is represented with pixels. By a simple substraction procedure, we can see the variation between those two moments in the third piece of the set.

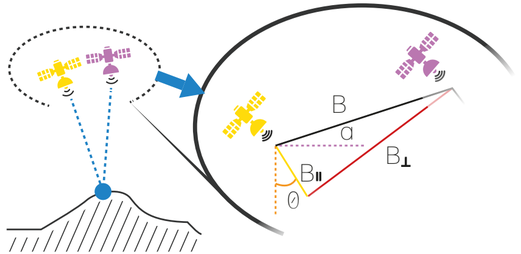
SPECIFICATIONS

- **Humidity ranges:** strongly wetter, wetter, slightly wetter, equal, slightly dryer, dryer and strongly dryer
- **Spatial resolution:** 8 meters
- **Temporal resolution:** 8 days
- Measurement on bare soil
- Product based on SAOCOM data
- In-situ calibration is required in order to obtain absolute data



INTERFEROMETRY

Interferometry is a technique that, based on two or more GROUND satellite images from two or more SAR satellite, makes it possible to obtainground displacement measurements with high.



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)

Oil&Gas Uses

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

GROUND DISPLACEMENT VELOCITY

Oil&Gas Uses

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

USE CASES - OIL & GAS

PIPELINE MONITORING

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

USE CASES - OIL & GAS

OIL & GAS BASIN MONITORING

Fluid injection/extraction operations generate volumetric variations in basins and, therefore, changes in the height of their surface covers. 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) make it possible to measure surface height variations with centimetric and sub-centimetric 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 so as to lower environmental risks. By means of the SAOCOM constellation, it is possible to carry out these studies with a periodicity of 8 days.

USE CASES - MINING

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 vehicle traffic, or 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, the environment, and mining operations. 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 intervals multiple of 8 days in the case of the SAOCOM satellite constellation.

USE CASES - INFRAESTRUCTURE

ANALYSIS OF SUBSIDENCE IN CIVIL WORKS

High-rise buildings, bridges, tunnels, dams and 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 the upper layers of the land cover, where the aforementioned construction works are located. Therefore, even after foreseeing all the construction factors, it is necessary to analyze sudden or high-value changes to safeguard infrastructure and to avoid both human and economic losses, which is where interferometric techniques come in handy, as they can measure displacement with centimetric and sub-centimetric precision over large remotely observed areas. These measurements, in the case of the SAOCOM satellites, are possible at 8-day multiple intervals. As a consequence, by means of SAR measurements and the differential interferometry technique, a continuous temporary analysis of ground movements and works that settle on it can be performed, which allos us to anticipate potential risks of damage to structures.

GROUND STATIONS

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.

ANTENNAS

CÓRDOBA

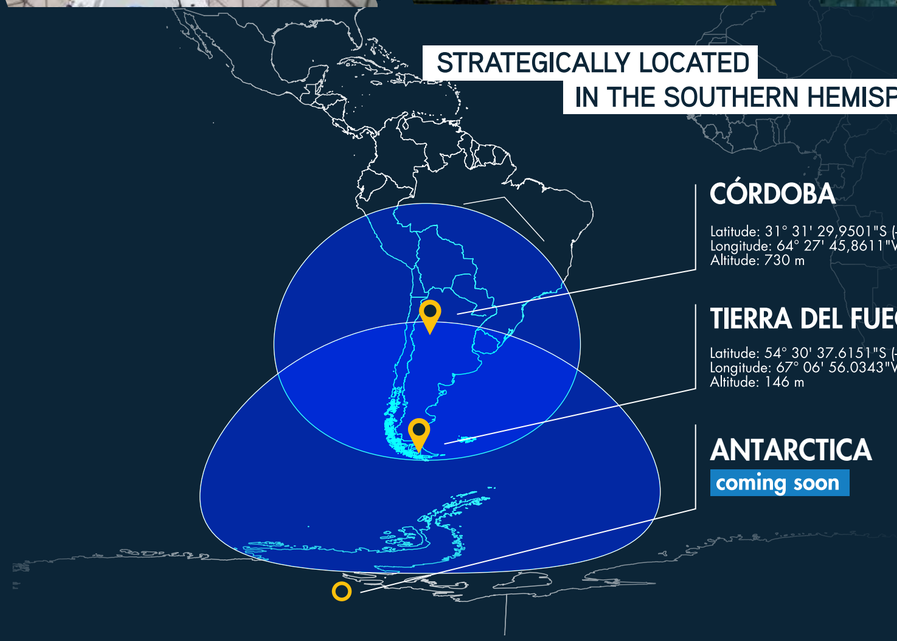
- Dimensions: 3.6, 5.4 (mobile), 7.3 and 13.5 meters
- **TT&C** in **S-band**
- Data Download in **X-band**

TIERRA DEL FUEGO

- Dimensions: 7.3 and 13.5 meters
- **TT&C** in **S-band**
- Data Download in **X-band** & **Ka-band**

HOSTING

- GROUND STATION SITES READY
- SECURED AREAS
- ON-SITE TECHNICAL SUPPORT
- BACKED UP ELECTRICAL SYSTEM
- HIGH SPEED INTERNET



Antennas & Specifications

Córdoba


Dish Diameter
3,6m


Dish Diameter
5,4m


Dish Diameter
7,3m


Dish Diameter
13m

S-Band

Brand	Scientific Atlanta	ViaSat	Datron	Datron
Tx Frequency Range	2025 MHz to 2120 MHz	2025 MHz to 2120 MHz	2025 MHz to 2120 MHz	2025 MHz to 2120 MHz
Rx Frequency Range	2200 MHz to 2300 MHz	2200 MHz to 2300 MHz	2200 MHz to 2400 MHz	2200 MHz to 2400 MHz
Antenna Gain	35.36 dBi	37.4 dBi	41.05 dBi	45 dBi
G/T	12.43 dB/°K min	16.0 dB/°K @ RHCP	18.94 dB/°K	24 dB/°K
Tx Polarization	Linear	RHCP/LHCP selectable	RHCP/LHCP selectable	RHCP/LHCP selectable
Rx Polarization	RHCP/LHCP simultaneous	RHCP/LHCP simultaneous	RHCP/LHCP simultaneous	RHCP/LHCP simultaneous
Tx Power	2W to 200W selectable	2W to 200W selectable	3.2W to 100W selectable	2W to 200W selectable
EIRP	54.5 dBW @ 200W	58 dBW @ 200W	58.9 dBW @100W	62 dBW @200W
Beamwidth	2.7° nominal	0.82° nominal	1.3° nominal	0.8° nominal

X-Band

Rx Frequency Range	8025 MHz to 8400 MHz	8025 MHz to 8400 MHz	8025 MHz to 8400 MHz	8025 MHz to 8400 MHz
Antenna Gain	46 dBi	51.8 dBi	54.5 dBi	59.3 dBi
G/T	25.68 dB/°K	31 dB/°K	30.87 dB/°K	37.5 dB/°K
Rx Polarization	RHCP	RHCP/LHCP simultaneous	RHCP/LHCP selectable	RHCP/LHCP selectable
Beamwidth	0.7° nominal	0.4° nominal	0.3° nominal	0.19° nominal

Antennas & Specifications

Tierra del Fuego


Dish Diameter
7,3m


Dish Diameter
13,56m

Antarctica


Dish Diameter
6,1m

S-Band

Brand	ViaSat	ViaSat	ViaSat
Tx Frequency Range	2025 MHz to 2120 MHz	2025 MHz to 2120 MHz	2025 MHz to 2120 MHz
Rx Frequency Range	2200 MHz to 2400 MHz	2200 MHz to 2300 MHz	2200 MHz to 2300 MHz
Antenna Gain	41 dBi	45 dBi	41.7 dBi
G/T	18.91 dB/°K	24.56 dB/K°	18.3 dB/°K
Tx Polarization	RHCP/LHCP selectable	RHCP/LHCP selectable	RHCP/LHCP selectable
Rx Polarization	RHCP/LHCP simultaneous	RHCP/LHCP simultaneous	RHCP/LHCP simultaneous
Tx Power	3.2W to 200W selectable	2W to 660W selectable	2W to 200W selectable
EIRP	58 dBW @200W	69.2 dBW @ 660W	58.1dBW @200W
Beamwidth	1.2° nominal	0.71° nominal	1.6° @2.2 GHz

Ka-Band

X-Band

Rx Frequency Range	25.5 GHz to 27 GHz	8000 MHz to 8500 MHz	8025 MHz to 8400 MHz	7800 MHz to 8500 MHz
Antenna Gain	59.8 dBi	53.7 dBi	59.5 dBi	52.5 dBi
G/T	36.77 dB/°K	32.5 dB/°K	38.16 dB/°K	30.66 dB/°K
Rx Polarization	RHCP/LHCP simultaneous	RHCP/LHCP simultaneous	RHCP/LHCP simultaneous	RHCP/LHCP selectable
Beamwidth	0.1° nominal	0.3° nominal	0.18° nominal	0.38° nominal

COMING SOON

SERVICES

DATA REDUNDANCY

- HIGH POWER AVAILABILITY
- HIGH AVAILABILITY OF CONNECTIVITY
- 24/7 SERVICE ALL YEAR ROUND

DATA DOWNLOAD

- Science Data Download
- **LEO** and **Geostationary** Orbits

TT&C.

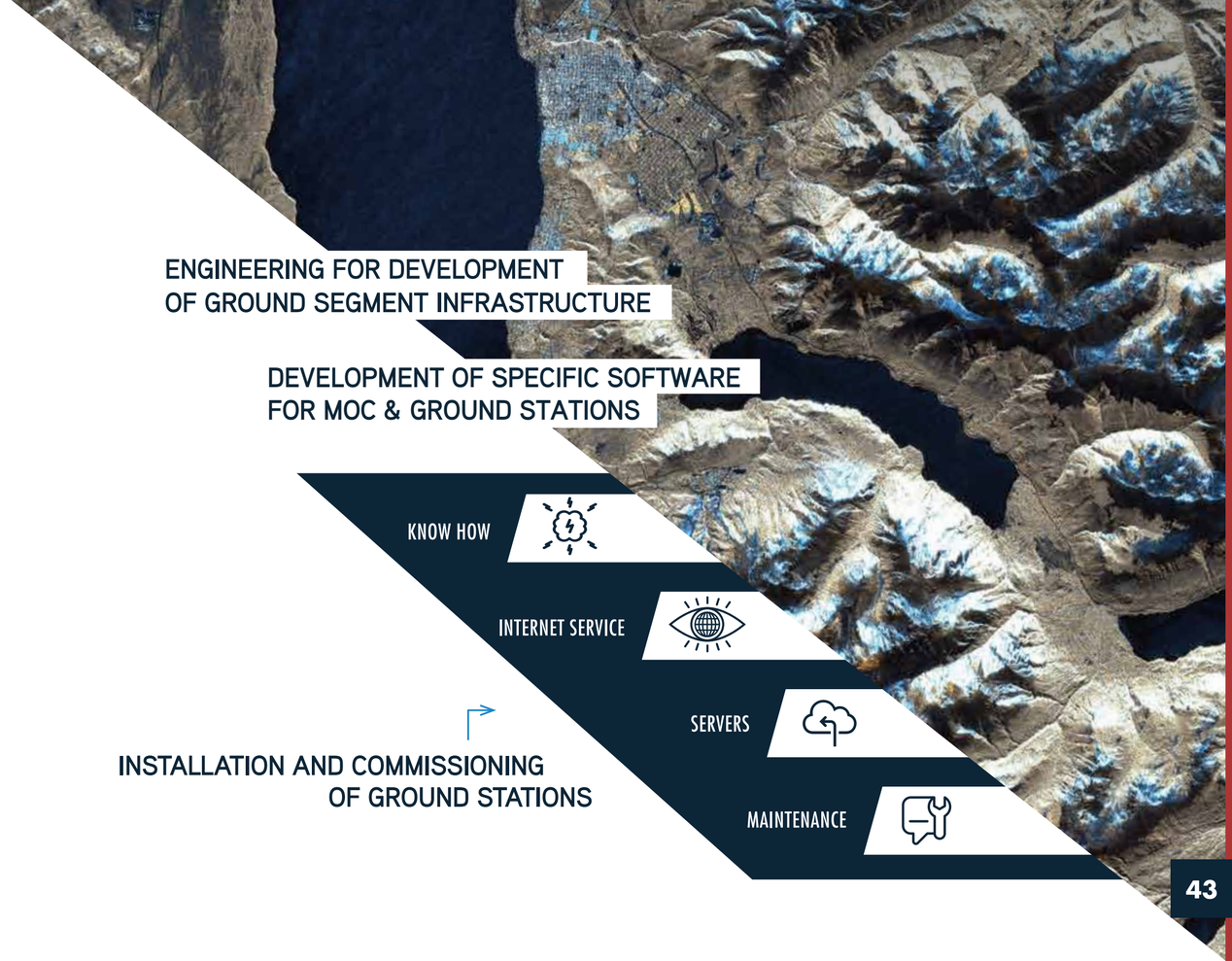
- Telemetry, Tracing & Command
- **LEO** and **Geostationary** Orbits

SPECIFICATIONS

Fully automatic transfer from one satellite to the other one in **30 seconds.**

Product catalog available **one hour** after the satellite passes over the selected area.

+100 gigabytes of data downloaded every day.



SAOCOM MISSION CONTROL CENTER OPERATION

34 DAILY REVISIT PASSES	**Semi automated** OPERATION OF PROCESSES	**24/7** SUPPORT & MONITORING FOR OPERATING PLATFORMS
1.000+ PRODUCTS GENERATED AND PUBLISHED AUTOMATICALLY PER DAY	**Critical operation** OF MANEUVERS AND MAINTENANCE TASKS ON SATELLITES	**High availability** AND REDUNDANCY DATA CENTER

SERVICES

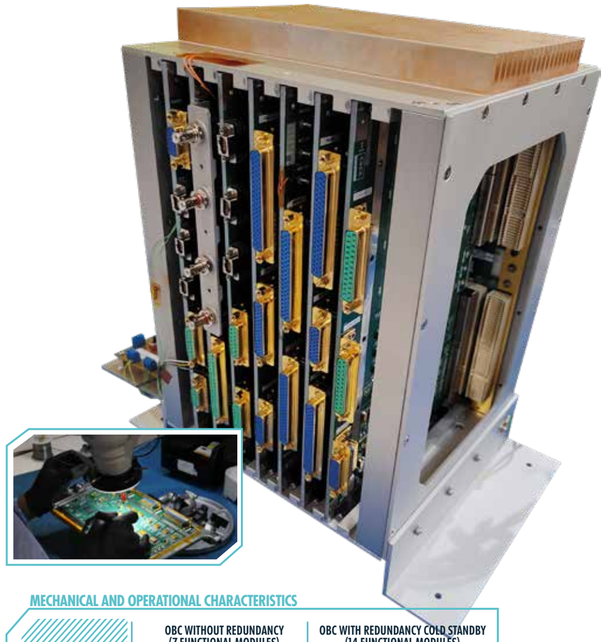
VENG is dedicated to the hi-tech space activity and technology industries, and provides high-added value on bth the H/W and S/W of our customers by getting involved in the design, conceptual and detail engineering, manufacturing, assembly, integration and testing of our products. Among our products, the development of satellite systems, subsystems and ad-hoc parts stand out.

In addition, there is our Workmanship Program, which contemplates the adoption of the IPC standard as a certification baseline through the creation of an IPC Regional Training Center with the expertise and competence to certify operators.

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 CHARACTERISTICS

	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] Maximum consumption: 40[W]	Rated consumption: 30[W] Maximum consumption: 40[W]
OPERATION TEMPERATURE	-10 °C to +40°C	-10 °C to +40°C
LIFE TIME	5 years	5 years

POWER BOX

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.

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.

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 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).

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.

FACILITIES

LaIEM
MECHANICAL INTEGRATION & TESTING FACILITY

LEM
MECHANICAL TESTING FACILITY

LaIMe
MECHANICAL INTEGRATION FACILITY

LEA
LABORATORY OF SPATIALIZATION AND ASSURANCE

LaREs
SPACE COATING FACILITY

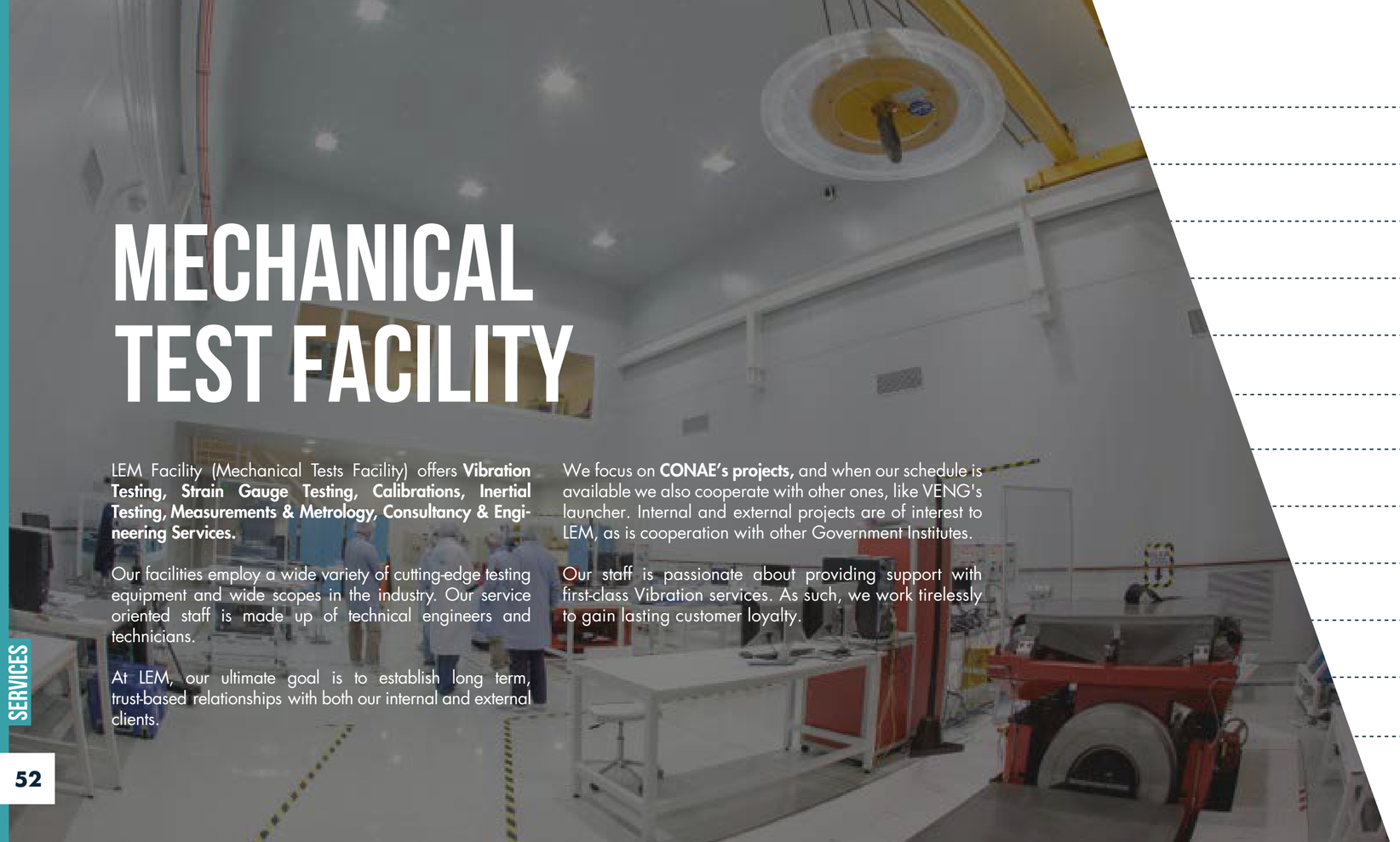
LaRF
RF TESTING FACILITY

LaIEE
ELECTRONIC INTEGRATION & TESTING FACILITY

LaTVC
THERMAL VACCUM TESTING FACILITY

LaMA
ANTENNA TESTING FACILITY

LaCEM
ELECTROMAGNETIC COMPATIBILITY TESTING FACILITY



MECHANICAL TEST FACILITY

LEM Facility (Mechanical Tests Facility) offers **Vibration Testing, Strain Gauge Testing, Calibrations, Inertial Testing, Measurements & Metrology, Consultancy & Engineering Services.**

Our facilities employ a wide variety of cutting-edge testing equipment and wide scopes in the industry. Our service oriented staff is made up of technical engineers and technicians.

At LEM, our ultimate goal is to establish long term, trust-based relationships with both our internal and external clients.

We focus on **CONAE's projects,** and when our schedule is available we also cooperate with other ones, like VENG's launcher. Internal and external projects are of interest to LEM, as is cooperation with other Government Institutes.

Our staff is passionate about providing support with first-class Vibration services. As such, we work tirelessly to gain lasting customer loyalty.

- STRUCTURAL & MODAL SIMULATIONS
- PRODUCT ENGINEERING
- MECHANICAL VIBRATION TESTING, PLANNING & DEVELOPMENT
- STRESS, STRAIN AND DEFORMATION TESTIG WITH USING STRAIN GAUGES
- TEST RESULTS ANALYSIS
- MEASUREMENT & METROLOGY
- SENSOR & INSTRUMENT CALIBRATION SERVICES
- TESTING, ACQUISITION AND CALIBRATION
- MGSE DESIGN AND VALIDATION
- ENGINEERING CONSULTING SERVICES.
- QUALITY MANAGEMENT SYSTEM DEVELOPMENT. (ISO17, 025)
- INERTIAL TESTING (PRECISION MOTION SIMULATION)

SHAKERS

LDS V9-HBT 1220

Sine Force (peak)	105 kN
Acceleration (sine peak)	150 g
Random Force (rms)	105 kN
Internal Load Support	1800 kg
Acceleration (random rms)	70 g
Velocity (sine peak)	3.0m/s
Displacement (pk-pk)	- 76.2mm

LDS V875-HBT 600

Sine Force (peak)	35.6 kN
Acceleration (sine peak)	112 g
Random Force (rms)	35.6 kN
Internal Load Support	600 kg
Acceleration (random rms)	100 g
Velocity (sine peak)	1.8m/s
Displacement pk-pk)	- 76.2mm

Unhotlz-Dickie S-452/ST

Sine Force (peak)	26.7 kN
Acceleration (sine peak)	120 g
Random Force (rms)	26.7 kN
Internal Load Support	272 kg
Acceleration (random rms)	100 g
Velocity (sine peak)	3.4m/s
Displacement (pk-pk)	- 51mm

- RANDOM, SINE AND SHOCK TESTING
- SINE SWEEP TESTING
- QUASI-STATIC TESTING (SINE BURST)
- RESONANCE SEARCH, TRACK AND DWELL (RSTD)
- RANDOM-ON-RANDOM (ROR) TESTING
- SSINE-ON-RANDOM (SOR) TESTING
- SHOCK RESPONSE SPECTRUM (SRS) SYNTHESIS
- FATIGUE TESTING
- TIME WAVEFORM REPLICATION (TWR)
- VIBRATION TESTING TO MIL-STD, DIN, ISO, IEC, SAE

CALIBRATORS

B&K Type 3629
Vibration Transducer
Calibration System

B&K Type 4294
Accelerometer Calibrator
Hand-held
Battery-powered

Fluke 8508A & Fluke 5730A
8 ½ Digit

Keithley 2015
6 ½ Digit

INERTIAL TEST

CONTRAVES 51N-30H
2 Axis

CONTRAVES 53M1-30H
3 Axis

STANDARD FEATURES

Position Accuracy: ±1 Arc Sec
Position Repeatability: +/- 1 Arc Sec
Rate Accuracy: 0.0001%

MEASUREMENTS & METROLOGY

HBM GENESIS 16t

LDS Dactron LASERUSB Shaker Control System

SOKKIA NET1200 3D Station

Angular Accuracy: 1s
Linear Accuracy: 0,6mm + 2 ppm x D

HBM GENESIS 3i

UNHOLTZ-DICKIE APEX SL

FARO FaroArm Platinum P4

Single Point Accuracy: 0,020 mm
Volumetric Accuracy: 0,029 mm

AVAILABLE HBM ACQUISITION INPUT CARDS

GN3210	GN411	GN441
Basic/IEPE/Charge 250 kS/s - 2 GB RAM	Bridge amplifier 1 MS/s - 512 MB RAM	Universal amplifier 1 MS/s -512 MB RAM

FARO Laser Tracker VANTAGE

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

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.

Geodetic Systems V-STARS M Photogrammetry

INCA4
Accuracy: 9µm + 9 µm/m or 1:90,000

Dynamo D5
Accuracy: 14µm + 14 µm/m or 1:60,000

PRO-SPOT
Point density - 600 to 23,000 points

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-reflective targets or projected **PRO-SPOT** points.

FARO Laser Tracker VANTAGE

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

Advances in image-based 3D measurement are making the video borescope an increasingly powerful tool in the inspector’s toolbox. While in the past, inspectors could identify indications and capture images; today’s advanced video borescopes allow you to map, measure, and analyze indications in 3D and improve probability of detection (POD) by checking your work in real time. Mentor Visual iQ brings the processing power to operate 3D Phase Measurement and 3D Stereo Measurement with 3D point cloud analysis.

SPECIAL COATING FACILITY

- THERMAL CONTROL COATINGS APPLICATION AND DESIGN
- TWO PROCESS AVAILABLE PROCESSES
  - Thermal Coating
  - Multi-Layer Insulation (MLI)
- ENVIRONMENTAL DEVELOPMENT & QUALIFICATION OF COATING APPLICATION PROCESSES OVER DIFFERENT SUBSTRATUM (METALS, COMPOSITE MATERIALS, POLYMERS AND MORE)

THERMAL-CONTROL COATING APPLICATION

DELIMITED WORK ZONES

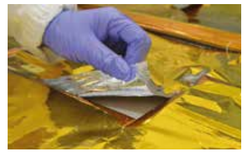
PREPARATION ZONE | PAINTING (APPLICATION) ZONE | CURING/DRYING ZONE

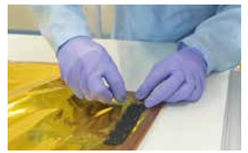
ACCEPTANCE CONTROL TESTS IN COMPLIANCE WITH INTERNATIONAL STANDARDS

MEASUREMENT OF DRY FILM THICKNESSES ON FERROUS, NON-FERROUS AND NON-METALLIC SUBSTRATES

THERMO-OPTIC FEATURE MEASUREMENTS

MLI DESIGN & MANUFACTURING





ELECTRONIC TESTING & INTEGRATION FACILITY

CLEANROOMS
ISO 14644-1 CLEANROOM STANDARDS
ISO 7 (10000) -- 180M2

CONTROLLED HUMIDITY & TEMPERATURE CONDITIONS
ECSS-Q-ST-70-08C
MANUAL SOLDERING OF HIGH-RELIABILITY
22 °C ± 3 °C
55 % ± 15 %

ESD ANTISTATIC PROTECTION
EN 61340-5-1
ALL HANDLING OF ESDS PARTS, ASSEMBLIES AND EQUIPMENT HAS BEEN ESD PROTECTED

SPECIAL PROCESSES AREA
Cleaning - Bake out - Coating (With Vacuum Chamber) - Staking

INTEGRATION & INSPECTION AREA

TESTING AREA
Incoming Inspection test - Performance test - Aliveness test - Thermal tests

STORAGE AREA AND STOCK SYSTEM – EEE COMPONENTS
Incoming - Part List - Handling & Storage - Traceability - Alerts - Nc´s

SOLDER VALIDATION PROCESSES

SAOCOM PROJECT HERITAGE
+ 1000 Populated PCB
+ 200 Harness Manufacture

ACCELERATED CORROSION TESTS BY SAULTY FOG

MF-90C

ASTM- B117

ISO 9227 -2012 en sus variantes NSS, ACSS y CASS

GBT10125

GB2423

X-RAY INSPECTION SYSTEM

GE NANOME|X 180

HIGH PERFORMANCE X-RAY INSPECTION SOLUTIONS

HIGH-RESOLUTION 3D COMPUTED TOMOGRAPHIES

VISUAL INSPECTION (IC, CONNECTORS, HARNESS, PCBS, STAKING, COATING AND MORE)

ADAPTATIVE PRODUCTION SOFTWARE

RF TESTING FACILITY

- PERFORMANCE TESTING
- ALIVENESS TESTING
- DEBUG, NC´S
- CALIBRATIONS
- MIL-1553 V&V
- GROUNDING, BONDING & ISOLATION TESTING
- RF TESTING (<50GHZ)
  - Noise Figure Measurement
  - Spurious Measurement
  - Pulsed RF Signal Testing
  - Active/Passive Devices Characterization (Filters, Amplifiers, Others)
  - Enviromental Characterization Testing

THERMAL VACUUM TESTING FACILITY

TVT
THERMAL VACUUM TESTING

TBT
THERMAL BALANCE TESTING

TCT
THERMAL CYCLING TESTING


HVT 10100 d 1,8 m

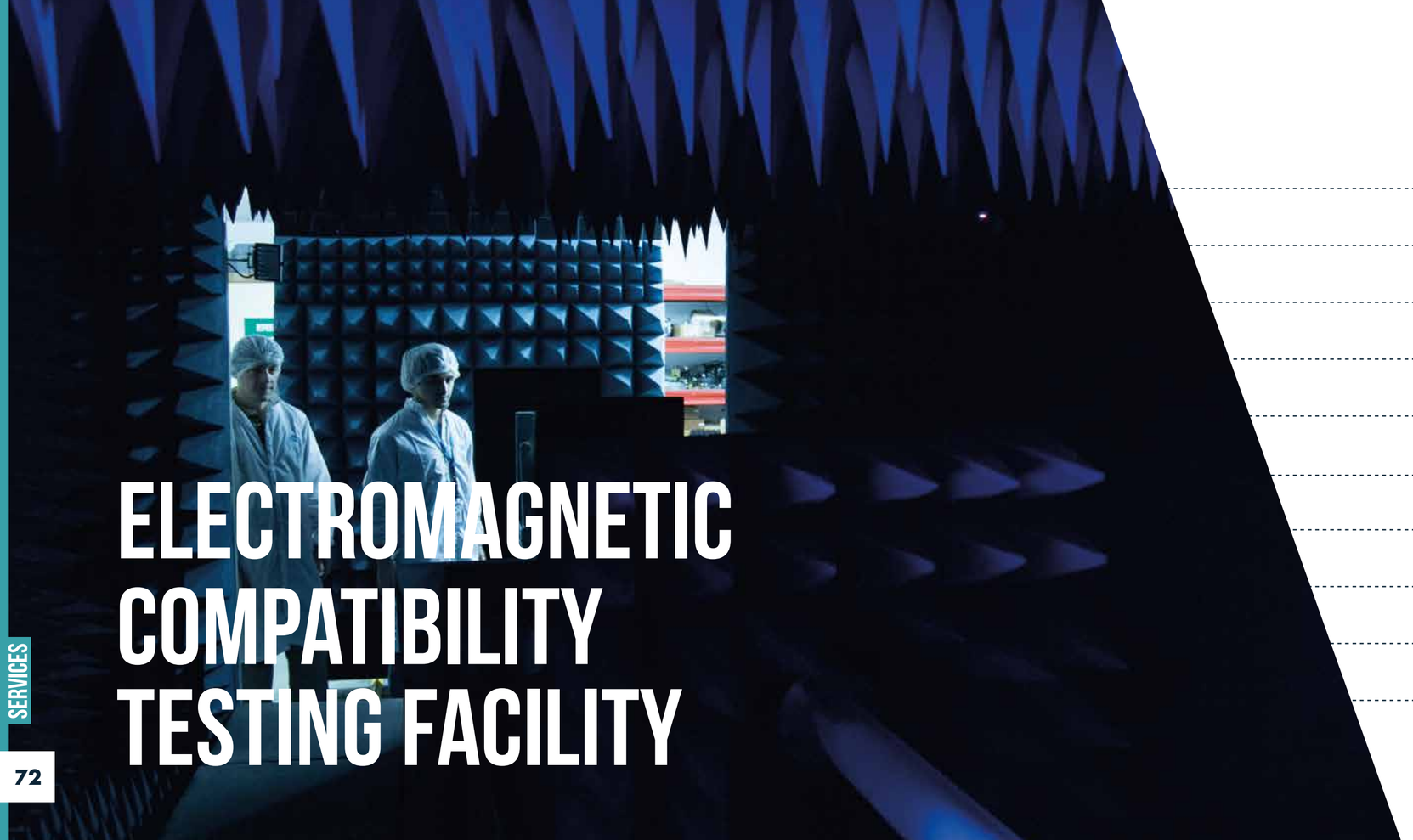
HVT 400 d 0,71 m

SPECIFICATIONS	HVT-400	HVT-10100	TGSE
Working volume (liters)	160	9500	31230
Vacuum Pressure max. (mbar)	$1x10^{-7}$	$1x10^{-7}$	$1x10^{-7}$
Temperature Range (°C)	-190° to +160°	-100° to +100°	-196° to +130°
Maximum Weight of the DUT (Kg)	40	200	500

SU-1400 1400 lts

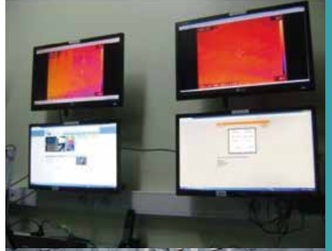
SU-500 500 lts

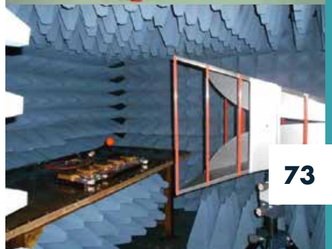
TEMPERATURE RANGE
-75 °C TO +180 °C



ELECTROMAGNETIC COMPATIBILITY TESTING FACILITY

- CONDUCTED EMISSIONS
- CONDUCTED SUSCEPTIBILITY
- RADIATED EMISSIONS
- RADIATED SUSCEPTIBILITY
- GROUNDING
- BONDING
- ISOLATION
- ESD
- INRUSH CURRENT
- THERMOGRAPHY MONITORING



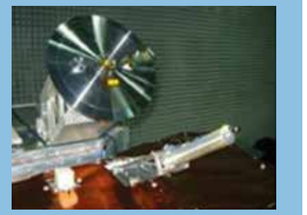


IN-DOOR & OUT-DOOR TESTING AT DIFFERENT INTEGRATION LEVELS

ANTENNA SM

BONDING MEASUREMENTS ON STRUCTURAL COMPENENTS AT CEATSA



PANEL EM

TESTS PERFORMED AT LACEM - CETT

Grounding, Bonding & Isolation
CE01/CE03 - Conducted Emissions. Frequency Domain
CE07 - Conducted Emissions. Time Domain
CS01/CS02 - Power Line Ripple
CS06 - Transparent Power Lines
CS - Bulk Cable Injection




SAR INSTRUMENT NEAR FIELD TESTING

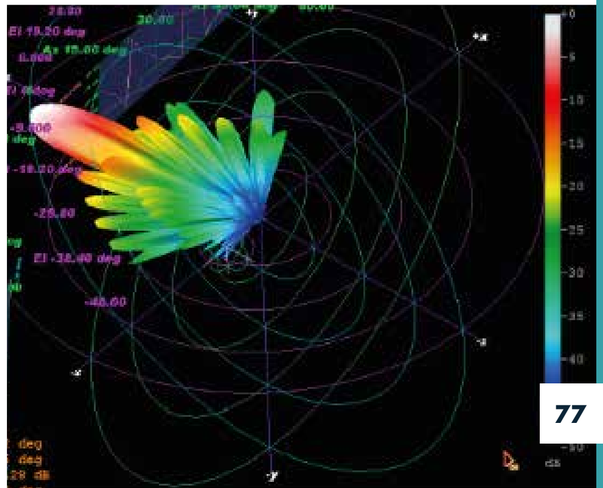
ANTENNA TEST FACILITY

- NEAR FIELD TESTING
- CIRCUIT ANTENNAS PROPERTIES (RADIATION PATTERN, GAIN, EFFICIENCY, POLARIZATION PROPERTIES AND MORE)
- ANTENNA RADIATION PROPERTIES (INPUT IMPEDANCE COUPLING BETWEEN CHANNELS, COUPLING BETWEEN ANTENNAS, ACTIVE REFLECTION COEFFICIENT AND MORE)
- RADIATION TESTING AND CIRCUIT PROPERTIES OF ANTENNAS IN DIFFERENT TEMPERATURE CONDITIONS (AMBIENT PRESSURE)
- ESTIMATION OF INTERACTION BETWEEN ANTENNAS (SATELLITE SCALE MODELS)
- EVALUATION OF RADIATION PROPERTIES OF ANTENNAS (INSTALLED ON THE BUS USING SCALE MODELS OR PARTIAL MODELS ON A 1:1 SCALE)

CLEANROOM: 100K (ISO 8)
FREQUENCY RANGE: 400MHZ – 40 GHZ
PLANE MODE ACQUISITION AREA: 11.1M X 5.4M
CYLINDRICAL MODE: 5.4M X 360° O 11.1M X 360°
SPHERICAL MODE
DIMENSIONS OF THE CHAMBER: 12.5 X 13.5 X 8.5 M
AUTOMATED TESTING / CONTROL TEST VIDEO

RF TRANSPARENT THERMAL CHAMBERS

CLEANROOM: 100K (ISO 8)
FRECUENCY RANGE: 300MHZ – 20 GHZ
DIMENSIONS OF THE CHAMBER: 4.9 X 2.6 X 1.6 M
AUTOMATED TEST / CONTROL TEST VIDEO



ENGINEERING/ DEVELOPMENT AREA

Focused Design for Manufacture and Test Philosophy.

From product concept stage, design is offered in addition to experience and expertise in manufacturing and testing for requirements validation and verification. This has a positive effect on the product, project cost and delivery times, thus resulting in state-of-the-art results.

- RESEARCH & DEVELOPMENT (R+D)
- DESIGN
  - ANTENNAS
  - ELECTRONICS
  - MECHANICAL
  - THERMAL
  - ELECTRICAL GROUND SUPPORT EQUIPMENT (EGSE)
  - MECHANICAL GROUND SUPPORT EQUIPMENT (MGSE)
- COMPLETE CYCLE DEVELOPMENT
  - REQUIREMENT INTERPRETATION
  - CONCEPTUAL DESIGN
  - DESIGN DETAIL
  - IMPLEMENTATION
  - VERIFICATION & VALIDATION
  - PRODUCTION ENGINEERING / TESTING

LABORATORY OF SPATIALIZATION AND ASSURANCE

THERMAL SHOCK CHAMBER ACS CST130/2T "SPINNER"

MAIN TESTS

MIL-STD-833H
Method 1010.8 test condition A, B, C, D, F

MIL-STD-810G
Method 503.5 procedure I-B, I-C, I-D

IEC 600068-2-14
Test Na

TEST COMPARTMENTS WITH SYSTEM AIR TREATMENT

- HOT CHAMBER: TEMPERATURE RANGE +70/+220 °C ±1 °C
- COLD ROOM: TEMPERATURE RANGE -80/+100 °C ±1 °C

BASKET MECHANISM

- FREE PT100 SENSOR INSIDE THE BASKET FOR MONITORING
- BASKET CAPACITY: 130 L
- USEFUL BASKET DIMENSIONS: 614 X 500 X 425 MM
- MAXIMUM LOAD OF THE BASKET: 50KG
- BASKET MOVEMENT TIME < 10 SEC
- MAXIMUM LOAD WITH MIL 883 TEST (15 MIN SAMPLE REPLACEMENT TIME)
  - 13KG DISTRIBUTED IN 2 SHELVES WITH MIL 883 TEST D
  - 20KG DISTRIBUTED IN 2 SHELVES WITH MIL 883 TEST C
  - 26KG DISTRIBUTED IN 2 SHELVES WITH MIL 883 TEST B
- FREE PT100 SENSOR INSIDE THE BASKET FOR MONITORING

ELECTRONIC WORKMANSHIP TRAINING CENTER

AVAILABLE IPC CERTIFICATION

IPC-A-610H
ACCEPTABILITY OF ELECTRONIC ASSEMBLIES

IPC/WHMA-A-620D
REQUIREMENTS AND ACCEPTANCE FOR CABLE AND WIRE HARNESS ASSEMBLIES

IPC J-STD-001H
REQUIREMENTS FOR SOLDERED ELECTRICAL AND ELECTRONIC ASSEMBLIES

IPC-J-STD-001HS
SPACE AND MILITARY APPLICATIONS ELECTRONIC HARDWARE ADDENDUM TO IPC J-STD-001H (OPTIONAL)

IPC CERTIFICATIONS COMING IN 2024

IPC/WHMA-A-620DS
SPACE AND MILITARY APPLICATIONS ELECTRONIC HARDWARE ADDENDUM TO IPC/WHMA-A-620D (OPTIONAL)

IPC-7711/21 C1
REWORK, MODIFICATION AND REPAIR OF ELECTRONIC ASSEMBLIES

IPC-A-600K
ACCEPTABILITY OF PRINTED BOARDS

IPC-6012E
QUALIFICATION AND PERFORMANCE SPECIFICATION FOR RIGID PRINTED BOARDS

IPC-COMPLIANT ELECTRONIC DESIGN COURSE

COURSES WITH CERTIFICATES DELIVERED BY THE WORKMANSHIP TRAINING CENTER

ANSI/ESD S20.20-2021
PROTECTION OF ELECTRICAL AND ELECTRONIC PARTS, ASSEMBLIES AND EQUIPMENT

WELDING COURSE WITH SMT TECHNOLOGY + LABORATORY PRACTICES

CUSTOMIZED AD HOC COURSES

WELDING COURSE WITH TH INSERTION TECHNOLOGIES + LABORATORY PRACTICES

ALTIUM DESIGN COURSE FOCUSED ON SMT MANUFACTURING

AERONAUTICAL INDUSTRY

Focused Design for Manufacture and Test Philosophy.

From product concept stage, design is offered in addition to experience and expertise in manufacturing and testing for requirements validation and verification. This has a positive effect on the product, project cost and delivery times, thus resulting in state-of-the-art results.

VENG is pleased to introduce one of its first **innovative products** for the **aeronautical industry**: the fatigue meter. This device is similar to the electromechanical types already used in the market, except that it has an **advanced electronic design**, **better features**, and a **more reliable system**.

FATIGUE METER

MILITARY GRADE CERTIFICATIONS.

Enviromental
MIL-STD-810H

EMC/EMI
MIL-STD-461G

DC Power
MIL-STD-704F

Safety
SAE ARP-4761

Packaging
MIL-STD-2073-1E

Identification
MIL-STD-130N

Software
DO-178C

SOFTWARE.

CONFIGURE ALL THE PARAMETERS OF THE EQUIPMENT

VIEW ALL THE DATA OF THE CURRENT AND PREVIOUS RECORDS

CHECK THE FUNCTIONAL STATUS OF THE SYSTEM AND DISPLAY THE FOLLOWING PARAMETERS

> Sensor reading indicated in G
> Battery voltage

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, and for private clients such as New Space Companies who are seeking reliable and efficient results. Also, we develop electronic integrations to aeronautical companies such as FAdeA.

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.

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 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.

LAUNCHER VEHICLE ENGINES

Since its early days, VENG has —as one of the main technological development areas— the liquid propulsion area which is mainly focused on both the development of propellants for launch vehicles and also of small propellants, for launch vehicles attitude control, along with the potential use in the satellite industry.

In the field of micropropellants , VENG, as a legacy, has been involved in the development of monopropellant 1.5N thrust force prototypes, at lab level, having verified the development capacity of these type of propellants, which are able to adapt to the needs of satellite clients and the space industry in general.

The features of the prototype developed in R+D+I mode are shown below.

1.5 N THRUST FORCE MONOPROPELLANT THRUSTER

The operation of monopropellant engines is based on fuel catalytic decomposition, which then produces heat and gasification. These gasses are later spread in a nozzle in order to generate thrust.

Thrust	1,5 N @ (400psia)
Propeller	Monopropellant (Hydrazine)
Valve type	Double solenoid, double seal
Catalyst	Shell 405
Specific impulse	220 sec @ 400psia
Maximum weight	0,5 kg
Dimensions	
Length	<195 mm.
Height	< 55 mm.
Length	< 45 mm.

LAUNCH VEHICLE ENGINES

Regarding liquid propellants (rockets) of greater thrust, VENG has an extensive over-a-decade experience in the development of Hydrazine/Nitric Acid and Lox/Kerosene (Kerolox) engines for launch vehicles prototypes, with the design, manufacture, test and integration in TI, T4000, Vex 1A, Vex1B and Vex5A launch vehicles prototypes as main milestones. Vex5A first stage engine, the largest propellant developed by VENG so far, is shown as a reference.

VENG is nowadays the leading main contractor in the design of propellants of the Tronador II launch vehicles series. It is in charge of the complete propulsion value cycle: from the requirements definition, to the design, simulation, manufacture, tests, qualification and integration in the final/deliverable vehicle .

Thanks to this experience, we are able to adapt to any propulsion solution that the clients require, such as launch vehicles, satellites and spacecrafts in general.

VEX5A 1ST STAGE MCA2 PROPELLANT

Name of the rocket engine	MCA2
Use	S1 of the VEX5 (x1)
Thrust to SL	11600 Kgf
Propellents	LOX/RP-1

TII-250, VEX 5 A AND VEX 1 2ND STAGE MES3K PROPELLANT

Rocket engines	MES3K
Use	S1 of the VEX1 (x1) S2 of the VEX5A (x1) S2 of the TII-250 (x1)
Thrust in a vacuum	2975 Kgf
Propellents	MMH/NTO

TII-250 1ST STAGE MCA3 PROPELLANT

IN DEVELOPMENT

Rocket engines	MCA3
Use	S1 of the TII-250 (x3)
Thrust to adapted nozzle	35750 Kgf
Propellents	LOX/RP1

ELECTRONIC DETONATOR SYSTEM

FOR THE OIL INDUSTRY

VENG introduces its new Electronic Detonator System (EDS) for the oil industry. VENG's EDS allows the operation of all its components: Control Software; Firing Panel; Selective Electronic Detonators; and Switch for Resistorized Ignitor, ensuring the safety of people and assets.

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.

EDS VENG

is based on API-RP67 standard and consists of:

- 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.

ESD

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

DIRECT CURRENT

Tested at 220V AC - 50Hz. Safe.

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.

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.

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