



# Annual Report

2021



GMV business group believes that behind each new need, behind every new problem, there is a challenge and a chance to innovate. Technology is not an end in itself; it is the means to make something new or to make something old better. In GMV we draw on our existing range of products and services or, if need be, we develop completely new ones to meet the particular needs of each client, providing bespoke innovation and technology. We take on our clients' challenges as our own, spurring us on to new heights of innovation.

GMV goes beyond its clients' brief, exploring their real needs with a total readiness to find solutions. This allows us to come up with the right response, often imaginative, sometimes unique and always honest.

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# 01

## Letter from the President MÓNICA MARTÍNEZ





For many of us, 2021 was not exactly an eventful year. Instead, we will remember it as part of the pandemic, a time when many of our plans were put on pause. We continuously adjusted our heading to overcome the changing winds and lingering uncertainty, picking up new habits and harnessing new tools, some of which we will continue to make use of when the pandemic is finally over. And step by step, our daily efforts led to amazing progress, that almost went unnoticed given the lack of opportunities to celebrate our successes.

At GMV we are undertaking bigger projects in ever higher positions in the value chain, often integrating complementary technologies from a range of fields which are all indispensable for the end-to-end solutions our customers need.

This is the case of GCS, the Galileo constellation control system. Version 3.0, which was successfully deployed by GMV in August, not only handles the operational control aspects of the satellites throughout their life cycle, but also manages the system's cybersecurity.

This is in addition to important developments in other Galileo services, several of which have also been led by GMV. The company's wealth of experience in navigation systems is proving vital to projects in other sectors as well, such as the automotive industry, aeronautics and defence.

Meanwhile, the space market is booming. The European Union has several major projects underway and is working on launching new ones, whereas the continuity and possible new activities of the European Space Agency in the coming years will depend on the outcome of the Ministerial Council Meeting at the end of 2022. In view of the growing commercial interest in space, which has triggered a dramatic spike in the number of satellites in orbit, a strong institutional push in this direction is more than justified, not only to tap into the multiple possibilities that space offers for communications, science, and a myriad of Earth observation applications, but also to ensure a sustainable use of space itself.

The digital transformation made huge strides in all areas of social life in 2021. Due to pandemic-driven restrictions, remote working, e-learning, and even remote wine tasting became widespread. This has led to a significant increase in cyberattacks. At GMV we always have cybersecurity in mind, continually evolving and adapting new solutions

to protect our customers in all sectors, often as an integral part of the specific projects we develop with and for them, be it for satellite control centers, banking, Industry 4.0, or for the automotive industry.

Like cybersecurity, artificial intelligence and big data are cross-cutting technologies that we at GMV are developing for our customers, independently and also by taking part in and sometimes leading major European R&D projects. We are implementing these disruptive technologies in all our target sectors: to guide, navigate, and control satellites, robots, and drones; to distill information from Earth observation images; to plan surgical operations; to identify cybersecurity threats in the network and detect intrusions.

Since the end of 2021, business activity has been picking up in the sectors most downtrodden by the pandemic, including public transportation, which needs to make up for lost time, embrace the latest digital transformation developments, and help tackle another of the great challenges we face as a society: climate change. The global electronic component shortage affected our operations in this sector in 2021, in some cases forcing us to take on cost overruns in order to meet our delivery commitments.

These problems are being exacerbated by the war in Ukraine in 2022, which underlines the urgent need for joint European defence. GMV is a trusted supplier to the Spanish Ministry of Defence and a national co-leader of one of the pillars of Europe's future combat air system. We also bring our special blend of expertise to NATO and various European agencies, and we are Europe's leading mid-cap in terms of participation in European Commission defence programs.

We closed 2021 with significant growth in headcount and improvements in results. The pandemic has underlined the value of science and technology as a source of solutions to society's most pressing problems, and the current shortages emphasize the need to develop these solutions in Europe. GMV has demonstrated its capacity to spearhead major international projects in collaboration with leading companies and institutions. By working closely and intensely with our own customers, we are able to identify real needs and develop the very best solutions to overcome them. This collaboration, coupled with the determination, creativity, and drive to innovate of the people at our company, has been key to the many milestones we reached at GMV in 2021.

*Mónica Martínez*



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**Letter from the CEO**  
**JESÚS B. SERRANO**







This year we have still felt the effects of the pandemic, although with a significantly lesser impact than last year. The global situation created by the pandemic has affected the markets where GMV operates and has also given rise to supply and demand tensions, especially in the electronic components market. Despite the global situation, however, GMV has continued to pursue its strategic development in the various markets, consequently posting significant growth and improvement in its indicators. With a turnover similar to 2020 (€252M), we have significantly increased our Ebitda to €18.7M (44% growth), and net profit has risen by 53% to €6.3M; the workforce has also increased by 8.5%.

All sales activity indicators are at record highs: with a sales activity figure of 3.27x sales. The order backlog at the end of 2021 was 1.35x sales. The number of tenders still to be resolved also reached 1.35x, some of them large in volume and with a high probability of success, generating a good outlook for the coming year and GMV's future.

GMV's vision of being a global leader in the use of technology and innovation to improve our clients' operations in highly demanding markets calls for the proper day-to-day execution of all the company's activities, but its clearest indication is overcoming the most demanding challenges. In 2018 GMV won the contract for the maintenance and evolution of Galileo's ground control segment (GCS) in its operational phase. We said at the time that we were aware of the huge responsibility we were taking on and that we were committed to living up to it. After the fulfillment of important milestones over these years, 2021 was an exceptionally relevant year in that the renewed and updated version of the complete system was delivered. In addition, it was the first time that LEOP (Launch and Early Orbit Phase) operations were to be performed on the 28th and 29th satellites of the constellation using the dedicated GCS system. Thanks to the talent, motivation, and dedication of GMV's whole team and the trust we had from the European Space Agency (ESA), the European Union Space Programme Agency (EUSPA), and the European Commission (EC), the system's deployment and operation was a resounding success ratified both by the successful operations of the new satellites and by the recognition and sincere and enthusiastic congratulations from the client for the quality and performance of the system deployed and also for the fulfillment of the established schedule.

GMV has a client-centric strategy of commitment, flexibility, quality, and reliability that is implemented in all our activities, for both large and small contracts, because we have to meet the expectations of all our clients. The results in all areas demonstrate the appropriateness of this strategy, which is even more relevant the bigger and more demanding the challenge.

For us, technology is not the end but the means to improving our customers' operations and resolving their challenges. In the 2019

report, we emphasized the award by the BMW automotive group of the contract for the development of the precise and complete satellite positioning system (GNSS) for the German automaker's new generation of autonomous vehicles and the enormous technological challenges it entailed due to the demanding requirements and performance that the customer had set. After three years, it extremely satisfying to see that the system we have developed meets absolutely all the client's expectations and is ready to be declared SOP (Start Of Production) in 2022, which will lead to the immediate sale and use of cars with the autonomous driving capabilities provided by the GMV-developed system. This is yet another example that demonstrates the company's values and vision and the outstanding capabilities of our professionals.

They say that Alexander the Great used to say: "There is nothing impossible to him who will try." We believe that "there are no impossible problems, only challenges to our creativity." We always try and, many times, we succeed.

We have emphasized these two contracts because they are a clear statement of GMV's values and strategy, which we apply and deploy in all our activities, because of their relevance, the successes achieved, and because they show that GMV can do much more to help more clients improve their operations and results. Because GMV goes far beyond these two one-off contracts. GMV contributes to all kinds of space missions: earth observation, navigation, telecommunications, science, robotic exploration, human spaceflight, space traffic and safety, technology demonstration, and launchers. We support and facilitate the digital transformation of public administrations and companies in various sectors of activity with systems, products, developments, and experience in information and communication technologies and help eliminate cybersecurity risks in all systems and applications. In the intelligent transportation systems market, we consolidated the successes of our new generation of products based on the new strategy launched in 2016. Finally, in the defense and security market, GMV plays an important role in designing, developing, and implementing operational systems used by the armed forces, security forces, and multilateral defense and security organizations.

As always, we are especially grateful to our customers for their trust in us. We would also like to make special mention of the important contribution to GMV's development made by each of its over 2,500 professionals with their remarkable talent, passion, and commitment, as well as the excellent collaboration of our partners and suppliers, without whom we would not be able to tackle the challenges we face.

*Jesús B. Serrano*

03

# Corporate structure

**GMV Aerospace and Defence, SAU / Aerospace and Defense Markets**

Grupo Navegación por Satélite Sistemas y Servicios, SL / Galileo development and exploitation

**GMV Soluciones Globales Internet, SAU / Telecommunications and e-business Markets**

**GMV Sistemas, SAU / ITS and Industry Markets**

**GMV Innovating Solutions, Inc / Aerospace, ITS and Telecommunications Markets of USA**

**GMVIS Skysoft, SA / Aerospace, Defense, ITS and Telecommunications Markets of PORTUGAL**

**GMV Seguridad Integral, SAU / Security Market**

**GMV GmbH / Aerospace, Defense, ITS and Telecommunications Markets of GERMANY**

**GMV Innovating Solutions, Sp.z o.o / Aerospace, Defense, ITS and Telecommunications Markets of POLAND**

**GMV Innovating Solutions, SRL / Aerospace, Defense, ITS and Telecommunications Markets of ROMANIA**

**GMV Innovating Solutions, SARL / Aerospace, Defense, ITS and Telecommunications Markets of FRANCE**

**GMV Innovating Solutions, SAS / Aerospace, Defense, ITS, and Telecommunications Markets of COLOMBIA**

**GMV Innovating Solutions, Sdn. Bhd / Aerospace, Defense, ITS and Telecommunications Markets of MALAYSIA**

**GMV NSL Limited / Aerospace, Defense, ITS and Telecommunications Markets of UNITED KINGDOM**

**GMV Syncromatics Corp / ITS Markets of USA**

**GMV Innovating Solutions, BV / Aerospace, Defense, ITS and Telecommunications Markets of THE NETHERLANDS**

**GMV Innovating Solutions, SRL / Aerospace, Defense, ITS and Telecommunications Markets of BELGIUM**

**Payload Aerospace, SL / Aerospace Market**



# 04

## Governing bodies

1. MÓNICA MARTÍNEZ WALTER  
President
2. JESÚS B. SERRANO MARTÍNEZ  
Chief Executive Officer
3. JAVIER LÓPEZ ESPAÑA  
Director
4. SUSANA MARTÍNEZ WALTER  
Member of the Board
5. FCO. JAVIER MARTÍNEZ CENDEJAS  
Chief Financial Officer
6. IGNACIO RAMOS GOROSTIOLA  
Chief People Strategy and Infrastructures
7. PEDRO J. SCHOCH  
Director of Corporate Development, Marketing and  
Communication
8. ÓSCAR TEJEDOR ZORITA  
Director of Security Compliance
9. RICARDO TÓRRON DURÁN  
Member of the Board (GMV Aerospace and Defence, SAU)
10. JORGE POTTI CUERVO  
General Manager Aerospace
11. MANUEL PÉREZ CORTÉS  
General Manager Homeland Security & Defense
12. MIGUEL ÁNGEL MARTÍNEZ OLAGÜE  
General Manager Intelligent Transportation Systems
13. LUIS FERNANDO ÁLVAREZ-GASCÓN PÉREZ  
General Manager Secure e-Solutions
14. ALBERTO DE PEDRO CRESPO  
General Manager GMV in Portugal



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# Company history







GMV was born in 1984 from the business initiative of Professor Juan José Martínez García. At first GMV centered on the space and defense sectors, taking its initial steps in fields like mission analysis, flight dynamics, control centers, simulation or earth-observation and satellite-navigation, all areas in which GMV is nowadays a leading light worldwide. Starting out as a small group of engineers who won a contract from ESA's European Space Operations Centre (ESOC) in an open international tender, GMV then went from strength to strength, quickly growing into a solid firm running a 100-strong staff by the late eighties. It played a key role in ESA's first space missions and defense programs and provided highly specialized services for the major international satellite manufacturers and operators.

In a few short years the sheer quality of its work won GMV a cast-iron reputation in the European space sector. In 1988 it was declared to be a "Center of Excellence in Orbital Mechanics" by the European Space Agency (ESA).

In the early nineties GMV decided to branch out into other sectors by way of technology transfer. This engendered new business lines in the sectors of intelligent transportation systems, Cybersecurity and telecommunications, and in information-technology applications for the public and private sector. By breaking into these new markets GMV became a trailblazer in fields like internet solutions or satellite-navigation applications, still in their infancy in those days. In the transport field GMV became a pioneer in intelligent transportation systems, developing the first GPS-based fleet tracking and management systems. From the space sector the company thus began to transfer to other markets its knowhow and expertise in control centers, data processing, onboard software, geographic information systems (GISs), satellite navigation, telecommunications services and data networks.

It was also during the nineties that GMV found its feet in the defense and security sector, especially in the fields of command and control systems, simulation and military satellite applications (communications, Earth Observation and navigation).

By the end of the nineties GMV's diversification process had been successfully negotiated; its business structure was solid and its staff had built up to almost 300. Turnover now topped 20 million euros, about 50% of which came from sectors like intelligent transportation systems, Cybersecurity, telecommunications and information technologies.

In 2001 the founder and president of GMV, Professor Juan José Martínez García, passed away. This led to a change in the executive structure of business group GMV; the post of CEO was created while the presidency of the group was taken on by Dr. Mónica Martínez Walter.

In these years GMV embarked on a new stage with a dual objective: firstly to maintain its business independence and secondly to draw up a forward-looking plan that would guarantee ongoing profitable growth both in its traditional business areas and in other new ones. It therefore invested heavily in the development of new products, services and solutions in space, defense, intelligent transportation systems and information technology; the company also decided to break into new sectors and unfurled an ambitious program for internationalizing the longstanding business lines.

As a result of this international expansion policy GMV took a crucial step forward in 2004 with the creation of its US-based company, thus becoming a multinational trading on two continents. The new company focused on the US aerospace market with the aim of becoming a tried and trusted supplier in this sector.

In May 2005 business group GMV upped the stakes in its international growth and development strategy by buying a 58% holding in Skysoft, a Portuguese firm with very similar business lines and target markets to GMV's. In 2007 the operation was completed with the purchase of 100% of Skysoft, its operations then being knitted seamlessly into the rest of the business group.

GMV's new corporate identity was officially launched in September 2006, to bring its image into line with the actual situation of the multinational technology group GMV. The group had by now broken into many new sectors

and expanded its business internationally. To make sure the corporate brand did not lag behind this new situation we decided to carry out a thoroughgoing overhaul of the group's identity, unifying all the corporate brands under a single denomination. As a result, all the subsidiaries took on the new GMV brand as a single corporate identity.


In June 2007, GMV purchased a 66% stake in Masisconvi, SA, a company specializing in the design, development, manufacture and marketing of advanced ticket-vending and fare-collection systems. This transaction allowed GMV to round out its range of passenger-transport telematics, traditionally founded on advanced fleet-management systems. In early 2011 GMV completed the 100% purchase of Masisconvi, S.A. and in 2012 it was wholly integrated into the group structure by means of a merger-based takeover.

In late 2007, giving a new kick to its worldwide expansion, GMV decided to internationalize those business lines that had attained number-one status in the Spanish market, such as the intelligent transportation business. This strategy soon came good; by 2009 the company had won its first contracts in Asia and Eastern Europe. Since then this process has thrived, important new contracts being won in Poland,

Malaysia, Indonesia, Morocco, Sweden, Mexico, Chile, United Arab Emirates, Australia and Cyprus, etc.

From 2008 to 2015 GMV's growth slackened slightly but never ceased. Its strong suits of business specialization, unbeatable competitiveness and ongoing internationalization helped it to stave off the worst effects of the worldwide downturn. During this period important contracts were also won with new clients, such as telecommunications satellite operators like Measat, Azersat, Nilesat and international agencies and organizations like GSA-Galileo-, EMSA, FRONTEX, the UN and EUMETSAT. The company also kicked on in growth areas where GMV had already built up a healthy client portfolio, such as physical security and Cybersecurity, healthcare, automotive software, robotics, big science facilities, Big Data, Internet of Things, testbeds and control and instrumentation.

In July 2015 GMV and the California-based technology firm Syncromatics Corp, a provider of Software as a Service (SaaS) solutions for the intelligent transportation systems (ITS) market, signed an agreement under which GMV made a strategic investment in Syncromatics Corp's capital. One year later GMV's investee company Syncromatics then bought 100% of Mobilitat Works Inc., a technology



In 2006 all the corporate brands are unified under a single denomination. As a result, all the subsidiaries took on the new GMV brand as a single corporate identity





GMV is a +2500-strong multinational group with a bulging international portfolio of clients from five continents. It trades in Europe, the Americas and Asia in several hi-tech sectors

company specializing in the North American market of ITS-based demand-response public-transport systems and paratransit (special transport services for people with a disability or functional diversity). In 2018, as part of its ongoing strategy of investment and growth in the USA's ITS market, GMV completed its takeover of Syncromatics, which from that moment on began to trade under name GMV SYNCROMATICS. This latest outlay increases GMV's expansion capacity in the USA and consolidates its position in the worldwide ITS market.

In 2016 GMV GmbH, GMV's German aerospace subsidiary trading in the aerospace, defense, ICT and ITS markets, signed a merger agreement with INSYEN AG, a leading German space-missions firm. The resulting company, GMV-INSYEN AG (under the GMV INSYEN brand), was then fully integrated into the whole set of companies making up GMV Group. At the end of 2016 GMV also bought a stake in PLD Space, a young Spanish space startup that has now been working for some years on the design and testing of space launcher technology. In 2020 a merger agreement was signed between, on the one hand, GMV Innovating Solutions Limited, GMV's British aerospace company, trading also in the markets of defense, ITC and intelligent

transportation systems, and, on the other, Nottingham Scientific Limited (NSL), Britain's top satellite-navigation and critical-application company. This agreement makes GMV NSL's sole shareholder and gives birth to the company GMV NSL, now to be knitted seamlessly into GMV's set of companies.

By the end of 2021, on the strength of this international expansion process initiated back in 2004 with the creation of the US company, GMV was running subsidiaries in Germany, Colombia, Spain, the USA, France, Malaysia, The Netherlands, Belgium, Poland, Portugal, the UK and Romania, plus permanent establishments or project offices in Morocco, Cyprus and Mexico, among others. GMV is a +2500-strong multinational group with a bulging international portfolio of clients from five continents. It trades in Europe, the Americas and Asia in several hi-tech sectors.

Today GMV is still looking to the future with undimmed, upbeat enthusiasm, maintaining its original aim of building up a strong knowledge-based company whose main resource is still the talent, far-sightedness and industriousness of its personnel.



# 06

## GMV in 2021

### Main figures

Total Income

259.10 M€

EBITDA

18.67 M€

Net profit

6.28 M€

N.º employees

2,557

07

# Activity sectors



GMV provides turnkey systems and solutions, specialist hi-tech products and services. Its activities take in the whole life cycle, ranging from engineering and consultancy services, the design and development of software and hardware, to the integration of systems and subsystems, verification and testing, operational support and maintenance. Through its stable of subsidiaries this business is carried out in the following sectors: Space, Aeronautics, Defense and Security, Intelligent Transportation Systems, Automotive, Healthcare, Cybersecurity, Telecommunications and Information Technologies for government authorities and major corporations.







# Activities

GMV is a tried-and-tested supplier of products and services not only for leading aeronautical manufacturers such as Airbus but also for providers of air navigation services and for regulatory authorities such as Spain's airport and air navigation authority ENAIRE, the International Civil Aviation Organization ICAO and Eurocontrol. GMV participates in the main aeronautics programs, providing engineering services and developing state-of-the-art aeronautical systems and software while always adhering to the highest quality standards. In particular GMV has spearheaded development of aeronautical approach- and landing-systems based on satellite navigation systems (GNSS) and is one of the few European companies with comprehensive knowledge of advanced avionics architectures, testbeds and verification systems and their associated regulations.

The most important areas of activity within the aeronautics sector are the following:

- Flight dynamics
- Development of safety critical software and hardware (DO-178 / DO-254)
- Avionics and equipment design
- Integrated Modular Avionics (IMA)
- Remotely Piloted Aircraft Systems (RPAS)
- Pilot- and operator-training and engineering simulators
- Testbeds
- Approach and landing procedures and systems
- GNSS technical assistance for air-navigation operators and authorities



# Aeronautics

## Assessment

In the field of aeronautics, 2021 was a year of strong growth, especially thanks to GMV's work on the Next Generation Weapon System (NGWS) of the Future Combat Air System (FCAS). GMV is focused on developing and providing high value-added engineering products and services to major manufacturers, especially Airbus. Because of this, the company has worked on all of Airbus's major military aeronautical programs over the last 30 years. GMV also works for air navigation service providers, as well as national and international regulatory and control agencies, specializing in developing critical software and hardware that meets stringent aeronautical standards.

In 2021, all Phase 1-A activities of the FCAS/NGWS program were carried out. The research phase of this macro-program is structured into pillars, each developing technologies with different scopes. GMV has played a very important role not only in the Remote Carriers pillar, where it is national co-leader, but in others as well, namely the Next Generation Fighter, Sensors, and Combat Cloud pillars.

All other aeronautical activities continued their course in 2021, including collaboration with Airbus in its various programs; the supply of more than 40 electronic control

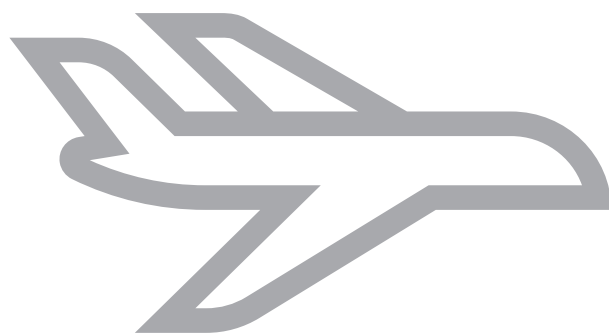
units (ECUs) for the A400M crane system, which are installed in the aircraft of various countries; and participation in several projects under the European Clean Sky 2 program. Cooperation also continued with international and national air traffic service providers through a number of projects in the field of satellite positioning (GNSS).

The FCAS/NGWS program is expected to come to completion in 2022. A standstill began at the end of 2021 due to a lack of agreement among the program's industrial partners in France and Germany on the development of Phase 1-B of the fighter aircraft, keeping the program's other pillars from making headway on this phase as well. However, the situation is expected to be resolved in 2022, allowing the FCAS/NGWS program to move on through its next phases.

GMV also has great expectations for 2022 in terms of participation in other key aeronautical programs, such as the recently launched Eurodrone unmanned aircraft project, where it is expected to be heavily involved in the system's critical DAL A equipment. Finally, GMV expects to take part in upcoming projects supported by the European Defence Fund as well as national support programs.

# Aeronautics

## Main milestones



01



In 2021 GMV claimed its stake as one of the most heavily involved Spanish companies in the FCAS program. This year saw the end of the Joint Concept Study (JCS), in which GMV participated. The aim of the JCS was to carry out a conceptual analysis of the FCAS's capabilities and possible architectures, as a step towards design tasks. The legal entity SATNUS Technologies, S.L., which includes GMV, was also set up to coordinate the activities of the Remote Carriers pillar of the NGWS/FCAS project in Spain. The tasks of Phase 1-A of this pillar were all but completed, pending final acceptance by the customer. Phase 1-A of the Next Generation Fighter pillar, the Combat Cloud pillar and the Sensors pillar, in which GMV is also involved, were completed as well.



02



Under the Spanish Ministry of Defence's RAPAZ program, in October the army carried out an operational assessment of the Passer UAS, an unmanned aircraft developed by GMV and Aurea Avionics. As with the Seeker UAS, the Passer UAS is a compact system specially designed for the armed forces, as its low weight, vertical take-off, 60-minute endurance (among the highest in its category), and 6-kilometer communications range make it especially useful for missions requiring situational awareness at ranges that other micro rotary-wing systems cannot reach. In addition, and after several years of development, GMV and Aurea Avionics took to the FEINDEF International Defence and Security Exhibition to present the Solo UAS system, a new Class I Micro, fixed-wing, high-performance unmanned system with a design focused on high operability.

03



This year GMV continued to work on AI-GNCAir and SAFETERM, two projects on the strategic research agenda of the European Defence Agency (EDA) as part of CapTech GNC. These projects are studying how to integrate artificial intelligence technology into guidance, navigation, and control systems and exploring the road maps needed to close the technological gaps in the EU in the field of aerial systems and remotely piloted aircraft systems (RPAS). After completing the definition phase, SAFETERM initiated its design phase in 2021. The project team plans to improve the demonstrator using real avionics hardware and software. In 2021, AI-GNCAir conducted a literature review on the current technological landscape and held a workshop to identify the most promising artificial intelligence technologies and application use cases for improving the navigation characteristics of military airborne platforms.

04



During the World ATM Congress in October, GMV presented its **MagicIFP** solution, a Software as a Service (SaaS) solution that allows air navigation service providers (ANSPs) to carry out all the GNSS-based instrument procedure validation tasks recommended by the International Civil Aviation Organization (ICAO) quickly, efficiently, and cost-effectively. In its presentation, GMV pointed out the benefits highlighted by some of the current users of this product, such as ENAIRE and FINTRAFFIC.

05



In the airport sector, 2021 saw GMV deliver its **Emil** solution, a comprehensive system for ground inspection of air navigation radio aids such as VOR, ILS locator, and ILS path, to CORPAC and SANS, air navigation service providers in Peru and Saudi Arabia, respectively. With these deliveries, GMV gained new users of its products in places with great commercial potential. In addition, GMV delivered its **SRX-10i** solution, a GNSS interference detection and monitoring system, to PANSO, Poland's air navigation service provider, in order to support the implementation of GNSS-based instrument procedures in its airports. The system has since been deployed in 15 Polish airports and is capable of detecting interference that may affect GPS and Galileo systems, as well as issuing alerts in real time, making it useful in air navigation applications.

06



The area of GNSS interference detection and localization received a great deal of attention in 2021 from a variety of customers, and GMV was able to seize this opportunity by securing three new projects: GRIT for Eurocontrol, AIRING for the European Commission, and Passport for the European Union Agency for the Space Programme (EUSPA). In 2021 GMV also began development for ENAIRE of the second version of the APRESTA system, the aim of which is to monitor the performance of the ADS-B surveillance service in Spanish airspace.

07



GMV continued to make improvements to its family of U-space products, **Dronelocus®**, developed by the company as part of the ENAIRE-coordinated DOMUS project. This suite of U-space services allows drone operators to ensure compliance with established restrictions and enables specially authorized operators to carry out missions in restricted areas by means of enhanced vehicle tracking and emergency management capabilities.

08



As part of the European Clean Sky 2 aeronautics research program, significant progress was made on vACCINE and UBBICK in 2021. The Aeronautical Cyber INtrusion dEtECTION mechanism (vACCINE) aims to design an onboard aircraft security filter to detect intrusion in communications between aircraft and air traffic control (ATC) systems. In 2021, several academic experts joined the ongoing work on aeronautical communications, anomaly detection, and avionics systems security and created reference datasets to identify cyberattack events in avionics networks and ground-to-air communication channels. With regard to Utility Building Blocks Integration for Cockpit (UBBICK), which aims to modernize current cockpit utility management architectures, work in 2021 focused on getting final validation towards the development of all the artifacts required to obtain XKY's DAL-A certification.

09



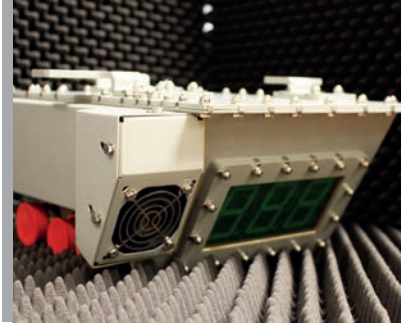
Also under the Clean Sky 2 umbrella in 2021, substantial progress was made on EMA4FLIGHT and VALEMA, two projects aimed at developing and validating electromechanical actuators and ECUs for in-flight control systems, to demonstrate the feasibility of using electromechanical actuators in aviation. With respect to EMA4FLIGHT, GMV produced a first version of the ECU software for ailerons and spoilers, marking the end of the project. As for the VALEMA project, the low-level requirements were formally verified and further verification activities were carried out.

10



In the Solution for E-GNSS U-space Service (SUGUS) project, the aim of which is to speed up the use of GNSS and Galileo in the unmanned aerial vehicle (UAV) segment, three flights for the project's planned proof-of-concept test took place in July. A part of the European Union's research, development, and innovation program, the project is being carried out by a consortium co-led by GMV and Everis Aerospace, Defense and Security, with the participation of VVA Brussels, ESSP, FADA-CATEC, and Unify. The three flights, which were designed to emulate three operations that could benefit from the E-GNSS services proposed in the project (building inspection, healthcare product delivery, and precision agriculture), demonstrated the added value delivered by the European navigation systems Galileo and EGNOS (E-GNSS), as well as the project's application programming interface (API).

11



In 2021 GMV delivered the 40th ECU production unit for the crane system of the A400M tanker and long-range strategic airlifter. Developed and manufactured by GMV for Héroux-Devtek (formerly CESA) and certified according to DO-178B DAL-C with EASA, the ECU controls the crane's two engines and brakes, following the commands given by the operator, and handles the data supplied by the system's sensors (load cells, proximity sensors distributed along the rails, crane cable tilt sensors, temperature sensors, engine speed, etc.).

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GMV continued to provide various engineering services to Airbus Defence and Space. Worthy of particular note was its collaboration in the A330 MRTT tanker programs, where it took part in developing and certifying the refueling system (onboard control software for the boom, onboard monitor software, operating consoles) and in developing simulators. GMV was also involved in simulation activities in the A400M aircraft, taking part in engineering simulators (especially the simulation models of the landing gear, electrical system, and communications systems).

13



GMV continued to work on the DevOps for Complex Cyber-physical Systems (COSMOS) project. Carried out by a consortium led by The Open Group, COSMOS aims to provide infrastructure and technology that will enable the effective, seamless, and continuous development and upgrading of cyber-physical systems of systems (CPSoS). COSMOS will improve the overall quality of the delivered CPSoS by reducing the number of defects, while at the same time boosting the efficiency of system development, maintenance, verification, validation, and upgrading by minimizing development efforts and costs. In 2021, GMV's work focused on specifying the aeronautical use case for free route airspace (FRA). Furthermore, as part of the collaboration program between GMV and Embraer, 2021 saw the third phase of the DIMA project for the development of a distributed integrated modular avionics platform kick off.



# Activities

GMV is one of the world's top suppliers working for space organizations and agencies and also for the major satellite manufacturers and operators.

With over 35 years of experience behind it and nearly 900 satellites carrying its technology, GMV can safely claim to be a technology partner of cast-iron dependability, capable of meeting the most stringent needs under the strictest quality standards. It has now achieved CMMI Level 5 certification, covering the whole range of activities and services within the space sector:

## FLIGHT SEGMENT

- System-engineering and mission analysis
- Guidance, navigation and control (GNC) systems
- Autonomy and robotics
- Satellite and mission simulators
- Testbeds
- Onboard software and independent validation
- Data and satellite simulators for astronomy and earth observation instruments

## NAVIGATION

- Engineering and algorithms of satellite navigation systems
- Major systems of processing and generation of Global Navigation Satellite System signals
- Precise positioning solutions and augmentation systems
- Accurate time management
- Satellite-navigation service centers
- Galileo security centers, Galileo public regulated service, PRS

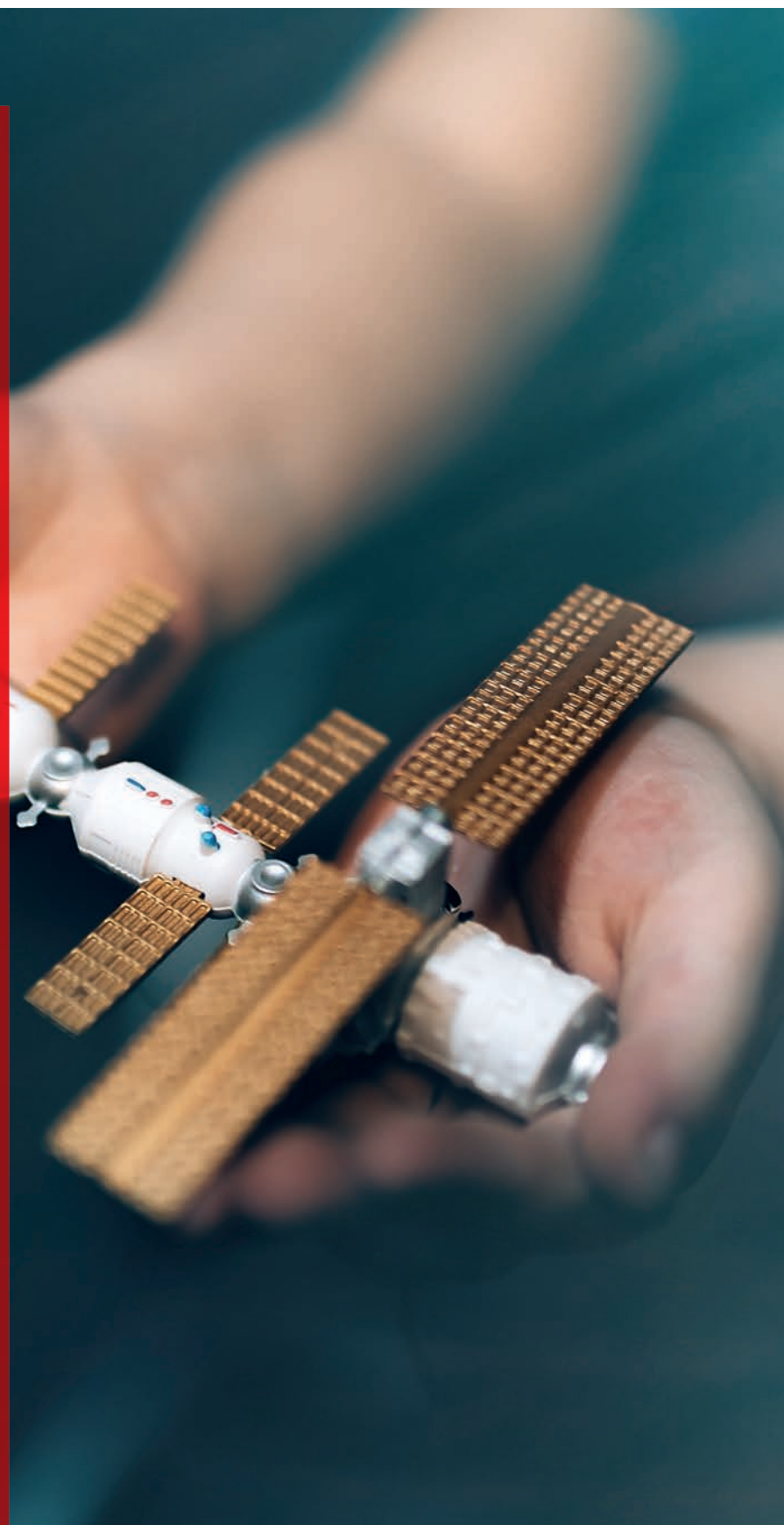
## GROUND SEGMENT

- Design and integration of complete ground systems
- Satellite control centers
- Flight dynamics systems
- Mission planning systems
- Ground station control and tracking
- Security systems
- Networks and Cybersecurity
- Configuration, planning and payload-optimization systems for telecommunications missions
- Science mission operations centers

## DATA PROCESSING

- Earth-observation and science-mission instrument processors
- Quality control and calibration systems
- Data archiving and dissemination
- Space applications, solutions and services

## OPERATIONAL SUPPORT FOR SPACE MISSIONS





# Space Assessment

Thanks to the strong performance of the many lines of activity that make up GMV's space portfolio, 2021 was a solid year for the company in this industry, posting record figures in terms of turnover and personnel. With a team of more than 1,300 people, GMV consolidated its position as Europe's sixth biggest space industry group.

The navigation area must be highlighted, with special mention to the Galileo program, where GMV plays a major role and important achievements have been made in control, mission, and service center ground segments. In the flight segment, it has an important role in fascinating missions such as the planetary defense mission, Hera, and the Mars Sample Return, and has also completed developments for Space Rider and the Miura-1 micro-launcher. In the area of orbital dynamics, space surveillance, and operations, GMV continues to be a top-notch global standard. In the satellite communications market, GMV remains the world leader in control centers and orbital dynamics systems. In Earth observation, good progress has been made in the MTG and EPS-SG ground segments for EUMETSAT, as well as in significant activities in Earth Explorers, Sentinels and remote sensing applications for climate change and security.

GMV's significant growth in the space business in recent years has translated into the development of larger-scale projects, solutions, and services, and has enabled GMV to reach higher positions in the value chain. This 2021 was the first full year following the GMV NSL merger and the creation of GMV Belgium. It also saw significant momentum

in all countries where GMV is active in the space industry (Spain, Germany, UK, France, Portugal, Poland, Romania, the Netherlands and the USA).

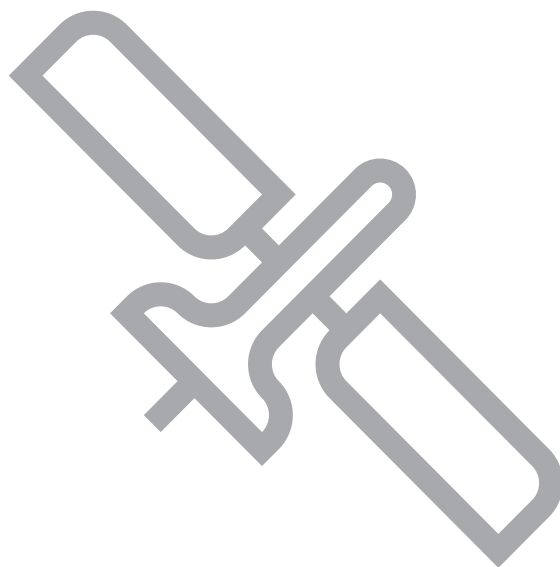
The year 2022 offers excellent prospects. GMV's goal is to remain on a double-digit growth path. The company has started the year with a larger order book than ever before and expect to close ongoing negotiations and bidding processes for huge, highly strategic projects.

The year 2022 will be pivotal for the space industry, especially in Europe. It is the second year of the current multi-year financial framework of the European Union, including Galileo/EGNOS and Copernicus, as well as government communications and space traffic management. In addition, a new EU secure connectivity program is expected to go ahead in 2022. GMV has strong interests in all of the above. In 2022 we should also see new space programs backed by Next Generation EU funds, which will offer additional opportunities.

The ESA Ministerial Council Meeting will take place in Paris on November 23 and 24. There, the agency will seek funding from Member States to advance the fields of exploration, science, Earth observation, telecommunications, navigation, security, transportation, and technology in the coming years. The meeting is of paramount importance as it will largely determine the future of Europe's space industry in the years ahead. It is crucial that GMV's countries of interest make an important contribution and that the meeting is a success.

# Space

## Main milestones



01



GMV maintained responsibility as prime contractor for the ground control segment of the Galileo constellation (Galileo Control Segment, GCS). In August, the new GCS v3.0 infrastructure was fully deployed in Galileo's ground control centers in Oberpfaffenhofen (Germany) and Fucino (Italy), being used for the operational control of the whole constellation of satellites in orbit. It also enabled the successful completion of the launch and early orbit phase of Launch 11 in early December. The design phase of version v3.1 was completed at the same time, including new infrastructure and substantial operational improvements. Working towards the future, GMV continues its leadership in the design of the full Galileo Second Generation (G2G) ground segment.



02



In the area of satellite navigation, GMV played a notable role in defining the ground segment for the future generation of the Galileo system, as a leader of one of the consortia bidding to develop it. Major headway was also made in 2021 on the developments of the Galileo Reference Centre (GRC), the Galileo Service Centre (GSC), and the geodesy and precise time synchronization services (Time and Geodetic Validation Facility, TGVF), as well as on the infrastructure needed for the return channel of the search and rescue service (return link service provider, RLSP), all led by GMV. In 2021 GMV was also awarded the contract for the initial study of EGNOS Next, the future generation of the European Geostationary Navigation Overlay Service (EGNOS), allowing the company to continue working on this program in which it has been involved for over 20 years.

03



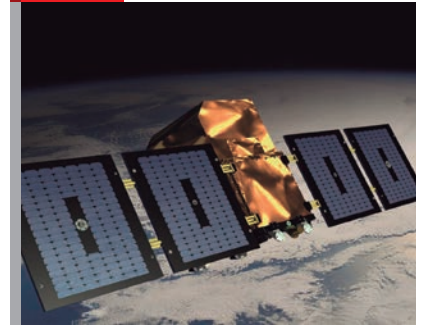
Other noteworthy developments in 2021 came in the Public Regulated Service (PRS), the SBAS operational demonstrator (installed in Australia and New Zealand), and other high-precision, high-integrity products such as the one GMV is developing for BMW's new generation of autonomous vehicles. GMV also took part in various initiatives of the European Space Agency (ESA), the European GNSS Agency, and the European Commission for improving high-precision tracking and positioning services and developing new high-integrity applications and navigation receivers. In 2021, GMV was awarded two contracts by the EUSPA, one for the supply of Galileo's high-accuracy data generator (HADG) and the other for the development of a new Galileo maritime receiver, which GMV will develop in collaboration with Saab.

04



GMV held its status as the world's number-one supplier of control centers for commercial telecommunications satellites, with new developments for Airbus, Eutelsat, Hispasat, Inmarsat, OneWeb, Arabsat, Yahsat, iSpace and Es'hailSat. In 2021 our customer base grew to over 40 operators worldwide and the total number of operational satellites controlled by GMV-developed systems reached nearly 700. We also began managing, configuring, and optimizing new high-capacity, extremely flexible payloads. AI-Powered Ground Segment Control for Flexible Payloads (ATRIA), a project funded by the European Commission under the Horizon 2020 framework program, also kicked off in 2021. This project will be carried out by a GMV-coordinated consortium and aims to optimally configure the payload of new-generation satellites.

05



In the flight dynamics area, GMV held onto its worldwide leadership, carrying out important activities for ESOC, EUMETSAT, CNES, and DLR. Highlights in 2021 included winning the contract to supply the dynamics system for the Atmospheric Limb Tracker for Investigation of the Upcoming Stratosphere (ALTIUS) mission; developing and validating the flight dynamics system for Inmarsat's sixth generation of satellites (I-6); securing the contract to provide an operational optical data service to support the flight dynamics operations of EUMETSAT's fleet of Meteosat satellites (MSG and MTG); and entering into new contracts with key customers such as Yahsat, Hispasat, and Eutelsat to supply both the flight dynamics system and the control center for their new missions and satellite fleets.

06



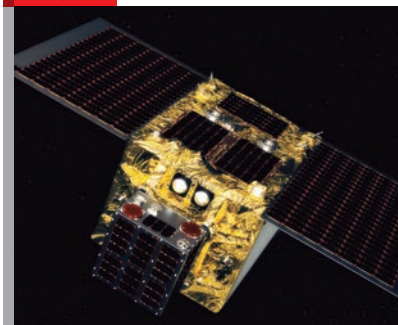
GMV also strengthened its position as prime ground-segment contractor for Earth observation and scientific missions, especially in the EUMESTAT Polar System-Second Generation (EPS-SG); the Copernicus, CHEOPS, PAZ and Ingenio ground control segments; and the Meteosat Third Generation. In 2021, a GMV-led consortium was awarded a multi-year contract for the maintenance and upgrading of mission control systems, operational simulators, and other auxiliary systems for the satellites of the European Commission's Copernicus program. Other highlights included the five-year renewal of the GoF9 framework agreement with the European Space Agency (ESA) for the supply of data systems and engineering services to its European Space Operations Centre (ESOC), and GMV's role in developing the ground segment of this center's Earth observation missions (EGOS-CC).

07



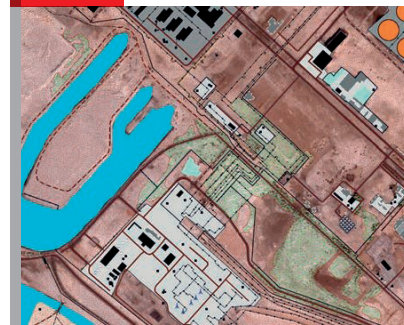
GMV is a major player in space debris threat analysis and space surveillance and tracking (SST) activities in Europe. In 2021 GMV started developing a proprietary passive satellite tracking system called **Focussear**. GMV was awarded two contracts for the development of the European Space Agency's SST processing software and two other contracts for the development of its CREAM system for automating collision avoidance operations, among others. GMV also strengthened its foothold in the European Union's SST consortium activities this year with the award of several contracts. In addition to several contracts with the CDTI in Spain and the CNES in France, GMV was also awarded two contracts by the German Aerospace Center (DLR) for the maintenance and upgrading of the German Space Situational Awareness Centre's (GSSAC) mission system and for the development of advanced SST data processing algorithms for the future European space debris catalogue.

08



As regards space debris removal activities, 2021 saw the launch of the End-of-Life Service by Astroscale-demonstration (Elsa-d), a service demonstration mission for missions at the end of their operational life, for which GMV provided the mission planning system and the flight dynamics system. GMV also collaborated with the United Kingdom Space Agency (UKSA) on several space debris removal missions, including LEOPARD, which aims to study the removal of two British low earth orbit (LEO) satellites that are no longer useful and to prepare for a future in-orbit servicing mission.

09



GMV is stalwart of the Copernicus program, namely in the areas of global environmental management and security. Since 2014 it has been developing and operating the precise orbit determination (POD) service of the Copernicus satellites. It is also leading the consortium that is developing WEkEO, the fifth European data information access services (DIAS) platform for online access and usage of Copernicus data. GMV has been working on the Copernicus Security Service since its inception in 2015; in 2021 it was part of the consortia awarded the Reference Mapping and Support to External Actions service contracts, tendered under a framework agreement by the European Union Satellite Centre. GMV is also providing mission analyses to the two consortia involved in drawing up the Sentinel-1 Next Generation mission, which will provide continuity to the program.

10



In the applications area, GMV consolidated and further strengthened its position in 2021. Standout activities included environmental monitoring with projects like BEWATS and PLESS, in which GMV is developing a novel approach for detecting marine debris using satellite images and machine learning techniques, and the FirEURisk project for improving forest fire management. Stepping up its activities to improve climate resilience, GMV also successfully concluded the EO4SD project, the continuation of which, GDA Climate, was signed at the end of the year. Thanks to these activities, GMV had a prominent place at the United Nations Climate Change Conference (COP26). With these projects the company was able to expand its catalogues of agricultural (**Wineo**), forestry (**EOForest**), and climate (**EOclima**) services.

11



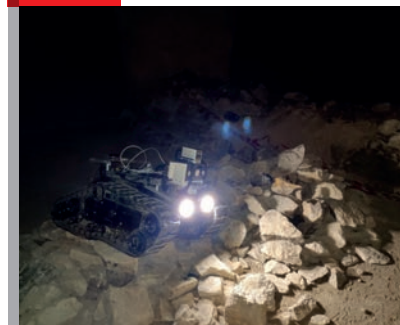
In the flight segment area, GMV made great strides in 2021 as a supplier of complete avionics systems, including GNC/AOCS subsystems, flight software, and flight equipment design, development, and integration. In 2021, the final testing phases of the complete avionics (both hardware and software) of PLD Space's MIURA-1 micro-launcher were carried out. GMV also won the contract for the flight software of the two components of the Space Rider vehicle (re-entry module and orbital module), as well as the GNC SCOE and data handling of the re-entry module. In the avionics area, GMV continued to build up its know-how in lower-level technologies, as in the case of Quality Assessment for the new European Ultra Brave FPGA Software Tools (QUEEN3), and secured a significant position in the ESA initiative for a space optical transport network with the HyDRON project. It also developed operational simulators for ESA missions such as BIOMASS and end-to-end simulators such as HARMONY.

12



The guidance, navigation and control (GNC) system of HERA, a planetary defense mission, successfully passed the preliminary design review (PDR), authorizing the start of the detailed design and implementation phase. Developed by GMV, this system will make it possible to autonomously orbit and approach asteroids that could pose a risk of impact against the Earth or be of scientific or commercial interest. In addition, as part of the same mission, GMV continued the design and development of the Juventas GNC system, one of the two CubeSats on board the mission. The system requirements review of the Comet Interceptor mission, in which GMV is responsible for the GNC subsystem within one of the two competing consortia, was also successfully passed. GMV also continued to pursue innovative GNC technologies, processes, and methodologies for spacecraft. For instance, in 2021 GMV won several contracts from the ESA in this field, including FTC-CRE, WW4RTOS, and FASTREC. These projects tackle the challenges faced by launch service providers and cover reusable launchers, space tourism, and micro-launchers.

13



GMV strengthened its leadership in the robotics area thanks to its role in the third phase of PERASPERA, the European Commission's biggest space robotics program; its active role in national projects in the UK; and its successes in European Space Agency projects. In 2021 GMV was confirmed as a strategic partner in EROSS+, PERIOD, and CoRobX, the three projects resulting from the program's third call. In addition to contributing to the GNC systems, the company will maintain its responsibility and leadership over critical aspects such as autonomy and cooperative capability. The final tests of Autonomous DEcision Making in very long traverses (ADE), a GMV-coordinated project under the PERASPERA 2 umbrella, took place in April. The European Robotic Orbital Support Services (EROSS), Planetary Robots Deployed for Assembly and Construction Tasks (PROACT), and Autonomous Robotic InSpEction (ARISE) projects also came to an end. Meanwhile, GMV also began work on the operational phases of the Mars Sample Return-Sample Transfer Arm (MSR-STA) and the Sample Fetch Rover-Visual Based Detection System (SFR-VBDS), as well as on CISRU (an AI-enabled SW suite able to support the programming of complex robot-robot and robot-human applications), Moon Robotic InSpEction (Moon-RISE), and Autonomous Robotics Soil Health monitoring (ARSH).



A person wearing military camouflage gear is using a tablet device. The background is a blurred outdoor setting with green foliage. The person's hand is visible, touching the screen of the tablet. The overall image has a red overlay on the left side where the text is located.

# Activities

GMV is a tried-and-tested supplier of the Spanish MoD and Interior Ministry as well as international defense and security organizations. Its activities in this field take in the engineering, design, development, integration, testing, verification and maintenance of defense and security systems covering their whole life cycle.

The products and services provided in the defense and security area cater for the most demanding needs and are developed under strict quality standards. They cover the following areas:

## DEFENSE

- Engineering, development and integration of C4I systems
- Design, development, deployment and maintenance of JISR systems (STANAG 4559)
- Intelligence systems, signal and data processing and fusion
- Cyberdefense, artificial intelligence and big data
- Training, operational-research and R&D simulators
- Development of military navigation systems based on GPS, EGNOS and Galileo PRS
- Onboard equipment, military avionics software and testbeds
- Logistic and maintenance services for systems and software
- Military space applications

## SECURITY

- Perimeter-surveillance and access-control systems
- Border protection and surveillance systems
- Advanced security systems incorporating new technologies
- Emergency and crisis management systems, 112, SOS centers
- Monitoring and management systems for vehicles and personnel of security forces
- Onboard video-surveillance and security systems

The company, its personnel and the various sites and facilities have all obtained the necessary security clearance for carrying out classified projects.



# Defense and Security

## Assessment

This was a bumper year for GMV's defense and security portfolio. There was a substantial growth in 2021 thanks to GMV's positioning with key technologies in the Spanish Ministry of Defence, being involved in international agencies and bodies, and collaborating with other defense ministries, especially in the supply of joint intelligence, surveillance, and reconnaissance (JISR) tools.

In 2021 GMV strengthened its involvement in the Ministry of Defence's two major production programs: the F-110 frigate and the 8x8 wheeled combat vehicle. For the F 110, GMV supplied the SENDA navigation and timing system that features Galileo Public Regulated Service (PRS) navigation, a critical vessel system that can be configured and is intended to be the benchmark for fitting other navy ships. For the VCR 8x8 vehicle, GMV signed a contract in 2021 for the supply of all the vehicle's navigators, which provide varying capabilities and precision depending on the vehicle's mission and characteristics.

GMV has become a European pacesetter in terms of involvement in the European Commission's defense initiatives, namely the Preparatory Action on Defence Research (PADR) and the European Defence Industrial Development Programme (EDIDP). In fact, GMV currently tops the project scoreboard among European mid-caps, taking part in three PADR projects and eleven projects in the two EDIDP calls (four projects in the 2019 call and seven in the 2020 call), coordinating one of them as well.

GMV also continued its work with international agencies, including NATO, the European Defence Agency (EDA),

the European Border and Coast Guard Agency (Frontex), and the European External Action Service (EEAS). With the NATO Communications and Information Agency (NCIA), progress was made in developing an enduring coalition shared data (CSD) services solution, which will provide the mechanism for exchange with NATO's Alliance Ground Surveillance (AGS). GMV is involved in various framework agreements with the EDA for different purposes: design, accreditation support, deployment, and maintenance of systems for processing and exchanging classified information; design of a platform for decision support in hybrid warfare based on artificial intelligence; and development of smart algorithms for safely landing RPAS. Our partnership with Frontex continued to grow through various contracts, such as EUROSUR and OP-300. Meanwhile, with the EEAS, GMV continued to maintain, support, and upgrade its command and control system (EUCCIS).

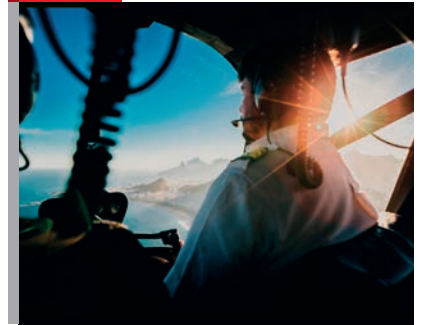
In the wake of recent events and, in particular, the war in Ukraine, both Europe and Spain are sending clear messages that defense capabilities need to be bolstered and improved. This will imply an increase in defense budgets, which we may already see in 2022. For high-tech companies like GMV, therefore, the prospects are excellent. The improvement of capabilities in command and control, intelligence, data processing, and navigation and guidance, among others, all fields in which GMV is leading the way, means that great opportunities, and also great challenges, can be expected in this and the coming years.

# Defense and Security

## Main milestones



01



In 2021 GMV raised its international profile and positioned itself among the main players in the defense and security sector. This is borne out by the fact that it was awarded seven of the 26 projects selected by the European Defence Fund under the second call of the EDIDP program. The awarded projects focus on the development of command and control, navigation, unmanned vehicle, and cyberdefense capabilities. The European Defence Industrial Development Programme (EDIDP) is a two-year program aimed at boosting the competitiveness of the EU defense industry and thereby supporting the EU's strategic autonomy. GMV was awarded a total of eleven projects in the two calls for proposals under the program, making it the fifth-ranked company in Europe in terms of number of projects.



02



With regard to the EDA framework agreement for the design and deployment of communication and information systems (CIS), a second system for handling information up to EU RESTRICTED level entered the preparation and design phase in 2021, with the aim of going operational in early 2022. Under this framework agreement, which began back in 2019, GMV is the systems integrator, acting as the single point of contact and the company responsible for carrying out and analyzing user and system requirements; assessing threats, vulnerabilities, and risks; identifying the pertinent countermeasures; producing the necessary documents for the accreditation process; and providing support during said process.

03



In 2021, as part of a main framework agreement for the maintenance and upgrading of the EUROSUR network, GMV successfully modernized and updated the network's node infrastructure in more than 30 countries, to the customer's satisfaction. This work was carried out ensuring minimum service outage, which involved careful and exceptional planning with each national coordination center, with Frontex, and with suppliers and logistics teams. This proved decisive given the pandemic constraints during the implementation phase. As part of the European Commission's European Border Surveillance System, EUROSUR set up a cooperation and information-sharing mechanism that makes sure Member States are better equipped to prevent, detect, and combat illegal immigration and organized crime, and also to react faster and save the lives of migrants in danger, especially in the Mediterranean.

04



Under the framework agreement for the development, maintenance, support, and upgrading of the European Union Command and Control Information System (EUCCIS), the final version of the system was deployed in 2021 on the new secure infrastructure for handling classified European External Action Service (EEAS) information and is now available for use by the end-user. In addition, this version includes improvements to the tactical viewer (common map on which tactical elements are displayed) and the collaborative planning module.

05



Regarding the Joint ISR Systems Interoperability (ISIC) program for the Spanish Ministry of Defense, in which GMV is developing systems for the **JISR SAPIIEM** tool suite, GMV continued to work this year to offer new features, with a view to validating them at the operational level and offering proposals for their standardization to ensure interoperability with allied countries. GMV, in collaboration with AUTEK Ingeniería, was also awarded a contract to provide an X Domain solution for the exchange of ISR products through the Battlefield Information Collection and Exploitation Systems (BICES) network to aid the sharing of intelligence between NATO countries and other allied countries, such as Sweden and Finland. Also in 2021, **SAPIIEM** added new international customers to its customer portfolio, including the Belgian Ministry of Defence. Two of the planned demonstrations also took place this year as part of the Integrated Modular Unmanned Ground System (iMUGS) project, in which GMV is coordinating the C4ISR command and control and interoperability subproject.

06



During the Dynamic Front (DVIDS) multinational exercise, the TALOS fire support command and control system was validated for integration into the Artillery Systems Cooperation Activities (ASCA) community. In development since 2010 for the Ministry of Defence's Directorate General of Weapons and Material, TALOS is GMV's C4I system for tactically planning, conducting, and executing military operations, allowing the integration of different combat functions (command, fire, intelligence, logistics, or communications). In 2021, GMV also expanded the system's capabilities. The aim was to develop the required software to enable the system to operate at up to five tactical levels and integrate the functions of the Field Artillery Command Post (PCART) of the Division and Army Corps (EC).

07



For yet another year Sociedad de Salvamento y Seguridad Marítima (SASEMAR) entrusted GMV with the maintenance of its operations management information system. This GMV-developed system, operational since 2004, was designed as a global solution for managing all emergency-related data from each of SASEMAR's centers, facilitating centralized access to data to optimize the use of available resources (rescue units and personnel). This new contract also provides for various improvements, including connection with the Spanish Navy's Maritime Surveillance and Operations Centre (COVAM), favoring the exchange of information and collaboration between the two organizations, which have overlapping responsibilities in the maritime field.

08



GMV continued to make headway in the design of the SENDA system under the contract signed between GMV and Navantia for the development and supply of these systems, as well as backup elements for the future F-110 frigates. In 2021, SENDA passed the second design milestone, focused on delivering part of the agreed technical documentation, continuing the planned course towards production, and delivering the first equipment for verification and integration in Navantia's test laboratories. The future F-110 frigates represent a key technological leap forward in platform systems and their combat systems, integrating Industry 4.0 technologies in their design to improve systems' management throughout their life cycle.

09



GMV stepped up its leadership in the field of navigation systems in September, signing a contract for the production of the ISNAV navigation and timing system for the Dragón program's 8x8 wheeled combat vehicles. The contract covers the supply of a first batch of 240 ISNAV systems. ISNAV is GMV's advanced navigation and time reference solution for ground systems and is designed to include Galileo PRS capability. ISNAV will provide 8x8 wheeled ground vehicles with advanced positioning, navigation, and timing (PNT) capabilities, making it possible to track their position in all types of scenarios, including scenarios in which there is no GNSS signal.

10



GMV won a new R&D project for the Ministry of Defence's Santiago program, the aim of which is to develop a demonstrator to reduce interoperability risks when upgrading the signals intelligence (SIGINT) system in the future phase II of the program. This demonstrator will focus on processing electronic intelligence (ELINT) information using the new NATO electronic warfare database model, NEDB NG. The proposed solution will reuse the service architecture of the CSD systems developed by GMV for the Directorate General of Weapons and Material, as well as the ATENEA tool for the mission planning and tracking part, which ensures interoperability in networks with systems based on MAJIC2 protocols that comply with STANAG 4559 Ed4.

11



After completing the development of three prototypes and performing an operational demonstration for Legión personnel, the Integrated Dismounted-Soldier System (SISCAP) R&D project entered a new phase of development. Overseen by Directorate General of Weapons and Material, SISCAP aims to develop and integrate technologies to provide soldiers with the resources they need to carry out for effective combat operations. The program began in 2017 and is broken down into seven subsystems: armaments and munitions, fire efficiency, communications and information, upkeep, survival, power source, and training. GMV, in a joint venture with Indra, is responsible for these subsystems and will develop the electronics and software of the soldier's main computer, which is responsible for command and control capabilities, connectivity with the devices carried by the soldier, and power management, one of the most critical factors in the whole soldier system.

12



Andromeda, a project co-funded by the European Union that kicked off in 2019 and whose aim is to boost the capacity and extensive use of the Common Information Sharing Environment (CISE) data model, came to an end in 2021. GMV played a prominent role in the project, which involved 19 partners from nine different countries, leading the design of the system architecture, providing the Socrates command and control tool, and taking part in one of the demonstration scenarios. OCEAN 2020 also came to an end, with GMV's contribution focusing on command and control (C2) systems and joint intelligence, surveillance, and reconnaissance (JISR), in keeping with the company's international track record in these areas. Coordinated by Leonardo, the project was able to significantly improve maritime situational awareness by integrating unmanned systems with intelligence surveillance target acquisition and reconnaissance (ISTAR) capabilities. GMV is also playing a leading role in PROMENADE, a Horizon 2020 project that launched in 2021 and aims to improve ship tracking systems, enabling operators to make the best decisions at any given moment.

13



GMV engaged in a number of initiatives throughout the year to consolidate its role as an international benchmark in defense and security. One of these initiatives was GMV's integration into the Atlantic Strategic Partnership for Advanced All-domain Resilient Operations (ASPAARO), a consortium set up by Northrop Grumman Corporation and Airbus Defence and Space together with seven companies from the defense sector, which is starting work on the tender for carrying out risk reduction and feasibility studies (RRFS) for NATO as part of the Alliance Future Surveillance and Control (AFSC) program. GMV also signed an agreement with the Spanish National Institute for Aerospace Technology (INTA) to carry out scientific research projects in the field of navigation and defense; it acquired the GNC division of Everis; and it signed a collaboration agreement with Sener Aeroespacial and Escribano to work together to develop and promote solutions in the area of missile systems and other precision-guided munitions as part of the SMS initiative.



# Activities

Over twenty years ago now GMV decided to bring its proven R&D expertise to bear on the challenge of improving the world's health. Drawing on its knowledge built up in robotics and space simulation, and working in close collaboration with hospitals, healthcare research institutes, universities and flagship organizations like Innovative Medicine Initiative (IMI) and EIT Health, it has now developed trailblazing in-house products and services while spearheading cutting-edge projects.

GMV's healthcare portfolio is bulging. Its telemedicine products and services now range from specific applications for telepediatrics, teleophthalmology, telerehabilitation and the care of chronic patients through the mining of epidemiological and clinic data based on advanced analytics to the design of surgical simulators and intraoperative radiotherapy planners.

The most significant areas of activity in the healthcare industry are as follows:

- Epidemiological- and clinical-data-mining solutions: Big Data and Smart Data
- Cybersecurity services and solutions
- ICT mobility solutions
- Medical-image management and processing solutions
- Remote healthcare systems (telemedicine) working on both a patient-physician and physician-physician basis: telepediatrics and teleophthalmology platforms
- Intraoperative surgery and radiotherapy planning and simulation systems
- Monitoring and follow-up systems for chronic, multi-pathology patients
- Telerehabilitation systems
- Mobility systems, humanitarian-aid-infrastructure and emergency-management systems
- Technology and process-optimization consultancy





# Healthcare Assessment

GMV upped its leadership in artificial intelligence (AI) in 2021, securing major projects that will help reorganize our public healthcare system and ensure its sustainability and development towards personalized precision medicine.

All of this is an outcome of a global situation emphasizing health, the importance of health systems going digital, and the pertinence of tapping into their data so that countries have robust epidemiological prevention and prediction systems in place, under a global governance framework that guarantees data privacy and protection. At the national level, the aim is to strengthen cybersecurity, AI, and data science capabilities.

GMV is leading projects such as TARTAGLIA and ALISSE that will mark a milestone in clinical and healthcare research, as well as in astronaut healthcare on long-distance manned missions. The first of these projects involves setting up a federated AI network to accelerate clinical and healthcare research in Spain. By applying advanced cryptographic methods, patient data remains encrypted while all the necessary computations are being performed. This ensures a balance between privacy and the ability to use information without revealing it or transferring it away from the organizations involved. The second project is embracing new AI techniques capable of guiding and

assisting crew members in acquiring diagnostic-quality images, removing the need to consult with medical specialists on the ground interactively to obtain such images, so that potential ailments of spacecraft crew members can be detected at an early stage. The growth achieved in recent years through investment in research projects has led to the development of high-value solutions and services. These include big data platforms such as the one developed by GMV for the HARMONY Alliance, with which the first European map of hematological cancers is being drawn up; software for navigation, physical simulation, and imaging in intraoperative procedures aimed at improving soft-tissue planning and navigation; and tools such as **uTile** that allow data to be processed without moving them from their owners' repositories.

Recovery from the pandemic is on the agenda for 2022, for which the European Union has released Next Generation funds to invest in strategic sectors, including healthcare. GMV will continue to take part in and deliver value to projects where its technology can substantially improve complex and costly processes, such as the biomedical research processes involved in finding treatments for rare diseases or processes requiring clinical monitoring of chronic or frail patients through its **Antari** platform.

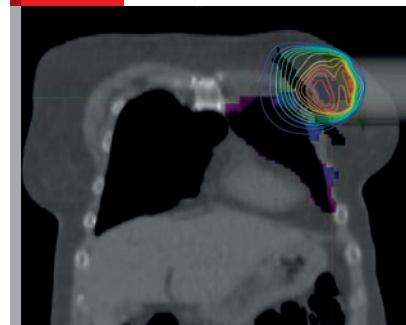


# Healthcare

## Main milestones



01



This year, the consultancy firm Apex Market Research, in its latest worldwide market study on intraoperative radiation therapy (IORT), placed GMV among the top 10 in the innovative company category. In the matrix used for the study, companies with this ranking are those suppliers that have demonstrated substantial product innovations compared to their competitors. GMV is among the world leaders thanks to **Radiance™**, its IORT planner, and its business alliances with other market leaders such as Carl Zeiss Meditec AG (Germany) and IntraOp Medical Corporation (USA). This innovative software provides all the necessary data to support the procedure, as it calculates the exact parameters needed to deliver the radiation therapy in the operating room prior to the operation. It provides high-quality multiplanar reconstructed (MPR) images and a three-dimensional (3D) view of the patient. Plus, it allows for simulated viewing of the treatment outcome.



02



In 2021 GMV was chosen to be a technological partner for the MICHAGEFFERT KOM project, led by prestigious Lithuanian surgeon Simonas Grybauskas, a world-renowned figure in maxillofacial surgery. The aim of this project is to improve the final result of jaw correction or orthognathic surgeries and provide maxillofacial surgeons worldwide with a cloud-based planning service. To this end, GMV developed AI-powered technology that can automate part of the planning of these procedures, which is essential given the great precision they require.

03



As part of ALISSE, a project spearheaded and financed by the European Space Agency (ESA), GMV is developing a deep learning-based artificial intelligence technology to guide and assist astronauts in taking high diagnostic-quality ultrasound images of organs affected by the conditions of manned space travel. The aim is to support the work of medical specialists, who will be able to remotely diagnose health issues in the astronauts at an early stage from the ground and treat them so that they do not progress.

04



GMV continued to make improvements to **uTile PET** (Privacy Enhancing Technologies), a solution for carrying out secure, private calculations on distributed data without exposing it or moving it from one organization to another. It is also able to harness confidential data to improve machine learning algorithms and analytical models, while complying at all times with organizational stipulations and current data-privacy obligations. Its application in sectors such as healthcare, finance, insurance, services, and industry represents an important advance in terms of designing machine learning models.

05



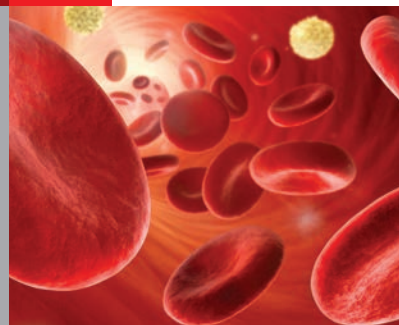
GMV, in partnership with MD, Almadesign and INEGI, developed a portable health device featuring medical biosensing equipment. This equipment relays information to a telemedicine computer application, giving healthcare providers all the information they need to provide more accurate and personalized diagnoses, even during televisits. The smart, portable health device for telemedicine, called iDocStation, has cut down the number of trips to places where there is a high risk of contracting SARS-CoV-2, such as healthcare facilities and residences.

06



One year after the outbreak of the pandemic, primary and home healthcare continues to play an important role in relieving the pressure on hospitals and healthcare centers. The same goes for the strategic remote healthcare platforms, which are used to monitor and follow up on COVID-19 and other patients who have been discharged from the hospital, as well as chronically ill and frail patients who need to be protected from risks. For this reason, GMV continued to make **Antari®**, its suite of e-health and telemedicine products and epidemiology solutions, available to health authorities this year.

07



In 2021 GMV continued its work on the European projects NAVIPHY and HARMONY. The former, a research project focused on navigation, physical simulation, and imaging in intraoperative procedures, aims to improve soft-tissue planning and navigation. Here, GMV serves as technology partner and overall project coordinator. This year, it carried out research to provide real-time images and parameters of the actions being performed by the surgeon during the operation, as well as the possible changes that the patient's anatomy will undergo while under the knife. In the latter project, which is looking for more effective treatments for hematological tumors, GMV is technology leader. With its second phase in full swing in 2021, the company contributed by applying advanced analytical techniques and big data tools in compliance with applicable data privacy and security regulations.

08



Throughout the year GMV continued its work on the eTRANSafe project for drug-safety assessment. The project is the result of a public-private collaboration coordinated by the Hospital del Mar Medical Research Institute and is funded by the EU and the European Federation of Pharmaceutical Companies and Associations. GMV has been one of the project's technology partners since it launched back in 2017, working to develop the biomedical data technology platform. As the system's technical manager, it is responsible for defining and coordinating how the final product will look and which features will be included in each version, as well as for documenting and delivering the prioritized features to the end users.

09



This year saw the launch of OPTIMA, a project backed by the European Union and the pharmaceutical industry through the Innovative Medicines Initiative (IMI), with a budget of €21.3 million and a team of 36 leading cancer-fighting organizations in Europe. The OPTIMA project seeks to advance treatments for prostate, breast, and lung cancer by applying GMV's cutting-edge technologies for data access, management, and harmonization. As part of the project, a platform will be created to provide distributed access to big data from a vast network of European hospitals and enable their use. GMV is responsible for data access, management, and harmonization, working in accordance with the European OMOP standard, and also for the platform design and the extraction of complex information using natural language processing technologies.

10



The DALEM project came to an end in 2021. Funded by the European Space Agency, it sought to transfer visual navigation technology for landing spacecraft on asteroids to healthcare in order to improve the early diagnosis of skin cancer. DALEM is an example of space technology transfer to dermatology and of public-private collaboration between the Biomedical Research Foundation of Madrid's Hospital Universitario La Paz (FIBHULP) and GMV. The aim of the project was to identify and monitor pigmented lesions for the early detection of melanoma. The algorithms developed for the space project were successfully shown to be useful in healthcare as well.

11



GMV, in consortium with 16 other organizations, secured a project to create a federated network using artificial intelligence to speed up clinical and healthcare research in Spain. The project, known as Tartaglia, will take place under the R&D Missions in Artificial Intelligence program, which is part of the Digital Spain 2025 agenda and the National Artificial Intelligence Strategy. The project is funded by the European Union using Next Generation EU funds, with a budget of over €75 million. GMV's work on the project will consist of applying advanced cryptographic methods to ensure that patient data remains encrypted while all of the necessary calculations are being performed, to create a balance between privacy and the ability to make use of that data without exposing it and or transfer it away from the organizations involved.

12



Efforts continued on the NAPO project, which focuses on social innovation through connectivity and health, bringing a 3G mobile service and maternal and child care to Amazonian communities. Launched back in 2016 by the EHAS Foundation (a Spanish NGO) and the PUCP Rural Telecommunications Group, NAPO provides access to specialized, quality healthcare services to more than 21,000 inhabitants through Antari, GMV's remote medicine platform.

13



GMV joined the German research campus M<sup>2</sup>OLIE (Mannheim Molecular Intervention Environment), an initiative seeking to foster collaboration between industry and clinical and technological research. A team of physicians, engineers, computer scientists, economists, and data scientists is working to push the envelope of conventional medicine and accelerate the application of personalized precision medicine in cancer treatment, with robotics and information technologies as allies. Funded by the German Federal Ministry of Education and Research, it aims to turn cancer into a chronic disease, and even in cases that currently have a poor prognosis, to provide patients with personalized, precise, and rapid treatments that provide a better patient experience.



# Activities

GMV has been leading the development of ICT security services and technologies in Spain for over 25 years now.

GMV provides services and solutions for analyzing any organization's level of cybersecurity, managing the technological infrastructure and governing the lifecycle-long cybersecurity process:

- Protection of critical infrastructure
- Engineering, security services and solutions
- Cybersecurity in industrial environments
- Definition and implementation of information security management systems and business continuity plans
- National Security Scheme compliance plans
- CERT Managed services





# Cybersecurity Assessment

The cloud was fully embraced in 2021 as remote work spread in response to COVID-19 restrictions, social concerns about the pandemic, and vaccine eagerness. The knock-on effect was an increase in cyberattacks, especially those involving social engineering, prompting the company to develop and launch robust solutions such as **Biolock** and **uCyberBolt**. The first of these secures and protects workstations in space mission control centers, guaranteeing the confidentiality, integrity, and availability of the information they handle. The second, **uCyberBolt**, is a tool designed to review organizations' security arrangements in order to strengthen their protection.

GMV also gained valuable insights from its computer emergency response team (CERT), harnessing the power of artificial intelligence to more quickly identify threats and automating processes under certified quality standards. The round-the-clock monitoring yielded high-quality data that helped produce reports on cybersecurity amid a pandemic, especially on cyberattacks in the healthcare sector. These documents were made public and distributed to customers and the media. They showed that ransomware became the biggest concern for organizations due to the ease of procuring "as a service" versions on the black market. Cybercrime is expected to rise at all levels in 2022, resulting

in an increase in demand. Against this background, GMV is increasing cybersecurity audits and will offer Express Security Checks, as well as ethical hacking services, beefing up both its own security and customers. Concepts such as zero trust, passwordless security, DevSecOps (security throughout the software development life cycle), and cybersecurity as a service are included in the services that it is offered across the board to customers in all sectors.

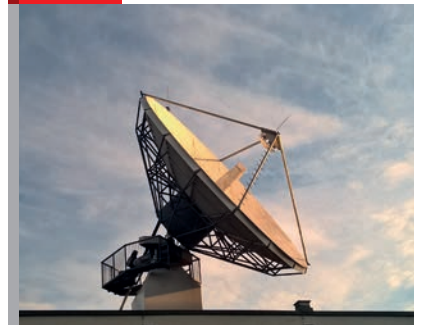
In recognition of GMV's leadership status, the CDTI, with the support of the Ministry of Science and Innovation, has made the company the leader of the CUCO project within the R&D Missions program. This innovative proposal, which focuses on quantum computing and its application to strategic industries of the Spanish economy (energy, finance, space, defense, and logistics), reaffirms the leading role of quantum information sciences in the sustainable development of economies and has a notable impact on cybersecurity.

# Cybersecurity

## Main milestones



01



GMV's experience in cybersecurity and its application to the space industry was decisive in clinching the Galileo Ground Control Segment (GCS) contract back in 2018. Under this European Space Agency (ESA) agreement, GMV continued to lead and develop all aspects of cybersecurity in 2021, ranging from protection to detection, response, and recovery. This work is especially important given that an essential part of the system to be maintained and upgraded calls for management of secure access to information from the Galileo constellation, as well as management of the security keys for access to the regulated and high-performance signals.



02



GMV developed **Biolock** as a specific solution for protecting the workstations of space mission control centers, in order to ensure confidentiality, integrity, and availability. Control centers have very specific characteristics that prevent them from applying solutions that are common in other IT infrastructures. User authentication and authorization provide a clear example, as does 24-hour operation, which requires non-interruptible monitoring and as smooth a shift change as possible.

03



In 2021 **Checker ATM Security**® strengthened its position as the go-to solution for ATM protection against cyberattacks. Now boasting a 16-year track record, this in-house GMV solution has continued to expand its numbers and is now implemented in more than 300,000 ATMs owned by 74 customers in over 25 countries. The new ATM security product is **Checker XFS Filtering**. Featuring ATM behavior analysis, anomaly detection, and suspicious action filtering and integrating with **Checker ATM Security**, it provides ATMs with the highest level of security out there.

04



**UCyberBolt** was launched in 2021 as a way to review organizations' security arrangement and ultimately step up their protection. This solution makes it possible to implement the "cybersecurity by default" paradigm, which focuses both on servers in the organization's data centers and on critical devices. In addition, **uCyberBolt** fortifies operating systems and establishes comparison criteria for secure setups in the organization's business sector (benchmarking).

05



Orange and GMV have teamed up to offer an innovative end-to-end solution for setting up and accessing virtual mobile devices, harnessing the power of cutting-edge 5G technology. Through the GMV-developed solution, **Ubic**, users can have all the main features of their smartphone in the cloud and access them easily, securely, and immediately thanks to the speed, quality, and low latency of Orange's 5G network. **Ubic** is designed to provide complete cybersecurity when in use and provides a virtual smartphone that meets specific user requirements, such as those for very demanding games or applications.

06



The Regulation Group of the Spanish Association of Telecommunications and Information Society Users (AUTELSI) published the study “Suplantación de la Identidad” (Identity Theft) to analyze the risks faced by companies and individuals if an attempt is made to impersonate them. As a member of this group, GMV was involved in drafting the report together with other experts in the field. The document identifies the most common methods used by perpetrators, as well as defining a series of good practices to respond and minimize these risks and their legal consequences.

07



GMV has been handling the security arrangements of the banking group BBVA for 19 years now. In 2021 GMV continued to work with the bank to upgrade the corporate security management product FARO Corporativo. The GMV-developed platform, with intellectual property of BBVA, was designed with international organizations in mind, enabling them to manage the security of all the offices and buildings in the various countries they trade in through a single app.

08



GMV’s Computer Emergency Response Team (CERT) worked with the CCN-CERT and the ecosystem of SOC service providers to define and set up the future National Network of Spanish SOCs, which will provide cybersecurity services remotely to state, regional, and local public administrations of any size, in an example of cybersecurity-focused public-private collaboration.

09



Due to the onslaught of cyberattacks in 2021, demand for GMV's Threat Intelligence and Forensic Analysis services rose considerably. To keep up, we trained our incident response teams in specific skills and helped numerous clients recover from ransomware attacks, the biggest cyberthreat in 2021.

10



GMV cemented its position as the top cybersecurity partner of the Technological Hospitality Institute (ITH). Risks in the hospitality industry revolve around apps, remote access, Wi-Fi networks, and the theft of sensitive information and data through malware campaigns, especially phishing and ransomware. GMV's services help protect the systems and infrastructure of hotel companies and online travel agencies in Spain through measures such as pentesting, secure Wi-Fi, perimeter security, data protection, secure cloud access, SecDevOps security by design, and security diagnostics that red-flag possible threats. Essentialist, a luxury online travel agency, entrusted GMV with the technical security audit of its technological platform in 2021.

11



GMV continued to offer its customers with Express Security Checks. Launched in 2020 in view of the COVID-19-driven surge in remote work, this service provides companies with a quick report on the security status of their remote access systems (VPNs and VDIs), to flag the most glaring vulnerabilities. This empowers companies to take proactive measures to minimize the attack risk.



The background image shows the interior of a modern bus. It features yellow handrails and red seats. A digital display at the front shows a map and route information. The bus is clean and well-maintained.

# Activities

GMV is a leading firm in the design, development, implementation and rollout of Intelligent Transportation Systems (ITSs) based on IoT, mobile communications and GNSS, guaranteeing compliance with sector standards such as GTFS, SIRI, NeTEx and CAN bus. GMV offers all-in, turnkey, ready-to-go solutions, taking on complete development of the project and incorporating its own inhouse hardware and software along the way.

GMV provides solutions for all the various means of transport and types of fleets (public transport, railway transport):

- Advanced passenger-transport fleet management systems
- Transport scheduling and planning systems
- Electronic fare collection systems enabling payment by contact smartcards, bankcards and mobile apps
- Ticket Vending Machines (TVMs) and point-of-sale management systems
- Demand-response transport management systems
- State-of-the-art passenger information systems: onboard, bus-stop, APPs, websites with real-time information and trip planners
- Ecodriving systems
- Advanced fleet-management systems for railway transport (SAE-R®)
- Onboard video-surveillance (CCTV) systems
- Onboard digital intercom and PA systems
- Special fleet-management systems: public services, emergencies, maintenance, distribution, logistics, etc.
- Advanced car telematics units
- Electronic tolling and information systems on toll-roads, highways and at bridges and tunnels
- Solutions for the connected car and autonomous vehicle: end-2-end software and services, Cybersecurity, advanced GNSS-based positioning technology
- Advanced mobility services: PAYD/UBI insurance, carsharing, carpooling, MaaS



# Intelligent Transportation Systems Assessment

In 2020, the pandemic took a heavy toll on people's mobility and, therefore, on GMV's two main target ITS markets: public passenger transport and the automotive industry. However, 2021 (especially the last two quarters) began to see a sharp upturn in business activity in both markets.

A milestone on this path to business recovery was GMV's contract for the complete overhaul, including all the lots open to competition, of the passenger information system of the bus fleet of Barcelona's public transport company (TMB).

Despite this third- and fourth-quarter turnaround, 2021 was a particularly tough year for the sector and for GMV for two reasons: first, COVID-19 brought business activity in the sector to a near standstill for much of 2020, which in 2021 led to a sharp drop in GMV's ITS turnover; and second, the global shortage of electronic components threatened our operations and our ability to execute and meet our scheduled deliveries in 2021. In order to offset both effects, significant adjustments were made to its cost structure, which enabled GMV to maintain and even improve operational margin ratios. At the same time, the company did everything in its power to make up for the component

shortages. This included having to tweak the design of its equipment, resorting to secondary markets, and assuming cost overruns where necessary in order to honor its delivery commitments. All in all, GMV demonstrated an extraordinary ability to weather an extremely challenging global situation for the industry in both 2020 and 2021, while at all times maintaining its main source of competitive advantage: their exceptional team of people.

In 2022, it is expected a business recovery that has already begun in the second half of 2021 to gain further traction. Provided that this recovery leads to a portfolio of contracts with deliveries in 2022 and the electronic components crisis does not worsen, it will see a strong rebound in GMV's turnover in 2022, to levels close to or even higher than before the pandemic.

However, on the whole, it should proceed with great caution. There is an enormous shroud of uncertainty surrounding the global macroeconomic situation arising from the effects of the pandemic (supply shortages, inflation, and high levels of public debt) and the global geopolitical situation, which may have an adverse impact on the performance of this particularly sensitive sector in these regards.



# Intelligent Transportation Systems

## Main milestones



01



In 2021, GMV continued to dominate the area of intelligent bus-based public transportation systems in Spain, securing new contracts. These included the contract awarded by Transports Metropolitans de Barcelona (TMB) for supplying the new user information and video surveillance system for Barcelona's city buses. The public tender was awarded to GMV for a value of over €10 million. GMV's bid won all three lots: one for the supply of onboard systems architecture, another for the user information system, and the third for the video surveillance system, thus outfitting the whole fleet of over 1,100 buses.

02



GMV is leading the way in implementing EMV technology in the public transportation sector in Spain. In 2021 ALSA strengthened its trust in GMV and awarded it a contract to renovate the passenger information, operating support and ticketing systems in Granada's urban transportation system. The project involves equipping the vehicles with onboard driver consoles and passenger validators, which will enable users to pay with contactless transportation cards, QR codes, and EMV cards, whether physical or on their smartphones. The contract also provides for implementation of the new **ITS Suite** in the control center. This new milestone reinforces GMV's leadership role in implementing EMV payment technologies, with systems already operational in the Balearic Islands and Almería.

03



Other noteworthy projects in this area in 2021 include the contract awarded by AVANZA for the provision of the operating support system, the user information system, the onboard video surveillance system (CCTV), and a passenger counting system for the public urban collective passenger transportation service concession between Castelldefels, Gavà, Viladecans, Barcelona, and other municipalities. This concession was awarded to AVANZA by Àrea Metropolitana de Barcelona (AMB). In Galicia, as part of the concessions tendered by the regional government, the operators Monbús and Vectalia are implementing operating support and ticketing systems for the fleets providing interurban services, and are also integrated into the operating assistance system monitoring tool of the Operational Mobility Center (COMGA). Both projects, in Catalonia and Galicia, are based on GMV's **ITS Suite**.

04



The public transportation planning and optimization software **GMV Planner** continues to expand with new rollouts. This is the case of municipal transportation company EMT Fuenlabrada, which in 2021 awarded GMV a contract for setting up and maintaining this service-allocation tool, integrated with GMV's operating support system. It is also worth mentioning an important new project with EMTUSA Gijón, where GMV's ticketing systems are being renewed and features such as passenger counting and the bus anti-grouping system are being added. The main operators of the Regional Transportation Consortium of Madrid (CRTM), ALSA, and AVANZA also renewed their maintenance contracts with GMV, with fleets totaling nearly 1,000 buses.

05



GMV continued its international expansion in the bus-based intelligent transportation systems market by bringing in new contracts. This year saw the deployment of an account-based ticketing system in Malta's public transportation system, as well as the renewal of the maintenance contract for the Malta Public Transport network, which covers the operating support, video surveillance, and electronic fare collection systems for its fleet of 400 buses. In Morocco, ALSA and CityBus renewed their maintenance contracts with GMV. After the successful deployment of the operating support system in Castelo Branco, Portugal, the municipality decided in 2021 to extend the system by awarding GMV a new contract.

06



GMV has been operating in Poland since 2008, installing intelligent transportation systems in numerous Polish cities such as Warsaw, Szczecin, Gdansk, Gdynia, Bydgoszcz, Nowy Sącz, and Toruń. In 2021 the Gdansk City Development Directorate together with the Gdansk Public Transport Office awarded GMV a contract to expand the passenger information system with 84 new panels and an **ITS Suite**-based content management system. GMV signed its third consecutive maintenance service contract for the intelligent transportation systems of Tristar (three years) and Szczecin. Also in 2021, GMV completed the expansion of the fleet management system and real-time passenger information system in Toruń, including the city's bus and tram fleets. GMV's work in Poland continued this year with various expansions and improvements to the systems in the cities where it operates.

07



GMV's came to the fore in the national and international railway sector in 2021, winning major contracts. CAF commissioned GMV with several onboard systems for the new trains that make up the first batch awarded by Renfe. These will be incorporated into the metric gauge fleet (formerly FEVE) currently serving Asturias, Cantabria, the Basque Country, Galicia, Castilla y León, Murcia, and Madrid's C-9 line. Under this contract, GMV will supply three of the systems to be incorporated into this fleet: the passenger information system, the communications platform, and the departure signal warning system.

08



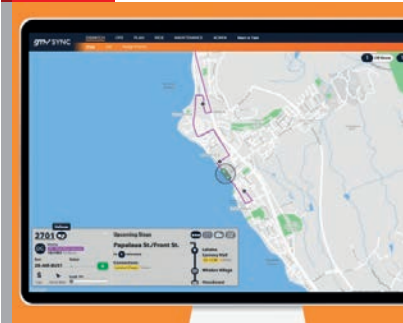
GMV will supply the fully digital CCTV system for the Danish company DSB for eight new intercity trains based on the Talgo 230 platform linking the Danish capital, Copenhagen, with the German city of Hamburg. The Warsaw tram authority signed a contract with GMV for the supply of more than 700 tracking devices for its entire fleet, integrated with the **SAE-R®** platform, which calculates arrival time estimates and feeds the passenger information system. CAF awarded GMV a contract for the supply of onboard systems for the Lisbon and Malaga trams, comprising the passenger information system, the public address system, and the intercom system. The onboard Ethernet communications network is also being supplied as part of this project.

09



Also in the tram and metro sectors, an onboard video surveillance system was installed on the 47 series 5000 and 6000 trains of Metro de Barcelona and on the 10 new series 5000 and 6000 trains supplied by CAF to TMB. Alstom contracted GMV to renew the operating support system (**SAE-R®**) on the Trambaix and Trambesòs tram networks running in Barcelona's metropolitan area. Ferrocarrils de la Generalitat Valenciana (FGV), the public authority in charge of managing the transport services of Metrovalencia in the regional capital and TRAM in the city of Alicante, awarded GMV a contract for a timetable planning system that will also be based on **SAE-R®**, GMV's operating support platform for railway and tramway environments.

10



In 2021, the intelligent transportation system subsidiary in North America achieved major contracts in Knoxville, Tennessee; Vail, Colorado; and Roanoke, Virginia. In fall 2021, the full unification of the GMV Syncromatics brand with GMV began, launching publicly at GMV's booth at APTA EXPO 2021 in Orlando, Florida, and showcasing both custom intelligent transportation system and Software as a Service solutions together for the first time.

11



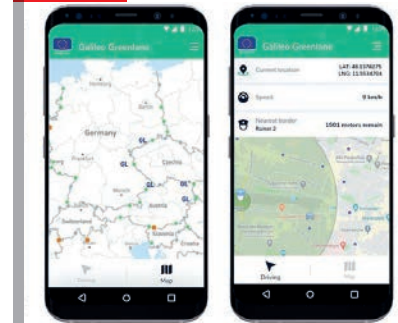
In the area of automotive cybersecurity, GMV is running a project to develop its IDPS model for connected autonomous vehicles and is exploring new solutions to make V2X connectivity more robust. As a result of this project, this year GMV deployed a real-time vehicle intrusion detection system based on artificial intelligence algorithms (AI-IDS). GMV also completed the TISAX assessment in the Valladolid and Lisbon facilities; it helped define the new ISO/SAE 21434 standard for cybersecurity in automotive engineering; and it supported FICOSA ADAS in analyzing cybersecurity risks and defining and implementing appropriate security controls against cyberattacks in driver assistance systems.

12



With respect to self-driving vehicles, 2021 saw the launch of ERASMO, a project co-funded by the European Union Agency for the Space Programme (EUSPA) to upgrade the high-precision, high-integrity positioning solution that leverages the services offered by Galileo, Europe's satellite navigation and camera-based positioning system. In this project, GMV is heading the technical management and coordinating tasks related to the positioning hardware and software. GMV NSL and HORIBA MIRA are also collaborating on a groundbreaking project that will harness advanced cooperative positioning technologies and low-latency wireless communications to optimize traffic-flow coordination by automating platoons of vehicles moving along highways.

13



Regarding connected services for transportation and mobility, EUSPA awarded GMV its contract to extend the Galileo Green Lanes project, designed to ensure that the green lanes are operating properly, whereby trucks must not spend more than 15 minutes at border controls. GMV also worked on certifying the cooperative services (C-ITS) use cases on the DGT3.0 platform and updated the SATELISE® application, a pioneering Cintra and GMV initiative for mobile payment for infrastructure use, to integrate and validate C-ITS services on smartphones and integrate onto them information from the National Access Point (NAP) of the Portuguese traffic authorities. Work continued on the C-STREETS project, in which GMV is developing a number of urban mobility applications for smartphones and V2X onboard units. In addition, GMV carried out a study for BiP&Drive related to pay-per-use systems in infrastructures based on GNSS and smartphone technologies.



# Activities

## TELECOMMUNICATIONS

GMV works closely with the main operators and providers of telecommunication and media services, offering tailor-made solutions to meet their needs:

- Development and consultancy of value-added services
- Cloud solutions
- IoT solutions
- Online channel and mobile Apps
- Specialized Cybersecurity services for operators
- Advanced network services testing and deployment of global services
- Third-party integration and provisioning systems
- Big Data solutions: network anomaly detection, client segmentation
- Network performance management
- Capacity planning
- 24x7 operation and support services

## INFORMATION TECHNOLOGY FOR THE PUBLIC AND PRIVATE SECTOR

GMV designs, develops and implements state-of-the-art ICT solutions to improve the processes of leading organizations, acting as long-term technology partner. GMV's proven ability to come up with secure solutions has won it the trust of both government authorities and major companies.

This sector is continually developing at breakneck speed and our range has to be made increasingly complete and groundbreaking to keep up with the pace, anticipating market needs on the strength of constant research and mastery of new technologies.

- Web portal platforms, Intranet, document management and contents management
- Cybersecurity services
- E-government solutions
- Online channel and mobile Apps
- IoT solutions
- Corporate email and agenda solutions and synchronization with mobile devices
- Open data platforms
- Cloud solutions
- Design, implementation and management of ICT infrastructure
- BI and Big Data solutions
- Messaging and mobility solutions
- User experience (UX) and usability consultancy
- 7x24 support and operation services
- Open Source developments





# Telecommunications and Information Security Assessment

Many large organizations successfully launched new digital transformation processes in 2021 as a result of the pandemic, and many of these were supported by GMV. Other organizations in sectors that had been lagging behind technologically got to see the benefits of remote work, e-commerce, and e-administration this year, and began to focus their efforts on enabling technologies as part of consortium projects. In addition to this particular emergence, a favorable climate was also fostered by the Recovery, Transformation and Resilience Plan, which this year earmarked 30% of the Next Generation EU funds for digitization.

GMV is taking an active part in the scheme set up to invest these funds in this modernization process, helping to define and draw up the Macro Seed Project Plan (*Plan de Macroproyectos Tractores*) proposed by AMETIC to the Spanish government, the aim of which is to digitalize basic sectors of the Spanish economy. The main lines of action in this plan have been brought into the Recovery, Transformation and Resilience Plan.

GMV is also working on consortium projects in sectors such as agriculture and industry that have been awarded by the Artificial Intelligence R&D Missions Program run by the State Secretariat for Digitalization and Artificial Intelligence, a part of the Ministry of Economic Affairs and Digital Transformation, under the Spanish Recovery, Transformation and Resilience Plan. These are technologically innovative projects that aim to offer better results to the participating companies and will have a direct impact on the country's productivity and competitiveness, as well as on the quality of life of its people.

These projects include AgrarIA and CUCO. The first is researching how to apply artificial intelligence to the agricultural value chain (production, processing, and distribution). The 24 organizations working on the project are looking into new agricultural production methods that will result in a more technological, innovative, and sustainable Spanish agri-food sector that is committed to energy efficiency and reducing the carbon footprint. The second project is studying the application of quantum computing in strategic industries for the Spanish economy: energy, finance, space, defense, and logistics.

GMV also launched new digitalization processes in 2021 and transposed them to its customers, a move partly motivated by the rollout of the remote work system and the company's desire to improve internal communication between the Human Resources department and its collaborators. Examples included the application of new advanced data analytics solutions to optimize internal processes, cutting down on time and offering better results.

In 2022, the open data movement in public administrations, which has been joined by other public and private bodies, is expected to grow stronger with the spread of national and international openness initiatives. GMV's experience in the development of big data technology platforms and proprietary solutions such as **uTile**, which makes it possible to exploit data while assuring privacy and security; its knowledge of data governance for data management and analysis, applied in projects such as the *Datos.gob.es* portal and *Ciudades Abiertas*; and its participation in the European federated data infrastructure Gaia-X make it a major player in promoting the data economy.

# Telecommunications and Information Security

Main milestones





01



GMV is among the members of a consortium that set up the CUCO project for research into quantum computing applied to strategic industries in Spain's economy: energy, finance, space, defense, and logistics. Subsidized by the CDTI and supported by the Ministry of Science and Innovation as part of the Recovery, Transformation and Resilience Plan, it is the first major quantum computing project at the national and business level with the aim of advancing scientific and technological knowledge of quantum computing algorithms by means of public-private collaboration between companies, research centers, and universities, making it possible to accelerate the implementation of these technologies for their use in the medium term.

02



A GMV-led consortium of 24 public and private organizations launched the AgrarIA project as part of the Digital Spain 2025 agenda and the National Artificial Intelligence Strategy. This project seeks to explore the applicability and feasibility of harnessing artificial intelligence together with other Industry 4.0-related technologies to come up with real solutions for defining new agricultural production methods that will make Spain's future agri-food sector more technologically oriented, innovative, sustainable, and committed to energy efficiency and lowering its carbon footprint.

03



GMV broke down the barriers of distrust when it comes to sharing data thanks to its **uTile** solution, used both in the AgrarIA and Tartaglia consortia and in numerous functional proofs of concept for customers. **uTile PET** is a GMV-developed solution that makes it possible to harness confidential and private data to improve machine learning algorithms and analytical models, while also complying at all times with organizational remits, data-privacy obligations, and current law. With **uTile**, there is no need to choose between data privacy and usability, as it leverages advanced cryptographic methods that keep data encrypted while all necessary computations are performed. In this way, **uTile** keeps organizations' sensitive data from ever being exposed or transferred across departments, organizations, or countries.

04



GMV joined the eCitySevilla project to develop a digital and sustainable city model. A public-private collaboration initiative led by the Regional Government of Andalusia, Seville City Council, the Cartuja Science and Technology Park (PCT Cartuja), and Endesa, the project aims to turn PCT Cartuja into an international benchmark of sustainability and a model of energy transition. GMV is taking part in the "Digitalization" working group, which aims to use advanced technologies to better harness resources and cut emissions, and in the "Sustainable Mobility" working group, in which it will contribute its experience in robotics and self-driving vehicles.



05



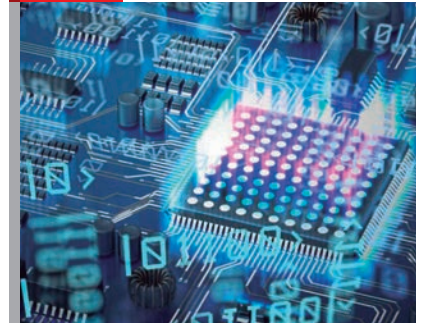
For yet another year GMV collaborates in the Smart Energy Reference Guide, the 10th in the series under the banner “Technology to Boost Energy Efficiency” and the subtitle “Good practices, solutions, 100 fundamental suppliers and 2021’s trends.” Drawn up by Plataforma enerTIC, the guide gives a revealing overview of technology’s transformation potential in the field of energy efficiency and sustainability. It is a key document for managers leading technology, innovation, operations, and sustainability strategies to learn about the latest developments and the most impactful technology solutions for competitiveness and efficiency.

06



During the year GMV’s People Strategy and Culture (PSC) department implemented advanced data analytics solutions, drastically reducing the time taken to retrieve information on employees, hiring, and salaries, with reliable data quality. These technological advances have allowed the PSC team to gain a better understanding of its gender equality indicators, onboarding policies, and non-discrimination obligations.

07



Aiming to boost Europe’s competitiveness and excellence in the quantum industry, GMV joined the European Quantum Industry Consortium (QuIC), Europe’s largest quantum industry organization, in 2021. QuIC was founded at the behest of the European Commission and advocates, promotes, and fosters the common interests of the European quantum industry towards all quantum technology stakeholders. It currently has more than 100 members, representing large corporations, small and medium-sized enterprises, academic and research centers, and associations, all of them European and all of them working in quantum technologies.

08



Orange and GMV have teamed up to offer an innovative end-to-end solution for setting up and accessing virtual mobile devices, harnessing the power of cutting-edge 5G technology. Through the GMV-developed solution, **ubic**, users can have all the main features of their smartphone in the cloud and access them easily, securely, and immediately thanks to the speed, quality, and low latency of Orange's 5G network. This initiative is part of the National 5G Plan, the program for carrying out pilot 5G technology projects run by the public business entity Red.es, promoted by the Ministry of Economic Affairs and Digital Transformation and financed jointly with the European Regional Development Fund (ERDF).

09



Population growth, industrialization, and the impacts of climate change call for an effort to make solid commitments and follow clear strategies regarding the use of water, arable land, and a sustainable and fair energy transition. Mindful of this, GMV is working on automation and digitalization initiatives in the agricultural and livestock sector to boost the sustainability of agri-food systems, food safety, and the entire supply chain to achieve a green and digital industry. In this environment, technologies such as artificial intelligence and the Internet of Things are essential to achieve new models that are more effective, efficient, and environmentally friendly.

10



The COVID-19 pandemic forced tourism companies to speed up their digitalization processes. In 2021, GMV continued to provide technological solutions to help the tourism sector adapt to the new situation and offer customers greater convenience, assurance, and reliability. Hotels, online travel agencies, and smart cities and destinations that welcome tourists can harness robotic process automation to save time and ensure fewer human errors in tasks such as booking, customer check-ins, and refunds. One key aspect in this area is the development of applications using big data and artificial intelligence, such as machine vision for identifying individuals, calculating capacities and personal distances, or measuring temperatures. This information can then be used to generate a heat map to determine who has been in a particular area of a hotel.



# 08

## Social responsibility

Mindful of its responsibilities to the present and future society, GMV constantly strives to make a better use of its resources, improving its process efficiency by using state-of-the-art technology.

GMV's corporate social responsibility therefore includes a general set of long-term goals:



Act in a responsible and ethical way in all our activities and ensure that our employees, clients and suppliers do likewise with their stakeholders.



Reduce the environmental impact of our operations and carry out eco-friendly initiatives.



Contribute to the creation of a more sustainable society, providing groundbreaking solutions that improve the quality of life, helping people to integrate into society and join the working force.





# 09

## Human capital

Right from the word “go”, GMV made its people policy a cornerstone of its business project. We believe that having the best professionals on our team gives us a strong competitive edge, which is why GMV’s people policies are geared towards attracting, motivating, and nurturing top-tier talent. To this end, GMV offers a unique teamwork environment that encourages its staff’s talent, training, and imagination.

In line with this overall policy, GMV follows a strategic human resources plan based on three mainstays: a painstaking talent-selection policy, a stable environment for personal and professional development, and a culture of continuous training.

Attracting and nurturing talent is a complex process, which is why GMV’s priority aim is to retain its entire workforce. By maintaining a long-sighted commitment to technology and innovation, diversifying its business into various sectors, and breaking into new international markets, GMV has managed to achieve this aim. This puts us on solid footing to continue our growth into the future. GMV closed the year with a staff of 2,557, 83% of whom are university graduates.

GMV has always shown a strong commitment to carefully selecting its staff members and providing them with a

stable environment to grow as people and professionals. This keynote policy has allowed us to maintain a high percentage of open-ended employment contracts, reaching 99.61% in 2021. As part of our commitment to our employees, GMV has policies in place that ensure equal treatment and encourage diversity. These cover the candidate selection process and employees' entire careers in the company. In fact, 24% of GMV's staff are women, who also represent 15% of senior management. The professionals on our team come from 44 different countries, with an average age of around 35.

The company's activity sectors require specialized, up-to-date knowledge of the most advanced technologies, which is why one of the main planks of GMV's human resources policy is continuous training. To develop the professional skills of its employees, GMV works with an integrated training model to determine their knowledge and skills. In all, 1,676 individual and group training actions were carried out in 2021, adding up to a total of 29,913.88 training hours. These covered specific technical training in the Group's different business areas and soft skills training.

As part of its ongoing commitment to academia, GMV has maintained a collaboration agreement called the GMV Chair since 2004 with the Higher Technical School of Aeronautical Engineers (*Escuela Técnica Superior de Ingenieros Aeronáuticos*: ETSIA). Under this agreement, GMV collaborates in aerospace engineering training, mainly in second-cycle and PhD studies, and also in research, development, and innovation in the area.

GMV makes a major effort to provide opportunities to students and recent graduates, in order to encourage their incorporation into the working world. In this regard, the company carries out an annual training scholarship plan, through various initiatives that run throughout the year. In 2021, GMV set up training agreements with 85 study centers, through which 178 students from different master's and bachelor's degrees in engineering and vocational training studies were awarded scholarships to join the GMV teams in Germany, Spain, France, Poland, Portugal, the UK, and Romania.

Steadfast in their commitment, GMV continues to support initiatives every year to spark students' interests in technological fields. This is the case of the ASTI Robotics Challenge, Spain's premier national educational robotics competition. Participants learn about technology, programming, and robotics while gaining the skills required to work in a team, manage projects, start a business, innovate, and be creative.

GMV also continues to form part of the mentoring program for students on the Bachelor's Degree in Cybersecurity Engineering at Universidad Rey Juan Carlos's Higher IT Engineering School (*Escuela Técnica Superior en Ingeniería Informática*). The aim is to boost employability in the sector by creating an opportunity for students, teachers, and company representatives to get together to share their ideas, needs, and skills. As a member of the program, GMV keeps up with students throughout the academic year directly through regular with technical orientation sessions, practical workshops, and lectures to guide them towards their professional future. Depending on their aptitudes, GMV may take on these students as interns to take part in real company projects.

GMV is also involved in the CESIN innovation studies chair, a collaborative project set up by the Forum of Innovating Firms (an association of which GMV is a member) and the Universidad Complutense de Madrid through its Innovation Policy and Economics Research Group. The chair was created to in 2019 to encourage innovation training on the strength of university-enterprise collaboration, as a key factor in the development of Spain's economy. CESIN works closely with the Inter-University Master's Degree in Economics and Innovation Management and the Inter-University PhD in Economics and Innovation Management. Within this framework, GMV generates knowledge in the area of innovation in ICTs for new graduates and doctoral candidates.

Likewise, GMV collaborates with initiatives to raise the profile of women in science, technology, engineering, and mathematics (STEM). Likewise, GMV collaborates with initiatives to raise the profile of women in science, technology, engineering, and mathematics (STEM). This is the case of the Asti Talent & Technology Foundation, which is responsible for programs such as the STEM Talent Girl, in which GMV staff take part every year in talks, master classes, and one-on-one tutoring, offering their experience and knowledge to the young women in this program (14 years old and up) to guide them as they explore their training interests. In 2021, GMV held a virtual training workshop for female students in the third and fourth years of compulsory and upper secondary education.

GMV has also joined the *Mujer e ingeniería* (Women and Engineering) mentoring program run by the Royal Academy of Engineering and AMETIC for female students with outstanding academic records in the final years of their master's degrees at various Spanish universities.

# 10

## Excellence management

Right from the start way back in 1984 GMV has always regarded excellence as one of the most important factors driving sound and sustainable development. Excellence has imbued all its lines of activity and processes throughout these years, taking the specific form of a company-wide delight in doing things well, a continual search for innovation and an attitude of constant improvement. This ongoing pledge to excellence and continual improvement works not only at an internal level, ensuring all the company's projects are carried out efficiently, but also outwardly towards the customer, making sure the products, systems and services delivered match or even exceed expectations.

All GMV's various management systems have been designed with this overall aim in mind. Either on its own initiative or in response to the requirements laid down in the various markets it trades in, all GMV's QMSs are designed in light of the international standards applicable directly to the company's several business lines.

The various management systems of the company's subsidiaries, including quality, information security and environmental commitment, are all certified under national and international standards of varied ilk and scope.

Furthermore, the sheer technological complexity of GMV's developments, as well as the disparate nature of each GMV company's particular market, means that each of these subsidiaries needs its own standards, improvement models and certifications to suit its particular areas of activity and specialization, as recorded in the following page.

GMV is well aware that excellence is not achieved with a single certification or title but rather depends on the ongoing workmanship and involvement of the whole staff.

# Certificaciones

## GMV Innovating Solutions, SL

- UNE-EN ISO 14001:2015  
*Environmental systems*
- UNE-EN ISO 50001:2018  
*Energy management systems*

## GMV Aerospace and Defence, SAU

- CMMI Nivel 5
- UNE-EN ISO 9001:2015  
*Quality management*
- PECAL/AQAP 2110, 2210 & 2310  
*Specific for purposes of defense*
- EN 9100:2018  
*Quality systems in the aerospace and defense sector*
- UNE-EN ISO 14001:2015  
*Environmental systems*
- UNE-EN ISO 50001:2018  
*Energy management systems*

## GMV Soluciones Globales Internet, SAU

- ISO 27701:2019  
*Privacy Information Management*
- UNE-EN ISO 9001:2015  
*Quality management*
- UNE-ISO/IEC 20000-1:2011  
*service management*
- ISO 13485:2016  
*Health product quality management: intraoperative radiotherapy planning systems.*
- UNE-EN ISO 14001:2015  
*Environmental systems*
- UNE-ISO/IEC 27001:2014  
*Information security management*
- ISO 22301:2019  
*Business continuity management. Resilience*

- UNE 166002:2014  
*R&D management*
- RD 3/2010  
*National Security Scheme (Esquema Nacional de Seguridad: ENS), Spain*
- UNE-CEN/TS 16555-1:2013  
*Innovation Management*
- UNE-EN ISO 50001:2018  
*Energy management systems*

## GMV Sistemas SAU

- CMMI Nivel 5
- UNE-EN ISO 9001:2015  
*Quality management*
- UNE-EN ISO 14001:2015  
*Environmental systems*
- UNE-EN ISO 50001:2018  
*Energy management systems*
- UN/ECE N° 10  
*Type approval process*

## GMV Innovating Solutions, Inc

- CMMI Nivel 5
- UNE-EN ISO 9001:2015  
*Quality management*

## GMVIS Skysoft, SA

- CMMI Nivel 5
- UNE-EN ISO 9001:2015  
(Alcance: TIC para la empresa)  
*Quality management*
- UNE-EN ISO 9001:2015  
(ICT for Business Scope) Energy  
*Quality management*
- ISO 14001:2015  
*Environmental systems*
- UNE-ISO/IEC 27001:2014  
*Information Security management*

- EN 9100:2018  
*Quality systems in the aerospace and defense sector*

## GMV GmbH

- CMMI Nivel 5
- UNE-EN ISO 9001:2015  
*Quality management*

## GMV Innovating Solutions, Sp.z o.o

- CMMI Nivel 5
- UNE-EN ISO 9001:2015  
*Quality management*

## GMV Innovating Solutions SRL

- CMMI Nivel 5
- UNE-EN ISO 9001:2015  
*Quality management*

## GMV Innovating Solutions, SARL

- CMMI Nivel 5
- UNE-EN ISO 9001:2015  
*Quality management*

## GMV NSL

- UNE-EN ISO 9001:2015  
*Quality management*



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# GMV in the world

- BRANCHES AND OFFICES
- PROJECTS



# Economic and financial results



# FINANCIAL STATEMENTS 2021

## BALANCE SHEET

ASSETS	2020	2021	LIABILITIES	2020	2021
Fixed assets	64.565.895,19	61.065.808,84	Stockholders' equity	53.000.940,29	55.502.269,28
			Capital grants	484.846,35	421.692,13
			Minority interests	16.058.637,35	18.873.026,21
			Long-term funding	46.400.683,36	24.271.732,99
			Interest free credits	4.860.551,20	5.427.425,34
			Long term funding	41.540.132,16	18.844.307,65
<b>Total fixed assets</b>	<b>64.565.895,19</b>	<b>61.065.808,84</b>	<b>Total Long-term Funding</b>	<b>115.945.107,35</b>	<b>99.068.720,61</b>
Inventories	24.248.901,87	21.125.835,00	Short term liabilities	42.030.444,51	49.199.557,73
Accounts receivable	18.819.910,95	12.937.787,97	Bank loans and overdrafts	17.335.791,38	24.268.710,15
Trade debtors	50.416.497,88	42.340.113,38	Non-trade payables	24.694.653,13	24.930.847,58
Trade services on account	-39.265.957,35	-36.217.149,82	Deferred payments	4.228.680,83	455.229,41
Other debtors	7.669.370,42	6.814.824,41			
Cash	54.569.524,68	53.594.075,94			
<b>Total current assets</b>	<b>97.638.337,50</b>	<b>87.657.698,91</b>	<b>Total short term liabilities</b>	<b>46.259.125,34</b>	<b>49.654.787,14</b>
<b>Total assets</b>	<b>162.204.232,69</b>	<b>148.723.507,75</b>	<b>Total liabilities</b>	<b>162.204.232,69</b>	<b>148.723.507,75</b>
Working capital	51.379.212,16	38.002.911,77	Working balance	51.379.212,16	38.002.911,77
Working capital/Equity	44,31 %	38,36 %	Working balance/fixed asset	79,58 %	62,23 %

## PROFIT AND LOSS ACCOUNT

EXPENSES	2020	2021	INCOME	2020	2021
Purchase of goods	91.155.043,83	72.755.690,84	Turnover	252.035.900,60	254.003.324,38
Ancillary Services	20.276.708,03	19.400.726,55	Own expenses capitalized	9.152.004,15	3.490.938,21
Taxes	643.386,39	541.268,16	Operating grants	605.143,95	537.657,58
Employee Costs	136.601.639,30	147.213.346,79	Financial Income	155.039,06	177.627,13
Financial Expenses	832.224,14	1.253.205,93	Extraordinary Income	66.175,55	897.478,84
Extraordinary Expenses	29.836,43	35.296,83			
Period Depreciation and Amortization	6.907.884,01	9.809.400,38			
Appropriations, transfer to Provisions	374.742,63	490.578,78			
<b>Total Expenses</b>	<b>256.821.464,76</b>	<b>251.499.514,26</b>	<b>Total income</b>	<b>262.014.263,31</b>	<b>259.107.026,14</b>
Corporate income tax	1.082.040,27	1.327.165,06	<b>Pre-tax profit</b>	<b>5.192.798,55</b>	<b>7.607.511,88</b>
			<b>Post-tax profit</b>	<b>4.110.758,28</b>	<b>6.280.346,82</b>

## CASH FLOW STATEMENT

OPERATING ACTIVITIES	2020	2021
Profit after tax	4.110.758,28	6.280.346,82
Depreciation and amortization	6.907.884,01	9.809.400,38
<b>Operating Cash Flow</b>	<b>11.018.642,29</b>	<b>16.089.747,20</b>
Net finance expense	832.224,14	1.253.205,93
Corporate income tax	1.082.040,27	1.327.165,06
<b>EBITDA</b>	<b>12.932.906,70</b>	<b>18.670.118,19</b>
(Increase) / decrease in trade and other receivables	5.943.323,87	9.005.189,85
Increase / (decrease) in trade and other payables	2.922.574,41	236.194,45
(Decrease) / increase in provisions	-899.785,27	-3.773.451,42
Deferred income (capital grants)	-605.143,95	-537.657,58
<b>Cash flow generated from operations</b>	<b>20.293.875,76</b>	<b>23.600.393,49</b>
Tax paid	-1.082.040,27	-1.327.165,06
<b>Net cash flow from operating activities</b>	<b>19.211.835,49</b>	<b>22.273.228,43</b>
INVESTMENT ACTIVITIES	2020	2021
Purchase of subsidiary undertaking (Goodwill)	-1.339.777,98	-1.550.536,29
Capital expenditure - plant and equipment	-4.249.378,59	-3.195.030,70
Capital expenditure - intangible assets	-11.555.161,11	-3.195.030,70
<b>Net cash flow from investing activities</b>	<b>-17.144.317,68</b>	<b>-6.309.314,03</b>
FINANCING ACTIVITIES	2020	2021
Net new debt (debt increase + debt repayments)	38.118.948,24	-15.196.031,60
Capital Grants and subsidies on capital	645.336,18	474.503,36
Interest paid	-832.224,14	-1.253.205,93
Dividends paid to equity shareholders	0,00	-1.106.025,96
Paid-in capital / Adjustments to the equity value	-199.385,05	-1.237.641,32
Minority Interests	545.759,38	2.814.388,86
Results attributable to the Minority Interests	-947.718,52	-1.435.350,55
<b>Net cash flow from financing activities</b>	<b>37.330.716,09</b>	<b>-16.939.363,14</b>
<b>(Decrease) / increase in cash and cash equivalents</b>	<b>39.398.233,90</b>	<b>-975.448,74</b>
Cash and cash equivalents at beginning of year	15.171.290,78	54.569.524,68
<b>Cash and cash equivalents at end of year</b>	<b>54.569.524,68</b>	<b>53.594.075,94</b>





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