News

No. 91

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INNOVATING SOLUTIONS

Cross-domain solutions: the present and future of a growing industry

INTERVIEW
Manuel Sanz and Miguel Sanz
Autek founding partners

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Letter from the president

Secure communications are the backbone that holds the European Community's member states together at the most critical times, ensuring coordination in emergencies, the protection of sensitive information, and the ability to gather and analyze vital intelligence. By ensuring that information is shared only between authorized parties, the integrity of operations is safeguarded. In addition, a great deal of critical infrastructure depends on communications systems, and protecting them is critical to ensuring that the country does not grind to a halt even in the darkest moments of emergencies or conflicts.

In this context, GOVSATCOM is an essential pillar. One of the five components of the European Union's space program, it offers a fundamental solution: secure and resilient satellite communications that are resistant and resilient to jamming and cyber-attacks. GMV leads the consortium responsible for the Communications Hub, the central IT system that ensures that commercial and government satellite communications capabilities are available to those entrusted with the mission to ensure our safety.

We recently completed the acquisition of Autek, a company that provides critical solutions for securely connecting classified information systems to other networks. These capabilities are vital, enabling our command, control, intelligence, surveillance, and reconnaissance systems to operate with the confidence that only comes with a well-controlled and secure flow of information.

With this acquisition, GMV reaffirms its commitment and leadership as an independent supplier of advanced systems for the defense market, guaranteeing groundbreaking and secure solutions for present and future European security needs.

Mónica Martínez

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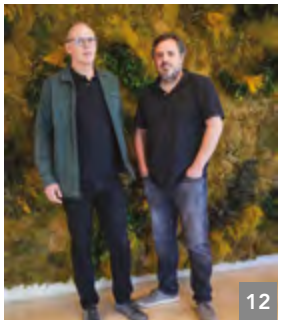

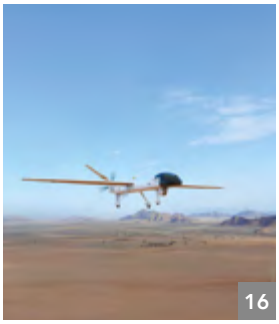

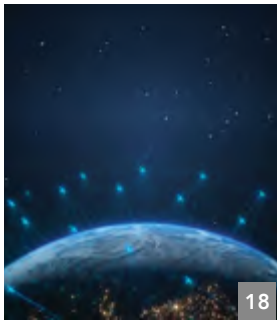

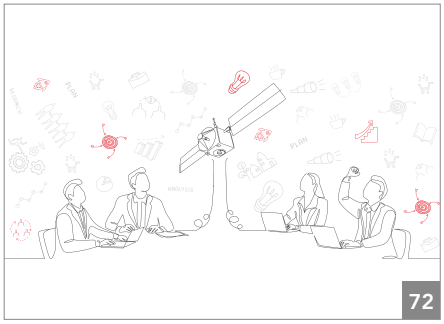

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Cross-domain solutions: the present and future of a growing industry

The demand for these types of solutions has increased significantly due to their growing application in military command and control systems and in the protection of critical infrastructure

Cross-domain solutions (CDS) consist of the secure exchange of information between security domains. This type of solution, which emerged as a technological answer to the need to share data between segregated or classified networks, has seen a sharp rise in demand due to its growing application in military command and control systems and critical infrastructure protection. The rise in digitalization has made modern societies highly dependent on the availability of digital infrastructure in strategic sectors, and there is a movement towards taking the protection mechanisms offered by this type of solutions and applying them in these areas.

The organization of a nation's or agency's confidential or sensitive information into tiers to control access to it is called an "information classification system." Originally, confidential information was handled on paper and access was managed through physical and procedural controls. When computer networks emerged, the same criteria were followed: information from the different levels was managed in separate networks at each level, completely isolated from any other network. Information exchanges (inputs and outputs) with these networks were carried out through human intervention, with some physical supports and following strict procedures. With the increase in the volume of information and the number of formats, this approach was no longer operational, leading to the need to automate this process. Of course, this automation must not compromise the security properties of the networks between which the information is transferred.

To understand cross-domain solutions, as well as their evolution and the

challenges of these information exchange systems, we must understand certain key concepts, such as security domains, interconnections, and asymmetry.

In classified information environments, networks that handle information of a certain classification level and are managed by a certain operational authority are known as security domains. There may be different security domains with the same classification level that cannot be directly connected because they are managed by different operational authorities. In military environments, this is common in mission networks and in the networks of multinational organizations. In both cases, they cannot be directly connected to the national networks, even if they are of the same or equivalent classification level. The concept of security domains can also be applied to networks that are kept isolated for convenience even if they don't handle classified information and there are no formal obligations.

Interconnection is the set of information exchanges between two security domains. When there are two security domains between which there is a need for information exchange, the interconnection must be analyzed in terms of the general criteria of the risks and threats that such interconnection may pose to the information assets of both domains.

The criteria applied by each nation are not fully transparent and are, in general, themselves classified matters. There are NATO reference standards that establish general criteria and principles. However, they cover a wide range of scenarios, since many factors are involved, such as the difference in levels between the domains to be connected, operational needs, risks, etc.

In a broad sense, a cross-domain solution is not a single device or system, but rather a set of measures (hardware, software, organizational, etc.) that are deployed for a given interconnection. The number and characteristics of these measures depend on the risk analysis, the security levels of the domains involved in the interconnection, and particular characteristics of the environment that may warrant additional restrictions. Strictly speaking, the term "cross-domain solution" is commonly used to refer to the core component of the interconnection that includes the physical medium of information exchange.

An important feature to take into account in cross-domain solutions is asymmetry: The greatest risk is the unauthorized outflow of information from the top-ranked domain. The terms typically used are "high-security domains" (or HIGH domain) and "low-security domains" (or LOW domain), and sometimes "internal" and "external" domains. In typical classified information scenarios, where protecting confidentiality is the priority, outbound or downstream flows will be more restricted (sometimes even not allowed).

CURRENT CROSS-DOMAIN SOLUTIONS

A cross-domain solution must ensure that the flows through it are as intended and that there are no other parallel flows. It must fully control all flows between the two domains. Though there are varying approaches, all of them provide specific support for the permitted flows, rather like adding a designated bridge for each of the supported data flows. This approach is radically different from that of a firewall, where only filtering is applied to decide whether a flow passes or not, but the flow is transferred as is.

There are a number of general criteria that apply to all current cross-domain solutions:

- Inter-domain flows must be defined and documented.
- Separation of inflows and outflows as much as possible.
- Complete breakage of the protocol stack.
- Prevent interactive communication between domains.
- Strict filtering of all exchanged data.

When the security of a type of transfer cannot be guaranteed in any other way, human authorizations are used, with the systems validating them through tags and digital signatures.

Based on the security properties of the assets to be protected, the following application scenarios for cross-domain solutions can be identified:

Classic scenarios of classified networks: The main goal is to protect the confidentiality of data in the highest security domain. The most drastic approach is to completely limit the

information output, for example, by using data diodes. In scenarios where this is not possible or necessary, greater restrictions will be applied to outflows than to inflows.

Critical infrastructure scenarios: In these cases, the industrial control network is kept isolated to ensure its integrity and availability. However, data must be sent out of the network for management and operational monitoring. This case is traditionally solved through data diodes placed in such a way so as to allow flow out from the isolated network, but not the other way around.

Corporate scenarios: This use case consists of keeping certain critical assets of an organization in an isolated network either for confidentiality or for availability or integrity. It involves taking segmentation one step further. The same solutions applied in the other scenarios can be applied here as well, adapting them appropriately to the particular case at hand.

FUTURE PROSPECTS

As systems become more complex, cross-domain solutions must continue to adapt to meet new challenges. In this regard, there are several trends that will shape the future of CDS in the medium and long term. First, **integration with multi-cloud architectures and distributed environments**, where CDS is evolving to ensure secure interoperability between multiple clouds and dispersed networks, thus allowing enterprises and organizations to operate in complex environments while ensuring that data flows securely.

Secondly, it is important to highlight the need to ensure **security in critical infrastructure and Internet of Things (IoT) environments**, where cross-domain systems are crucial, as they must be able to manage large volumes of data in real time, ensuring that only authorized information crosses domains. Third, with the advent of **quantum computing**, CDS will have to adapt to new threats linked to cryptography. Future solutions will incorporate **post-quantum cryptography**, which offers new ways to protect the security properties needed in many parts of cross-domain solutions from the challenges posed by quantum computing.

THE MARKET FOR CROSS-DOMAIN SOLUTIONS

In Spain, the market for cross-domain solutions is aligned with the most sensitive sectors, such as defense and critical infrastructure. In the defense area, the Spanish Armed Forces and Ministry of Defense have increased their investment in cybersecurity and interoperability technologies, such as CDS, to improve the protection and sharing of classified information. Regarding critical infrastructure, sectors such as **energy, transportation, and telecommunications** require cross-domain solutions to ensure the secure interoperability of their control and operational systems.

The market for cross-domain solutions in Spain is expected to continue to grow in the future.

Military modernization and increasing international defense cooperation (NATO, EU) will drive the adoption of CDS to ensure secure interoperability of defense systems. In fact, CDS investment in the defense sector is expected to grow approximately **10-12%** per year until 2030. **Furthermore**, critical infrastructure protection will be one of the main growth drivers for CDS. With the adoption of the **Internet of Things (IoT)** in these sectors, there will be a greater need to guarantee communications between OT and IT systems. This sector is expected to see an annual growth of 8-10% in CDS implementation. Another major growth driver is the modernization of **public administration** systems and compliance with the **National Security Framework, which** will continue to promote the adoption of cross-domain systems,

especially in secure interoperability projects between ministries and government agencies. It is estimated that this market will have a sustained annual growth rate of around **8-10%**.

In **Europe**, the cross-domain market is even larger due to the presence of multiple government organizations, military alliances such as **NATO**, and the need for interoperability among members of the European Union. CDS is crucial for **defense, cybersecurity**, and **regulatory compliance** in sectors such as **critical infrastructure** and **financial services**.

The European CDS market size is estimated to be growing at an annual rate of 10-12% until 2030. The CDS market is in a phase of accelerated growth at the Spanish, European, and global levels, driven by increasing digitalization, the need to protect classified and critical information, and regulatory compliance in strategic sectors. Defense cybersecurity, critical infrastructure, and the use of multi-cloud architecture will be the main drivers of this market in the coming years.

AUTEK, LEADER IN CROSS-DOMAIN SOLUTIONS

Autek is a Spanish company specializing in the development of cross-domain solutions with proprietary technology, certified by organizations such as Spain's National Cryptology Center (CCN) and NATO. The company is a pioneer in Spain in offering advanced products for the secure exchange of information between networks with different levels of security classification.

Autek focuses on strategic sectors such as defense and security, **protecting** the secure exchange of the government and military's classified information; critical infrastructure, securing interconnections between industrial control networks and administrative networks in sectors such as energy and transportation; and aerospace, **contributing** to high-security projects to ensure the exchange of information in complex systems.

Autek stands out not only for its CDS technological innovation, but also for its focus on **continuous improvement and working closely with its clients** to ensure secure solutions tailored to their needs. With these products and its focus on cybersecurity, Autek has earned a solid reputation in critical sectors, positioning itself as a key partner for the protection of classified information in Spain and beyond.

Autek's main cross-domain solution products:

PSTgateways
These security gateways are **bi-directional devices** that allow for the exchange of data between high and low security domains. They are designed to provide physical separation of networks, TCP/IP protocol stack breaking, and **advanced filtering**. Its architecture includes two appliances that manage communication from both domains.

They are marketed as COTS products, but there are also specific solutions for certain use cases (JISR scenarios, air traffic control information, command and control information, etc.).

PSTdiode
These **hardware data diodes** allow for **one-way** transfer of information between domains, providing a physical guarantee that transmission can only take place in one direction. These diodes are used in environments where **extreme security** is critical, such as in military networks or critical infrastructure, preventing any possibility of data backflow that could compromise security.

Autek products are **Common Criteria** certified up to **EAL 4+**, an international standard that certifies product safety. The company has also been included in the **NIAPC** (NATO Information Assurance Product Catalog) listings, underscoring its commitment to the highest security standards.

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Manuel Sanz and Miguel Sanz

Autek founding partners

September saw the announcement of GMV's takeover agreement for 100% of Autek, Spain's leading Cross-Domain systems company. As a result of this agreement Autek is integrated into GMV's group of companies and its current management team will lead GMV's cross-domain area at the global level.

With a track record defined by technological innovation in the secure exchange of information, Autek has positioned itself as the leading Spanish manufacturer of Cross-Domain systems, protecting classified information systems for defense organizations, public administration, aerospace, critical infrastructure, and corporate environments. Over the years, the company has expanded its reach by constantly developing its product and service offering, adapting to an ever-changing digital environment, making Autek a clear reference in cybersecurity.

In this interview, Manuel Sanz and Miguel Sanz, founding partners of Autek, explain the company's history and the path it has taken to become the leading Cross-Domain representative in Spain.

How did Autek begin and how has it been the path to become a leading company in the cross-domain field?

We founded Autek in 1998, together with two other partners who only contributed capital, to give continuity to several custom software development projects that we were carrying out with another company. The fields of application and customers at this early stage were very diverse. In 1999, circumstantially, we participated in several projects related to information security—at that time the term 'cybersecurity' had not yet been coined—and we discovered a world that we were passionate about and that we began to delve into. This allowed us to deepen our knowledge of low-level system operation, learn about many technologies and work in a constantly evolving field.

Our involvement in the company's technical side has always been very significant and, for more than a decade, the interactions with associates and clients have been very enriching and our professional growth has been constant. Three or four fields of work within cybersecurity where our developments could be applied and were in demand began to emerge.

As a company, the principles of customer focus and flexibility that we applied were working well, but by 2008 we realized that the company was too dependent on certain customers and external factors. We came to the conclusion that the strategy to follow should be to focus on a niche market where we could have our own product and start working as a manufacturing company. But we needed to identify the market niche.

In 2009, we built on the knowledge acquired in the project to modernize a mail gateway with customized development by Autek to obtain our first product, ***COTS PSTmail,*** an email application gateway. With a considerable investment of time and effort we achieved the safety certification of this product, under the international Common Criteria standard, at the EAL4+ level, a very high level. In 2011, we attended the NATO information security trade fair, NIAS, as an exhibitor, presenting this unique product. Attending the fair several years in succession allowed us to identify the Cross-Domain market niche (or secure exchange of information between security domains), where we would end up positioning ourselves, and we gradually moved on from the other lines of work.

Since then, our progress has been slow but steady. We have been increasing our product portfolio, which currently consists of two lines, ***PSTgateways*** bidirectional gateways and ***PSTdiode*** data diodes. Our approach has been to respond to the demands of Spain's Cross-Domainmarket, keeping in mind the guidelines of the National Cryptologic Center (CCN), but always keeping an eye open to developments in our immediate environment (NATO and EU) and international competition.

> "Autek's approach has been to respond to the demands of Spain's cross-domain market, taking into account the CCN guidelines"

From 2021 onwards, there has been accelerating growth in demand. This, together with the type of clients—organizations and companies with very high security needs—the environments in which our products are integrated, most of which are classified information exchange environments, and the aspiration to be competitive at an international level, meant we had to make a move that would strengthen us and allow us to continue increasing our capabilities. The solution has been integration into an important group like GMV.

> "We know GMV well; we have been collaborating with the company since 2014, and it has become one of our best clients. We think it is going to be a good fit"

What does it mean for Autek to become part of GMV?

We know GMV well, we have been collaborating with the company since 2014, and it has gradually become one of our biggest clients. It was not a casual choice. We think the fit will be good because we share the same core values. Of course there will also be a number of challenges in the integration process, as Autek is a 26-year-old company, and there will be differences in corporate cultures and other small obstacles, but we are certain that the positive aspects will prevail.

For Autek, this integration will mean being able to concentrate on its core business (product development) and not having to worry about the management of corporate services, talent attraction, etc. It will also allow us to access larger contracts and be able to compete internationally.

How is Autek's staff taking on this new stage? What values does the company promote in its teams?

The Autek team faces this new stage with enthusiasm, despite the personal concerns that any change of this magnitude can logically provoke. Most of us have had contact with GMV during our professional work and the experience has always been very positive.

Autek encourages a focus on customers, collaboration to always seek the best solutions, and motivation to do a job well. We have a culture of transparency and collaboration within the teams where everyone contributes their best. There is considerable commitment to continuous improvement at all levels: personnel, processes, and product.

What are the main advantages of this acquisition for customers?
Autek is a well-established company in Spain's market. We have established trusting and long-term relationships with our clients. So, the main advantage is that customers can rest assured that we will continue to support the entire installed base and meet their demand as we have done so far, trying to provide the solutions they need with the same professionalism and transparency. We are certain that being part of GMV will also enable us to increase our capacity and improve our time-to-market. In the medium term, we expect to expand our portfolio of solutions, as we have many ideas and projects that we are confident we will be able to develop as we have greater capacity.

What do you see as the main synergies to be generated by the agreement between GMV and Autek?
Joining GMV will undoubtedly give Autek's Cross-Domain solutions greater exposure on the international market. In international space and defense projects, there will be greater alignment in overall approaches, which will result in greater effectiveness in the application of Cross-Domain within global architectures in the early design phases.

How do you see cross-domain advancing in the coming years? What do you think Autek's role will be in this development?
In recent years, we have observed a trend, which we believe will continue, towards the integration of Cross-Domain systems into vehicles (ships, airplanes, etc.).

Autek is present in several important projects of this type, such as the Eurodrone, promoted by OCCAR, the modernization of the C-295 aircraft of the Spanish Air, and Space Army and the Spanish F-110 series frigates.
A new field is also opening up with the application to cloud environments, where there is a very varied range of cases and which, logically, is related to virtualization. We are conducting R&D in these fields in several different lines of solutions.

Another area where we are conducting R&D is data-centric security (DCS), which emphasizes protection of data itself rather than infrastructure security. It is a developing field due to its application in network federation and the significant needs for secure information sharing in environments such as geospatial.

In addition to these other three trends, although applicable to all three, data labeling is an area where we are moving forward and in where Autek has a lot of experience and know-how, since we started working long before the standards were definitively approved. In the last edition of the international CWIX exercises, we conducted very successful interoperability tests in this field with other nations and NCIA.

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GMV presents its innovations in defense and sustainable aviation at Farnborough 2024

Every two years, the aerospace, aviation and defense industries converge in the UK for the Farnborough International Airshow (FIA), a prime opportunity to forge new connections, engage with industry thought leaders, and stay at the forefront of the latest technological trends.

The Farnborough International Airshow featured a world-class Exhibition & Conference Center and the industry's premier airshow.

Amid rising global tensions that have driven defense budgets to unprecedented levels, José Neves, Director of Homeland Security and Defense in the Portuguese subsidiary of GMV, highlighted the importance of GMV's presence at this pivotal global platform for the aviation and defense sectors.

This edition also provided an excellent opportunity to showcase GMV's latest achievements in the sector. In the defense area, the EPIIC project stands out, advancing the technology of combat aircraft cockpits to ensure seamless collaboration between systems and pilots. Regarding civil aviation, GMV presented the HECATE project, which represents a significant milestone in research and innovation, driving the transformation of aviation towards a sustainable future.

Airbus entrusts GMV with the development of the navigation system of the UAS SIRTAP

This contract has consolidated GMV's position as a national leader in the development of navigation systems for defense systems

GMV has been selected by Airbus to develop the navigation system of the tactical UAS SIRTAP (High Performance Remotely Operated System). The contract covers both the equipment on board the aircraft and the ground augmentation station to improve navigation accuracy during takeoff and landing.

The SIRTAP remotely piloted aircraft is designed for advanced intelligence, surveillance, and reconnaissance (ISR) missions (day and night), both on land and at sea. With a range of more than 2,000 kilometers and an operating time of more than 20 hours, it will be able to fly in the harshest environmental and operating conditions (-40°C and +50°C). In the future, attack capabilities may also be integrated.

This project has consolidated GMV's leading position in the development of navigation systems for defense systems. The navigation system for SIRTAP draws on GMV's long experience in navigation and avionics systems, incorporating all the navigation advances developed by GMV in other programs, such as the development of the SENDA navigation system for the F-110 frigate and the ISNAV navigation system for the 8x8 vehicle.

The High Performance Remotely Piloted System (SIRTAP) will provide a performance leap in the high-end tactical unmanned aircraft segment. Its dual applications, both in support of civilian and military operations, will offer a wide range of missions tailored to the operational needs of institutional and government clients.

Together with the development of the navigation system, GMV will also develop the front-view camera used remotely by the pilot for taxiing, takeoff, and landing.

The Army and the Air and Space Army will have 27 of these drones that Airbus will manufacture in Spain and whose first units are expected in the first half of 2027. SIRTAP has also generated interest from other nations, aspiring to become a leading platform in its segment at international level.

GMV leads the GOVSATCOM Hub, key contract for the European Union Governmental Satellite Communications Programme

The contract has a budget of €107M, with a planned duration of about three years

The European Union Agency for the Space Programme (EUSPA) has awarded a new contract to GMV, to lead a consortium that will include Indra and Hisdesat as the other key members. The contract covers the design, development, and deployment of the Communications Hub, a key element of the European Union's GOVSATCOM programme.

The award of this contract culminates the rigorous competitive bidding process, which included the pre-selection of consortia and the subsequent execution of several parallel contracts for the preliminary design and final demonstration of the future system's capabilities, with the leadership of the "core team" and significant contributions from other companies such as Hispasat and neXat. During this process, GMV and its partners demonstrated outstanding technical responsiveness, commitment, reliability, and flexibility, all of which proved decisive for the final award of the contract.

GMV's contract with EUSPA has a maximum budget of €107 million. GMV leads an industrial team made up of several European companies, with core team members playing a pivotal role. It is worth mentioning GMV's management capabilities and technical expertise in space systems and cybersecurity, Indra's technological leadership in communications, and command and control systems, and Hisdesat's operational experience. This important contract paves the way for a bright future and will create new opportunities for highly skilled employment within these companies.

GOVSATCOM is one of the five components of the European Union's space programme, along with Copernicus, Galileo, EGNOS, and the Space Situational Awareness Programme. Its mission will be to provide secure and cost-efficient satellite communication services to authorized governmental users in the EU Member States. It will provide these users with communication services in various scenarios, such as crisis management, border and maritime surveillance, and critical infrastructure management, as well as services related to security in polar regions.

The Hub is a fundamental element of the GOVSATCOM architecture. Its function is to ensure the optimal delivery of satellite communication services, to meet the demand for required operational services of EU Member States users. The Hub's planning will cover predefined medium-term communication needs, as well as dynamic and urgent requests arising from unforeseen scenarios, all under strict security and resilience requirements. In addition to the satellite communication resources of the European Union's Member States, the Hub will also handle the services provided by the EU's future multi-orbital secure communications constellation, known as IRIS2.

This contract is carried out within the framework of a programme funded by the European Union. The views expressed in this article are the sole responsibility of the author and do not necessarily reflect those of the European Commission or European Union Agency for the Space Programme (EUSPA).

GMV improves the capabilities of the Spanish Space Surveillance and Tracking Operations Centre

GMV has announced significant improvements to the Spanish Space Surveillance and Tracking Operations Center (S3TOC) [S3TOCEVO] as part of Spain's SST project, which is being funded by the Spanish Space Agency (AEE) and managed by the European Space Agency (ESA) under a third-party agreement. These upgrades have been designed to improve computing capabilities as well as performance, while also expanding and adapting the data processing center (DPC) and analysts' room.

The S3TOC is part of the space surveillance and tracking (SST) system of the European EUSST program. It provides collision avoidance (CA) services to more than 400 satellites operated by 40 different users worldwide. In addition to this service, it oversees the coordinated planning and task assignment for the space objects that use the EUSST program's sensors.

These latest improvements include those implemented to provide additional computing capacity, by improving the number of servers and the technology they use, and to increase the speed of the communications network, improve its structure, and implement a more robust system. In addition, advanced security features have been implemented to protect the users' data and safeguard their privacy. The DPC has been updated with state-of-the-art technologies, such as cooling and security systems, with the aim of considerably increasing its computing capabilities. Finally, the analysts' room for the S3TOC has been significantly improved. It can now accommodate up to 14 people with new capabilities also added, all with the aim of making space a safer place.

With these new improvements, the S3TOC is now ready to respond to a new era in space, where space objects will be increasingly uncontrolled, with megaconstellations flooding the sky. Also, GMV is leading a group (which also includes participation by its partners Hisdesat and ImmediaIT) that is responsible for analyzing the future needs and capabilities of the next generation (V3) of the S3TOC.

New edition of AMOS, one of the largest SDA events worldwide

In September, GMV attended AMOS (Advanced Maui Optical and Space Surveillance Conference), the annual conference on advanced optical and space surveillance technologies held in Maui, Hawaii. AMOS is one of the leading technical events in the fields of space situational awareness (SSA) and space domain awareness (SDA), which makes it an important meeting space for sectors such as administration, industry, and academia.

GMV sponsored the event, taking part in it with the presentation The GSSAC Mission System: A New Solution for Space Objects Cataloguing From DLR, showing the cataloguing system developed by GMV for the DLR as part of the European EUSST program, and a poster on Debris Tracking Laser Network - DLTN, showing the work carried out for the European Space Agency (ESA) with the aim of coordinating a network of laser sensors for tracking objects in space.

GMV, as a world leader in the SSA and SDA applications market, also took part with a stand exhibiting the ***Ecosstm***® product line, the complete software solution for SSA and SDA, as well as the ***Focusoc*** services, a conjunction and collision-risk analysis service, and ***Focusear***, a passive satellite tracking service based on radio frequency using the communications signals emitted by the satellites themselves.

GEO satellite tracking for the EU SST system

The French Space Agency (CNES) issued a public consultation to collect Space Surveillance and Tracking (SST) data from EU-based commercial data providers for the EU SST system. The intention is to complement the data collected by national sensors (both military and civilian) with a growing amount of commercial data thus promoting the European SST industrial ecosystem.

GMV has been awarded with a contract to provide Passive RF data to the EU SST system from its proprietary ***Focusear*** network of stations located in Spain for a period of two years. ***Focusear*** is able to track on a 24x7 basis more than 60 GEO satellites emitting in Ku band over Europe. With this information, the EU SST will be able to keep high accuracy and low latency custody of these active satellites to support the provision of operational collision avoidance services in GEO.

With this new contract, GMV secures the EU SST as an anchor customer for ***Focusear***, which is also providing accurate tracking data to satellite operators in GEO and complementing the commercial collision avoidance services provided by GMV's ***Focusoc*** operations centre with proprietary ephemerides.

GMV will participate in the refactoring and maintenance of the EU SST Database

In the frame of the European Union Space Surveillance and Tracking (EU SST) partnership, Germany is responsible for the space objects catalogue and the database, which are at the heart of the public core services (Collision Avoidance, Fragmentation and Re-entry) provided by the programme. GMV was already playing a major role in the catalogue as responsible for the development and maintenance of the system since 2021. GMV just increased its participation in the programme as part of the winning proposal, in a Consortium led by CGI, that will carry out the refactoring, maintenance, and evolution of the database.

The EU SST database contains information needed for the provision of Space Situational Awareness (SSA) services, such as the characteristics of the sensors of the EU SST network providing observations, the observations themselves and the orbital data (ephemerides and state vectors) that allows us to know the trajectory of the catalogued objects at any time, amongst others. The main goal of this project, whose kick-off was held on August, is improving the performance of the current system to be able to cope with the increasing number of users and requests, as well as its maintenance (i.e., correction of anomalies and development of new capabilities).

During the activity, which is expected to take place until the end of 2026, and GMV will participate as part of an integrated Agile team with CGI, with a particular focus on the interfaces between the database and the Coordinated Planner (COPLA) of the EU SST network of sensors, also developed by GMV.

This is a big achievement for GMV since it strengthens the company´s position in the EU SST programme, where GMV is already one of the main contributors, but also on the SSA domain in a broader sense, which is a key element to ensure the sustainability of space operations.

Space Norway satellites launched to boost broadband connectivity in the Arctic, powered by GMV

On August 11, Space Norway's ASBM-1 and ASBM-2 satellites were successfully launched from Vandenberg Space Force Base, California. Built by Northrop Grumman for Space Norway, these satellites will provide broadband communication services over the North Pole and high-latitude areas using highly elliptical Three Apogee (TAP) orbits.

The satellites will provide continous broadband coverage to aircraft, ships, research vessels, fishing vessels, cruiseships, expeditions and troops operating in the Arctic.

This mission marks the first commercial broadband payload deployment in such orbits and SpaceX's first launch to this type of orbit using the Falcon 9 launcher.

GMV has been responsible for developing and installing the control center for the ASBM satellites, which includes the real-time command and telemetry processing system based on ***Hifly®***, the flight dynamics system based on ***FocusSuite***, and the ground segment control and monitoring system, ***Magnet***. Additionally, GMV is providing other flight control solutions such as ***Flyplan*** for operation planning and automation, ***FleetDashboard*** for comprehensive system monitoring, and ***CentralLog*** for integrating event data across subsystems.

The control software and equipment have been installed at the ASBM (Arctic Satellite Broadband Mission) ground stations in Northern Norway, facilitating seamless operations for the ASBM mission. This robust infrastructure will ensure reliable command and control of the satellites, which are set to deliver critical broadband connectivity to civil and military users in the Arctic from 65 degrees Northward.

The ASBM satellites carry multiple payloads, including the U.S. military's EPS-R for secure communications and payloads for the Norwegian Armed Forces and Viasat. This mission is a significant milestone in military-commercial collaboration, providing critical communication capabilities in the Arctic region, which is gaining strategic importance.

GMV secures major contract for ESA's CyberCUBE mission to bolster Space Cybersecurity

The GMV-led consortium, which includes GMV's subsidiaries in Romania and Spain, along with Alén Space will manage the end-to-end lifecycle of the CyberCUBE mission

GMV has been awarded a contract by the European Space Agency (ESA) to lead the CyberCUBE mission, a key initiative under ESA's Cybersecurity Operations Centre (CSOC) Cyber Evolutions program. The GMV-led consortium, which includes GMV's subsidiaries in Romania (prime contractor) and Spain, along with Alén Space, a pioneering company in New Space that joined GMV in 2023, will manage the end-to-end lifecycle of the CyberCUBE mission—from specification and design to procurement, assembly, verification, validation, and launch, and LEOP. This mission is a critical step in bolstering the cybersecurity of space-based assets, ensuring they remain resilient against emerging cyber threats in future operations.

The CyberCUBE mission is a bold step forward in ESA's efforts to safeguard its space infrastructure. It will validate the CSOC's radio frequency (RF) capabilities and provide a real-world demonstration of sophisticated data analysis tools designed to detect and counter potential cyber threats. In response to the growing need for stronger space cybersecurity, GMV will deliver a cutting-edging in-orbit operational laboratory equipped with innovative onboard cyber capabilities. This platform will support the development, testing, and refinement of cryptographic functions and key management strategies while gathering valuable security data from operational systems.

The CyberCUBE mission aims to offer ESA a cost-effective, reconfigurable cyber capability for demonstrating new technologies in orbit, minimizing risks, and accelerating the adoption of cybersecurity solutions for future ESA missions.

GMV brings a diverse portfolio of products and services to the table, providing ESA with a reliable infrastructure for both the flight and ground segments of the mission. The project will be led by GMV's Romanian subsidiary, with Alén Space acting as subcontractor and supported by GMV Spain's expertise in flight software and ground control systems, and SES in cybersecurity.

GMV's responsibilities span the entire CyberCUBE mission lifecycle, from development to launch and operations. This includes delivering the flight segment, composed of a 3U cubesat bus provided by Alén Space, equipped with advanced reprogrammable processing capabilities and a core payload for cybersecurity monitoring. The platform will remain operational in orbit for at least one year, collecting essential data on space asset vulnerabilities and cyber resilience.

GMV will also provide components for the ground segment, including the Alén Space Mission Control Center integrated with GMV's ***focussuite*** COTS product, and a representative flatsat. ESA's CSOC will be the primary user

segment, managing mission requests, ingesting raw data, and processing it for cybersecurity analysis.

In addition, GMV will oversee the launch segment, ensuring the cubesat is deployed into the designated orbit. The mission will target orbits that support regular communication with ESA's primary antenna at the European Space Security and Education Centre (ESEC) in Redu, Belgium.

Following successful commissioning, the LEOP, GMV will transfer control of the CyberCUBE satellite to ESA for nominal operations. The mission's findings will guide future cybersecurity strategies, and potential extensions will be evaluated based on performance and resource availability. At the end of its operational life, the CyberCUBE satellite will be decommissioned in accordance with ESA's Space Debris Mitigation Policy.

GMV awarded with the On-board Collision Avoidance Detection Testbed project (OCAD)

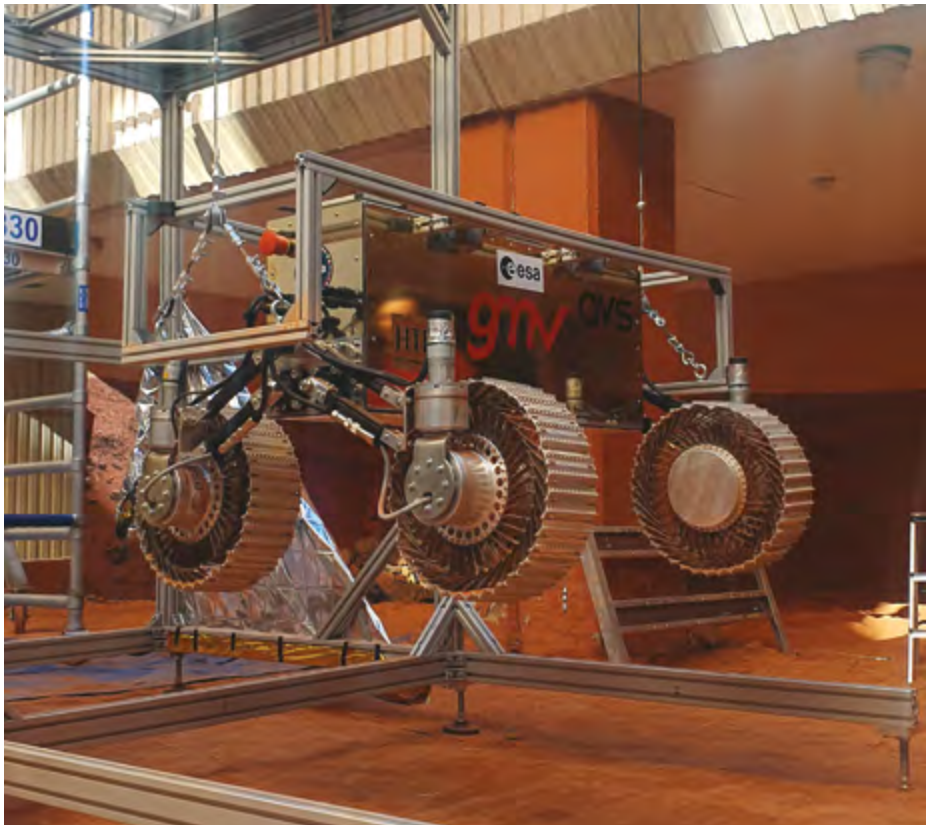
ESA has awarded a consortium led by GMV the On-board Collision Avoidance Detection (OCAD) Testbed project with a budget of €800k as part of the ARTES Advanced Technologies (AT) work plan to design, develop and test an on-board autonomous collision avoidance detection system for satellites.

The project will enable the development of a payload stand-alone kit which will provide a ground-independent on-board collision avoidance detection system that compute and triggers the required Collision Avoidance Manoeuvre (CAM) between systems carrying the same elements. The system will communicate with each other by the means of RF-beacon, exchanging orbital state, forecast and status.

This shall enable a reduction of the burden of the operators by means of on-board autonomous coordination within certain orbital neighbourhoods. At the core of the testbed lie the development of autonomous Conjunction screen, Risk analysis and Decision making, leveraging classical and artificial intelligence and machine learning techniques. The system will also design on-board the CAM to be performed, optimizing for fuel or collision risk.

All these developments are building on GMV's heritage of ground and flight segment expertise in other ESA activities such as CREAM, the standalone AUTOCA tool specifically for active Collision avoidance and the PROBA-3, HERA, ARIEL missions for onboard AOCS and GNC systems development and deployment.

GMV concludes the EMRS project with a successful testing campaign



GMV has concluded the European Moon Rover System (EMRS) project, which ended with the successful completion of the Rover's deployment system testing campaign.

The egress system, designed to handle challenging and rocky lunar terrains, offers a flexible approach to Rover deployment. It features two descent platforms that can be selected based on the specific needs of the mission, ensuring that the Rover's wheels are always the first to make contact with the lunar surface, rather than the egress system itself.

This feature is essential for safely navigating complex environments where standard deployment methods could fail. The testing campaign took place at GMV's facilities in Madrid, where the entire system was assembled and tested under various simulated conditions, including flat terrain and highly rocky surfaces.

One of the most demanding scenarios involved placing a large rock directly under the Rover's center, preventing any of its wheels from touching the ground or the rock. Despite this challenge, the operations team demonstrated the Rover's ability to deploy successfully, highlighting the effectiveness and resilience of the suspension and drive system.

The tests conducted by the GMV team confirm that the EMRS is fully prepared for future lunar exploration missions.

GMV participates in World Space Business Week and the Space Defense & Security Summit

This year, GMV played a leading role in two of the space sector's most important events: World Space Business Week (WSBW) and the Space Defense & Security Summit (SDSS).

Enrique Fraga, GMV's general manager of EST Space Systems, participated in the "Ground System Developers and Integrators Supporting New Architectures" round-table discussion, where he shared his perspective on ground systems at a key moment for the sector and highlighted innovation and flexibility as the foundations for these systems. He addressed the challenges posed by emerging constellations and advanced spatial architecture, with a particular emphasis on the trends towards "software-defined everything."

The first-ever Space Defense & Security Summit (SDSS) was held at the same time as the WSBW. Miguel Ángel Molina, GMV's deputy general manager of EST Space Systems, participated in the "Space Surveillance: The Next Stage" round-table discussion where he addressed, among other topics, the challenges and opportunities of space surveillance in this new stage, emphasizing the importance of investment in technology, as well as the regulated management of future space traffic, fundamental aspects to maintain sustainability and sovereignty in space.

With the events taking place simultaneously, there were even more opportunities for interaction and collaboration among participants, fostering dynamic exchanges between innovators, investors, clients, and strategic partners.

GMV leads the development of the VigIA-EO co-processor with AI processing models for earth observation satellites

As part of the Recovery, Transformation, and Resilience Plan (PRTR) GMV has been selected by the Center for Technological Development and Innovation (CDTI) in collaboration with the Spanish Ministry of Defense through the Directorate General of Weapons and Material (DGAM) to lead a project for developing artificial intelligence (AI) onboard Earth observation satellites. This project contributes to the Aerospace Strategic Project for Recovery and Economic Transformation (PERTE) in its Line of Action ACT9 - Spanish Earth Observation System for Security and Defense in its Technological Challenge No. 2.

GMV is developing the VigIA-EO co-processor, designed using technology compatible with new ADHA (Advanced Data Handling Architecture) avionics architectures, which integrate advanced AI models executed at the edge to reduce the flow of data transmitted to Earth, optimizing the available bandwidth. This innovative solution, compatible with institutional and New Space missions, seeks to improve real-time processing of SAR and optical data, contributing to improved detection of ships and buildings and fire monitoring from space. The project is being developed in two stages.

A kick-off meeting took place in April 2024 for the first phase, which has now already been completed and which focused on the preliminary design through a competitive process involving four companies. The second stage, lasting 17 months, kicked off in July 2024. It selected the two best companies, GMV among them, and will cover the complete development of the prototype and its final validation. Satlantis and SpaceSur are collaborating in the project as experts and validators of the chain of use of optical and SAR sensors, which would be carried out by the VigIA-EO co-processor.

Edge computing refers to data processing that is performed directly on devices close to the source of the data, rather than sending these data to a centralized data center. This allows for reduced latency, improved response speed, and optimized bandwidth utilization, which is especially useful in applications such as artificial intelligence onboard satellites.

Financiado por la Unión Europea NextGenerationEU
Plan de Recuperación, Transformación y Resiliencia

GMV showcases its advanced resource and emergency management solutions

The conference "Earth Observation for the Madeira Region" held at the Electricity Museum - Casa da Luz in Funchal highlighted the vital role of space technologies in informing political decisions and effectively addressing the unique challenges faced by the Madeira territory.

This event, organized by the Portuguese Space Agency in collaboration with the Order of Engineers of the Madeira Region, brought together national and international experts to explore a diverse array of topics. Discussions covered smart cities, land use, emergency management, agriculture, forestry, nature conservation, the blue economy, maritime monitoring, marine resources, and climate change.

António Araújo, GMV's Business Manager for the Remote Sensing and Geospatial Applications Division of the Portuguese team of GMV, showcased several innovative applications recently developed by GMV and highlighted the Portuguese team's involvement in several real-world operational activities. Araújo also discussed products developed under the Copernicus operational services framework, emphasizing GMV's vital role in supporting security and emergency crisis management. His presentation focused on the Copernicus Emergency Management Services (CEMS), detailing GMV's 24/7 support for the European Civil Protection Mechanism. The work includes rapid mapping and damage assessment for disaster-affected areas—such as those hit by earthquakes, floods, and fires—as well as risk assessment and recovery analysis to assist emergency managers, public authorities, first responders, and others involved in emergency management.

GMV, a leader in simulation of the Copernicus program with the new CRISTAL and LSTM missions

CRISTAL and LSTM are the new missions of the Copernicus Sentinel Expansion Missions Program, a six-mission program of the European Union (EU) aimed at addressing the challenges posed by urbanization, food security, sea level rise, polar ice reduction, natural disasters, and, of course, climate change.

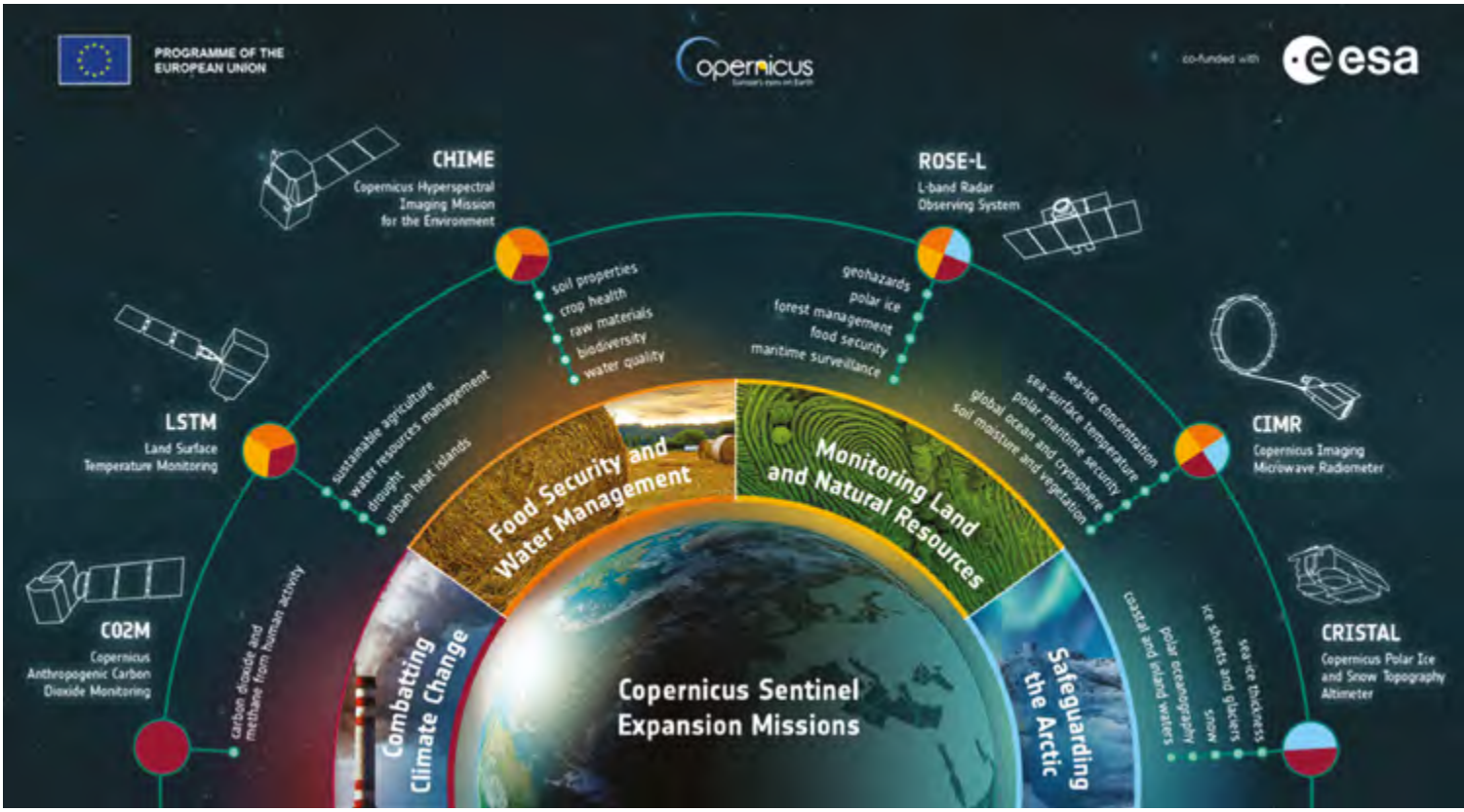
GMV is consolidating its leadership with these two new missions and is in charge of developing three simulators of this program, together with CO2M.

The CRISTAL (Copernicus Polar Ice and Snow Topography Altimeter) mission, to be launched in 2027, is the first to incorporate a dual-frequency radar altimeter and microwave radiometer, capable of measuring and monitoring sea ice thickness taking into account elevations and underlying thickness, as well as changes in ice cover and glaciers. The ultimate goal of these measurements is to understand and quantify climatic processes as well as to provide accurate information on ocean topography to improve the safety of maritime operations.

LSTM (Land Surface Temperature Monitoring) will be incorporated into the Copernicus Sentinel System in 2028. This mission will consist of two satellites, LSTM-A and LSTM-B. Each of these satellites has a high-resolution thermal infrared sensor that will provide observations of the Earth's surface temperature and emissivity. The objective of the mission is to improve sustainable agricultural productivity, enabling water resource management and drought prediction, monitoring coastal and inland waters, and finally, assisting in the management of urban heat islands and heat waves.

GMV will develop the Operations Simulators for both missions, which are critical to the preparation of operations and validation of the ground segment before launch.

Leadership in both missions, which will bring about a crucial transformation towards a greener, healthier, more inclusive, and resilient continent, is a new sign of GMV's long track record in Copernicus, where the company has contributed to all phases of the program and throughout the value chain, from engineering and mission analysis to data export services.



Revolutionizing space safety for LEO satellites

In a major advancement for space safety, GMV has successfully demonstrated an innovative on-board collision avoidance system for low Earth orbit (LEO) constellations. Part of the CREAM2 initiative, this breakthrough leverages Galileo signals to autonomously manage collision risks, representing a significant leap forward in satellite operations.

The growing congestion in low Earth orbit, with over 30,000 catalogued objects, poses substantial collision risks. Traditional avoidance methods, heavily dependent on ground-based systems, often suffer from delays and limited responsiveness. The new system proposed for CREAM2, however, introduces a paradigm shift, enabling satellites to autonomously calculate and execute collision avoidance maneuvers using real-time data from Galileo signals.

During the CREAM2 initiative, various collision avoidance concepts were assessed and selected based on criteria including operational costs, system-level impacts, performance, and robustness. The selected concepts emphasize on-board decision-making and maneuver execution, in contrast to traditional ground-based approaches. These concepts proved to be more efficient and responsive, significantly reducing the number of collision avoidance maneuvers required and overall delta-V.

GMV spearheaded the breadboarding demonstration for this activity, testing the selected concept with a software solution on a flight-ready On-Board Computer (OBC) equipped with the ***SEXTANS GNSS*** receiver. This on-board system significantly accelerates response times to potential collisions, thereby enhancing satellite mission safety and longevity. By integrating orbit determination and maneuver computation directly on the spacecraft, GMV's solution minimizes reliance on ground stations, enabling quicker and more efficient collision avoidance actions.

The success of the CREAM2 project underscores GMV's leadership in advancing space situational awareness and traffic management. Its innovative approach not only boosts operational efficiency but also establishes a new benchmark for future satellite constellations, ensuring safer and more sustainable use of space.
This demonstration reflects GMV's commitment to pioneering technologies that safeguard our increasingly crowded orbital environment, paving the way for more resilient and autonomous satellite operations.

Key aspects of space security and defense debated in Santander

GMV took part in the 16th Seminar "Satellites as a key element for security and defense and government applications", held on the premises of the Universidad Europea del Atlántico in Santander from 4 to 6 September 2024.

The event, inaugurated by Admiral General Teodoro Esteban López Calderón, Chief of Defence Staff (JEMAD), was attended by representatives of the Government and the main Spanish companies in the sector. This event has established itself as a key event for understanding the Spanish space panorama from the perspective of government applications.

In recent years, the needs and requirements of the Armed Forces have evolved in parallel to the different theaters of operations, both national and international. The redefinition of strategies in the different sectors of the industry related to Security and Defense has been a constant in the provision of solutions and services for the government sector. Space, in this context, has become a decisive and valuable ally for the Armed Forces and State security forces in the fulfillment of their missions.

During the seminar, a series of conferences and round tables were held, addressing all the key space aspects and needs for national defense: satellite navigation, including Galileo; Earth observation -with special emphasis on the promotion of the Paz 2 program-, and telecommunications, with discussions on programs such as Spainsat NG, GOVSATCOM Hub or IRIS2. In addition, space domain awareness and the future challenges of the sector were discussed.

Miguel Romay, general manager of GMV's Satellite Navigation Systems, and Enrique Fraga, general manager of GMV's EST Space Systems, took an active part in various sessions of the meeting.

The Spanish space sector shows unity and muscle at the third edition of New Space Spain

The third edition of "New Space España" once again turned Galicia into the meeting point of the space ecosystem in Spain. On September 26 and 27, 2024, leading companies, organizations, and startups in what is known as New Space will meet at the Afundación building in Vigo with the goal of exploring the projects, capabilities, and opportunities of the Spanish space industry.

This new edition has served as a platform for knowledge exchange, business collaboration, exploration of new business opportunities in areas such as Earth observation, satellite communications, space exploration, and sustainable use of space. During the two days, interesting projects were tackled, such as LEO-PNT, led by GMV and promoted by the European Space Agency (ESA). GMV was represented at this third edition of New Space España by Miguel Ángel Molina, GMV's Deputy General Manager of EST Space Systems and Mariella Graziano, GMV's Director of Flight Segment Strategy and Business Development.

Hosted by Alén Space, the event is supported by prominent sponsors from the aerospace sector, in addition to the support of public institutions linked to the promotion of innovation and talent, such as the Xunta de Galicia, the Consorcio Zona Franca de Vigo, and the Universidade de Vigo. The conference featured lectures by leading industry experts, panel discussions on key topics, presentations of innovative projects, and networking sessions designed to foster collaboration among companies, institutions, and entrepreneurs.

New Space Spain is a driver of innovation and collaboration in the Spanish space sector, which will be

represented by the entire value chain, and seeks to grow compared to previous editions, which saw the participation of over 60 speakers, 400 registered participants, and 200 companies.

Alén Space showcases its potential at the Small Satellite Conference

Alén Space actively participated in the prestigious Small Satellite Conference in Utah, one of the world's leading events in the field of small satellites and space technology. The 2024 edition focused on automation, highlighting how automated technologies are transforming the design, launch, and operation of small satellites, and how this trend is shaping the future of the space industry.

The galician company had its own stand, where it presented its innovations and solutions for small satellites, attracting the attention of experts and potential US industry partners. Alén Space showed how its developments can contribute to the advancement of the industry.

The Alén Space team was represented by Business Development Manager Antonio Vázquez, Product Owner María Marante, and Space Mission Manager Juan Buján, who traveled to Utah to participate in the conference. Each of them played a crucial role in promoting the company's technological and business capabilities.

Antonio Vázquez led discussions on new business opportunities and strategic alliances, while María Marante focused on product innovations and customized solutions that Alén Space can offer its customers and Juan Buján contributed his expertise in space mission management, demonstrating the company's capacity to successfully develop and carry out complex space projects.

Alén Space's participation in the SmallSat Conference cements its place as a key player in the space sector, underscoring its commitment to innovation and the development of advanced technologies for the future of the industry.

GMV to evolve the infrastructure of the Galileo's European GNSS Service Centre

The framework contract is valued at 35 million euros, with a duration of six years

The European Union Agency for the Space Programme (EUSPA) has awarded GMV a framework contract to evolve the infrastructure of the European GNSS Service Centre (E-GSC). The contract, valued at 35 million euros, has a duration of six years.

The E-GSC is an integral part of the infrastructure of the European Union satellite navigation programme. Its main mission is to provide a unified interface for users of the Galileo and EGNOS systems, offering supporting services, and contributing to the delivery of new Galileo services. The E-GSC's various functions include the distribution of data from the European Union navigation satellite services to the user community and supporting the growth of the global Galileo applications market.

Originally designed to be part of the European GNSS infrastructure and to provide a unified interface between the Galileo system and its users, the E-GSC has expanded its role over the years to become a key component in the delivery of services enabled by the European Union Space Programme.

The new framework contract aims to advance the E-GSC's capabilities, enabling it to take on increased responsibilities. This includes creating new services for users, enhancing their experience, integrating service delivery aspects of Galileo and EGNOS, and supporting the development of additional services.

GMV is leading a consortium that features Indra as the main industrial partner, along with prominent companies such as Spaceopal, ESSP, Alten, the Universitat Politècnica de Catalunya (UPC) and the Universidad Autónoma de Barcelona (UAB).

Under the supervision of EUSPA as Contracting Authority, GMV will

oversee project management and the development of IT infrastructure through all stages, including definition, implementation, validation, and integration into the Galileo ground segment. GMV will also develop the software components necessary for delivering new data and signal authentication services for Galileo satellites.

With over 20 years of active involvement in all phases of Galileo's development, GMV has the expertise and experience needed to effectively manage engineering, validation, and deployment processes for the centre's evolution, adhering to the proposed timeline and meeting the quality and safety standards set by EUSPA., the EU Agency responsible for the exploitation and the delivery of the Galileo services.

GMV reinforces commitment to the Galileo Program with new DLR GfR maintenance contract

GMV further solidifies its leadership in the Galileo Program with the signing of a major new maintenance contract with DLR GfR. The agreement, which runs through the end of 2026, covers the upkeep of cryptographic mission and service components for the Public Regulated Service (PRS), as well as the core operational system of Galileo, the OSPF (Orbit Determination and Synchronization Processing Facility), developed by GMV. The contract also includes maintenance of the Galileo Security Monitoring Centre (GSMC) in Spain.

The new contract builds on a series of commitments GMV already holds with the Galileo Operator (GSOp), further solidifying its position as a key pillar of the program. Notable among the ongoing agreements are those related to the maintenance of the Galileo Service Centre (GSC) and the cryptographic component of the GCS (SKMF). These contracts reflect GMV's growing influence in strategic areas of the Galileo Program, particularly in security and cryptography, which are vital to the success of the global navigation system. With this new agreement, GMV expands its contributions to additional elements of the Galileo Program, showcasing its expertise and leadership in the development and maintenance of critical technologies. This broader responsibility highlights GMV's role as a leading contributor to the Galileo Program in Europe, ensuring its continued influence in developing the continent's most advanced satellite navigation infrastructure.

GMV's unwavering commitment to technical excellence, along with its ability to take on new responsibilities within the Galileo Program, reinforces its status as a trusted and essential partner, significantly contributing to the program's long-term development and success.

Galileo G2 successfully connects its space and ground segments

In September, the Galileo program marked a major achievement with the first successful compatibility test between the space and ground segments of Galileo G2, known as the System Compatibility Test Campaign (SCTC). The satellite, developed by Thales Alenia Space, and the ground control segment, created by GMV, successfully passed the first test at the Thales Alenia Space facilities in Rome, Italy.

This confirms the compatibility of the second-generation satellite with its ground infrastructure, an integration that will significantly enhance Galileo's services both in Europe and globally.

GMV developed the first portable version of the ground segment (GCS) for G2IOV to run a week-long test campaign, including initial communication tests between the satellite and ground segment to verify interface functionality. Following this successful first test with Thales Alenia Space satellites, GMV plans to conduct a similar operation in the coming months with the other Galileo G2 satellite family, led by Airbus Defense and Space.

GMV delivered this initial test version just over a year after the project's start, employing Agile methodology and maintaining close collaboration with satellite manufacturers to meet the planned deadline.

In 2023, GMV was awarded a significant contract by the European Space Agency (ESA) to develop the ground control segment for the second-generation Galileo (G2G) In-Orbit Validation (IOV) system. The primary goals of G2G include introducing new services and state-of-the-art technologies, enhancing existing offerings, improving the system's accuracy and robustness, increasing security, and reducing maintenance costs.

These initiatives aim to consolidate and strengthen Galileo's position in the global market. Currently, Galileo serves over 4 billion users worldwide, providing global positioning, navigation, and timing synchronization services with an accuracy of up to 20 centimeters.

Successful launch of Galileo L13 mission

GMV is responsible for the ground control segment that operated the deployment of FM26 and FM32 satellites

On September 17, the two satellites of the Galileo L13 mission were placed into MEO (Medium Earth Orbit) on board a Falcon 9 rocket from Cape Canaveral (Florida, United States). This was the 13th launch, and GMV is responsible for the ground control segment that managed the deployment of both satellites.

FM26 and FM32, the two Galileo FOC (Full Operational Capability) satellites, join the 30 satellites launched in different phases under the Galileo program, the European Union's global satellite navigation system, which already serves over 4 billion users. This launch is part of the Full Operational Capability phase of the program's first generation, which consists of a complete system of 30 satellites, control centers, a network of tracking stations, and uplink stations installed worldwide.

GMV deployed this new Galileo Ground Control Segment infrastructure in the centers of Oberpfaffenhofen (Germany) and Fucino (Italy) in August 2021.

Currently, the organization is responsible for the evolution and maintenance of this G1G ground segment until 2027. In parallel, it is also developing the ground segment for the in-orbit control and validation (IOV) of the second generation of Galileo (G2G).

This new generation will introduce new services and cutting-edge technologies, enhancing those of the first generation. It will also increase the system's precision and robustness, improve security, and reduce maintenance costs.

The GERMINAL project kicks off

GERMINAL (Connectivity: Enabling next generation NAV/COM Hybrid Terminal), a two-year project co-funded by EUSPA (European Union Space Program Agency) with the goal of developing communications and navigation solutions, held its Kick-Off Meeting (KOM) in July 2024.

In terms of communications, GERMINAL will allow terminals to use different infrastructure elements and bands to provide communications in segments such as aviation and the maritime domain, among others. In terms of navigation, GERMINAL will enable terminals to use the novel LEO-PNT signals (low earth orbit satellites for positioning, navigation, and timing). The final product will consist of a prototype IoT receiver, which will have a purely software-based approach, and a unified hybrid user terminal (UHUT) prototype that will be able to process several different signals using a set of signal processing units, including5G signals.

GMV, as project leader, will coordinate all work between the consortium members and EUSPA, bringing its expertise in navigation with signal hybridization (GNSS, 5G, LEO-PNT and LEO-SOP) as well as IoT devices with low energy consumption requirements. GERMINAL will benefit from synergies with other LEO-PNT developments also carried out at GMV.

The project's KOM was held in hybrid format at EUSPA's European GNSS Service Centre (GSC), located in Torrejón de Ardoz, Madrid. The consortium is led by GMV and includes the Madrid Institutes for Advanced Studies (IMDEA) and Autonomous University of Barcelona (UAB) as partners.

Operation of International GNSS Services celebrates its 30th anniversary

In July, GMV participated as a sponsor at the IGS Symposium & Workshop held in Bern, Switzerland, which took place with the theme "Three decades of service to science and society". The event also presented an opportunity to celebrate 30 years of operation for the International GNSS Service (IGS), which first went into service on January 1, 1994.

The University of Bern hosted the first IGS workshop in 1993, just before the service went into operation. Since then, the IGS has played a critical role in the advancement of global navigation satellite systems (GNSS).

GMV participated in this year's event as a sponsor, while also having its own space in the exhibition area, where it presented its innovative satellite navigation solutions. The company's representatives also gave several presentations highlighting GMV's contribution to the IGS real-time service, and to the precise orbit determination (POD) service for Copernicus.

By participating in this event and celebrating three decades of progress in satellite navigation, GMV has once again confirmed its commitment to the advancement of space technologies, and its support for the international scientific community.

A groundbreaking project to provide orbits as a service for positioning using signals of opportunity

ODYSSEY (Orbits-as-a-Service for Satellite Signals of Opportunity) is a project funded through Element 2 of the ESA NAVISP programme and developed by GMV-UK with the goal of developing a precise orbit determination centre for communications satellite constellations. This project will be used to provide a new commercial service generating precise orbits for different satellite constellations whose signals can be used as satellite signals of opportunity (SatSOOP) for assured Position, Navigation and Timing (PNT).

The orbit determination centre will be complemented with a test user receiver (TUR), capable of combining the precise orbit information with the SatSOOP to provide an end-to-end PNT capability, totally independent of GNSS. This will enable a demonstration of the achievable performance levels.

The initial implementation will involve the Iridum, Orbcomm and Globalstar constellations, which are those favoured by early adopters of SatSOOP positioning and navigation. However, it is designed to be compatible in the future with mega-constellations e.g. OneWeb and Starlink. A sensor network will be deployed across eight sites in Europe and Australia, using Software Defined Radio (SDR) technology to acquire and process the RF signals from the satellites to generate Frequency-Difference-Of-Arrival (FDOA) and Time-Difference-Of-Arrival (TDOA) observations using pairs of monitoring receivers that are located within the same footprint of each satellite in view.

ODYSSEY will address a wide range of stakeholders and community interests at an international scale and across government, industry, institutions, academia and users. This will include PNT service providers, LEO communication providers and PNT users. The key products will be the orbit determination centre software at TRL7 including proprietary algorithms, the sensor network and the TUR. The vision is to commence pre-operational services at the end of the project.

Scientific community gathers in Poland to discuss the latest GNSS developments

In September, GMV participated as a sponsor at the 9th International Colloquium on Scientific and Fundamental Aspects of GNSS, which was organized by the European Space Agency (ESA) and held in Wrocław, Poland.

This event, which also featured collaboration from the Wrocław University of Environmental and Life Sciences (UPWr), brought together numerous members of the European scientific community, along with their international partners involved in the use of Galileo and other global navigation systems.

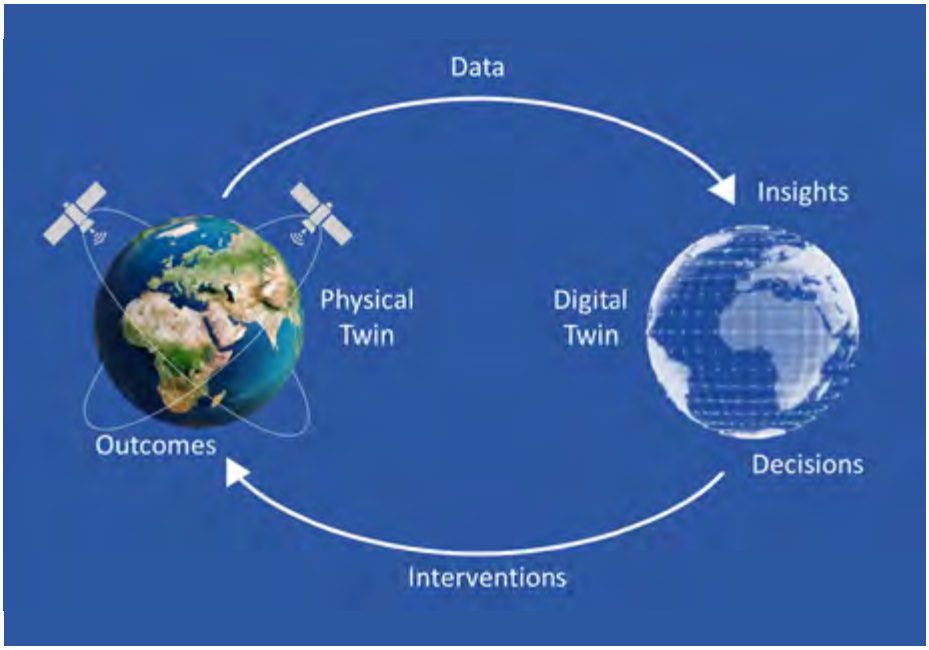
In addition to exploring the many applications of Galileo and other global navigation satellite systems (GNSS), this colloquium makes its own contribution to the development of global navigation systems, while also highlighting the latest scientific achievements in this field.

GMV was represented at the event by its GSSC Project Manager, Raúl García, who presented a poster entitled “The ESA GNSS Science Support Centre: Unleashing the potential of the global GNSS scientific community”.

GMV has played a key role in the Galileo program ever since its earliest phases. The company participated actively in the design, implementation, and operation of various essential components for the system, and it continues to play an important role in terms of improving the precision and reliability of the satellite constellation’s services.

Reinforcing the UK's PNT infrastructure

GMV has been selected as prime contractor for the UPDATE project, a UK government initiative within the NAVISP program to define requirements, architecture and a development plan for a Minimum Viable Product (MVP) of a UK National Positioning, Navigation and Timing (PNT) Digital Twin Environment (DTE). This DTE seeks to improve the country's resilience to the risks associated with PNT systems.



The MVP will enable UK government planners to assess more accurately the risks arising from PNT dependency and loss of critical services, and to explore options for strengthening the country's resilience to such threats. This modular and flexible digital environment will facilitate the evaluation of alternatives, the analysis of investments in future systems, and the implementation of new regulations.

Aligned with the UK's “Policy Framework for Greater PNT Resilience”, the MVP will provide essential quantitative data for strategic decision making and to support government planning for the next public spending review. GMV will thus help to ensure the operational continuity of PNT services in critical sectors such as transport, energy and defense.

GMV is awarded the contract for the replica of Galileo's RLSP

In August GMV was awarded the contract for the replica of the RLSP (SAR/Galileo Return Link Service Provider Facility).

The (RLSP) forms one component of the Galileo Ground Segment. Fulfilling its role as a service facility, located in Toulouse (France), the primary mission of the RLSP is to process SAR/Galileo Return Link Request and distribute them to the Galileo Mission Segment (GMS) for further dissemination in Galileo Signal in Space. RLSP is hosted by CNES in Toulouse premises and operated by SGDSP (SAR Galileo Data Service Provider). The RLSP was developed and deployed by GMV, and also will be maintained by GMV since 2021 until 2026.

The European Commission has decided to select Service Facilities backup sites aiming to host operational replicas of these infrastructures to reinforce Galileo Services robustness. A mutual redundancy concept has been retained between GSC site in Madrid and SAR/Galileo Service Centre (hereinafter referred to also as the “SGSC”) site in Toulouse which will respectively host replica of SAR/Galileo Ground Infrastructure and GSC one. The initial objective being to complete the readiness of the backup capabilities and provide cold redundancy capacities in case of catastrophic event affecting the prime site for a medium to long period of time. This will be achieved by deploying a single operational chain of each Service Facility Infrastructure in its respective backup centre.

One of the main challenges is the obsolescence issues. The implementation of the RLSP Replica will require the procurement of fresh HW and SW COTS, which implies the resolution of obsolescence issues affecting current baseline platform. The scope of the contract is the procurement, assembly, deployment, qualification, and commissioning of a replica of the RLSP OPE platform to support the readiness of the RLSP capabilities in case of incidence in the main site. The KOM took place in September 2024 and the contract duration is 14 months.

GMV partners with ESA to develop LEO PNT engineering support tools

Traditionally, satellite navigation has relied on satellites in medium Earth orbit (MEO) although future navigation systems are shifting towards a multi-layered architecture that incorporates satellites at various altitudes. This approach leverages the distinct advantages of each orbit, resulting in enhanced and providing a final solution with significant benefits, including improved signal resilience, robustness, and accuracy.

Global interest in LEO PNT solutions is surging, driven by numerous public and private initiatives. GMV's Portuguese team, with co-financing from the European Space Agency (ESA), will develop engineering support tools for LEO PNT, a key project to strengthen GMV's competitive advantage in the sector. Developing LEO PNT systems requires defining end-to-end solutions through a series of trade-offs, including constellation design, signal parameters (such as modulation, bandwidth, and frequency), message protocols, ground segment processing, and user terminal solutions.

The current initiative seeks to create a comprehensive toolkit to support the engineering of LEO PNT systems. The goal is to accelerate the design, development, and planning processes. The toolkit emphasizes signal simulation using commercial off-the-shelf (COTS) products and Software Defined Radio (SDR) technology. It is designed to provide the flexibility and adaptability needed to study and assess receiver performance across various environments.

GMV's engineering tools are designed to assist LEO PNT operators with all design decisions and provide a valuable reference for future testing. Ultimately, this support improves the performance of LEO PNT systems. Consequently, GMV is placed at the forefront of LEO PNT system development, reinforcing Europe's position as a leader in space navigation technology.

Providing space technology training for new generations

In July, the 14th edition of the ESA/JRC International GNSS Summer School took place in New Mesto, Slovenia, organized by the European Space Agency (ESA) and Joint Research Centre (JRC). Once again this year, GMV was a sponsor of this summer school program, which was developed with the primary aim of training a new generation of scientists and engineers in the field of space technology. By now, it has become a leading event for young talent.

The training workshops were focused on giving the students a comprehensive overall perspective on satellite navigation, which is a field where GMV has established a leading position. The training covered subjects such as global navigation satellite systems (GNSS), data signals and processing in receivers, and positioning, navigation, and timing (PNT) solutions.

Irma Rodríguez, GMV's Manager of Satellite Navigation Products and Services, took part in this latest edition of the ESA International Summer School, to give the students an in-depth introduction to the subject, and to share some of the lessons she has learned during her career at GMV.

Ms. Rodríguez gave a talk entitled "A solid 40-year foundation for building the navigation of the future, on Earth and beyond", which focused on GMV's contributions to satellite navigation over the company's four decades of history. She also discussed the main challenges that the company will be addressing in the upcoming years.

GMV improves its expertise on AI-based PNT systems

GMV has started a new chapter on the use of Artificial Intelligence (AI) and Machine Learning (ML) methodologies to enhance Position, Navigation and Timing (PNT) algorithms for critical applications.

Funded by ESA, VAIPOSA - Verifiable AI/ML Techniques for PNT Applications - project has kicked-off on the 17th September and will last 18 months. VAIPOSA's consortium is led by Fondazione Bruno Kessler (FBK) with GMV (UK) contributing as sub-contractor.

The project aims at developing innovative methodologies for the design, implementation and validation of PNT components combining bespoke AI and ML techniques to complement traditional PNT algorithms and improve their accuracy and robustness, particularly under non-nominal/degraded conditions (i.e. GNSS discontinuity).

One of the main requirements is to ensure the verifiability of the PNT components in terms of safety, robustness and resilience, in a context of autonomous agents operating in an open environment. To this aim, the VAIPOSA team will test the developed tools using a realistic road environment simulator, under assumption of autonomous driving. The ultimate goal is to demonstrate that the autonomous agent equipped with a PNT system implemented using AI-based techniques can operate safely, responding to changing weather conditions, road traffic, and other potential events.

At high-level, VAIPOSA activities include:

- Design of a system comprising of AI toolkit, PNT engine integrating data from different sources (i.e. satellite, lidar cameras, etc.) and verification engine.
- Development of the system within a tailored simulation environment mimicking autonomous driving scenarios.
- Application of verification and validation techniques to ensure the proper functioning of the autonomous agent integrating the AI components.

The participation of GMV in VAIPOSA enables the expansion of GMV background in accurate and safe positioning algorithms towards AI-ML based approaches for autonomous driving, including their validation and verification. Also, GMV commercial experience on autonomous driving is a key element for the assessment of the potential of VAIPOSA innovation for future exploitation.

GMV attends the ION GNSS+ 2024 event to present its latest GNSS and PNT advances

Once again this year, GMV attended the world's largest event related to global navigation satellite system (GNSS) technologies and services: ION GNSS+ 2024. This gathering took place in the USA in Baltimore, Maryland, from September 16th to 20th. The event was organized by the Institute of Navigation (ION), a not-for-profit organization, and it brought together some of the top international experts and leaders in the field of satellite navigation and positioning, navigation, and timing (PNT) technologies. For five days, the attendees discussed the latest R&D advances, presented their new products, and discussed some of the decisions that will influence the industry's direction in the near future.

GMV's attendance at the event included its own stand, where it showcased its most notable recent developments. These included its development for the European Space Agency (ESA) of one of the in-orbit demonstrators for LEO-PNT, which was clearly one of the subjects that attracted the most attention at the event, as well as the company's high-precision positioning service known as GMV ***GSharp®***, which has been designed for a wide range of applications in various markets. This service is based on GNSS products, and it is already being used by space operators for their low Earth orbit (LEO) satellite missions.

In addition to GMV ***GSharp®***, the company was able to demonstrate other innovative solutions such as its ***PRESENCE2*** receiver for the Galileo Public Regulated Service (PRS), and it highlighted the capabilities of SouthPAN, which is the first satellite-based augmentation system (SBAS) to offer service in the Australia-New Zealand region.

GMV's participation at ION GNSS+ has further established the company's position as a worldwide leader in GNSS solutions, as it continues to help establish a path towards a secure and high-precision future in multiple industries.

GMV, a key player in the UK's new SBAS and PPP service initiatives

The United Kingdom government's framework for resilient Positioning, Navigation and Timing represents a huge opportunity for GMV

Following the Brexit referendum in 2016 and the 4-year period of withdrawal of the United Kingdom from the European Union, several European GNSS services are no longer available to the UK, including Galileo Public Regulated Service (PRS) and EGNOS Safety of Life (SoL). During this time, the UK government has been evaluating their dependency on GNSS and looking at numerous options for the provision of Positioning and Timing solutions that are robust and assured. This includes a UK Space-Based Augmentation System (SBAS) and so, with help from the European Space Agency (ESA), the UK has initiated a SBAS testbed with GMV as a key contributor in the provision of core capabilities within the industrial team.

The UKSBAS testbed was conceived as a demonstration and feasibility project in the framework of ESA's Navigation Innovation Support Programme (NAVISP) funded by the UK government with the participation of the Department for Transport and the UK Space Agency. The UK SBAS testbed's main objective was to deliver a new L1 SBAS signal in space across the UK region using Viasat's Inmarsat-3F5 geostationary (GEO) satellite and Goonhilly Earth Station as signal uplink over PRN 158. The UK SBAS testbed also provides L1 SBAS, DFMC SBAS and PPP services over the Internet for dissemination to users via alternative communication channels.

The SBAS and PPP messages are generated by GMV's magicSBAS and magicPPP software tools which are supplied with GNSS data streamed from the Ordnance Survey's national GNSS reference network.

The testbed has successfully demonstrated the capability of UK industrial players, including GMV, to deliver a SBAS test signal in space.

The UK Department for Science, Innovation and Technology (DSIT) announced a new Government Policy Framework for Greater PNT Resilience in 2023. The framework, which includes a "10-point plan" to enhance national PNT resilience, includes a specific action to develop a proposal to replace the UK's use of EGNOS services and to enable high accuracy positioning for autonomous and precision uses.

More recently in March 2024, the UK government progressed this action through the publication of a Request for Information (RFI) inviting industry input and ideas on their plans and solutions for the future provision of UK SBAS, PPP and Timing services, a great opportunity for GMV to support the UK Government in its efforts to implement its plan for robust PNT services.

A new UK SBAS/PPP/Timing programme not only generates direct industrial benefit in the form of preserving highly skilled jobs within the UK space sector, but it also creates new opportunities for further employment, investment and generating/growing new businesses with the space sector as well as in the downstream equipment, products and applications sectors. The UK is now the only member of the G7 economic bloc without access to SBAS services. It is evident that the UK needs SBAS services.

The UK government is currently developing a business case to support the financial investment into providing SBAS/PPP/Timing services across critical national infrastructure and applications.

As part of the business case, the UK government will be assessing all options including: possible return to EGNOS, UK to build its own system as well as UK procures SBAS-as-a-service. Given the funding required and the current fiscal climate, the business case work must also analyse the "do nothing" scenario. Regardless of the outcome of the business case and the new UK government's discussions with EU, there are good signs that the UK government's PNT policy framework will generate lots of new business opportunities for GMV from infrastructure to applications and from equipment to operations.

Phoenix: a groundbreaking precise orbit determination project for GNSS satellites

Phoenix is a state-of-the-art GNSS ODTS SW based on a Kalman filter. Many ODTS have been developed in GMV through the years relying on Batch filters, but this is the first one using a real-time Kalman filter. This allows very accurate estimation of GNSS products in real time.

One of the main advantages of this type of filter is that, although a convergence time is needed to reach final accuracy, results can be provided from the very beginning of the execution or right after a satellite´s maneuver without the need to wait for the buffer to be filled in. Another advantage is that all parameters are estimated at the same time, obtaining consistent results.

Additionally, more weight is given to the last measurements and the impact of the older ones decreases with time. This is especially important for predictions, for which last epochs are more relevant.

Over the past one year and a half, the PHOENIX team has done a very good job, obtaining great results in very short time. Very high accuracies, in line with the expected results, have been achieved for all the products estimated (not only orbits and clocks, but also code and phase biases, ionosphere parameters, etc). The accuracies are improving continuously, with the refinement of the algorithms and the addition of new parameters and models.

The current implementation accounts for Galileo and GPS, but expandability to other GNSS constellations (i.e Glonass, Beidou...) is possible.

This product helps GMV to maintain its leading position in GNSS ODTS processes. This is especially relevant for the Galileo Second Generation system and therefore, this SW will be integrated and tested in the frame of the Galileo Second Generation System Testbed (G2STB) developed for ESA. Within the G2STB, PHOENIX will be running operationally on routine basis, generating not only reference products but contributing to the generation of predictions and high accuracy corrections.

EU Space ISAC: European collaboration to strengthen space security

Various coordination and launch meetings took place in September, for the working groups that will become part of EU Space ISAC's regular activities beginning in October. EU Space ISAC is an initiative supported by the European Commission (EC) and European Union Agency for the Space Programme (EUSPA), via the EU Space Strategy for Security and Defence. It represents a collaborative effort to help companies operating in the European Union's space industry exchange information, raise awareness, and share recommended practices as a way of strengthening their security. The aim is to improve the resilience of the EU's space sector, and to make progress on preventing, managing, and mitigating security-related challenges.

A General Assembly meeting was held on September 20th, at which the EC and EUSPA informed the companies that they had been approved as ISAC members, with new participants also accepted into the organization.

Two working groups being led by GMV were also launched at these recent meetings. One will be addressing threats in the space environment (including everything from electromagnetic threats to cyber threats), while the other will focus on standardization of space-related policies. It is expected that these working groups will be presenting their first results in 2025.

A proposal was also raised at these meetings to invite European lawmakers working on security issues in Germany, France, Spain, and Italy, to discuss their security policies related to critical cybersecurity matters, such as European legislation on accreditation, certification policies, and the vulnerabilities of CIS systems.

GMV leads the digital transformation of Spain's National Security System

The project is a milestone in the modernization of Spain's critical infrastructure, which will improve the operational capacity of the National Security System

GMV has won the tender issued by Spain's Department of National Security (DSN) to develop and deploy the first phase of the National Security System (SSN) Data Intelligence Platform. The GMV-led project, whose kickoff meeting was held on 13 September, is a milestone in the modernization of Spain's critical infrastructure that will improve the operational capacity of the National Security System (SSN) through the analysis, design, development, and implementation of an advanced information system.

GMV's solution focuses on developing a modular platform based on microservices, designed to ensure scalability, availability, and maintainability. This platform will enable the SSN to manage the entire data lifecycle, from secure capture and storage to advanced analytics and the generation of critical National Security indicators. The GMV-developed platform will also integrate advanced visualization capabilities and allow for predictive analysis and crisis-scenario simulations.

The project incorporates the latest GMV-developed technologies in the fields of big data and artificial intelligence (AI), backed up by a robust and automated infrastructure based on data containers. The platform will also adopt a security architecture that will meet the strictest national security standards, applying "Zero Trust" and "defense-in-depth" principles.

The first phase of the project, which is part of GMV's strategic line of action for the development of decision-intelligence systems, will be completed in November 2025. With its leadership in the digital transformation of the Department of National Security, GMV is reaffirming its commitment to providing this organization with a top-quality solution, backed up by its experience and qualifications in the development of complex systems. Through this project, GMV is once again demonstrating its commitment to innovation and excellence, reinforcing the company's role as a leader in the development of critical technologies for global defense and security.

GMV awarded support services contract for certification and accreditation of EMSA's classified CISE network

The European Maritime Safety Agency (EMSA) has awarded GMV a four-year framework contract for consulting services. The contract includes performing security audits and assessments and producing all required documentation for the Certification and Accreditation of the Classified CISE Network.

As part of its responsibilities, the Agency supports EU Member States, the European Commission, and other EU bodies in developing a common information sharing environment for maritime surveillance (Maritime CISE2 or CISE). This EU initiative encourages the voluntary exchange of information among maritime authorities across different sectors and borders.
The objective is to establish an interoperable infrastructure that links all public, civilian, and military authorities involved in maritime surveillance, thereby improving maritime awareness and enabling more effective actions at sea.

EMSA is engaged in the seamless evolution of the CISE network during the operational phase beginning in 2024, which succeeds the transition phase (2019-2023). From 2024 to 2028, the Agency will consolidate initial operational capabilities, strengthen the existing network for sharing unclassified information, and develop the new classified network up to the 'RESTREINT UE/EU RESTRICTED' level or equivalent national classifications.

Under this framework contract, GMV will provide the Agency with services in the following areas:

- Supporting CISE participants with the Certification and Accreditation of their Local CISE Systems.
- Supporting EMSA with the Certification and Accreditation of CISE Components and SW Tools.

SASEMAR once again entrusts GMV with the maintenance of SIGO

The Maritime Rescue and Safety Society (SASEMAR) has once again turned to GMV for the maintenance of its Operations Management Information System (SIGO) this year, thanks to the good work carried out by the team on the client's site.

This system, developed by GMV and operational since 2004, is a comprehensive solution for managing all emergency-related data from each of SASEMAR's centers, facilitating centralized access to data with the goal of optimizing the use of available resources (rescue units and personnel).

The tool also makes it possible to analyze possible paths, both of pollution spills and of ships or missing persons at sea, based on parameters such as weather data (wind and currents), local geographic data (tidal currents), and information on the relevant parties (characteristics of the vessel or vessels involved, clothing or tools of the people in the water) in order to optimize the use of time in carrying out searches and organize emergency management resources. All these features are accessible online at the various locations where the Maritime Rescue and Safety Society has a coordination center.

The capabilities requested in the new contract include the improvement of emergency and intervention management, the development of a new fleet service module and an environmental module, the incorporation of SAR searches in emergencies, integration with Port Authorities based on specific agreements with ports, and the creation of interactive maps that will enhance the usability of the operational display.

GMV presents the Argus system at the Army's "Force 35" 2E+1 forum

GMV once again participated in the annual Spanish Army-Industry Forum (Foro 2E+I), leading in the event held on 2 and 3 October in Toledo. The Forum is organized by the Army Museum Foundation and led by the Army, under the direction of the Army Logistics Support Command (MALE).

The theme of this edition was "Integrating new capabilities". José Luis Delgado, head of GMV's Defense and Security SCIS section, participated in the first day in the round-table discussion on the dynamic demonstration to be held later that day and, during the second day, in the "Experimentation Plan" round-table discussion, which covered the role of experimentation in the development of military systems as a meeting point between the conceptual design phase and the practical implementation phase.

The dynamic demonstration was led by GMV and showcased the capacity of GMV's command and control system, Argus, for managing manned and unmanned land, air, and maritime units and platforms at small-unit level.

The goals of this forum are to encourage ongoing collaboration and exchange of ideas between the Army, universities, research centers, and industry, to identify the needs of the Army and the lessons learned from BRIEX 2035 (Experimental Brigade 2035), while catalyzing to transmit these needs to industry and to present the Army's current experimentation projects. Additionally, it aims to promote the Army Museum Foundation as an entity that supports culture and defense awareness.

GMV, a key participant in the SILAM program

■ In December, the Spanish Army will receive the prototype of the new High Mobility Rocket Launcher System (SILAM), a project focused on developing an advanced mobile rocket launcher with the goal of improving the artillery capabilities of the Spanish Army, offering greater mobility and precision in the launching of missiles and rockets.

The SILAM is designed to be a highly mobile system, capable of moving quickly in different terrains, which will allow it to respond effectively in a wide range of tactical situations. It also incorporates advanced technology in its guidance and control systems, thus ensuring high precision in its attack missions. This development is part of the efforts to modernize and strengthen Spain's defensive capabilities, keeping the military equipped with state-of-the-art technology. GMV will play a crucial role in the SILAM program, facilitating the integration of the new rocket launcher system into the TALOS artillery command and control system used by the Spanish Army and ensuring that the new rocket launcher system is perfectly aligned with existing control platforms, thereby optimizing its operability and effectiveness on the battlefield.

GMV unveils new smart battery charger for VCR 8x8 Dragón program

GMV has been commissioned by Indra to supply its new smart battery charger for the VCR 8x8 Dragón program. Designed for hostile operational environments, this charger sets a new benchmark in efficiency, durability, and advanced energy management.

Engineered to withstand extreme conditions, GMV's charger ensures optimal performance in any environment. Capable of charging up to three high-capacity Li-Ion batteries and two USB devices, the charger supports batteries using SMBUS 2.0 and 1.1 protocols, including advanced models such as those used in soldiers' personal radios.

Key features of GMV's battery charger include a sophisticated charge management system that independently monitors and controls each battery. It also provides Ethernet connectivity for full remote monitoring and management, enabling seamless integration with the vehicle's mission systems.

With a compact design and weighing around 3 kg, the device meets the strictest military standards, ensuring resistance to vibrations, thermal shocks, dust, sand, and salt spray. Its IP68-rated aluminum housing offers maximum protection against dust and water.

This charger is a 100% domestic solution, showcasing GMV's commitment to technological innovation and development in Spain. With a competitive price and a customizable design tailored to client needs, GMV's charger is positioned as an essential tool for the armed forces in tactical operations.

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GMV, in the ICEX mission to the USA for the cybersecurity sector

ICEX Spain Export and Investment, the Spanish National Cybersecurity Institute (INCIBE) and the Economic and Commercial Office of Spain in Washington organized a direct trade mission to the East Coast of the United States in September for Spanish companies in the cybersecurity field.

GMV, a leader in the cybersecurity sector, took part in the mission to present its cybersecurity capabilities to potential clients and analyze the prospects of the US market, which accounts for nearly a third of the global cybersecurity market.

During the mission, Luis Fernando Álvarez-Gascón, general manager of GMV's Secure e-Solutions, and Jonás Porcar, North America director of GMV's Secure e-Solutions, took part in informational and networking sessions. These sessions covered regional market niches, business opportunities with multilateral organizations, as well as current cybersecurity and data protection regulations and standards.

As part of the mission, GMV visited two of America's top cybersecurity states: Maryland and Virginia, meeting with specialized agencies and institutions dedicated to incubate and collaborate with companies that want to boost their growth in the U.S. market.

In the words of Jonás Porcar: "This mission strengthens GMV's commitment to expanding its presence in the competitive North American markets and among multilateral institutions, highlighting our unique offerings and high standards of quality."

The solution for remote recovery after mass incidents

GMV's ***resQit®*** solution enables corporations to quickly recover their affected systems

This year in July, many Windows users experienced a critical failure in their systems, which was caused by a configuration update released by CrowdStrike, a worldwide leader in cybersecurity. Although the update was part of the routine operations for the CrowdStrike Falcon platform, it triggered a logic error that generated the dreaded "blue screen of death" (BSoD), which indicates a complete crash of the operating system.

When the BSoD appears, it is an unmistakable sign that the Windows operating system has experienced a serious malfunction and cannot recover on its own. Although Microsoft does offer system recovery tools, those solutions require physical access to the equipment. This can be impractical in a corporate setting, especially when multiple devices have been affected at the same time. Incidents of this type demonstrate the critical importance of having effective recovery solutions that can be relied upon when disaster strikes.

Companies typically have disaster recovery protocols, to protect their operations against mass contingencies like cyberattacks, power failures, and natural disasters. However, the malfunction caused by the CrowdStrike update was so extensive and simultaneous that it revealed the inadequacy of many of those protocols, since most of them were not prepared to manage remote recovery of thousands of Windows systems all at once. Interruption of a company's critical systems can have a wide range of consequences, which may vary depending upon a variety of factors. However, those consequences always include financial losses caused by the company's full or partial inactivity for a certain period of time, and it may also be impossible to recover essential business data.

How to be prepared

In this context, the ***resQit***® tool from GMV presents a solution that allows remote mass recovery of Windows systems experiencing the BSoD. It lets companies quickly recover their affected systems, minimizing downtime while also avoiding the need for physical work on each device.

The ***resQit***® solution not only makes recovery of Windows systems more efficient in distributed and remote work environments, it can also be used as an essential tool for addressing mass incidents like the recent CrowdStrike outage. Instead of carrying out a slow and costly recovery process, companies can restore their operations in record time, while safeguarding their critical data and ensuring business continuity.

In a world that is increasingly dependent upon technology, the ability to respond quickly to mass failure events is essential. With ***resQit***®, GMV offers companies an efficient, advanced solution, to ensure that even in the worst possible scenarios, they can perform fast and effective remote recovery.

Cybersecurity by design and software development for managing threats

In July, the ITDM digital media group organized the meeting entitled "Business Software and its Key Role for Organizations in the Present and Future". Silvia Abarca, head of GMV's Security in the Software Development Life Cycle section, was invited to participate by the Madrid Cybersecurity Cluster (CyberMadrid), which has GMV as one of its members.

Ms. Abarca began her presentation by presenting an up-to-date overview of the software field, including its latest trends. She stressed the importance of addressing security issues during the development life cycle, especially with the concept of security by design, as a way of more effectively managing the existing range of threats and attacks. She explained that security has to be a fundamental part of a company's culture, and she emphasized that "we all need to have the right training and awareness, regarding the importance of security and working as a unified team".

In addition, she offered some key advice about how to achieve secure software development, such as by applying good practices and pursuing interoperability through the use of open standards and well-documented APIs. She also mentioned the need for design and implementation of a modular architecture that eliminates interdependence among layers, and with suppliers, to minimize the impact of new changes and simplify maintenance. Finally, she discussed secure external configuration management, which can be achieved by taking advantage of the possibilities of the Internet of Things (IoT), with inclusion of resilience as a way to supplement security and continuity, and with performance of ongoing validation tests, including functional testing and testing of security, performance, and recovery.

GMV participates in roundtable discussion on AI and cybersecurity at Menéndez Pelayo University

GMV recently participated in a summer education course entitled "Artificial Intelligence: Present and Future Challenges", organized by Menéndez Pelayo International University and directed by Spain's State Secretariat of Digitalization and Artificial Intelligence. Pablo González, head of GMV's Big Data and AI Architecture section, took part in a panel discussion on Cybersecurity and AI, which was coordinated by Spain's National Cybersecurity Institute (INCIBE).

Mr. González described the initiatives that GMV is developing together with the INCIBE in the context of Innovative Public Procurement, such as the Luis Valle Program, which includes self-sovereign identity projects and creation of security operations centers (SOCs) for key industries such as space, manufacturing, and transportation. He also mentioned the progress being made in relation to quantum technology, such as in the field of quantum key distribution (QKD).

Mr. González explained that GMV's self-sovereign identity solution, which uses identity-based cryptography (IBC), is able to outperform more established technologies like blockchain. This is helping GMV solidify its position as a leader in federated solutions, while also enhancing privacy protection in distributed environments, which are seen as an essential part of the future of Europe's data economy.

During the discussion he also stressed the potential of AI for incident monitoring and response, and he emphasized the need to protect this technology during its rapid evolution, especially now that tools like ChatGPT have appeared. Finally, he commented on Europe's new AI legislation, and he said that although it could end up increasing the costs of projects, it also represents an opportunity for companies to offer new services to their customers.

Opinion

Generative artificial intelligence: opportunities, challenges, and ethical boundaries

Generative artificial intelligence (GAI) is now presenting a wide range of opportunities that are transforming many industries and practices. GAI is based on models that can be adapted to an extensive variety of tasks, while also giving companies and researchers the ability to address complex problems with unprecedented efficiency. For example, these models can be used in marketing to enhance personalization, doctors can use them to make more accurate diagnoses, and they can speed up the development of innovative solutions in fields like environmental sustainability. GAI is also opening up many opportunities in the business world. This technology can be applied to create innovative solutions that are able to transform processes, products, and services, offering a significant competitive advantage. In addition, GAI can be used to achieve large-scale personalization, so that companies can offer unique experiences adapted to each of their customers.

However, GAI is also generating a series of challenges and ethical concerns, which need to be addressed in order to ensure that it is used in a way that is responsible and beneficial for society. One of the main challenges is the need to define clear policies and procedures that cover the entire life cycle of GAI models, including their design, training, implementation, and monitoring. In addition, in order to encourage trust and accountability, it is essential to make sure that these models are transparent, and that the decisions they are making are traceable.

Another significant challenge involves managing the risk associated with GAI models, which brings up the need to identify, assess, and mitigate the potential ethical, legal, operational, and security risks. This in turn requires implementation of mechanisms for ongoing control and monitoring of these models, in order to detect and correct any deviations or inappropriate behavior. In terms of corporate governance when GAI models are being developed and implemented, it is essential to establish an organizational culture that encourages interdisciplinary collaboration, continual training, and a commitment to ethical values and principles.

GAI also has a tendency to generate false or deceptive information, in a phenomenon known as "AI hallucinations", which is raising additional concerns about ethics and safety. These hallucinations may be caused by errors during the machine learning process, biases existing in the training data, or limitations that affect a specific model's ability to understand the relevant context. AI hallucinations can have a series of negative consequences, such as generating fake news, making incorrect decisions, and causing a loss of trust in the system. To address these challenges, companies need to invest in improving the quality and diversity of their training data. They also need to implement rigorous assessment and validation techniques, while developing more sophisticated models that are able to detect and correct any hallucinations that occur.

José Carlos Baquero
Director of the Artificial Intelligence and Big Data Division at GMV's Secure e-Solutions

"GAI generates ethical concerns which need to be addressed to ensure that it is used in a way that is responsible"

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GMV helps make progress towards a more personalized form of medicine

Vall d'Hebron University Hospital is relying upon GMV to implement its data and AI platform

In the field of healthcare services, innovation and the use of data are putting medicine on a path towards a more personalized and efficient approach. Every interaction with a patient generates a large amount of information, such as primary care and hospital records, data generated by medical equipment, and patient experience surveys. All of this information is essential for research, and for developing new healthcare practices.

In addition, creation of the European Health Data Space (EHDS) is now presenting significant opportunities for improving medical care, through the sharing of information within the European Union (EU). However, secure and efficient management of this information is essential. In relation to this, the European Union's Data Act represents an effort to maximize the value of data, while ensuring its responsible use.

One groundbreaking example of how a data-driven strategy can be established is found at the Vall d'Hebrón Hospital in Barcelona, which is relying upon GMV to implement its data and artificial intelligence platform for use in primary and secondary care. This platform is allowing the hospital to take maximum advantage of its data, with decision-making based on exhaustive data analysis. This platform, known as VHTeDades, is also facilitating collaborations and secure sharing of clinical information. GMV selected the IBM Cloud Pak for Data solution when developing the platform, which gives healthcare professionals the ability to access and analyze data more efficiently. The platform is also based on a data fabric model that allows the information to remain at its original location, while also preventing duplications and safeguarding the information's integrity.

In addition to facilitating access to data, the VHTeDades platform makes the use of data more democratic, and in this case, the Vall d'Hebron Hospital, Vall d'Hebron Research Institute (VHIR), and Vall d'Hebron Institute of Oncology (VHIO) are all able to take advantage of its potential. The VHTeDades platform represents progress towards consolidation of a data-based model at this major healthcare and research institution. In addition, it is providing a high-quality substrate that is essential for developing artificial intelligence tools, which in addition to driving innovation, can be used to optimize patient care and facilitate identification of clinical and research needs.

The role of digital technologies for sustainability of the healthcare system

In 2021, the Digital Health Strategy was approved for Spain's National Health System (SNS), which established a reference framework for developing a wide range of digitalization initiatives and actions. At the 38th edition of the Digital Economy and Telecommunications Meeting, organized by the Spanish association AMETIC, there was a clear emphasis on the transformative capacity of digital technologies, which are now having an impact on people, healthcare professionals, organizations for healthcare providers, and other stakeholders. This event also provided a forum for discussing the challenges that Spain's national health system is now facing.

Carlos Royo, GMV's Health Strategy Manager, stressed the importance of the budgeting that Spain's regional governments are allocating for healthcare, which accounts for 40% of the total. Expressed in round numbers, healthcare spending amounts to €140 billion per year, with €100 billion of that amount coming from the public sector and €40 billion from the private sector. In addition, 80% of the public budgeting allocated is used for treatment of chronic conditions.

Mr. Royo pointed out that 22% of Spain's population is currently 65 years of age or older, and it is predicted that this figure will increase to 30% by the year 2030. This will bring with it an increase in the number of chronic conditions, since it is estimated that 65% of people 65 years of age and older will suffer from one or more illnesses. It is also worth mentioning that out of the 200,000 physicians now working in Spain's public health system, 80,000 will be retiring during the next three years. In view of this reality, effective measures need to be applied, in order to prevent the healthcare system from being compromised.

For this reason, the Secretariat-General of Digital Health, Information and Innovation was created for the public health system in 2021, with its work focused on the use of digital health and information systems for modernization, innovation, and transformation projects. Next Generation EU Funds have also been used to support a variety of projects, which are taking place at the level of Spain's various regions, as well as through public-sector entities such as the Center for Technological Industrial Development (CDTI). One particularly noteworthy project, known as Tartaglia, is being led by GMV. This project has developed a federated health data network, as a way of expanding the use of artificial intelligence in healthcare systems.

GMV releases new version of *Intraplan Radiance®*

This tool is transforming the way in which cancer treatment is provided, thanks to its ability to combine precision and effectiveness

In the last two decades, significant discoveries have been made in the field of cancer research, with a 20% improvement achieved in terms of survival rates, specifically 3.3 percentage points for men and 2.6 percentage points for women. This progress is especially notable in a context where the occurrence of cancer has risen by 7.2% since 2016.

GMV's commitment to innovation has resulted in the product known as ***Intraplan Radiance®***, which is the only radiation therapy simulation platform designed specifically for intraoperative radiation therapy (IORT) equipment. This next-generation tool is transforming the way in which cancer is treated, by offering a unique combination of precision and effectiveness. Now, ***Intraplan Radiance®*** has evolved, with a new version becoming available on the market.

GMV's product is able to produce a simulation of the results that this form of therapy will produce, before it is actually applied, to optimize the radiation treatment given during surgery. ***Intraplan Radiance®*** uses advanced algorithms to provide high-quality visualization and dosimetry, so that the specialists can precisely determine the dose of radiation therapy that should be applied in the operating room. Thanks to this product's ability to generate 3D images and imaging based on multi-planar reconstruction (MPR), doctors are able to view detailed simulations of the treatment's results.

One of the most remarkable aspects of ***Intraplan Radiance®*** is the positive impact it is having on the patient experience. Since tumor resection and IORT treatment are performed directly in the operating room, there is a reduced need for follow-up hospital visits. Not only is this more convenient for the patient, it also supports the sustainability of the healthcare system. ***Intraplan Radiance®*** is currently being used at over 50 hospitals in more than 15 countries in Europe, the Americas, and Asia, which is allowing this product to become established as an important tool in many oncology departments.

GMV's new version of ***Intraplan Radiance®*** has a redesigned user interface, which helps optimize the work flow. It also offers other new features, which include uploading of 3D images (primarily CT scans, although other types are also accepted), recording of 3D images for a unified system of coordinates, and navigation over the patient to determine the best course of action and identify regions of interest.

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GMV wins contracts worth over €16 million and leads the way in the implementation of intelligent transportation systems in Spain

The company will supply the new central management systems for intercity public transportation in the autonomous regions of Castilla y León, Castilla-La Mancha, Murcia, and Aragón

GMV's technological leadership in intelligent transportation systems (ITS) and its multiplatform ***ITS Suite*** have earned it contracts worth more than €16 million for the development and launch of the new central intercity public transportation management systems run by the governments of Castilla y León, Castilla La Mancha, Murcia, and Aragón, as well as the renewal of its contract with the government of Galicia.

According to the Ministry of Agriculture, Fisheries, and Food's 2022 Annual Indicators Report, rural areas comprise a total of 6,656 municipalities with scattered population centers. These areas are increasingly populated by the elderly, and the lack of connectivity, underdeveloped infrastructure, and limited access to quality services have made them less attractive for young people to live and work, negatively impacting older people who also lack autonomy.

To take on these challenges and ensure mobility is sustainable, policies and actions must guarantee universal accessibility to basic services, promoting efficient public transportation alternatives adapted to people's needs.

Given the above, as part of Component 6 of the Recovery, Transformation, and Resilience Plan (one of the national plans drafted by the 27 Member States of the European Union to join the European recovery plan NextGenerationEU), several measures and investments have been included to modernize, digitalize, and enhance security and sustainability for key intercity and intermodal transportation infrastructure throughout Spain.

As part of initiatives to achieve this mobility, in 2023 several autonomous regions put out to tender the supply and implementation of a central ITS management system to integrate all the intercity public transport information from the different concessions that make up the corresponding concession maps, and to manage all the services for the general public, government agencies, and operators that will be developed using this information.

GMV has a powerful and groundbreaking solution to meet the needs of metropolitan transportation authorities and regional transportation consortia, as well as similar agencies on an international scale: ***ITS Suite***, an advanced public transportation management and passenger information platform, which provides access to a range of ITS applications, such as computer-assisted dispatch and passenger information systems, planning and scheduling, real-time regulation and control, ticketing, eco-driving, security, business intelligence, and much more.

In addition to these contracts for new regional systems, GMV also recently won the contract for continuing Galicia's computer-assisted dispatch (CAD) system, which the company set up in 2015 and which covers the region's entire transportation management system, integrating information from 127 concessions and over 3,500 vehicles from the various road transportation operators with their CADs. In 2022, GMV also upgraded the multi-fleet CAD system for the Barcelona area's Metropolitan Transport Authority, a pioneering system that GMV set up in 2021.

GMV wins contract to supply ITS for new Euskotren trains operated by CAF

CAF (Construcciones y Auxiliar de Ferrocarriles) has awarded GMV a contract to supply intelligent transportation systems (ITS) for five new trains destined for Euskotren, a company of the Basque government responsible for managing railway services in the Basque Country.

These trains will operate on Line 5 of the Bilbao metro, which is managed by Euskotren. The aim of the project is to increase service capacity to meet growing demand, both for special services during cultural, sporting, or festive events, and for regular rail services, whose needs are expected to increase with the opening of the new stretch of Line 5 in Bilbao.

The ITS to be supplied by GMV include the passenger information system and the public address and intercom systems.

Passenger information will be displayed on front, side, and interior LED panels, as well as on 17" LED monitors and 28" stretch LED monitors placed throughout the train. The system controller will generate both service information and scheduled advertising content to enhance the passenger experience.

The public address system is primarily digital and is distributed throughout the four train cars. The intercom system includes 17 IP intercoms per train, installed near the doors to provide quick and efficient passenger assistance in the event of an emergency.

All of these systems will be integrated with the train monitoring and control system, which will receive the necessary control information and send status updates and alarms.

GMV will also provide control center tools that will allow comprehensive management of the system. The passenger information system control tool will be used to manage routes and associated content, as well as to plan and set up advertising campaigns.

GMV attends ATUC National Congress

ATUC, which currently has over 90 members, is an association of urban and metropolitan public transportation companies. Its members are the public and private bus, metro, and railway companies responsible for urban public transportation in Spain's major cities.

This year, ATUC held its 30th National Congress under the theme "Artificial Intelligence in Motion," where, as in previous years, GMV contributed as a sponsor of the event.

ATUC congresses are landmark events in Spain, not only because they attract a significant number of transportation decision-makers, but also because of the range of topical issues discussed. They are a source of inspiration and a meeting point for some of the most important companies in Spain.

As usual, the congress included the ATUC General Assembly; an exhibition of technology companies, where GMV presented its new multifunctional ticketing system DTD200; as well as round tables and presentations. This year the focus was on artificial intelligence as a tool to be considered in transportation management, in which GMV played an important role.

Palermo's new streetcars to be fitted with state-of-the-art GMV technology

CAF has awarded GMV the project to supply intelligent transportation technology for nine new trams in the Palermo fleet, with an option to extend the supply to an additional 35 units

CAF (Construcciones y Auxiliar de Ferrocarriles) has awarded GMV a contract to supply intelligent transportation systems (ITS) for nine new streetcars in the Palermo fleet. These streetcars will operate on the city's new A, B, and C lines, with the possibility of an additional 35 units.

The ITS in this project include the passenger information system, the public address and intercom systems, the communications network, and the CCTV system.

Passenger information will be displayed on front and side LED panels, as well as on 21.5" LED screens placed strategically throughout the streetcar. The system controller will generate both service information and scheduled advertising content to significantly enhance the passenger experience.

The public address system installed throughout the four streetcars will be predominantly digital. The intercom system will include 12 IP intercoms per streetcar, located near the doors to ensure quick and efficient passenger assistance in case of emergency.

In addition, the CCTV system will include one video recorder per streetcar, capturing and recording images from six IP cameras in the passenger area, two front view cameras, and four rear view cameras.

All of these systems will be seamlessly integrated with the streetcar's monitoring and control system, which will receive the necessary control information and send status updates and alarms.

GMV will also provide control station tools to enable comprehensive system management. From the CCTV system control station, camera feeds can be viewed in real time, and video can be downloaded and analyzed. In addition, the passenger information system control tool will be used to manage routes and associated content, as well as to plan and set up advertising campaigns.

GMV strengthens its commitment to innovation in intelligent transportation systems

GMV took part in InnoTrans 2024, the leading international trade fair for the railway sector, held in Berlin from 24 to 27 September. During the four-day event, GMV showcased its complete portfolio of technology solutions for transportation, including onboard passenger information systems, public address and intercom systems, CCTV, ticketing, and service planning and optimization tools.

As well as hosting a booth, GMV participated in several concurrent activities, such as a reception at the Spanish Embassy hosted by the Minister of Transportation for key companies in the sector. GMV was also part of the official tour to visit innovative companies in the field of artificial intelligence, as well as the B2G event organized by the Spanish Railway Industry Association (MAFEX), which aimed to connect the Spanish industry with international rail transportation authorities.

GMV played a leading role this year by presenting its ***SAE-R®*** system, an advanced solution for railway operations support. This innovative system is designed to optimize train operations, improve user experience, and efficiently manage complex railway fleets.

GMV to expand ticketing system for Toledo City Council

Toledo City Council has selected GMV to expand its ticketing system, including the provision of equipment and the addition of 52 validators (47 to be installed and five held in reserve), with the aim of enabling single ticket payments via bank card and QR codes. The project, funded by the Recovery, Transformation, and Resilience Plan, will take three months to complete and will include the delivery, installation, and commissioning of the new equipment.

In 2017, GMV was selected by the current operator of Toledo's urban public transportation service to implement the CAD/AVL and ticketing systems in its fleet of 52 vehicles.

This new project to expand the ticketing system, recently contracted by Toledo City Council, includes the provision of 52 validators that will allow payment through the current system with the Toledo transportation card, while also adding payment options via bank card and QR codes.

This strengthens GMV's position as a technology provider in this area. The validators will offer various functions, such as single ticket payment through the EMV Transit system using bank cards and QR codes, validation of Toledo transportation cards, online updating of deny and allow lists as well as online fare system updates, and integration with both the operator's onboard systems and its central ticketing system.

GMV Awarded Contract to Upgrade Porto's Public Transportation System

The awarded project will enable the city's buses and trams to request traffic signal prioritization at intersections, improving the urban mobility

GMV has secured a contract with the city of Porto to implement a cooperative ITS server and install V2X Roadside Units (RSUs). This technology will enable the city's buses and trams, operated by Sociedade de Transportes Colectivos do Porto (STCP), to request traffic signal prioritization at intersections.

Cooperative ITS is a set of technologies designed to raise driver awareness, optimize traffic, and increase road safety for the various mobility actors.

Many use cases are already being implemented in multiple pilot projects across the EU. Traffic light prioritization is one of them. The main goal is to minimize the impact of traffic lights on delayed services, and therefore increase service reliability by reducing delays. This leads to more predictable and consistent service schedules, which is essential for both operators and passengers. Reliable services encourage more people to use public transport, reducing traffic congestion and emissions, and promoting cleaner and greener urban environments.

GMV will develop and deploy a central solution, connected to a set of C-ITS Roadside Units, the STCP SAE and Porto's traffic management system. This setup will enable the municipality to start providing V2X data, not only to the STCP's vehicles but also to any other V2X-enabled vehicle that drives on the city's roads.

This project highlights GMV's dedication to advancing mobility technologies and its commitment to fostering safer and more efficient urban mobility solutions.

New SATELISE updates for AUTEMA

Cintra (Ferrovial), through its groundbreaking SATELISE solution developed by GMV, has deployed new updates in the pay-per-use system based on GNSS technology and smartphones used on the AUTEMA highway (Sant Cugat - Terrassa - Manresa). The concessionaire's implementation of a new CRM has modernized customer service and boosted system security. In addition, both the core and back-office components of the system have been upgraded to ensure optimal integration with this new platform.

These updates come at a time when SATELISE has been approved as one of the ways local highway users can get full rebates on tolls, associated with commuting, thus helping those who make frequent trips for work, education, or to access essential services.

Specifically, users of motorcycles and light-duty vehicles (cars, vans, and trucks) traveling on the Terrassa-Manresa section (main and secondary barriers at Sant Vicenç de Castellet) will be able to benefit from free tolls on round trips made within a 24-hour interval and at the same toll plaza as the outbound trip, from Monday to Friday (excluding public holidays). To access these discounts, one option is to sign up to use the SATELISE dynamic payment system.

Through this initiative, and with the support of systems such as SATELISE, the Catalan government's Ministry of Territory continues to further its commitment to supporting commuters, promoting regional equity, and optimizing high-capacity roads, thus helping reduce congestion on major roads.

Advances in AI and robotics for smart and sustainable industry

In Seville, GMV presents its ASUMO project, which is using AI and the company's uPathWay solution to optimize remote management of electrical substations

More than 30 representatives from innovative companies gathered at Cartuja Qanat in the Spanish city of Seville, to attend a workshop organized by the Andalusia Technology Corporation (CTA). The purpose of this gathering was to explore the impact that artificial intelligence (AI) and robotics are having on industrial sustainability. The event brought together leaders from the worlds of technology and industry, who were able to learn about successful case studies involving companies like GMV, Redeia, and Ghenova, which demonstrated how these technologies are transforming industry towards a more sustainable and intelligent model.

Álvaro Pimentel, one of Seville's deputy mayors and a council member for Cartuja, Innovation Parks, Employment, Economy, Commerce and Consumer Affairs, summed up the event by emphasizing the importance of AI and robotics as drivers of innovation and competitiveness. "These technologies are not only essential for economic viability, but also for enhancing industry's environmental and social responsibility", he explained. He also stressed the need for these technologies to be adopted by both the public and private sectors, to lead the way towards a more sustainable future.

Luis Pérez, general manager of the Cartuja Science and Technology Park (PCT Cartuja), thanked the participating companies for sharing their advances, and he emphasized the role that the Spanish region of Andalusia is playing as a hub for technological talent. He also described PCT Cartuja as the ideal location for launching and testing new products. Finally, Beltrán Pérez, president of the CTA, put the spotlight on Andalusia's capabilities related to innovation in AI and robotics. He offered his organization's support for research, development, and innovation (RDI) projects in these fields, while mentioning that during the last five years, more than 47% of the projects promoted by the CTA have been related to AI.

Innovation for inspection of electrical infrastructure

At the workshop, GMV presented a progress report for the ASUMO (Advanced Substation Monitoring) project, which is being led by Elewit and Red Eléctrica, both companies belonging to the Redeia Group. The aim of this project is to optimize remote management of electrical substations, by using AI, IoT, data analytics, and autonomous mobile robotics. Daniel Ruiz Ayala, manager of Control and Monitoring Systems at Red Eléctrica, and Ángel C. Lázaro Ríos, head of Robotics and Automation at GMV, gave a demonstration to show how a quadruped robot equipped with GMV's ***uPathWay*** solution is able to perform autonomous inspections at substations, to help ensure the safety and efficiency of the electrical supply. This robot can perform complex tasks such as reading meters, producing thermographic reports, and detecting oil leaks.

AgrarIA project presented at workshop on the use of AI and robotics in the agrifood industry

The facilities of iHub La Vega Innova were the site of a recent workshop entitled “Artificial Intelligence and Robotics Applied to the Agrifood Industry”, organized in collaboration with Spain’s Ministry of Agriculture, Fisheries and Food. At the event, the Spanish node of the AgrifoodTEF project was presented, and key technological advances taking place in the agrifood industry were highlighted.

Eric Polvorosa Pascal, a member of GMV’s Secure e-Solutions Marketing and Communication department who is responsible for publicizing the AgrarIA project, gave a detailed presentation on the achievements of this initiative, which is being funded by Spain’s Ministry of Digital Transformation and Public Services.

He also described the technological platform created as part of the AgrarIA project, which is bringing together cybersecurity, sustainability, and interoperability in a “federated data space”. This platform allows modeling of use cases across the entire value chain, from production through distribution, and the particular cases discussed at the event included the use of drones for early detection of crop pests, prediction of crop yields for vineyards, and process optimization for companies in the agrifood industry.

The AgrarIA project is part of Spain’s Digital Agenda 2025 and National Artificial Intelligence Strategy, and its aim is to develop AI based systems as a way of enhancing the agricultural value chain. The project is also pursuing the objectives of reducing CO2 emissions, increasing sustainability, and improving energy efficiency and competitiveness for the agrifood industry in Spain.

The AgrarIA Project: ARTIFICIAL INTELLIGENCE APPLIED TO THE AGRICULTURAL VALUE CHAIN 2050 (TSI-100114-2021-0) has been funded by the Spanish Ministry of Digital Transformation and Public Services, through the R&D Missions in Artificial Intelligence 2021 program, as part of the Digital Spain 2025 Agenda and National Strategy for Artificial Intelligence, with additional European Union funding through the Recovery, Transformation and Resilience Plan.

Artificial intelligence for feeding the future

In September, the 2nd International Congress on Artificial Intelligence Applied to the Agrifood Supply Chain was held in Cordoba, Spain, with the theme of “SembrAI: Intelligence for feeding the future”. Miguel Hormigo, manager of GMV’s Industry sector, attended the event and participated in a roundtable discussion. He explained how the company is making a contribution to optimizing the agrifood industry by using Earth observation and satellite images. This approach is improving sustainability, and giving wineries the ability to estimate their crop production, for example.

Mr. Hormigo went on to highlight the application of automation mechanisms in the agrifood industry, so that data can be used to implement preventive and predictive maintenance, in a strategy aligned with the application of autonomous, collaborative, and industrial robotics.

He also stressed the importance of improving cybersecurity in an increasingly connected context. One clear example of these advances is AgrarIA, an innovative project being led by GMV in collaboration with 24 other partners. It is considered to be the first data space initiative that is modeling the agricultural value chain.

Passion Motorbike Factory-Scoobic and GMV are revolutionizing last-mile delivery

Passion Motorbike Factory-Scoobic, a leader in electric mobility, has teamed up with GMV to carry out an innovative project focused on automated last-mile delivery in urban environments. With funding from Spain's Ministry of Digital Transformation and Public Services, through the UNICO SECTORIAL 5G 2022 Program and the country's Recovery, Transformation and Resilience Plan, the aim of this project is to establish a new business model based on autonomous mobility, energy efficiency, and data management, all supported by the use of 5G technology.

The project is focused on development of an electric last-mile delivery vehicle with an autonomous control system, which will allow logistics companies to transport goods in cities with no human intervention. 5G technology is being used to provide real-time communications with minimal latency, which is a key aspect for safe operation of these autonomous vehicles in controlled areas. The vehicles are similar to mobile robots, and by performing their delivery tasks they will be improving economic, social, and environmental sustainability. The robots will be operated using artificial intelligence and a cloud-based management platform developed by GMV, known as ***uPathWay***.

Technological developments and benefits

The project includes the design and testing of an autonomous electric last-mile delivery vehicle created by Scoobic, which will be integrated into a management platform based on 5G and artificial intelligence algorithms. This platform will allow management of the vehicle fleet under a pay-per-use model, which offers benefits for logistics companies through a cost-effective and flexible solution. In addition, robust cybersecurity mechanisms will be implemented to protect this autonomous vehicle ecosystem.

The project is providing a wide range of benefits. Financially, the pay-per-use model will reduce initial and recurring costs, while enhancing competitiveness in the logistics industry. From an environmental perspective, it will reduce carbon emissions in cities, which will contribute to improving sustainability and quality of life. From a technological perspective, the project has potential applications in agriculture, as well as in the automotive and healthcare industries, where autonomous mobility can offer many advantages.

Through this collaboration, Scoobic and GMV are not only transforming

last-mile delivery, they are also creating the foundations for a more sustainable and efficient mobility ecosystem. The integration of 5G technology and artificial intelligence will help produce cleaner, more connected cities, with clear benefits for local companies and residents.

The "Scoobic MED Project: Autonomous 5G Electric Logistics Vehicle with Smart Pay-per-Use," has been funded by the Ministry for Digital Transformation and Public Administration through the UNICO SECTORIAL 5G 2022 Program as part of the Recovery, Transformation, and Resilience Plan. This project has a total budget of €2,950,594, of which a grant of €1,770,356 has been awarded. The main beneficiaries are Passion Motorbike Factory S.L in cooperation with Scoobic Urban Mobility S.L, with GMV as a subcontracted entity..

GMV is collaborating on development of an autonomous agricultural vehicle for protection of woody crops

The Greenbot Operating Group has been formed by GMV, Corteva Agriscience, TEPRO, Cooperativas Agroalimentarias, and the University of Seville, for the purpose of developing a modular autonomous vehicle for protecting woody crops.

The project's participants are creating Greenbot, which is an autonomous electric vehicle for agriculture, operated by using an artificial vision system based on artificial intelligence (AI). Greenbot will be capable of precise application of phytosanitary products for weed control, which will optimize the use of supplies while also enhancing sustainability.

Greenbot represents a solution that is financially, environmentally, and socially sustainable. The system is expected to increase agricultural productivity, while reducing the costs and energy consumption associated with applying phytosanitary products. In addition, this technology will allow more localized application of those products, which will help protect biodiversity and reduce soil erosion.

This project is making significant progress towards a more efficient and sustainable model of agricultural operations, to the benefit of woody crops such as citrus and almond trees.

The GreenBot Operational Group has a budget of €299,899.98 and is co-financed by the European Agricultural Fund for Rural Development (EAFRD) through the Operation of Operational Groups of the European Innovation Partnerships (EIP) on agricultural productivity and sustainability at 90%, and by the Ministry of Agriculture, Fisheries, Water, and Rural Development of the Andalusian Regional Government, which contributes the remaining 10%.

Sustainability-technology synergies are driving the future of industry in the Valencian Community

The enerTIC Platform recently organized a breakfast colloquium entitled "Advancing decarbonization and digital transformation for industry in the Valencian Community", which brought together representatives from a wide range of industrial companies, technology providers, and public-sector entities. The event provided a forum for discussing the opportunities and challenges now existing for industry in the Valencian Community region of Spain, as progress continues towards improved sustainability and digitalization.

Magda Andrés Barrios participated in the colloquium as GMV's representative, and she stressed the importance of implementing technological solutions that can improve energy efficiency and reduce emission levels. The Valencian Community is a region of Spain with a high level of industrial development and a significant contribution to the country's GDP, and it is now in a key position to play a leadership role in this transformation.

Attendees at the event emphasized the urgent need to adapt to the demands for sustainability coming from the market and society, and they agreed that digital transformation is an essential part of achieving those objectives. Some notable examples presented included efficient data management and the use of artificial intelligence to optimize industrial processes. These technologies are not only improving operational quality and efficiency, they are also allowing progress towards creation of a more sustainable industrial environment.

The colloquium's participants stressed the importance of collaboration among companies, suppliers, and public administrations, as a way of building sustainable value chains. Other topics addressed included regulatory challenges and the need for stability to allow effective decarbonization planning. Training and upskilling for personnel were also identified as essential elements for success in the digital transformation of industry. In summary, the event made it clear that sustainability and digitalization have become fundamental aspects of the future of industry in the Valencian Community, with the ability to drive competitiveness in the region and enhance its commitment to the environment.

AI and tourism: innovation and ethics

In today's increasingly digitalized world, artificial intelligence (AI) is emerging as a driver of transformation in a wide range of industries, and tourism is no exception. José Carlos Baquero, manager of Artificial Intelligence and Big Data for GMV's Secure e-Solutions, recently made a presentation on this subject as part of a webinar organized by the Barcelona Travel Hub, entitled "Travel planning and AI: innovation and ethics". During his talk, he explored the current realities of AI, along with perspectives on its immediate future. He emphasized GMV's solid positioning in this field, which it has achieved through its development of technological tools and high-impact projects. He also discussed the experience he gained while serving as an advisor for the European Union's new legislation on the subject of AI.

As Baquero explained, AI now has a presence in our everyday lives, even if we are sometimes unaware of its influence, and it can be found in use everywhere, from smartphones to self-driving cars to chatbots.

In the tourism industry, AI is revolutionizing customer service and allowing for more personalized experiences. However, it is also essential to ensure that AI is being used in a safe and ethical way. Today's AI systems have been trained using historical data, which means that they can potentially introduce biases related to gender, race, or other factors. In conclusion, GMV's expert explained that it has become essential to set limits and define regulations for the development of AI applications, in order to ensure responsible use of these technologies and prevent their rejection by society.

GMV demonstrates progress on quantum computing projects at D-Wave's Qubits conference

Ana María Sánchez Montero, head of GMV's Quantum Computing section, recently attended the Qubits conference in Boston, which was organized by the company D Wave Quantum Systems. During her presentation, she explained the innovative CUCO project being led by GMV, as a prime example of the quantum computing advances taking place in Spain.

Launched in 2021, the CUCO project has now become established as a point of reference in the field of quantum computing, not just in Spain, but also for companies involved in this field. The main objective of the CUCO project is to develop advanced quantum algorithms, then apply them in proofs of concept developed for industries considered as strategic for Spain's economy, such as energy, finance, space, defense, and logistics. With funding and support from Spain's Center for Technological Industrial Development (CDTI) and Ministry of Science and Innovation, as part of the country's Recovery, Transformation and Resilience Plan, the CUCO project demonstrates the commitment that GMV and Spain's public institutions have made to technological innovation.

During the conference, Ms. Sánchez Montero described some of the milestones achieved by the CUCO project, with an emphasis on its use of D Wave technology. One of the most relevant examples of how quantum computing is being applied is found in the space industry, where GMV has improved mission planning and trajectory optimization for satellite imaging, which demonstrates this technology's potential for solving complex problems.

With projects like CUCO, GMV is taking quantum computing from the theoretical to the practical. In turn, this is driving the transformation of key industries, while confirming the company's role as a leader in Spain for technological and economic progress.

University of Málaga offers summer courses on quantum computing and cybersecurity

GMV has been invited to participate in the summer courses being offered at the University of Málaga. Organized by the university's general foundation, these programs are now in their 22nd edition.

Specifically, the company shared its knowledge during the seminar entitled "Quantum computing and cybersecurity: certainties, risks, and uncertainties", with a presentation by Juan Jesús León, manager of Products and New Development for GMV's Secure e-Solutions, entitled "Quantumania: wishes and realities". Mr. León explained the current state-of-the-art in quantum computing, as well as the major advantages it is providing for simulations in quantum physics, a field with the ability to accelerate technological progress in many important areas. He also discussed the uncertain future with regard to the use of this technology.

He highlighted the CUCO project during his presentation, which has funding and support from Spain's Center for Technological Industrial Development (CDTI) and Ministry of Science, Innovation and Universities, as part of the country's Recovery, Transformation and Resilience Plan. The CUCO project has now emerged as Spain's first major quantum computing project with participation by the public and private sectors. The purpose of the project is to advance scientific and technological knowledge regarding quantum computing algorithms, through a public-private collaboration involving private companies, research centers, and universities. The aim is to accelerate implementation of these technologies and encourage their use over the medium term, and GMV is now working on three specific use cases: predicting wind patterns at ports, planning space missions, and Earth observation.

GMV presents use cases for making industry more digital, automated, and sustainable

Almudena Nieto de Castro, head of Business Development for GMV's Energy and Utilities sector, recently attended the 2024 "Twin Transition" Trends Forum, which was organized by the enerTIC Platform. During her presentation, she emphasized the critical role of technology for making progress towards a more sustainable world. Ms. Nieto stressed that in order for companies to advance the integration of sustainability and digitalization, it is essential to define clear objectives, select specific use cases, and develop a roadmap in collaboration with technological partners.

She also shared some specific examples of how GMV has successfully applied innovative solutions in the agrifood and energy industries. For example, in relation to the agrifood industry, she described how GMV has applied artificial intelligence for process optimization in the winemaking industry, which has allowed more efficient use of resources like water and energy, and how the company has also enhanced sustainability through more precise application of phytosanitary products. As another example, she discussed the use of autonomous mobile robotics with artificial vision for identifying and harvesting mature crops. This is a form of progress that is not only improving efficiency, but also the quality of the final product.

Ms. Nieto then explained how digitalization and automation have transformed the energy industry by introducing more efficient and sustainable practices, while also helping to protect employee health and safety. She concluded by summarizing some key objectives for the industry, such as accelerating the pace of decarbonization, improving the customer experience, employee safety, profitability, and cybersecurity for critical infrastructure.

At the ROSCon Spain event, GMV presents its sustainable autonomous mobility solution for last-mile delivery

GMV was an active participant at the ROSCon Spain 2024 conference, which was held this year at Pablo de Olavide University in the city of Seville. This event is part of the international series organized by the Open Source Robotics Foundation (OSRF), and it brings together developers and experts who work with robot operating system (ROS), which has become the global standard for software development in the field of robotics.

Rafael Uceda, a Robotics and Automation Engineer at GMV, gave a presentation on the project entitled "Scoobic MED: A 5G autonomous electric logistics vehicle in smart pay-per-use mode", which GMV is carrying out in collaboration with Passion Motorbike Factory-Scoobic. This project has been developed as a revolutionary solution to meet the challenges of last-mile delivery in urban environments, while also addressing critical issues such as traffic congestion, environmental impacts, and the growing demand for fast deliveries.

The Scoobic MED vehicle is designed to automate deliveries in cities, using advanced technologies such as 5G and artificial intelligence, and with integration of the ***uPathWay*** management platform. These are innovations that will allow efficient management of the delivery fleet, under a flexible, pay-per-use business model. In addition, the project is incorporating robust cybersecurity by design.

With funding from Spain's Ministry of Digital Transformation and Public Services, through the UNICO SECTORIAL 5G 2022 Program and the country's Recovery, Transformation and Resilience Plan, this project is notable for its focus on sustainability and energy efficiency, while also creating the foundations for a future where urban logistics will be transformed by autonomous mobility. With this presentation, GMV has further established its leadership role in developing disruptive technologies to support more intelligent and sustainable forms of mobility.

GMV is helping companies comply with new legislation on equal and transparent pay

The government of Spain has announced implementation of its Annual Legislative Plan, which includes transposition of the European Union's recent Directive on equal pay and pay transparency. The purpose of this legislation is to reduce the salary gaps existing between men and women, by imposing new obligations on companies in relation to equal and transparent pay.

Beginning in 2026, a significant transformation will occur in Europe's labor market, because companies will be required to publicly disclose their employees' salaries. The purpose of this measure is to eliminate the secrecy that often surrounds salary levels, so that workers are aware of how much their colleagues are being paid, based on salary brackets. This is intended to strengthen the principle of equal pay for equal work, regardless of gender or other factors.

The legislation states that any salary differences of 5% or more, for the same employment position, must be adequately justified. If a company is unable to justify the difference, it will have to implement corrective measures. In addition, companies will be required to provide annual reporting on any pay gaps existing between men and women, including a detailed description of their salary management practices and procedure for giving raises to employees.

The PAIT® solution: technological support for compliance with the new legislation:
To facilitate adaptation to these new requirements, Peoplematters and GMV have jointly developed the solution known as PAIT® (Pay Analytics Intelligence Tool), which makes use of advanced technologies by incorporating dynamic analytics and artificial intelligence algorithms. This solution

provides an exhaustive analysis of the existing pay gap, while also identifying trends and offering corrective measures for reducing salary differences in the future. This is an important tool that can help companies comply with the existing legislation, while also promoting remuneration policies that ensure equal pay.

In addition to requiring transparency from companies, this new legislation requires proactive correction of any existing pay inequalities, to ensure the existence of a more fair and equitable work environment.

GMV presents the ASUMO project at ANYbotics Industry Forum

Ángel C. Lázaro, head of Robotics and Automation for GMV's Secure e-Solutions Industry sector, recently attended the 2024 ANYbotics Industry Forum, where he gave a presentation on the ASUMO (Advanced Substation Monitoring) project. This is a project being led by Elewit and Red Eléctrica (companies from the Redeia Group), with the aim of using AI and robotics to transform management of electrical substations.

Lázaro's presentation highlighted integration of GMV's uPathWay solution into a quadruped robot created by ANYbotics. This approach has made it possible to create an autonomous mobile robotics solution for remote inspection of critical assets, which has already been applied in Madrid at Red Eléctrica's electrical substation in the Fuencarral neighborhood. This system can now be used to perform tasks such as reading analog meters, producing thermographic reports, and detecting oil leaks, all as a way of optimizing the monitoring procedures for critical infrastructure.

One of the most innovative aspects of this successful use case is the inclusion of an "opportunistic inspection" module, which applies advanced technology based on a visual AI agent that has been trained using artificial vision language models. With this technology, the system is able to independently detect anomalous situations as the robot moves between different points of interest at the substation. For example, it can identify a large piece of metal that has fallen off a transformer, or a rubber mat left behind by a worker. When situations like this occur, alerts are issued and the events are logged in real time, with no need to have a specific model for the objects encountered.

The ASUMO project represents a qualitative leap forward for remote management of electrical substations. It is not only ensuring better operational efficiency, but also significant improvements in terms of safety and monitoring for this type of critical infrastructure. GMV's participation in this project, which is focused on integrating ***uPathWay*** into a robot designed by ANYbotics specifically for inspection work, is further solidifying the company's leadership role as a provider of innovative automation and robotics solutions for industry.

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GMV strengthens its commitment to the Defense Sector with the strategic acquisition of Autek

With this operation, GMV integrates a key niche technology that expands its portfolio of technological solutions in defense and security

In September GMV announced the strategic acquisition of 100% of Autek, a leading Spanish company in Cross-domain systems. As a result of this agreement, Autek have been integrated into GMV's group of companies. Autek's current management team will lead the Cross-domain area within GMV on a global level.

With 25 years of experience, Autek has established itself as a reference in the development of Cross-domain products, systems, and solutions, which enable the secure exchange of information between different domains based on predetermined security policies, without compromising data security. These solutions are essential in complex military systems and in any systems requiring high levels of security, whether in the space sector, such as the Galileo satellite navigation system, or in the security sector, such as applications for critical infrastructure protection. Additionally, they have clear applications in public administration and corporate environments, among other fields.

Autek is the first Spanish manufacturer of Cross-domain products with proprietary technology and holds certifications from the Spanish National Cryptologic Center (CCN) and NATO, ensuring compliance with the highest security standards.

According to Manuel Sanz, founding partner and director of Autek: "The integration with GMV will allow Autek to undertake new R&D developments, access new markets where GMV is a European leader and a global reference, and apply our innovative technology in a global environment, further strengthening our capabilities and our contribution to national and international security."

For GMV, this is a strategic operation as it strengthens its leadership and expands its offering as an independent integrator in the defense sector, allowing it to access essential niche technology in the defense and security field. Specifically, Cross-domain solutions provide a significant competitive advantage in the areas of command and control networks and Joint Intelligence, Surveillance, and Reconnaissance (JISR) systems, areas where GMV is a leader in the defense market.

This operation continues to demonstrate and reinforce GMV's commitment to innovation and excellence in the development of critical technologies for defense and global security.

Third consecutive year in the 100 Best Companies to Work For ranking

For yet another year, GMV has appeared in the ranking of the 100 Best Companies to Work For of the business magazine Actualidad Económica.

Consultants and independent experts evaluate the answers to a questionnaire proposed by this publication, which addresses topics such as talent management, compensation, and remuneration policies, the work environment, training strategy and Corporate Social Responsibility.

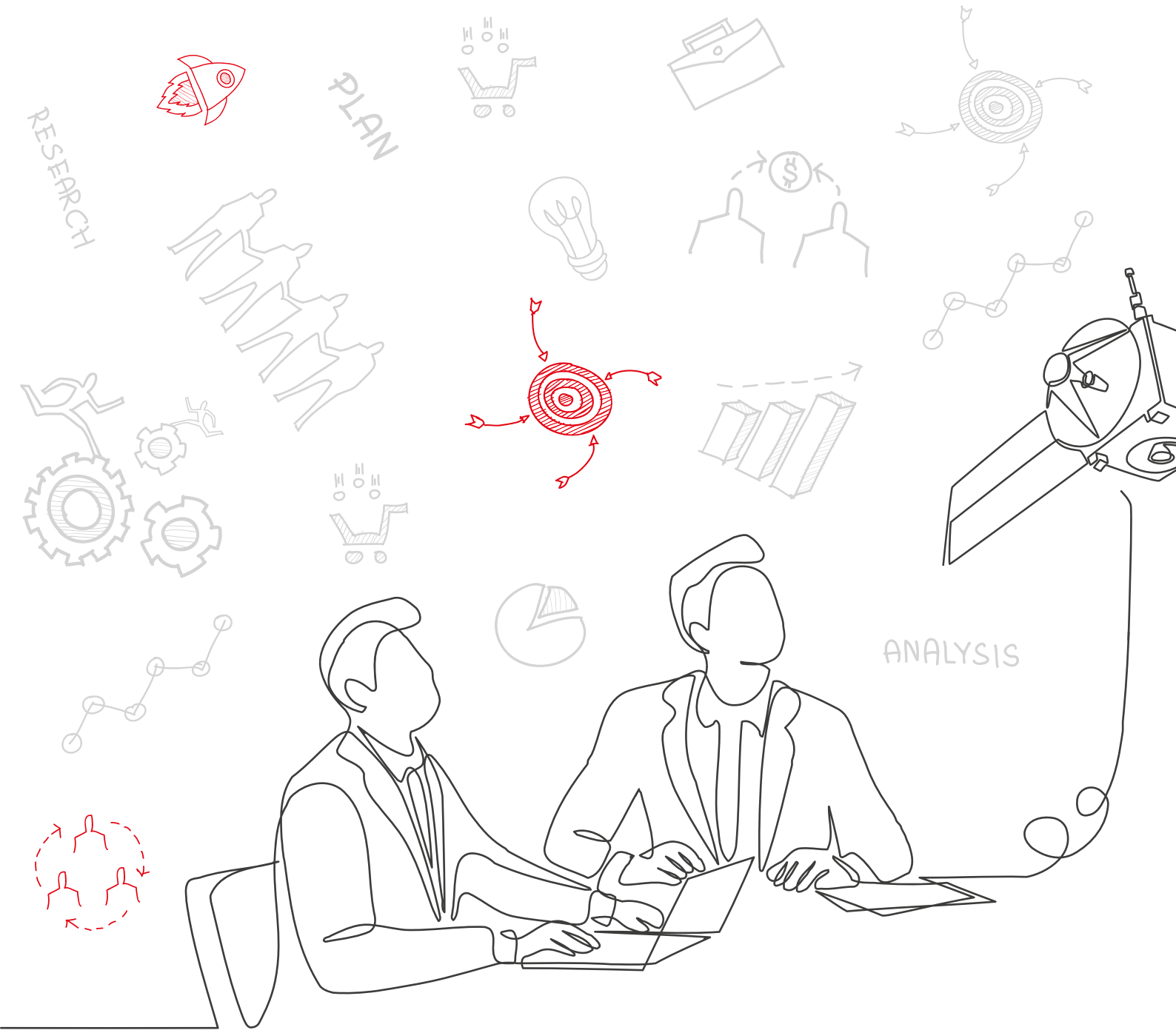
This recognition highlights our flexible working policy, based on trust and responsibility, which has allowed us to establish a system where more than 90% of the workforce follows a hybrid model.

Attracting, developing, and retaining the best talent is one of the company's cornerstones and has enabled our international team to grow to the more than 3,300 professionals that make up GMV today. A place in this ranking is an affirmation of the success of GMV's value propositions for its professionals.

GMV welcomes Autek

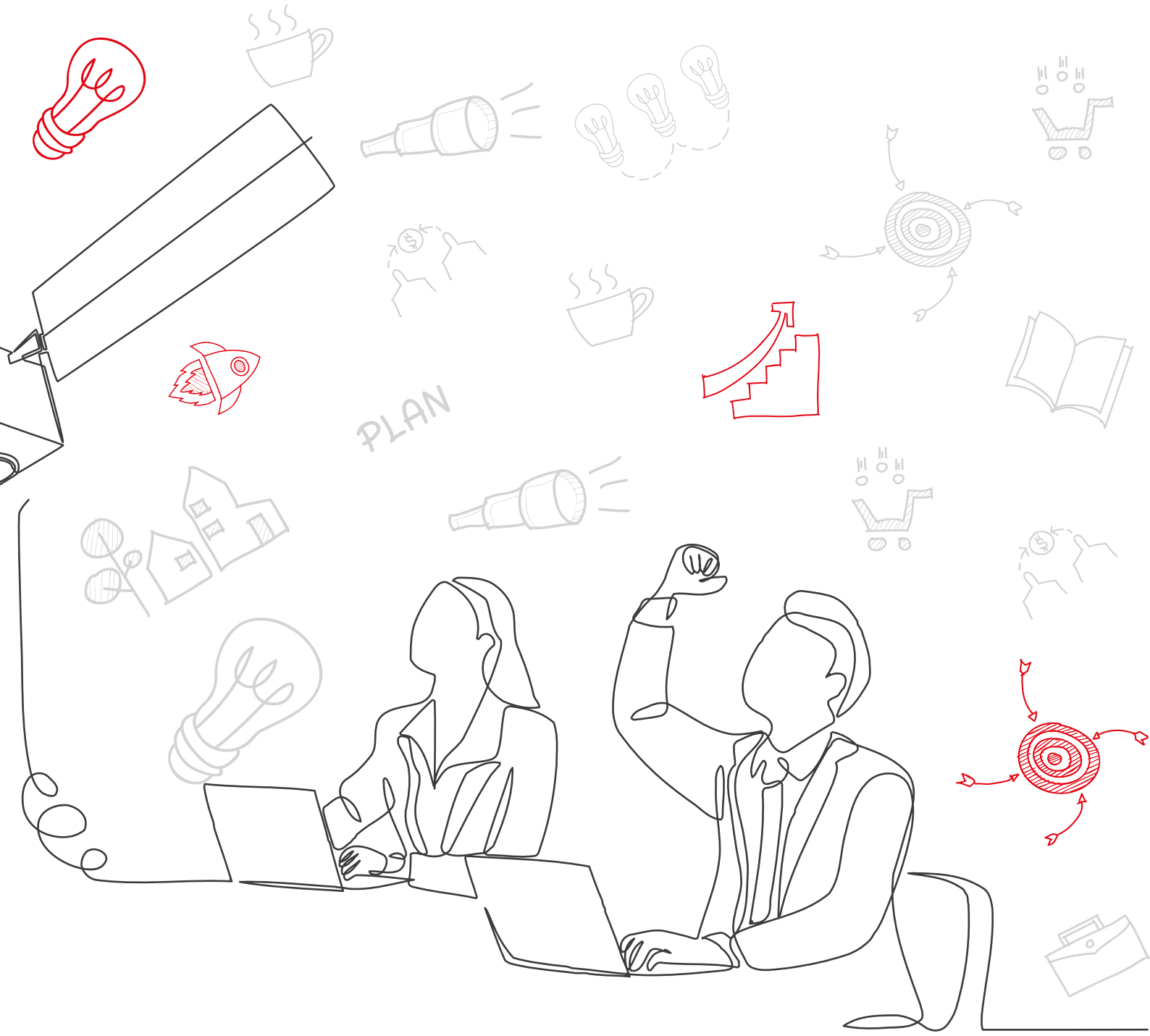
On Friday 28 September, GMV held a small welcome event to welcome new colleagues from Autek Ingeniería. Ignacio Ramos Gorostiola, GMV's Corporate Director of People and Infrastructure Strategy, welcomed the group and presented GMV's history and values, followed by other members of the company, who delved into the corporate and business development areas.

The event concluded with a photo session in which the new team members posed proudly sporting their new colors.



GMV and Alén: united by passion and shared values

In a world where technology is advancing at breakneck speed, companies that want to stand out must not only embrace innovation, but do so with passion and purpose. In June, we celebrated the one-year anniversary of the union between GMV and Alén Space, a partnership that has not only



strengthened our market position, but also merged two “souls” driven by the same passion and shared values.

Looking back, it is no coincidence that both companies were born as university spin-offs. They are the result of academic curiosity and an environment where the thirst for knowledge and the ambition to change the world through technology were the dreams that united us and guided our journey. What began as a university project, with young people full of enthusiasm and energy, has evolved into something much larger: a shared mission of excellence, innovation and, above all, teamwork.

We invite you to meet two of the key figures in this new chapter, who share their experiences, their expectations, and how they see this union as an opportunity to continue building a better future. They are Diego Nodar and Aarón Nercellas, two professionals who perfectly embody the innovation and commitment that GMV and Alén have brought to this joint venture.

Aarón Nercellas

Electronics Department Manager and Co-Founder

"We win and lose together"

Alén means "beyond" in Galician, symbolizing the ambition with which the company was born. But I was absolutely floored when I received the news that GMV wanted us to join their family. On the one hand, it was a motivational boost, knowing that this was an opportunity to grow and improve. On the other hand, there was pressure not to disappoint.

However, everything has gone smoothly and the technical teams are clearly demonstrating a willingness to add value rather than detract. There are no orders, just advice. They listen carefully to our perspectives and allow us to move forward with respectful oversight. The fear of disappointment vanishes when you're embraced in this way. We win and lose together.

As for my department, my experience couldn't be better. In response to the increasing number and quality of projects, a new electronics lab has been created for Alén's employees at GMV's facilities. The willingness to move forward together was evident in the speed of implementation, which immediately closed the gap between Tres Cantos and Nigrán. On a personal level, I'm very excited to see the possibilities multiply, especially in the hardware area, where Alén Space brings the freshness and agility we've been honing for years in the New Space sector, while GMVenriches us with its expertise and knowledge. This will make it easy to go to infinity and Alén.

Diego Nodar

COO

"We really do work as one team"

Since we started the Alén Space project, GMV has always been a role model for us. Personally, I believe that joining GMV was a step in the right direction and the most natural option, given the company's culture, origin (we are also a university spin-off), and personal affinity with the team.

From a personal point of view, the acquisition was an opportunity to learn, to achieve goals that would have taken us years to achieve on our own, and most importantly, to have someone I could rely on for things where I lacked experience and skills, both technical and managerial.

And after more than a year, I couldn't be happier.

First, because since we started working together, I haven't met a single person from the GMV team who hasn't welcomed us with the same enthusiasm as we have, and who hasn't treated me as one of the team, always willing to lend a hand with anything we need.

Second, because in just a few months, we've shown that the acquisition has been a success and that we really do work as one team. From day one, we've launched joint missions capable of competing and winning contracts, and we've been working on them for several months now with great results (LEO-PNT, CREAM-IOD, CyberCube, etc.). I'm sure that with the drive and quick work of the Alén Space team, combined with the quality, strength, and experience of the GMV team, we will continue to build amazing things in the years to come.

State-of-the-art solutions for the defense industry's new challenges

GMV is a trusted supplier for the Spanish Ministry of Defense and Ministry of the Interior, as well as for international defense and security organizations. It provides engineering, design, development, integration, testing, verification, and maintenance of defense and security systems throughout their entire life cycle. GMV offers defense and security products and services in the following areas, all under strict quality standards:

- Engineering, development, and integration of C4I systems.
- Design, development, implementation, and maintenance of JISR systems (STANAG 4559).
- Fusion and processing of data and signals for intelligence systems.
- Cyberdefense and cross-domain solutions.
- Artificial intelligence and big data.
- Training simulators and operational training, research, and development.
- Development of military navigation systems based on GPS, EGNOS, and Galileo PRS, for operation in denied areas.
- Remotely Crewed Systems and associated subsystems.
- Onboard equipment, military avionics software, and test benches.
- Logistics services and maintenance for systems and software.
- Military applications for space.

GMV has 40 years of experience in working with defense and security forces.

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