Spain
Space

IAC 2023

74th International Astronautical Congress

2 – 6 October, Baku (Azerbaijan)

Booth **#514**

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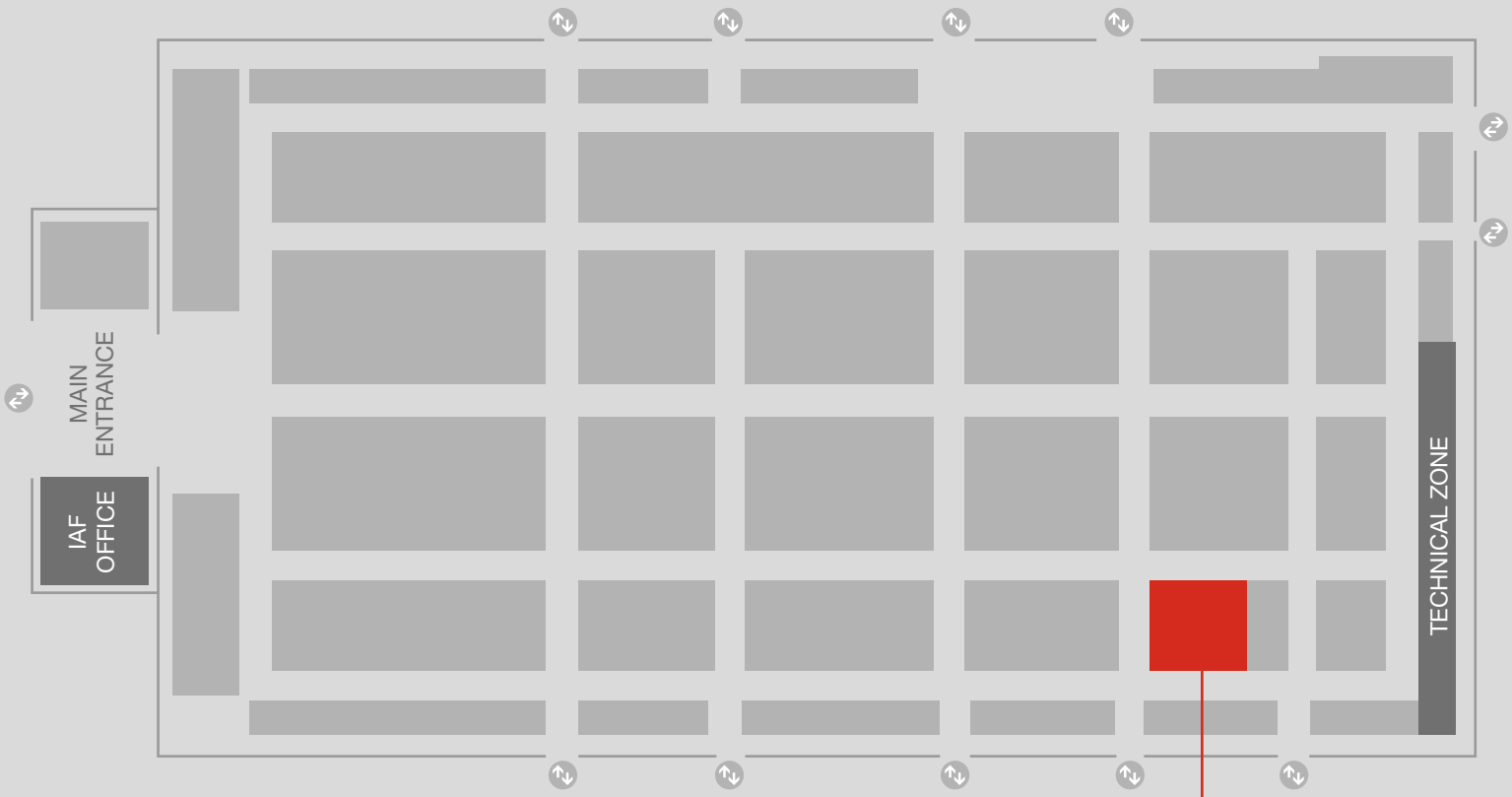
Exhibiting companies

ALÉN SPACE	**www.alen.space**
ARQUIMEA	**www.arquimea.com**
AVS ADDED VALUE SOLUTIONS	**www.a-v-s.es**
ELECNOR DEIMOS	**www.elecnor-deimos.com**
DHV TECHNOLOGY	**www.dhvtechnology.com**
GMV	**www.gmv.com**
SENER AEROSPACE & DEFENCE	**www.aeroespacial.sener**

BAKU CONVENTION CENTER



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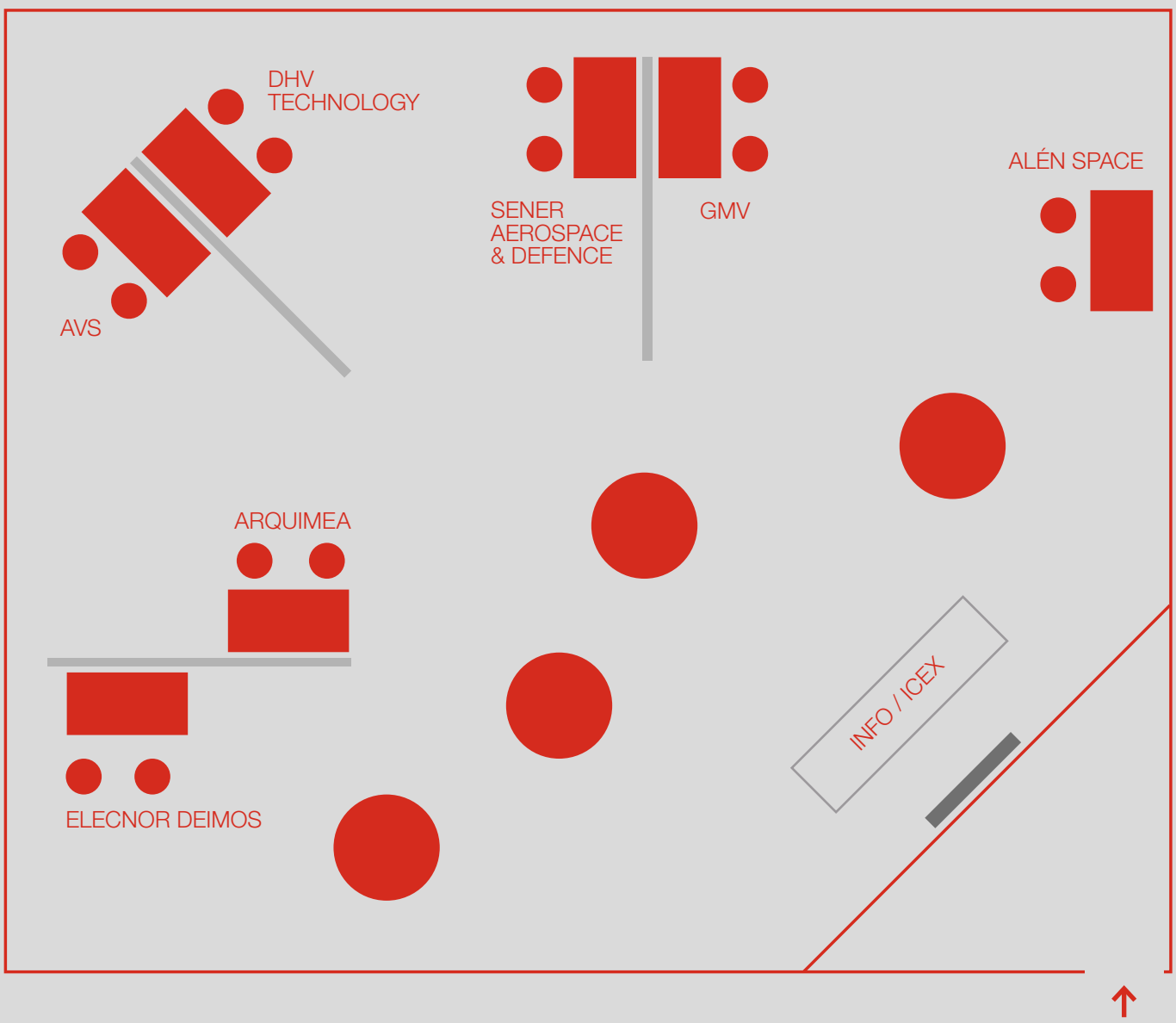

www.alen.space

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ALÉN SPACE is a Spanish company dedicated to the design, manufacture and operation of small satellites with a highly qualified team of more than 40 engineers and 15 years of experience. Its products and processes are based on ESA (ECSS) standards and backed by quality certifications.

Its main objective is to help its customers (space agencies, companies, institutions and high-tech centres) put their business ideas into orbit through its state-of-the-art space/ground segment products and turnkey solutions for the development of end-to-end nanosatellite missions.

ALÉN SPACE's services cover all essential aspects of any type of space project: platform and mission design; payload development and manufacturing; assembly, integration and verification (AIV) phase and support of specific satellite operations through its mission control software. Optionally, ALÉN SPACE prepares training programmes for those customers who need instruction in mission development and knowledge transference.

Its capabilities have led ALÉN SPACE to become part of the technology multinational GMV. A strategic alliance based on the purpose of growing together in an environment of strong competition and to strengthen their positions in the market.

TECHNOLOGICAL CAPABILITIES / PRODUCTS

ALÉN SPACE team has in-depth knowledge of many of the components available on the market for small satellites. Therefore, this company has been able to implement cutting-edge software and hardware to build its own small satellites with 100% success rate. Its technology has been accredited by well-known industry certificate such as ISO 9001.

The ALÉN SPACE's portfolio includes advanced space products and communication subsystems divided into:

SMALL SATELLITE PLATFORMS (1-16U)

• All buses are designed for time and cost-efficient payload integration. Prepared to accelerate the development time of individual nanosatellite projects or small satellite constellations.
Useful link:
https://products.alen.space/catalogue/small-satellite-platforms

PAYLOADS FOR SPACE MISSIONS

• Closed payloads based on our SDR technology with flight heritage. They are ready to operate in several applications (ADS-B, AIS, DVB-S2, IoT, Custom-apps) in multiple bands.
Useful link:
https://products.alen.space/catalogue/small-satellite-payloads

ON-BOARD COMPUTER (TRISKEL)

• TRISKEL. OBC + TTC in one single module. Some of its main features are:
· Optional closed on-board software (OBSW)
· Software Defined Kit (SDK) based on freeRTOS
· Closed TTC application in UHF band (400 MHz or 435 MHz)
Useful link: https://products.alen.space/products/triskel

SOFWARE DEFINED RADIOS (TOTEM, TREVO)

• TOTEM. SDR specifically developed for communication of small satellites. Some of its main features are:
· Multi-application capabilities
· Embedded Linux and GNURadio compatible
· Different RF Frontends: UHF, VHF and S-Band
Useful link: https://products.alen.space/products/totem- sdr

• TREVO. Modular high performance SDR platform. Some of its main features are:
· Up to 4 external modules
· Zynq Ultrascale+ with embedded Linux and GNURadio
· Multi-core processing and FPGA flexibility
Useful link: https://products.alen.space/products/trevo

GROUND STATIONS

• GS-Kits. Integral solutions for UHF, VHF and S-band. They include the following elements:
· Antennas, cables, azimuth and elevation rotors
· Strong structure with easy assembly
· SDR-Rack: rackable dual SDR compatible with GNU Radio
· GS control software
· Installation and operation manual
Useful links:
https://products.alen.space/products/ground-station-for-uhf-vhf-s-band
https://products.alen.space/products/ground-station-for-s-band

GS COMMUNICATION SYSTEMS

• SDR-Rack. Transceivers for UHF, VHF and S-band.
They integrate the SDRs and frontends necessary for communications with small satellites in these bands.
Useful links:
https://products.alen.space/products/gs-sdr-rack-s-band
https://products.alen.space/products/gs-sdr-rack

MAIN PROJECTS

Nowadays, ALÉN SPACE is already a consolidated company in the New Space sector, working with numerous global institutions and with several active clients in more than 20 countries.

Under the current brand name, some of the company's most important projects are:

· **Sateliot constellation.** An IoT communications payload was developed by ALÉN SPACE for the first of the future nanosatellite constellation whose goal is to democratise the Internet of Things with 5G coverage. There are plans for more collaborations.

· **Anser Mission.** The development of the intersatellite communication system (ISL) and the supply of the ground station for monitoring this mission of the Spanish National Institute for Aerospace Technology (INTA). It's aimed at monitoring water quality in reservoirs and marshes and the possible effects of climate change.

· **SATMAR.** A nanosatellite mission (still in process) under the VDES standard together with the Spanish company Egatel for the digitisation of maritime communications. It's supported by the Ports 4.0 capital fund of Puertos del Estado and the Spanish Port Authorities. Previously, ALÉN SPACE and Egatel had already collaborated in the development of a VDES solution in the SHIPMATE project, together with the Galician Telecommunications Technology Centre (Gradiant).

· **RoboCrane.** An ESA collaborative project with several international universities focused on deploying a group of small robots to explore caves on the Moon.

· **Alfa Crux Mission.** It was a joint development with the University of Brasilia of a nanosatellite mission for research and experimentation in the field of Internet of Things (IoT) communications, as well as the effects of space weather on satellite communications at equatorial latitudes.

In addition to these projects, ALÉN SPACE has supplied its products to the Indonesian Space Agency (BRIN), Colombian Air Force, ONERA laboratory and many other customers.

Right now, there are more projects that for confidentiality reasons cannot be published.

↰ Index

ARQUIMEA

www.arquimea.com

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ARQUIMEA is a tech company that operates globally, providing innovative solutions and products in high demanding sectors including Aerospace, Defense, Big science, Biotechnology and Fintech.

ARQUIMEA was founded in 2005 by Diego Fernández PhD, with the aim of developing technologies, products and services that contribute to solving the challenges of our society. At ARQUIMEA we all share a strong passion for technology.

ARQUIMEA invests most of its profits in R&D, as well as in the acquisition of other technology companies around the world. The company has its own research center with more than 65 researchers working on the technologies of the future.

In the space sector, ARQUIMEA collaborates with major agencies such as NASA and ESA, leading companies in traditional and new space, international consortium and research centers.

TECHNOLOGICAL CAPABILITIES / PRODUCTS

1. Design and integration of small satellites.

2. Design and production of structures and thermal systems for satellites, such as subassemblies, thermos structural panels, loop heat pipes, heat pipes, deployable radiators, and thermal blankets.

3. Optical systems and avionics for earth observation satellites, monitoring, space exploration and surveillance.

4. Design and manufacture of deployment mechanisms and actuators (HDRM) to hold and release elements such as solar panels and antennas on satellites.

5. Engineering and production of high-performance electro-mechanical components.

6. Design of analog, digital and mixed-signal integrated circuits, resistant to radiation.

To carry out this and other projects of the company, ARQUIMEA has production centers with the latest technology and machinery for design, integration, manufacturing and testing, including ISO-5, 7 and 8 clean rooms.

MAIN PROJECTS

ARQUIMEA and its acquired companies have successfully participated in more than 180 space programs including Coperni from the Shuttle, the International Space Station, Copernicus, Mars 2020, to Artemis.

↰ Index

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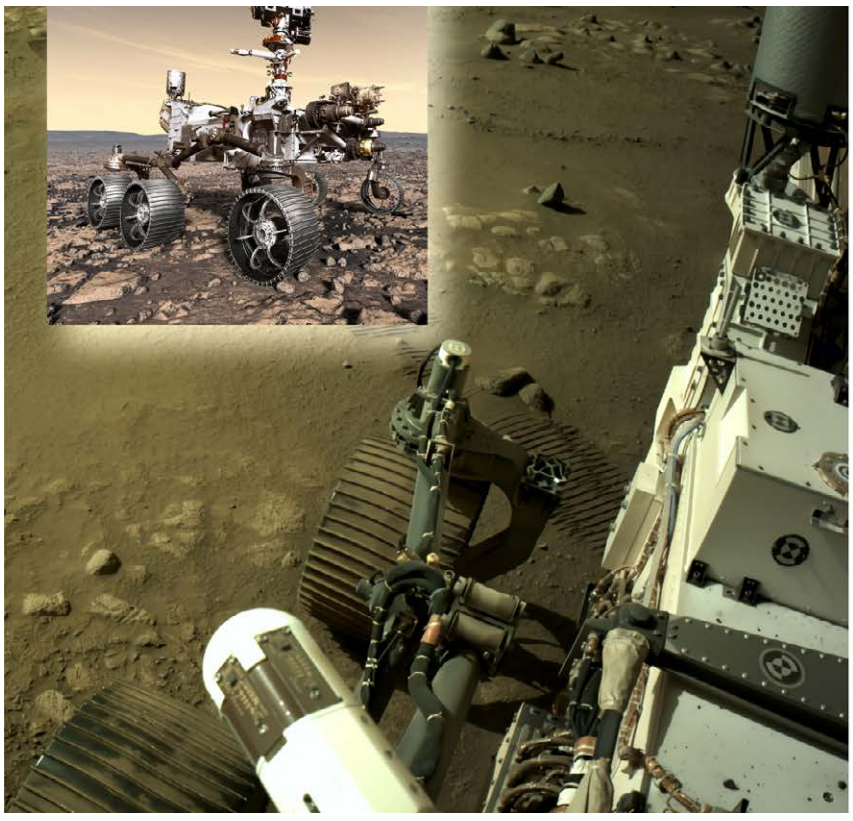

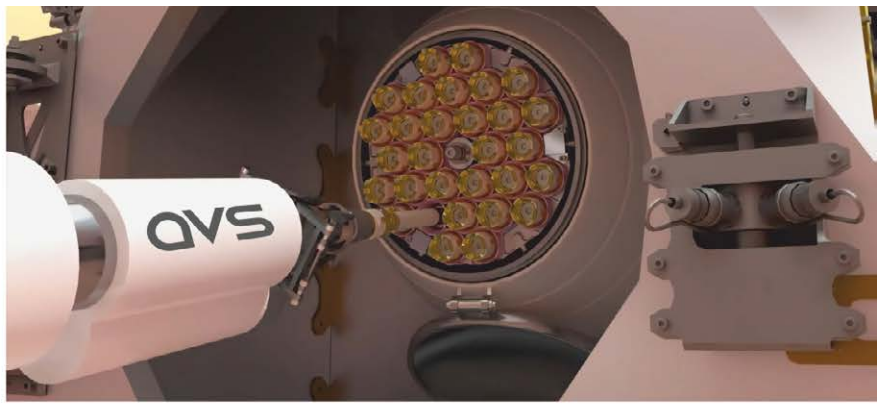

AVS, Added Value Solutions is a global SME established in 2006. Today we are proud of being one of the world's leading companies specialized in the development of complex equipment for industries such as fusion, particle accelerators, and space. With a remarkable track record and a strong focus on technological advancements, AVS has established itself in the Big Science and Space markets as a trusted provider of high-value, critical equipment worldwide.

TECHNOLOGICAL CAPABILITIES / PRODUCTS

AVS has experienced continuous growth, earning global recognition for its design and development of cutting-edge, high-value equipment. Through 17 years of bootstrapping, AVS has nurtured a team of over 150 stargazers and innovators, whose tireless dedication spans across locations in Spain, the USA, the UK, and France.

This diverse team serves as the rocket fuel propelling AVS's success in delivering innovative solutions to complex challenges in the space industry.

With a remarkable history of achievements, AVS has earned global recognition for its high-value, critical equipment and its role in groundbreaking projects with esteemed organizations like NASA and ESA. As AVS continues to push the boundaries of technology, it remains a trusted partner and a force to be reckoned with in the fields of mechatronics, robotics, and space exploration.

In AVS we are experts in design, manufacturing, assembly, tests and supply under ISO9001 and EN9100 certificates, with the advantage of the on-site manufacturing workshop and assembly and integration facilities, more than 10,000 m^2 of facilities distributed across six locations in Europe, as well as the UK and the USA, including clean rooms, providing our customers from the conceptual design to the turnkey.

MAIN PROJECTS

AVS embarked on its journey into the space sector by first gaining experience in fusion and particle acceleration technologies. Leveraging this expertise, the company expanded into the space industry, designing equipment with cross-applications. Over the years, AVS has achieved notable successes in space, including securing contracts with renowned organizations such as the European Space Agency (ESA), NASA, and ISRO, while also forming strategic partnerships with major European primes like Airbus, Thales, and OHB.

AVS's impressive achievements in the space domain encompass a wide range of projects. Notably, the company has contributed significantly to NASA's exploration efforts, including the development of two instruments for the Perseverance rover and the creation of three subsystems for the NASA-ESA Mars Sample Return Mission.

These collaborations with esteemed organizations and missions demonstrate AVS's growing presence as an advanced mechatronics and robotics provider for Moon, Mars, Earth Observation, Telecommunications and in-orbit servicing missions.

AVS has also been instrumental in the development of a disruptive water-based propulsion system in conjunction with URA Thrusters. Additionally, AVS is eagerly preparing for the launch of its own small satellite missions in 2024, representing a significant milestone as the first satellite of its class to be designed and manufactured by a private Spanish company.

The LUR-1 mission space segment includes one 50kg microsatellite, which is designed to perform the IOD of several advanced subsystems developed by AVS and URA thrusters, including Active Thermal Control, Electrospray Propulsion, Electrolyzed Water Propulsion and Mechanisms.

↰ Index

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ELECNOR DEIMOS is a European technology group founded in 2001, with about 500 staff, headquartered in Spain with subsidiaries in five countries. The group operates in space, transports, aeronautics and maritime sectors, and also designs and implements digital transformation processes.

ELECNOR DEIMOS has developed multiple space technologies and tools stemming from more than 500 contracts with ESA, NASA and other agencies. In addition to engineering work, the company has developed and provides operational space and ground infrastructure services for tracking and receiving satellite data and for its DEIMOS Sky Survey Center.

DEIMOS provides end-to-end services for space systems also following the New Space philosophy, covering small satellite design and integration, micro-launcher subsystem development and operations, earth observation satellite operations, data provision and end-user applications and services.

TECHNOLOGICAL CAPABILITIES / PRODUCTS

ELECNOR DEIMOS provides systems engineering, ground segment, mission analysis and design, onboard software and satellite integration for Science and Exploration, Satellite Navigation, Earth Observation, Space Safety and Launchers.

Our capabilities include the development of turnkey operational systems for aeronautical and maritime applications, both civil and military. The company also provides services for the transport sector, digital transformation solutions and location-based services.

MAIN PROJECTS

· Sat4EO
· Clearspace GNC
· Comet Interceptor Probe B2
· Neptuno Satellite
· Copernicus Imaging Microwave Radiometer Data Processor
· G3STAR GNSS receiver for Cubesats
· Exomars
· EO-Alert
· Sentinel-3
· Cheops
· Juice
· Lagrange
· Discoverer
· NextGEOSS

↰ Index

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DHV Technology is a Spain based international company that designs and manufactures solar panels for space applications and other power subsystems for different platforms.

DHV Technology has been providing tailor-made solar arrays systems to different international companies at the same time the company has been developing different power subsystems implementing the most advanced technologies.

DHV Technology is formed by more than 100 experts led by Dr. Miguel A. Vázquez, Dr. Vicente Díaz and Francisco Rubiño.

Our facilities, with a total of 3700 m², consist of:

– 1200 m² Clean room

– 1000 m² offices

– 1500 m² warehouse and others

TECHNOLOGICAL CAPABILITIES / PRODUCTS

CubeSats Power Solutions:

• **Solar Panels for CubeSats:**

Standard and custom solar array solutions for any kind of CubeSat platform as 1U, 2U, 3U, 6U, 12U and 16U. Deployables, cut-out areas and other customizations are also available under request.

• **Electrical Power Systems (EPS):**

Electrical Power Systems (EPS) designed to be integrated into different CubeSat platforms from 1U to quad deployable 16U. Deployment control, maximum power point tracking and other features available.

• **microSADA:**

Solar Array Drive Assembly (SADA) is in charge of rotating the solar arrays to keep them optimally oriented with respect to the sun and providing a path for power transfer from the arrays to the CubeSat bus.

MAIN PROJECTS

SmallSats Power Solutions:

· **Solar Panels for SmallSats:**

Deployable and body mounted tailor-made solar array solutions for small satellites. Our solar arrays are manufactured on PCBs or honeycomb aluminum substrates covered with carbon fiber reinforced polymer (CFRP) layers, integrated sensors, etc.

· **PCDU:**

The Power Conditioning and Distribution System PCDU has been designed to be integrated into different SmallSats systems. This PCDU is developed to provide an efficient power supply and control for any type of mission and it is composed by a power management module and a battery module.

· **SADA-M:**

SADA-M is the latest developed solution from DHVTechnology in charge of rotating the solar arrays to keep them optimally oriented with respect to the sun and providing a path for power transfer fromthe arrays to the SmallSat bus.

This device has been designed taking into account the features of the most common standard and customized platforms in the market.

· **Multi-Layer Insulation Blankets:**

Thermal insulators conformed by multiple layers of optical and electrically conductive materials separated by thin netting spacers. MLI Blankets are fundamentals pieces in the spacecraft thermal control and critical in preserving the spacecraft from the space extreme temperatures.

↰ Index

INNOVATING SOLUTIONS

www.gmv.com

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GMV is a private engineering and technology group, being one of the strongest players in the Space domain worldwide. It is a premier provider for space organizations and agencies, and the major satellite manufacturers and operators, including solutions for mission analysis, simulation, GNC, robotics, OBSW, control systems, orbital dynamics, space-mission planning, data processing, operations and applications.

TECHNOLOGICAL CAPABILITIES / PRODUCTS

With over 40 years of experience behind it and nearly 900 satellites carrying its technology, GMV can safely claim to be a technological partner of cast-iron dependability, capable of meeting the most stringent needs under the strictest quality standards. It had achieved CMMI Level 5 certification, covering the whole range of activities and services within the Space sector.

MAIN PROJECTS

Looking to our projects we can highlight our major responsibilities on the European satellite navigation programs Galileo and EGNOS, our presence in the commercial satellite telecommunications market (EUTELSAT, Hispasat, SES, Arabsat, Inmarsat, etc.), where we are recognized as the first worldwide ground segment provider, our strong commitment in Earth Observation and Meteorlogical programs for ESA (ESA Earth Explorers), EU (Copernicus), EUMETSAT (MTG and EPS SG), Spanish government (Ingenio/Paz), our major challenges on IOD missions (PROBA-3) or Robotics and Space Exploration (Exomars, MSR), our products and services around space safety and planetary protection (HERA, SSA, SST), our capabilities to provide operations support (DLR, ESA, CNES, Telecom operators) and finally our synergies to develop useful space applications (agriculture, security, forestry, maritime).

↰ Index

sener

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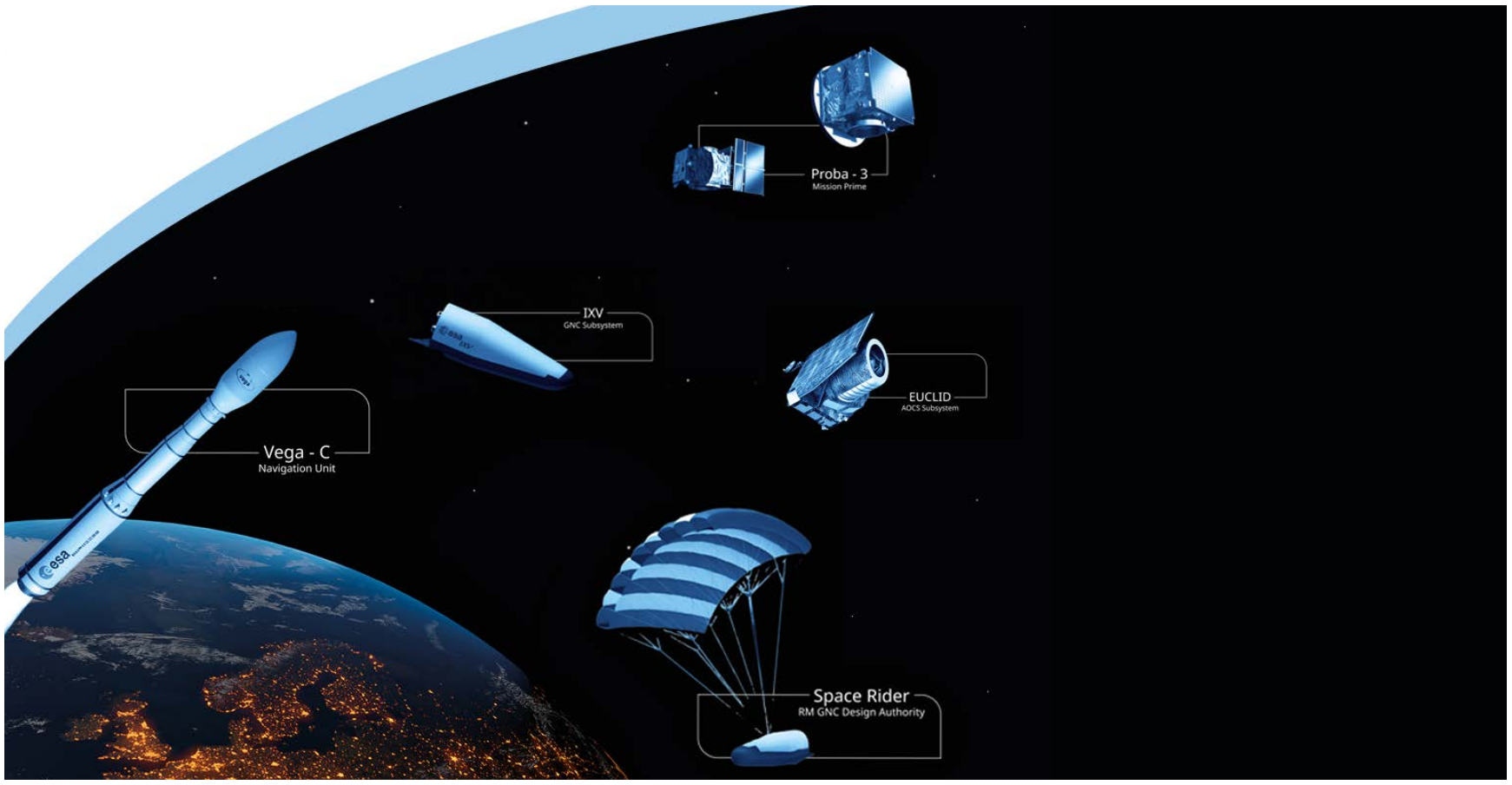

SENER AEROSPACE & DEFENCE is a pioneer engineering company in the design of satellite technology and equipment for space exploration and the defence industry. We have worked for decades with the main space agencies in the world —ESA, NASA, JAXA— and major companies in these sectors, always with the highest level of reliability. We are proud of our experience and excited about what's to come.

TECHNOLOGICAL CAPABILITIES / PRODUCTS

In the Aerospace industry, SENER develops high added-value products and technology for satellites and launchers in institutional, telecommunications, and scientific programmes, with capability for recurring series production across all its product lines.

Four major lines of activity:

• Electromechanical systems:

We've supplied NASA, ESA, JAXA or Roscosmos since 1956, and we are key supplier in ESA's science programmes (references: JUICE, Solar Orbiter, Perseverance).

• Communications systems:

We provide high-gain antennas and TTC, as well as a wide range of passive and active RF across the entire microwave range. Additionally, SENER supplies end-to-end Data Down Link equipment for the most demanding missions (references: Spainsat NG, Onesat, OneWeb).

• Navigation and control systems:

Navigation units for launchers and GNC and AOCS systems (references: Naviga/VEGA-C, PROBA-3, Euclid, Herschel & Planck, IXV and Space Rider).

• In science:

SENER provides optomechanical systems for large telescopes in astronomy (references: M2, M3 or M5 cells of ELT).

MAIN PROJECTS

SCIENCE:
· Rosetta
· Planck
· Solar Orbiter
· JUICE
· BepiColombo
· Euclid
· Gaia

SPACE EXPLORATION:
· Space Station
· Exomars
· Curiosity
· Pathfinder
· Gateway

EARTH OBSERVATION:
· SMOS
· Sentinel 1, 2, 3
· Flex
· CHIME
· LSTM
· CIMR

TELECOMS:
· Globalstar
· O3B
· Iridium Next
· OneWeb
· Onesat
· Spainsat NG

OTHERS:
· ATV
· IXV
· Space Rider
· Vega-C
· Proba-3

↰ Index

Organizer

GOBIERNO DE ESPAÑA
MINISTERIO DE INDUSTRIA, COMERCIO Y TURISMO
ICEX

www.icex.es

ICEX Spain Trade and Investment is a public business organization which works worldwide with the objective of promoting the internationalization of Spanish companies in order to improve their competitiveness, as well as boosting foreign investment in Spain. ICEX offers its services through 31 Provincial and Territorial Trade Offices in Spain, 98 Economic and Commercial Offices worldwide, the largest foreign network, and 29 Business Centres abroad. Every year, ICEX organizes around 1,200 promotional activities in foreign markets and answers over 90,000 queries on internationalization.

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In collaboration with:

SPANISH SPACE AGENCY

www.aee.gob.es

The mission of the SPANISH SPACE AGENCY is to provide a unified national space policy, and to guarantee effective strategic action of the Spanish government in the space sector by effectively coordinating national services and activities. It is also the point of contact with other national and international space agencies, and acts as a node for public–private collaboration, supporting existing aerospace companies and fostering the creation of new players in the sector.

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↰ Index

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SPANISH SPACE AGENCY

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