



2016  
**ANNUAL  
REPORT**



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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LETTER FROM THE PRESIDENT

# MÓNICA MARTÍNEZ

*We work on cutting-edge projects that thrill us. Each step along the way we find new innovation opportunities and new challenges to rise to.*



**G** MV is investing in growth, and GMV's growth rate is picking up speed. In 2016 we once more upped our turnover and we also won a record number of contracts, so now we are generating many new jobs. We closed the year with a staff of 1470, 17% up on the previous year, and we are continuing to grow and recruiting fresh talent.

GMV holds its position as the world's number one in satellite control centers. We are also leaders in satellite navigation. Another of our strong suits is onboard guidance, navigation and control systems. We are responsible for the data processors of Europe's main meteorological satellites. We have made huge strides in fields as innovative as space robotics. We collaborate in all ESA's missions and the major space programs of the European Commission (Galileo, Copernicus and SST), where GMV

continues to make progress in the value chain, taking on increasingly demanding challenges. We are winning multiannual contracts worth tens of millions of euros. Witness the Galileo Reference Center, a Galileo quality-control system that GMV is going to operate in its entirety, including the sites and infrastructure in the Netherlands, from where we are going to run the service. Galileo is starting operations, and this opens up new opportunities for our software receiver and our many solutions for harnessing the new services to be provided by Galileo. We are also spearheading new trends in the commercial telecommunications sector, such as the satellite constellation being developed by the US company OneWeb: nearly one thousand small satellites designed to provide affordable, worldwide broadband connections, controlled by a single command and control system made by GMV.

The European Space Agency's Conference at Ministerial Level, held in early December 2016, had satisfactory results and ensured ongoing participation by Spain and all the European countries we trade in. We are now looking forward to the continuation and culmination of projects as thrilling as ExoMars and missions as essential as those of the Earth Explorer program.

Our subsidiaries in the UK, Romania, Poland and Germany have all grown substantially. In 2016 we also carried out an important merger transaction in Germany with the Munich company Insyen. The resulting company, GMV INSYEN, is set to be a leading player in Germany's space sector while also helping us to broaden and consolidate our range in real-time operations and operations engineering.

We are breaking into the launcher business, through the acquisition of a stake in PLD Space, a Spanish start-up company that is developing game-changing reusable launchers for small satellites. The avionics will be developed by GMV.

In Defense and Security it is particularly hard to increase business. At national level available budgets are limited and the barriers for selling abroad are much higher than in other sectors. Nothing daunted, GMV has pulled it off.

In 2016 we won an important multiannual contract with the European External Action Service, fighting off fierce competition from the sector giants. GMV will see to maintenance and development of the system used to run EU's foreign operations. With Frontex we already have two framework contracts. Our NATO-employed C4SRI systems are running perfectly and awakening keen interest from other NATO member countries. With the EDA we are also working with an increasing level of responsibility. And of course we are continuing our strong collaboration with Spain's army and the Directorate General of Armaments and Material, the main two driving forces behind our growth in this area.

In Portugal we have won a key role in the European Clean Sky 2 program, especially in the field of integrated modular avionics. In Spain we are continuing to increase our aeronautics activities with Airbus, and we are responsible for the navigation systems in the two major technology programs of the Spanish MoD: the F-110 frigate and the VCR 8x8 combat vehicle, plus other contracts.

It was also a fine year for GMV in the ICT market. The situation was by no

means easy: the post-election caretaker-government situation in Spain throughout almost the whole year paralyzed purchases by government authorities. Despite this drawback GMV won several infrastructure projects, web developments and security-service contracts with state agencies and regional governments, well outperforming the most optimistic expectations in the circumstances.

We are leveraging growing opportunities in the financial sector, with BBVA as the standout client. Our **Checker** product, now ten years old, is protecting 120,000 ATMs around the world. In healthcare we are participating in European research programs involving Big Data. Security is also offering new prospects for us at world level, in critical infrastructures and particularly in space clients and European and UN security agencies.

This year we found more opportunities to tender and our bids were highly successful. Out of every 4 euros we tendered for in the ICT market we won 3, so we are well stocked with new professional challenges for the incoming year.

In transport this year we undertook far-reaching changes in our organization to boost our capabilities and competitiveness and take on an ambitious working plan. Major projects include the installation of our fleet management systems in all public buses of Cyprus and in light-rail trains in Sydney, plus participation in several European autonomous-driving R&D projects.

Across the Atlantic, we also made another investment in the USA. After acquiring the Los Angeles company Syncromatics in 2015, we followed this up in 2016 by bringing the Wyoming company Mobilitat

into the fold. The two companies together enable us to offer a comprehensive solution adapted to the important US transport market, an essential step on the way to become world leaders in Intelligent Transportation Systems.

This is only a quick sketch that leaves out of the picture many important projects that are presented in the body of this annual report. The sheer diversity of our projects is part of the charm and beauty of working at GMV. We work on cutting-edge projects that thrill us. Each step along the way we find new innovation opportunities and new challenges to rise to. We deliver the best possible projects because we never settle for less. And our clients show their appreciation by coming back time after time with new orders that enable us to continue growing together and to fulfil our most important objectives: to give our employees the most beguiling career-development opportunities and the best results to our customers.

Cordial greetings,  
*Mónica Martínez*

LETTER FROM THE CEO

# JESÚS B. SERRANO

*GMV's engineering, technology, products and systems are now being rolled out in the five continents while we continue to work on new promising business lines.*





**T**he year dealt with in this report (2016) was a fine one for GMV. The company's financial figures are bright and its strategic development forges onwards.

The financial side first. Turnover, at €143 million, is 13% up on 2015 and we also increased our Ebitda to nearly €9.5 million; net profit, however, dipped due to the change of legislation on goodwill amortization associated with corporate transactions. The new contract rate, for its part, continues to grow, now outstripping annual sales by a factor of 1.15; the order book, by the end of the year, was worth 1.05 x the sales figure, meaning the company is still on a path of solid growth.

Turning to its business development, we find that GMV is still a worldwide benchmark in the space sector. It continues to increase its business across the board, but especially in satellite navigation and satellite control centers, where it remains number one worldwide for telecommunications satellite operators. GMV's engineering, technology, products and systems are now being rolled out in the five continents while we continue to work on new promising business lines like space robotics. In 2016 GMV also reached an agreement to merge its German subsidiary GmbH with Insyen AG, boosting our space-missions operations capabilities and reinforcing our business and customer base in Germany.

Moreover, as a leader in the space market, our company is duty bound to spearhead the new initiatives now being launched within the sector that has come to be dubbed "new space". We have put in a huge effort here, winning important contracts with new global

telecommunications service providers while also buying a stake in a "new space" start-up in the launchers segment (PLD Space).

GMV's in-house developments, know-how and ICT expertise are all helping to drive the digital transformation of government authorities and private companies, ranging from banking and finance through telecommunications companies to the world of healthcare and utilities. Our Cybersecurity and healthcare products and solutions, now up and running in more than 20 countries from four continents, are helping to head off the world's most menacing threats and solve its pressing problems.

In the intelligent transportation systems market we confidently hope to grow from worldwide benchmark to worldwide leader. Back in 2015 GMV made a strategic investment in the capital of the California company Syncromatics Corp, provider of SaaS solutions for the North American market of intelligent public-transport systems. In 2016 we followed this up by purchasing a small paratransit company (Mobilierat Works Inc.) providing demand-response solutions for people suffering from some type of disability or functional diversity in the North American market, thus complementing our own range in this market. In 2016 GMV also unfurled its new global ITS strategy: by making a big investment in technology, processes and products we are going to boost our competitiveness in the world market (both in fleet-management and fare-collection systems) and maximize customer satisfaction in all the phases of developing, implementing and operating our systems.

In the defense and security market we are national leaders; we are also strengthening our hand with NATO in terms of C4ISTAR systems, attracting a huge knock-on interest from other countries. At European level we are continuing to roll out our border-surveillance systems throughout all EU countries while the company has at the same time secured a new flagship client, namely the European External Action Service. GMV's excellent international track record is generating new business opportunities and bringing new customers into the fold.

Our twin hallmarks are a quest for excellence and a determination to satisfy our clients' needs. Guided by these lodestar ideas, backed up by the talent, motivation and commitment of our staff and further supported by the excellent collaboration of our business partners and suppliers, we have been able to win and keep the confidence of our clients and nurture our organic growth. This intrinsic company growth has now been reinforced by judicious corporate purchases of firms who share these same values and ideas and help us to flesh out our range and boost our customer base.

Cordial greetings,  
*Jesús B. Serrano*

# CORPORATE STRUCTURE

Grupo Tecnológico e Industrial GMV, S.A.

GMV Innovating Solutions, S.L.

## GMV Innovating Solutions, S.L.

**GMV Aerospace and Defence S.A.U.** / Aerospace and Defense Markets

**Grupo Navegación por Satélite Sistemas y Servicios S.L.** / Galileo development and exploitation

**GMV Soluciones Globales Internet S.A.U.** / Telecommunications and e-business Markets

**GMV Seguridad Integral S.A.U.** / Security Market

**GMV Sistemas, S.A.U.** / ITS and Industry Markets

**GMV Innovating Solutions S.A.S.** / Aerospace, Defense, ITS, and Telecommunications Markets of COLOMBIA

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

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

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

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

**GMVIS Skysoft S.A.** / Aerospace, Defense, ITS and Telecommunications Markets of PORTUGAL

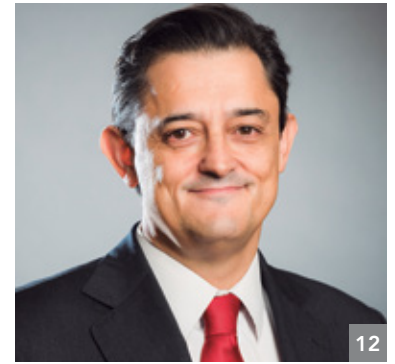
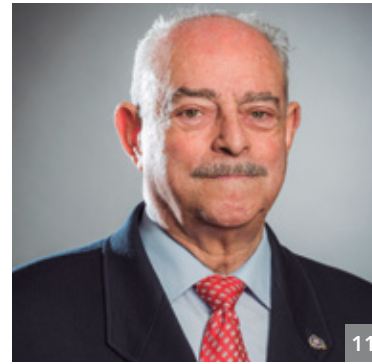
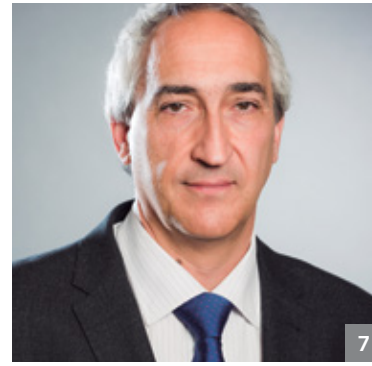
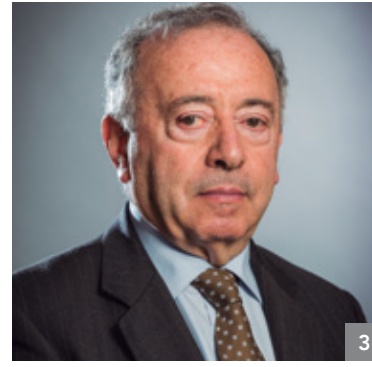
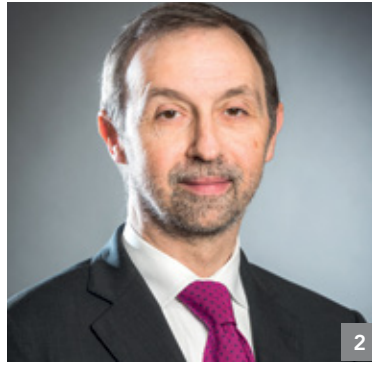
**GMV Innovating Solutions S.R.L.** / Aerospace, Defense, ITS and Telecommunications Markets of ROMANIA

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

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

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

**PAYLOAD AEROSPACE S.L.** / Aerospace Market



# GOVERNING BODIES

## BOARD OF ADMINISTRATORS CORPORATE MANAGEMENT

- 1. MÓNICA MARTÍNEZ WALTER**  
Board President
- 2. JESÚS B. SERRANO MARTÍNEZ**  
Member of the Board / Chief Executive Officer
- 3. JAVIER LÓPEZ ESPAÑA**  
Director / General Secretary
- 4. SUSANA MARTÍNEZ WALTER**  
Member of the Board
- 5. IGNACIO RAMOS GOROSTIOLA**  
Member of the Board / Chief Human Resources & Infrastructure Officer
- 6. MANUEL PÉREZ CORTÉS**  
Member of the Board / General Manager Homeland Security & Defense
- 7. FCO. JAVIER MARTÍNEZ CENDEJAS**  
Chief Financial Officer
- 8. MIGUEL ÁNGEL MARTÍNEZ OLAGÜE**  
Chief Business Development & Marketing Officer /  
General Manager Intelligent Transportation Systems
- 9. JORGE POTTI CUERVO**  
General Manager Space
- 10. LUIS FERNANDO ÁLVAREZ-GASCÓN PÉREZ**  
General Manager Secure e-Solutions
- 11. RICARDO TÓRRON DURÁN**  
Member of the Board (GMV Aerospace and Defence, S.A.U.)
- 12. ALBERTO DE PEDRO CRESPO**  
Managing Director GMV Portugal



# 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 systems, 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 was actively involved 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 Intelligent Transportation Systems-, Cybersecurity- and Telecommunication-sectors 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 consolidated its position 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 develop 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 subsidiary, thus becoming a multinational company trading in 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, S.A., 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, solidly 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, the company winning its first contracts in Asia and Eastern Europe by 2009. Since then this process has thrived, important new contracts being won in Poland, Malaysia, Indonesia, India, Morocco, Sweden, Mexico, Chile, United Arab Emirates, Australia and Cyprus, etc.







From 2008 to 2015 GMV's growth slackened 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, major scientific 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 intelligent transportation systems (ITS), signed an agreement under which GMV made a strategic investment in Syncromatics Corp's capital. A year later GMV's investee company Syncromatics bought 100% of Mobilitat Works Inc., a technology 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). This new investment boosted GMV's USA expansion capacity and cemented its position in the global ITS market.

In 2016 GMV GmbH, GMV's German aerospace subsidiary trading in the aerospace, defense, ICT and ITS market, signed a merger agreement with INSYEN AG, a leading German space-missions firm. The resulting company, GMV Insyen AG, 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.

By the end of 2016, on the strength of this international expansion process initiated back in 2004 with the creation of the US subsidiary, GMV was running subsidiaries in Germany, Colombia, the USA, France, Malaysia, Poland, Portugal, the UK and Romania, plus permanent establishments or project offices in Morocco and Mexico, among others. As of today GMV is a 1500-strong business group established in Europe, the Americas and Asia, trading in several hi-tech sectors with a swelling client portfolio in all five continents.

With this 33-year track record behind it GMV still looks 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.



# IN 2016

GMV  
MAIN FIGURES

Total Income: 143.50 M€

EBITDA: 9.50 M€

Net profit: 3.43 M€

Number of employees: 1,470



# 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 eight sectors: Aeronautics, Defense and Security, Space and major installations, Intelligent Transportation Systems, Cybersecurity, Information Technologies for the public and private sector, Telecommunications and Healthcare.



GMV wins the tender for the UBBICK (Utility Building Blocks Integration for Cockpit) project, thereby becoming a Core Partner of the Clean Sky 2 program.

## ACTIVITIES 2016

# AERONAUTICS

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 AENA, 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 the development of aeronautical approach and landing systems based on Global Navigation Satellite 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.

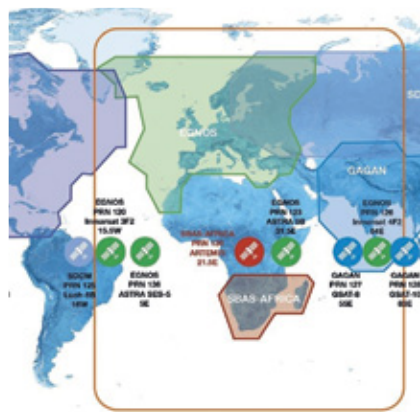
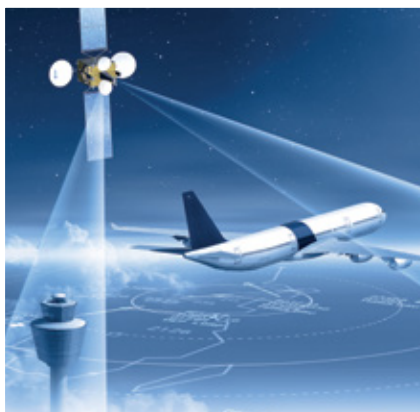
The most important areas of activity within the aeronautics sector are the following:

- 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)
- Engineering and operator- and pilot-training simulators
- Testbeds
- Approach and landing systems
- Aeronautical communications
- GNSS technical assistance for air-navigation operators and authorities

# AERONAUTICS. MAIN MILESTONES

- 1.** On the strength of its proven expertise in air-traffic management, transport, aeronautics and satellite communications GMV is playing a key role in the European Space Agency's Iris Service Evolution program, being carried out under the umbrella Single European Sky ATM Research (SESAR) program. SESAR aims to meet the demands and come up with the developments required for rolling out a high-performance aviation system in Europe.
- 2.** Clean Sky 2, Europe's biggest aeronautics research program, seeks to cut CO2-emission and aircraft-noise levels. Under this umbrella program GMV wins the PASSARO project; its aim is to work simultaneously in several areas in relation to impact- and noise-resistant aircraft structure and materials. Within this project GMV will tackle game-changing functional testing concepts and technologies, impinging on the in-factory management process for the development of cockpit- and wing-demonstrators.
- 3.** Within the same CleanSky2 program GMV in 2016 is awarded the UBBICK (Utility Building Blocks Integration for Cockpit) project, led by Zodiac Aerotechnics. This project proposes a simplification of current cockpit utility management architectures. A trailblazing component will allow a direct interface between the Integrated Modular Avionics (IMA) platform, cockpit utilities, and the aircraft's power distribution subsystem, providing all-in management on a single platform. The award of this project has won GMV "Core Partner" status for the Large Passenger Aircraft IADP, one of Clean Sky2's most ambitious demonstrators.
- 4.** During 2016 GMV continues to work on several projects designed to improve the performance of future integrated modular avionics (IMA) architectures such as the DIMA project, in collaboration with the aeronautics manufacturer Embraer for the development of reconfigurable modular avionics, or the ongoing activities under the ASHLEY product, which will represent a new step forward in second-generation IMA technology (IMA2G).
- 5.** Mid-2016 sees completion of the SBAS-Africa project, under which GMV has supported Avanti Communications. This project has rolled out an SBAS demonstrator to verify the potential benefits of this technology in the south and east of Africa. As well as supplying various products from its in-house **magicGNSS** suite, GMV has also carried out activities of operator-training, support and maintenance.
- 6.** During 2016 GMV continues to support Airbus DS in certification by the European Aviation Safety Agency (EASA) of the RPAS Atlante, a trailblazing activity in Europe. ATLANTE is a long-range, tactical, unmanned aerial vehicle designed for ISR missions (Intelligence, Surveillance and Reconnaissance). It is equipped with state-of-the-art technology and has been designed according to the standards used for crewed aircraft. GMV is responsible for the flight control computer (FCC), which sees to the aircraft's guidance, navigation and control, as well as the automatic takeoff and landing (ATOL) subsystem, integrated in the Ground Control Station (GCS).
- 7.** In 2016, under a contract with CESA (Compañía Española de Sistemas Aeronáuticos), GMV continues to work on development of the Electronic Control Unit (ECU) of the Airbus A400M's winch system. The Airbus A400 is a long-range strategic transport and air tanker aircraft designed to phase out the C-130 Hercules and the C-160 Transall; it represents one of the foremost tractor programs of Europe's aeronautics industry. GMV's activity has centered on helping to obtain DO-178B certification of the system and its adaptation to maximum loads.
- 8.** Halfway through the year the European-Commission-cofunded international research project AEROCEPTOR is brought to a successful completion. The project set out to develop new and innovative operational concepts to remotely and safely control, slow and stop non-cooperative vehicles in both land and sea scenarios, doing so by means of a Remotely Piloted Aerial System (RPAS).
- 9.** During 2016 work continues on the European Union's PHANTOM project (Cross-layer and multi-objective Programming approach for next generAtioN heterogeneous parallel cOMputing systems), forming part of the Framework Programme for Research and Innovation Horizon 2020 (H2020). PHANTOM represents an important milestone in terms of improving the computational performance of embedded systems, helping software parallelization developers while also taking non-functional requirements like execution time into account.
- 10.** In 2016 GMV continues to provide various engineering services for Airbus Defence and Space. Pride of place here goes to its collaboration in the tankers program, where GMV is taking part in many aspects of the flight refueling system (control laws, onboard control software, onboard monitor software, system simulators, etc.). GMV is also providing engineering services associated with the Fully Integrated Tactical System (FITS). These activities are rounded out by participation in simulators for the C-295 aircraft (including final integration of a mission simulator in Oman) plus ongoing work on the A400M, where GMV has participated in engineering simulators (especially the landing-gear and electricity system simulation models), plus diverse collaborations in the Eurofighter project.





## ACTIVITIES AND ASSESSMENT 2016

In 2016 GMV won two projects under the Clean SKY 2 program, Europe's biggest aeronautics research program, which seeks to cut CO<sub>2</sub>-emission and aircraft-noise levels. In one of them GMV is acting as key supplier of the Large Passenger Aircraft IADP, one of Clean SKY 2's most ambitious demonstrators. GMV is also playing an upfront role in the project for developing the next ATM generation under the European SESAR program. These activities, together with others under the Horizon 2020 framework program, are fruit of GMV's strategic decision, taken a few years back, to win itself a place in Europe's major aeronautics R&D programs.



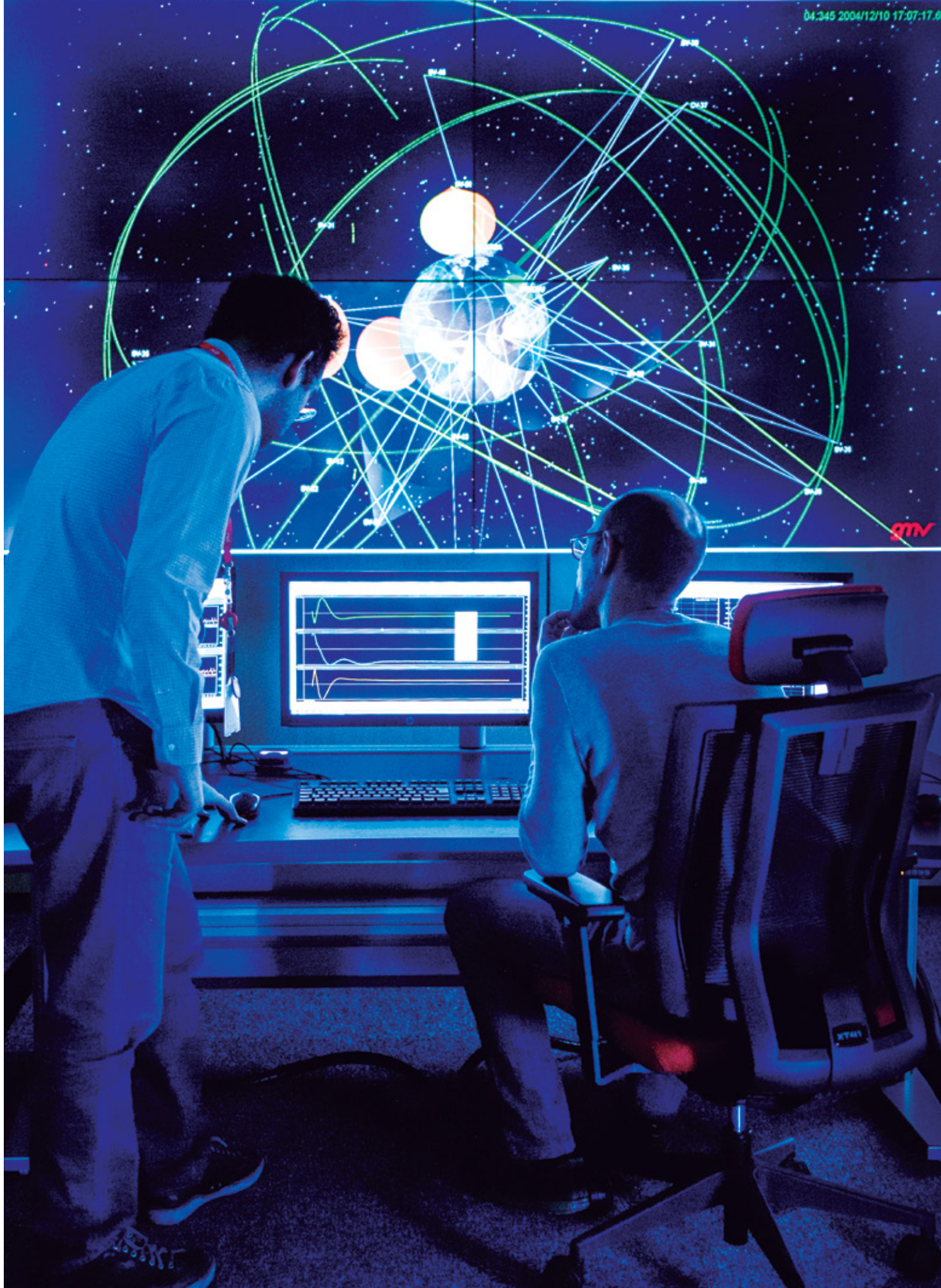
GMV continued its involvement in the development of diverse onboard and ground-control systems for UAVs and RPASs. The flagship project in Spain itself is the UAV Atlante. In this year GMV also continued to work on several key Integrated Modular Avionics (IMA) projects, which will bring about significant progress in second-generation IMA technology.

2016 also saw successful completion of the SBAS-Africa project, under which GMV supplied various products from its in-house *magicGNSS* suite. This project has rolled out an SBAS demonstrator to verify the potential benefits of this technology in the south and east of Africa. Taken together with other GMV developments in various geographical areas, this project has made GMV a worldwide benchmark in this sector.



Last but not least, GMV is continuing to develop subsystems for the major manufacturers of this sector, such as CESA and Airbus. Specifically, GMV continued this year to participate in the A400 program, one of the European aeronautic industry's most important tractor programs.





GMV GmbH and INSYEN AG, a leading German space-missions company, sign a merger agreement to form GMV Insyen AG, a company then fully integrated into Group GMV.

## ACTIVITIES 2016

# SPACE

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 30 years of experience behind it and nearly 400 satellites carrying its technology, GMV can safely claim to be a technological partner of cast-iron dependability, capable of meeting the most stringent needs under the strictest quality standards. It 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
- Ground validation and testbeds
- Onboard software and independent validation
- Processors and simulators of astronomy and earth-observation instrument data

#### - Navigation:

- Engineering and algorithms of satellite navigation systems
- Major global satellite navigation signal-generation and -processing systems
- Precise positioning solutions and augmentation systems

#### - Ground Segment:

- Design and integration of complete ground systems
- Satellite control centers and monitoring stations
- Science-mission operations centers
- Orbital dynamics systems
- Mission planning systems
- Payload management centers for telecommunications missions

#### - Data Processing:

- Instrument processors for earth-observation and science missions
- Quality control and calibration systems
- Space applications, solutions and services

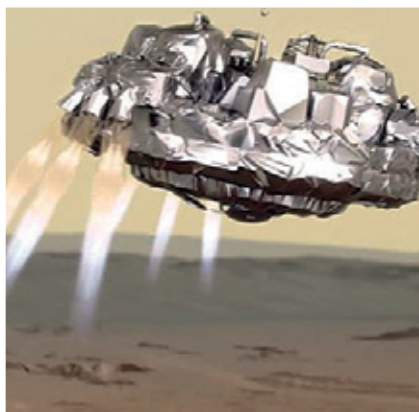
#### - Support for space-mission operators

# SPACE. MAIN MILESTONES

- 1.** GMV GmbH, the German aerospace subsidiary belonging to the technology multinational GMV, trading in the aerospace, defense, ICT and ITS markets, signs a merger agreement with INSYEN AG, a leading German firm in the space-missions operations field. The resulting company, GMV Insyen AG, is then fully integrated into the whole set of companies making up GMV Group. This merger will harness synergies between the existing business lines of GMV GmbH and INSYEN AG, reinforcing our support activities for operations with DLR, ESOC, EUMETSAT and other space clients.
- 2.** For yet another year GMV consolidates its position as the world's number-one supplier of control centers for commercial telecommunications satellites. 2016 sees the launch of 8 satellites operating with GMV control centers. Particularly noteworthy are the developments carried out for Eutelsat, Arabsat, Visiona, NBN.Co, BRISat, StarOne and SES. GMV also signs with WorldVU Satellites LLC (operating under the name of OneWeb) a contract for the development of the control center of the OneWeb constellation, an unprecedented development that will facilitate the operation of a thousand-strong constellation and set up the world's most far-reaching satellite broadband system.
- 3.** On 14 March, the first ExoMars mission is successfully blasted off into space. The aim of this ESA mission is to investigate the Martian environment and trial new technologies to pave the way for a future Mars sample-return mission. GMV has developed key mission technology, such as the onboard software of the guidance, navigation and control (GNC) system of Exomars's entry and descent module Schiaparelli. GMV has also participated in the design of GNC interfaces with the rest of the onboard software and of the GNC-related parameter database. Last but not least GMV has also made a notable contribution to ExoMars's flight dynamics operations.
- 4.** In 2016 GMV further strengthens its system-integrating business line. It is chosen by EUMETSAT for design, development, validation and deployment of the Mission Control and Operations (MCO) subsystem of the ground segment of the EUMETSAT Polar System Second Generation (EPS-SG) program. EPS-SG represents the European contribution to the Joint Polar System (JPS) program being implemented by EUMETSAT together with USA's National Oceanic and Atmospheric Administration (NOAA), set to play a key role in weather forecasting and climate observation operations. As prime contractor and consortium leader, GMV will be responsible both for the subsystems making up the MCO core and the integration, validation and deployment of the whole system.
- 5.** In the remote-sensing and earth-observation area, the European Space Agency (ESA) awards a GMV-led consortium the second phase of the ISSWIND project. This is a proof of concept for providing support services for the wind-power industry, harnessing existing space infrastructure, including GNSS-based wind power predictions that will help wind farms' decision-making procedures and cost-cutting efforts. The government of Mozambique, for its part, awards GMV a Mozambique mapping contract. The purpose of this contract is to draw up a detailed land-use and land-cover map as a necessary link in measuring greenhouse-gas emissions. ESA also awards GMV another contract in the Meteosat Third Generation (MTG) program, a joint European Space Agency (ESA) and EUMETSAT project for which GMV will be supplying the LI (Lightning Imager) flight operations processor.
- 6.** GMV carries out several notable projects for the Global Monitoring for Environment and Security program called Copernicus in both the ground and space segments. 2016 sees the launch of Sentinel 3A and Sentinel 2B, for which GMV first developed the mission analysis and performance simulator and then took on responsibility for onboard software and, finally, the control center and precise orbit determination (POD) service. GMV also forms part of the group of companies implementing the Copernicus reference mapping framework contract set up by EU Satcen (European Union Satellite Centre). Under another framework contract a GMV-primed consortium is defining user requirements of the next generation of Copernicus satellites, with the signing this year of a new specific contract.
- 7.** GMV wins three new contracts as part of the EarthCARE mission, the aim of which is to clear up doubts and grey areas about earth observation from space. Under these contracts GMV will be developing the satellite control center and operational simulator; it will also be responsible for scientific development and the mission's solar radiation product software. GMV is also awarded the contract for the control center of the Solar Orbiter mission, a sun-observing mission also of the European Space Agency (ESA). ESA likewise awards GMV the contract for the initial study of the Combined Science Mission Planning System" within ESA's General Studies Program, a previous step towards the design and prototyping of the future framework mission planning system. Equally noteworthy is GMV's participation in ESA's strategic ERFEC project, a technology program that reinforces GMV's position in the CCS area (Central Checkout Systems).
- 8.** GMV is one of the European space industry's main stakeholders in analyzing the space-debris threat. In July, under GMV's direct administration and coordination, the Operations Center (OC) of Spain's space surveillance and tracking system, known as S3T, formally comes into operation. GMV is responsible for development of the operations center (S3TOC), which records Spain's radar and optical telescope data as well as the same data from external sources to keep a catalogue of objects orbiting the earth. GMV, working from both Poland and Portugal, is also participating in the European Union's Space Surveillance and Tracking (SST) system. Furthermore, GMV is playing an important role in the design and development of the Guidance, Navigation and Control (GNC) system for future Active Debris Removal (ADR) missions of the European Space Agency (ESA).
- 9.** In September the European Rosetta space probe completes its mission with a final controlled descent to the surface of the comet 67P/Churyumov-Gerasimenko. GMV has played a key role in the Rosetta mission from the word go. Both the entry into orbit and the landing of a soft-touchdown module (Philae) on comet 67P/Churyumov-Gerasimenko were controlled by GMV. GMV's contribution was also crucial in the mission conception phase and in the planning of scientific operations, planning control of three instruments and preparation of the operations for the comet phase. GMV's input was equally decisive in deciding on the comet landing point and the lander's possible descent paths, and the company was responsible for flight dynamics not only for orbit control and spacecraft attitude but also comet approach operations, an activity it carried out right up to the end of operations.
- 10.** The European Commission awards GMV two far-reaching contracts under the umbrella Galileo program, firstly, the framework contract for developing the Galileo Reference Centre (GRC) and, secondly, the framework contract for supplying the Return Link Service Provider (RLSP) of the program's Search and Rescue Service (SAR). GMV has taken part in the Galileo program since its initial phases. As well as supplying several key elements of Galileo's ground segment, GMV is currently the prime contractor for Galileo's essential, service-enabling Timing and Geodetic Validation Facility (TGVF); it is co-leading development of the European Union's GNSS Service Centre (GSC) and is leading the development of Galileo's commercial service (CS) demonstrator. It is also making a significant contribution to the operations equipment of Galileo's control center.

**11.** GMV's space robotics business is up and away. Under the European Commission's PERASPERA program, GMV is leading three of the six, first-phase robotic technology building blocks, to be used in future space missions. The European Space Agency (ESA, for its part, awards GMV two new projects: ORCO (On Ground validation of a Rigid Combo system) and GOAC (Goal-Oriented Autonomous Controller). Equally keen to spread robotics to other industrial domains, GMV likewise forms part of the AL-ROBOTICS team selected by the United Arab Emirate's Khalifa University to take part in the Mohamed Bin Zayed International Robotics Challenge (MBZIRC); it also leads the Foxiris team that this year sailed through the 2nd competition of the ARGOS (Autonomous Robot for Gas & Oil Sites) Challenge, sponsored and brokered by the oil company Total to drive development of advanced robotics capabilities in the oil and gas industry.

**12.** At the end of the year GMV buys a stake in the space startup PLD Space, boosting the growth of both firms and winning them pole position in the market of small space launchers. GMV will be inputting its 30+ years of sector experience and expertise to develop the complete avionics of PLD Space's launchers ARION 1 and ARION 2, including guidance, navigation and control (GNC), telemetry and onboard software. Additionally, GMV will be participating with PLD Space in the integration, qualification and launch support of ARION 1 and ARION 2, during the phase of trial flights and commercial flights.



## ACTIVITIES AND ASSESSMENT 2016

2016 continued the upbeat trend of the previous year. Growth remains sharp in longstanding activities and is shaping up as equally promising in more recently established activities, in both the public and private sectors. This organic growth was further boosted by the merger with INSYEN AG, a leading German space-missions operations company, whose range complements our own and ushers in key customers like the German Space Agency (DLR).

For yet another year GMV remains the world's number one independent supplier of ground control systems for commercial satellite operators. This year 8 satellites operating with GMV's control centers were launched. OneWeb awarded GMV the contract for developing the control center for its thousand-strong constellation, which will be the world's biggest satellite broadband system ever developed. The project's technological challenges and its game-changing nature serve to reinforce GMV's worldwide leadership in this area.

GMV continues to carve itself a bigger slice of Europe's major space programs, with yet more contracts on the cards in the future. Equally noteworthy is the company's participation in other European science-, interplanetary-exploration and earth-observation programs.

GMV features particularly prominently in Europe's satellite navigation program Galileo, not only in terms of the amount of contracts won but also the number of critical systems for which GMV is responsible. Mention must also be made of GMV's participation in the Global Monitoring for Environment and Security program called Copernicus, whose satellites and systems deploy a wide range of GMV-developed technology. A newsworthy event within the Space Situational Awareness/Space Surveillance and Tracking project (SSA/SST) was the coming into operation, under direct GMV coordination and administration, of the operations center of Spain's space-object monitoring and surveillance system.

The recently developed space robotics business, a natural spinoff from GMV's proven leadership and expertise in Guidance, Navigation and Control, has likewise generated a brisk contract-winning rate within such key programs as the European Commission's PERASPERA, where GMV is leading three of the six, first-phase robotic technology building blocks, to be used in future orbital and surface missions. GMV's future space robotics business is therefore assured and even looks likely to spill into other fields of application.

At the end of 2016 GMV took a stake in the startup PLD Space. Under this agreement, GMV will also become the supplier of the complete avionics for its launcher program.



*The European Union's European External Action Service (EEAS) awards GMV a seven-year framework contract for maintenance, support and development of EUCCIS, the European Union's Command and Control Information System.*

## ACTIVITIES 2016

# DEFENSE AND SECURITY

GMV is a tried-and-tested supplier of armed forces and 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 and development of C&C systems and integration with C4ISTAR
- Intelligence systems, signal and data processing and fusion
- Cyberdefense
- 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 security and video-surveillance 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. MAIN MILESTONES

**1.** In 2016 GMV builds up further experience and expertise in the development of foot-soldier systems, initiated with its responsibility for the communications and information system of the Spanish MoD'S Future Combat System (Combatiente Futuro: COMFUT). The European Defence Agency (EDA) awards a GMV-led consortium the second phase of the Standard Architecture for Soldier System (STASS). The aim of this study is to develop a generic, open, reference architecture to favor the development and interoperability of member states' foot-soldier systems.

**2.** GMV is awarded several projects for integrating arms systems with the TALOS command and control system, developed by GMV for the Directorate General of Armaments and Material (Dirección General de Armamento y Material: DGAM) of the Spanish MoD. TALOS is a C4I system for the planning, management and execution of military operations at tactical level, allowing integration of various combat functions in the same mission. GMV also wins a contract for defining, studying and implementing secondary-channel data-broadcasting capabilities for Galileo-PRS receivers by means of military tactical networks. To vet the system a pilot scheme will be set up on GMV's command and control system, TALOS. The project will provide priceless information for defining operational procedures based on the use of Galileo PRS receivers in tactical environments for the armed forces.

**3.** GMV collaborates with the Spanish army in the wheeled combat vehicle (VCR in Spanish initials) 8x8 program. Within this Special Program of the Directorate General of Armaments and Material (Dirección General de Armamento y Material: DGAM) of the Spanish MoD, GMV is responsible for the GNSS/INS navigation subsystem of the shot-detection subsystem, integration of the TALOS command and control system and finally integration of the foot-soldier C2 system.

**4.** GMV delivers to NATO the first licenses of the COLLECTOR environment simulator for JISR (Joint Intelligence, Surveillance and Reconnaissance) training purposes. These licenses will be specifically used for training of the Joint Force Training Centre (JFTC) and the Joint Warfare Centre (JWC), NATO institutions based in Warsaw and Norway, respectively. COLLECTOR forms part of the suite of Joint, Intelligence, Surveillance and Reconnaissance (JISR) products developed by GMV under the SAPIEM project for the Spanish MoD. This environment simulator allows NATO to train up its military personnel in JISR processes and distribute sensor data on the basis of interoperability standards.

**5.** The European Union's European External Action Service (EEAS) awards GMV a seven-year framework contract for maintenance, support and development of EUCCIS, the European Union's Command and Control Information System. GMV's wealth of experience in command and control Communication and Information Systems (CIS) now enables it to take charge of a wide range of activities, including the development of a new tactical viewer, the replica mechanism that will improve communications between the various nodes deployed in the field as well as interoperability with other external systems. GMV will also be providing training and instruction services for system users as well as maintenance and support while operations are underway.

**6.** The European Defense Agency (EDA) awards GMV the RAMNET study, the aim of which is to define the context in which any purely European Federation Mission Network (FMN) has to operate. The Federated Mission Network (FMN) concept has been developed by NATO to ensure interoperability of command and control systems of different countries participating in the same mission, interconnecting the C2 systems of the various coalition nations and NATO itself. RAMNET will define a reference architecture that could serve for definition and implementation of specific systems to meet the needs of NATO-planned, EU-defined Mission Threads.

**7.** Diverse noteworthy cyberdefense projects also kick off this year. In a consortium with the Portuguese Army Research Center (Centro de Investigação, Desenvolvimento e Inovação da Academia Militar: CINAMIL), GMV will be developing a groundbreaking cyberdefense e-learning platform for the European Defence Agency and the European Union, among others. Secondly, as part of the NCIRC (NATO Computer Incident Response Capability) project, under a contract with Leonardo UK, GMV will be specifying, designing and developing a training package for NCIRC users of several NATO locations.

**8.** A trustworthy cyberdefense capacity consists of a balanced combination of technology, awareness-raising and personnel training plus the right processes to pool all these aspects. To guarantee the best possible training-syllabus information, the European Defence Agency (EDA) has set up two initiatives, both backed up by the private sector and awarded to GMV: the CDTEXP project (Cyber Defense Training and Exercise, coordination and support Platform) project and the DePoCyTE project (Demand Pooling for the Cyber Defense Training and Exercise). CDTEXP will provide the central point of access to available training information and infrastructure. DePoCyTE aims to improve EDA member states' affordable access to cyberdefense courses provided by the private sector.

**9.** GMV has considerably stepped up its involvement in European security R&D, especially in the area of maritime surveillance. 2016 sees finalization of the CLOSEYE project (Collaborative evaluation Of border Surveillance technologies in maritime Environment by pre-operational validation of innovative solutions) and the kickoff of two other projects: EUCISE2020 (European Common Information Sharing Environment 2020) and MARISA (Maritime Integrated Surveillance Awareness).

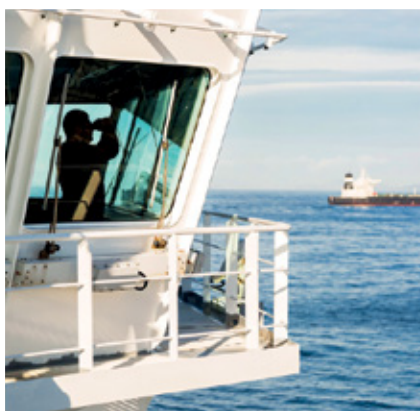
**10.** Within the framework contract for maintenance, extension and development of the European Border Surveillance System (EUROSUR), awarded to GMV in 2013 by European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union (Frontex, shortened from the French *Frontières extérieures*), GMV provides in 2016 the necessary services for ensuring EUROSUR runs smoothly for the 30 member states

and Frontex itself. Together with EUROSUR-extension and maintenance work, GMV also designs, develops and rolls out new technical and operational capabilities plus new services to meet the agency's ongoing needs. It also leads necessary studies and analysis for phasing in future capabilities. As part of the European Commission's border surveillance system, EUROSUR establishes a cooperation and information-swapping mechanism to help member states in border control and surveillance tasks, on the basis of EUROSUR Regulation (EU) 1052/2013 of the European Parliament and The Council.

**11.** GMV's 2016 access-control business includes, notably, delivery of a perimeter security system with thermal cameras for Madrid Technology Park (Parque Tecnológico de Madrid). Another system delivered this year is the presence- and access-control system of the Barcelona bank called Caixa d'Enginyers, while further headway is made on the consular management system for Portugal's Ministry of Foreign Affairs. Lastly, GMV continues its work during the year on the corrective, preventive and evolutionary maintenance of the alarm reception centers of Mapfre and the Constitutional Court (Tribunal Constitucional).

**12.** In October Spain hosts NATO's EXCIVIR 2016 exercise, the third joint Intelligence, Surveillance and Reconnaissance (ISR) interoperability exercise led by the Armed Forces Intelligence Center (Centro de Inteligencia de las Fuerzas Armadas: CIFAS) and involving personnel from all the armed forces. Execution of the ISR processes was supported by SAPIEM, a tool developed by GMV under a contract with the Spanish MoD. SAPIEM is made up by several systems to ensure interoperability of resources and maximize military usefulness of the information, as well as giving constant support for information-gathering, processing, mining and dissemination needs. During the five days the exercises lasted GMV provided support in all five locations where they were held.





## ACTIVITIES AND ASSESSMENT 2016

In 2016 GMV cemented its national leadership in C4ISTAR systems (Command, Control, Communications, Computers, Intelligence, Surveillance, Target Acquisition and Reconnaissance), winning new projects for integrating arms systems with GMV's command and control systems.

During this period the GMV-developed SAPIEM system was employed in NATO's EXCIVIR interoperability exercise, giving support to the intelligence, surveillance and Reconnaissance (ISR) systems. This represented a chance to roll out and showcase GMV's ISR capabilities. GMV also delivered the first licenses of the COLLECTOR environment simulator for JISR (Joint Intelligence, Surveillance and Reconnaissance) training and instruction purposes, to be set up in the Warsaw and Norway headquarters of two NATO institutions.

In 2016, drawing on its wealth of experience in this field, GMV increased its participation in the development of foot-soldier systems, both in national programs of the Spanish MoD and European programs brokered by the European Defence Agency (EDA).

GMV collaborated with the Spanish army, through the Directorate General of Armaments and Material (*Dirección General de Armamento y Material*: DGAM) in the wheeled combat vehicle (VCR in Spanish initials) 8x8 program, where GMV is responsible for several subsystems.

GMV continued its involvement in the EUROSUR network of the European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union (Frontex, shortened from the French *Frontières extérieures*), carrying out maintenance and upgrading activities and phasing in new capabilities and services.

In 2016, on the strength of its proven Cybersecurity expertise, GMV took part in several EDA and NATO projects to help train up various defense users.

Finally, GMV continued with its ongoing projects in the area of access-control and security systems, providing a service for a swelling portfolio of clients who place their trust in GMV's complete and advanced technological range.



GMV participates in the Harmony project (Healthcare Alliance for Resourceful Medicines Offensive against Neoplasms in Hematology) within the IMI2 initiative, one of Europe's biggest public-private initiatives in the area of Big Data applied to healthcare.

## ACTIVITIES 2016

# HEALTHCARE

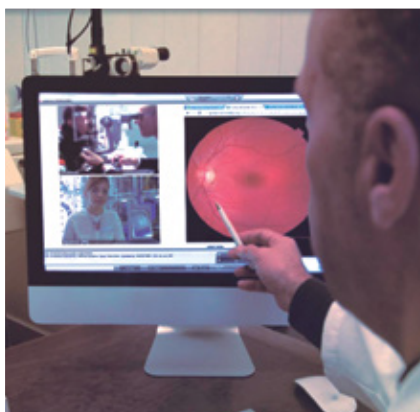
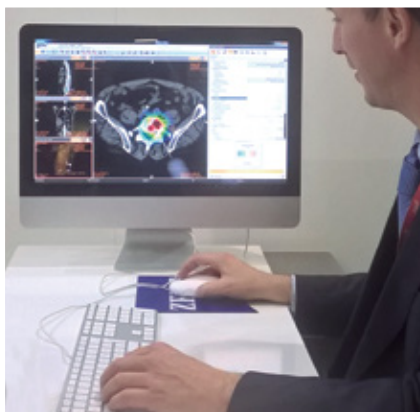
Information and telecommunication technologies (ICTs), virtual-reality simulation and digital-image processing are all new arrows in the quiver of healthcare professionals, giving them a whole new set of techniques and resources to work with. ICTs are bound to play a crucial role in the sector's digital transformation and will also be key in the development of a future healthcare system that is sustainable, personalized, patient-centered, ubiquitous and based on medical evidence, a new e-health concept.

We at GMV develop groundbreaking solutions and products to meet the specific needs of each particular healthcare client, complying with the most demanding standards of quality and safety:

- Real-time telemedicine systems
- Monitoring systems for chronic, multi-pathology patients
- Tele-rehabilitation systems
- Epidemiological- and clinical-data mining systems: Big Data and Smart Data for the healthcare environment
- Healthcare safety services and solutions
- Intraoperative radiotherapy (IORT) planning and simulation systems
- Medical image processing
- Mobility, humanitarian-aid-infrastructure and emergency-management systems

# HEALTHCARE. MAIN MILESTONES

- 1.** Fruit of the agreement signed between GMV and Carl Zeiss Meditec (CZM), GMV's intraoperative radiotherapy planner, **radiance**, has been integrated into the German firm's INTRABEAM product. In 2016 **radiance** is installed in the Azienda Ospedaliera Pugliese-Caiccio and in the Istituto Europeo di Oncología (IEO), two of Italy's flagship centers. The latter is a cutting-edge cancer-treatment center at world level. All its INTRABEAM vertebral metastasis treatment is now being planned with **radiance**.
- 2.** GMV participates in the Harmony project (Healthcare Alliance for Resourceful Medicines Offensive against Neoplasms in Hematology) within the IMI2 initiative, one of Europe's biggest public-private initiatives in the area of Big Data applied to healthcare. Harmony's aim is to help doctors' decision-making processes in their diagnosis and treatment of blood diseases. It will also come up with answers for researchers looking into new, more efficient drugs for more personalized treatment. GMV's input to the project is the design and development of the Big Data platform for mass processing of information.
- 3.** Spain's Medicinal and Healthcare Products Agency (Agencia Española de Medicamentos y Productos Sanitarios: AEMPS), dependent on the Spanish Ministry of Health, Social Services and Equality, turns to GMV for implementation of the IT application with which it reports on veterinary drugs authorized for use within the European Union, recorded in turn in the European Medicinal Product Database EudraPharm. This app picks up and processes information from three different databases providing associated information.
- 4.** GMV and the Spanish Private Healthcare Alliance (Alianza de la Sanidad Privada Española: ASPE) sign a collaboration agreement whereby ASPE opens up to GMV its communication and publication channels for presenting to its associates GMV's healthcare portfolio. This agreement will enable knowledge to be shared and more detailed information to be given on the **antari e-health** suite and the **radiance** intraoperative radiotherapy planner. It will also help ASPE members take on digitization challenges, including security and protection of its data and systems.
- 5.** Under the auspices of EIT Health, one of the world's biggest health initiatives, GMV participates in PAPHOS (Platform for Advanced Prescriptive Health Operational System). The aim of this project is to create a secure platform for applying the new generation of predictive and prescriptive technologies. This new platform will allow all healthcare stakeholders to move on from the merely reporting phase, restricted to answering the question "what happened?", to respond to the higher-level questions of "what might happen?" and "what will happen?". This will be done by tapping into the information offered by the platform on the development patterns of some of the commonest chronic illnesses and the behavior patterns of those who suffer from them. It will come in particularly useful for the personalization of treatment.
- 6.** Within the EU's Innovation and Research Framework Program, Horizon 2020, GMV, working together with public and private organizations like the Madrid Health Service (Servicio Madrileño de Salud), the National Health and Medical Research Institute (Instituto Nacional de Salud e Investigación Médica: Inserm) and Aberystwyth University, among others, sets up FACET (FrAilty Care and wEll funcTion). This project, which aims to promote a higher level of independence and self-health management by the elderly and adults in a state of pre-frailty, includes installation of a telemedicine platform based on GMV's in-house **antari HomeCare™**.
- 7.** GMV participates in MOPEAD, a project for clinical-scientific research into Alzheimer's disease. GMV is developing a web app based on the Citizen Science concept for recruitment of early-phase Alzheimer patients. Within this IMI (Innovative Medicines Initiative) project it is also designing and implementing a Big Data system for analysis of the data recorded from these patients.
- 8.** GMV's in-house pediatrics telemedicine system KidsCare has increased its takeup rate by 25% in schools and crèches of the region of Madrid, where parents and teachers can gain real time, instant medical attention to look after the health of thousands of children.
- 9.** My Vision 360, GMV's in-house, trailblazing telemedicine platform for providing real-time videoconference ophthalmology services in high street opticians, is installed in new opticians throughout Spain, doubling its 2015 takeup rate.



## ACTIVITIES AND ASSESSMENT 2016

GMV's healthcare range continues to grow while its customer base broadens at home and abroad. Over fifteen years ago now GMV took the strategic decision to drive its technological development in the healthcare sector by technology transfer from its expertise and knowledge built up in its traditional business lines like aerospace, ICTs, transport and defense. As fruit of this epoch-making decision 2016 witnessed a clear advance that bodes well for the company's future growth in this sector.

GMV's in-house intraoperative radiation therapy planner, **radiance**, a worldwide trailblazer that grew out of GMV's own R&D effort in collaboration with Spanish clinics and universities, continues to grow at home and abroad, with new installations during 2016 in prestigious hospitals and research centers like the Azienda Ospedaliera Pugliese-Caiccio and the Istituto Europeo di Oncologia. Growth prospects are very upbeat. The list of customers looks set to swell further while the product itself will continue to phase in new upgrades and functions in order to enhance its already attractive performance features.

GMV's in-house telemedicine platform, **antari**, continues to increase its takeup rate and broaden its areas of medical and healthcare support, phasing in new services.

KidsCare, the game-changing telepediatrics service set up by GMV and Ever Salud back in 2014, also continued to increase its takeup rate in 2016, recording a 25% growth in schools and crèches of the region of Madrid. For its part, My Vision 360, the ophthalmology teleconsultation service, doubled its 2015 takeup rate in Spain.

In the telehealth field GMV, working together with public and private organizations, set up a project to promote a higher level of independence and self-health management by the elderly and adults in a state of pre-frailty. This includes installation of a telemedicine platform based on GMV's in-house **antari HomeCare™**.

GMV has by now built up a wealth of knowledge in areas of such crucial, current-day importance as Big Data and predictive and prescriptive technologies and models. This proven expertise has won it participation in several groundbreaking healthcare projects that look set to drive more personalized healthcare treatment and expedite decision-making procedures for diagnosis and medical treatment.



*GMV wins several projects from the Regional Authorities of Castilla y León and La Rioja, INCIBE and Red.es to cut down the probability of security incidents, pinpoint room for improvement, analyze and assess risks and come up with answers to potential threats.*

ACTIVITIES 2016

# CYBERSECURITY

GMV has been Spanish leader in the development of network security services and technologies and information systems for over 20 years now. GMV provides integrated Cybersecurity engineering and solutions, security governance and intelligence centers, managing the technological risks and ensuring compliance with applicable legislation.

- Protection of critical infrastructure
- Security engineering, services and solutions
- Cybersecurity in industrial environments
- Security audits and vulnerability management
- Definition and rollout of Information Security Management Systems and Business Continuity Plans
- National Security Scheme compliance plans
- CSIRT managed services

# CYBERSECURITY. MAIN MILESTONES

- 1.** The solution developed by GMV to protect automatic teller machines from malware attacks, **checker ATM Security®**, continues to grow at home and abroad. It has now been installed in nearly 40 countries, with new additions in 2016 of Bank Simpanan Nasional (Malaysia), Bank of Scotland and BBVA Bancomer (Mexico), among others. In recent years **checker ATM Security®** has been taken up by some of the world's most important banks in areas especially prone to cyberattacks and cyberfraud. It has now been installed in over 120,000 ATMs and is showing itself year after year to be the world's leading ATM security solution.
- 2.** For 14 years now GMV has been managing BBVA Group's security procedures. In 2016 GMV began to market **FARO SECURITY**, a solution that represents a huge stride forward in today's company security management. The GMV-developed platform, with intellectual property of BBVA, has been designed with international organizations in mind, enabling them to manage through a single app the security of all offices and buildings in the various countries they trade in. **FARO SECURITY** helps to set up a corporate model of security processes, ensuring a more efficient use of human, technological and economic resources.
- 3.** GMV signs two service-distribution collaboration agreements to enhance its range of Cybersecurity solutions, one with the Finnish company SSH Communications Security, a leading provider of enterprise Cybersecurity solutions and inventor of the Secure Shell protocol, the other with Palerra, a Californian company specializing in CASB technology (Cloud Access Security Brokers), which will allow GMV to offer higher cloud security levels, cutting detection- and incident-response times.
- 4.** Banco Sabadell awards GMV a corporate email security-hardening project, under which GMV is helping to protect the bank from a wide range of email threats and vulnerabilities such as malware, spam and phishing attempts.
- 5.** La Caixa remains one of GMV's key clients. This year it continued to carry out security consultancy projects. With ITNow it is also responsible for infrastructure-maintenance and -operation projects.
- 6.** GMV provides the European Space Agency (ESA) with security support services, ensuring efficient management of security risks and compliance with current standards and legislation. GMV's team of IT security consultants offers expert Cybersecurity advice, covering all the agency's aspects.
- 7.** GMV's proven experience and trailblazing projects with financial institutions prompted Bankia to award GMV its first ever fraud protection contract, under which it is offering corporate consultancy plus protection from advanced persistent threats (APTs).
- 8.** GMV wins a contract with Uría Menéndez, one of the world's most prestigious law firms, opening up a promising new Cybersecurity business line. The project includes the supply of solutions to protect the firm from APTs and malware.
- 9.** GMV's industrial Cybersecurity business goes from strength to strength. This year it has continued to provide specific services and technologies to help harden the security of industrial environments and protect critical infrastructure. Its customer portfolio also grew further, bringing in key firms like Endesa and Iberdrola, GMV providing Cybersecurity services to protect their information systems.
- 10.** As an expert in managed security services, GMV wins several contracts from the Regional Authority of Castilla y León, the Regional Authority of La Rioja, the National Cybersecurity Institute (Instituto Nacional de Ciberseguridad: INCIBE) and Red.es to cut down the probability of security incidents, pinpoint room for improvement, analyze and assess risks and come up with answers to potential threats. In this competitive business GMV always aims to stand out from the pack, offering intelligent 24x7 monitoring services to head off problems and deal instantly with any incidents. It also inputs its vast experience in the definition and development of e-government solutions.
- 11.** GMV gains CERT (Computer Emergency Response Team) certification awarded by the prestigious US University Carnegie Mellon. A Computer Emergency Response Team (CERT), also known as a Computer Security Incident Response Team (CSIRT), as the name suggests, is a team of experts responsible for coming up with a response to any information-system threats and incidents. GMV-CERT now has a wealth of experience and boasts a group of experts responsible for preventive and reactive measures to any information-system security threats of both national and international clients.





## ACTIVITIES AND ASSESSMENT 2016

In the early nineties, nearly a quarter of a century ago now, GMV took the strategic business decision of developing groundbreaking Cybersecurity technology when few others saw much of a risk or threat to confront. By now this forward-looking vision and the ongoing development of cutting-edge technology has turned GMV into a Cybersecurity benchmark.

In 2016, one of GMV's marquee products, **checker ATM Security**<sup>®</sup>, designed to protect automatic teller machines from cyberattacks, continued to broaden its customer base and grow worldwide, clocking up the eye-watering figure of 120,000 protected ATMs in nearly 40 countries, confirming that no firm in the world does ATM security better.

In the financial sector GMV continues to run the Cybersecurity arrangements of Grupo BBVA in a collaboration arrangement dating back 14 years. In 2016 several new projects kicked off and additional functions were phased in.

In 2016, under another collaboration agreement with BBVA, GMV started to market a new solution, **FARO SECURITY**, specially designed to manage the security of all offices and buildings of the various countries any international business trades in.

GMV is now the go-to Cybersecurity provider for an increasing number of financial institutions. In 2016 Banco Sabadell and Bankia, awarding GMV two new Cybersecurity projects, were added to the fold.

As well as this growing business in the financial sector, GMV continued to win new Cybersecurity customers elsewhere, providing services and implementing solutions for public authorities, international organizations and diverse business sectors such as aerospace, defense, telecommunications, industry and critical infrastructure.

In 2016 GMV broke into a new market on the strength of a door-opening contract with Uría Menéndez, one of the world's most prestigious law firms. We confidently expect this to be the first step towards introducing GMV's Cybersecurity solutions into the law business in the future.



*In 2016 GMV consolidates its worldwide leadership in telematic systems for public transport, winning new contracts for the public transport of the whole republic of Cyprus and the metropolitan transport of the city of Seville.*



## ACTIVITIES 2016

# INTELLIGENT TRANSPORTATION SYSTEMS

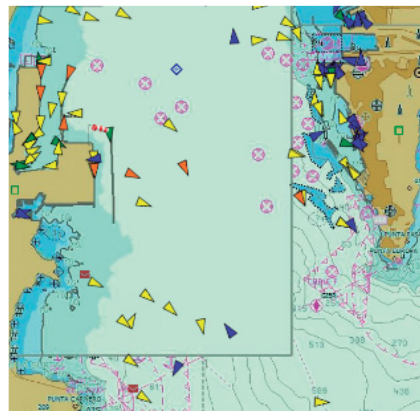
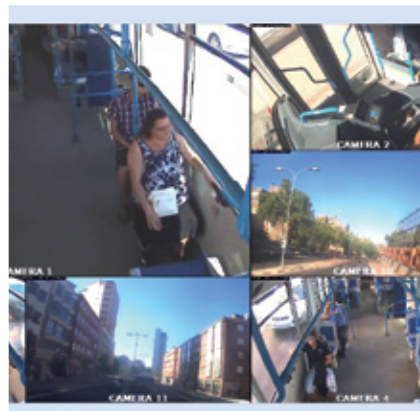
GMV has consolidated its position as a leading and trailblazing firm in designing, developing, manufacturing and installing Intelligent Transportation Systems (ITS) based on GPS technology, mobile communications, GIS, plus data-capture, -management and -fusion. Not only does GMV offer all-in, turnkey, ready-to-go solutions, but it also gets involved in the complete development of the project, incorporating its own in-house hardware and software along the way.

GMV provides solutions for all the various means of overland, sea and railway transport.

- Advanced passenger-transport fleet management systems
- Fare and ticketing systems (electronic fare collection systems for vending and validation of various types of tickets, farecards and other travel credits)
- Ticket window management and self-service ticket dispenser platform
- Support systems for the management of public transport-on-demand systems
- State-of-the-art multiplatform passenger information systems
- Advanced fleet-management systems for railway transport (**SAE-R®**)
- Transport services planning and optimization systems
- Passenger transport audio- and video-surveillance systems
- Public and private specialist fleet-management products and services: municipal services, emergencies, renting, etc.
- Advanced car telematics units
- Electronic tolling and information systems on toll-roads, highways and at bridges and tunnels
- AIS and VTS systems for maritime transport and port management
- DGPS coastal systems for navigational aid

# INTELLIGENT TRANSPORTATION SYSTEMS. MAIN MILESTONES

- 1.** In 2016 GMV consolidates its worldwide leadership in telematic systems for public transport, winning new contracts such as the supply, installation and commissioning of all ITS equipment and software for the entire public-transport bus fleet of the republic of Cyprus. GMV also wins the contract for the advanced fleet management system for the metropolitan public transport of Seville, run by the company CASAL. 2016 also marks the first anniversary of implementation of the fare system based on the contactless card (tallinja card), forming part of the modernization project taken on in 2015 by Malta Public Transport (MPT) of CMCXXI Group, belonging to the Cosmen family. Under this project GMV has supplied the fleet-management and video-surveillance system plus the electronic fare collection system. This year TMB (Transports Metropolitans de Barcelona) carries out a renewal project of the driver interface and communications equipment to phase in new communication requirements of the Telecommunications Master Plan, entrusting this project to GMV.
- 2.** In the railway transport area ONCF (Office National des Chemins de Fer), the public operator running the whole of Morocco's railway fleet, turns anew to GMV for extension of its fleet-tracking system. This new contract will graft new equipment and upgrades onto the system awarded by ONCF to GMV in 2014. There are also further developments in GMV's contract for supplying the fleet management system and in-station passenger information system to ALSTOM for Sydney's new light transit line in Australia. 2016 sees performance of the pre-installation FAI (First Article Inspection) test of the onboard hardware. After these tests Alstom gives the go-ahead to its series production according to the delivery plan agreed in the project agenda.
- 3.** RENFE Viajeros, Spain's national passenger network, awards GMV the contract for supply and installation of a security reinforcement system based on satellite technology, with the aim of avoiding incidents like the tragic high-speed-train crash of Angrois in 2013. GMV has already won a contract for developing the prototype of this system, which RENFE now intends to enhance and install in series on its non-ERTMS lines. Alongside this new project GMV continues to work on its former RENFE contracts. During 2016 it installs the fleet management, communications and tracking system in a total of 160 local and mid-haul trains. Seven installation teams are also trained up in 2016 to work in parallel until completing the full, 834-train project. Elsewhere, Renfe Alquiler, a component company of Spain's national railway operator, also chooses GMV for supplying the geolocation service and equipment for its entire hire fleet.
- 4.** GMV wins the contract for supply and installation of the new video-surveillance or closed-circuit television (CCTV) system for the 400-series units of Bilbao's Euskotren network. In this same city GMV supplies Euskal Trenbide Sarea (ETS) with an application for schedule-generation and -planning of the railway network run by the Basque Country's infrastructure administrator, real-time management of any incidents that crop up in daily operation and analysis of historical information as it is generated. Furthermore TALGO, with which GMV is working on the Mecca-Medina line, once more places its trust in GMV's technology, awarding it the contract for the intercom and public-address systems and the passenger information system for its new EMU (Electrical Multiple Unit) train, with which TALGO aims to tackle the medium-haul segment.
- 5.** GMV signs an epoch-making agreement through its US majority-owned company Syncromatics Corp. Under this agreement GMV's US ITS company acquires 100% of Mobilitat Works Inc., a technology company specializing in solutions for the US market of demand-response intelligent transportation systems, in particular special transport services for persons with a disability or functional diversity, known in the USA as Paratransit.
- 6.** The Los Angeles County Metropolitan Transportation Authority (Metro) awards Syncromatics a contract to design, install, and operate a network of 300 real-time bus information panels at bus shelters across Los Angeles County. GMV's ITS company in North America also wins new public-transport contracts in Illinois, Iowa and Los Angeles, plus two projects for supplying ITS software and hardware for airport shuttle services in the international airports of Los Angeles (LAX) and Portland (PDX). In the Democratic National Convention (DNC), held in late July, Syncromatics plays an essential role in the team that lays on secure and reliable transport for DNC delegates, press and VIPs.
- 7.** The Regional Public Works and Environment Ministry of Castilla y León (Consejería de Fomento y Medio Ambiente de la Junta de Castilla y León) extends its contract with GMV for management and maintenance of the demand-response transport program up to March 2018. In 2016 this demand-response model, set up by GMV in Castilla y León, Portugal and Poland, catches the eye of several regional authorities that are currently carrying out transport modernization and reorganization plans. Representatives from the regional authorities of Galicia, Valencia and Catalunya all visit GMV's site to check out this system, which introduces new mobility options for rural regions with a scattered, low-demand population, allowing connections between far-flung built-up areas to be made on individual request.
- 8.** Under a framework agreement with ALD, with whom GMV has been working for over 5 years, Securitas Direct fits GMV's fleet tracking and management technology on its whole 380-vehicle fleet. Securitas Direct is part of the Verisure Securitas Direct Group, Europe's leading provider of connected alarms for the home and business. Likewise, under another framework agreement with Alphabet, with whom GMV has been working for over three years, GMV signs an agreement with the beer group Hijos de Rivera (Estrella de Galicia brand) for setting up the fleet management and tracking system **MOVILOC®**.
- 9.** In September the Barcelona demonstration of the Zero Emission Urban Bus System (ZeEUS) project, in which GMV is participating, showcases the first ever wholly electric, 18-meter-long buses ever run on Spain's roads. The FP7-brokered ZeEUS project, coordinated by the International Association of Public Transport (Union Internationale des Transports Publics: UITP), aims to demonstrate the economic, environmental and social viability of electric urban buses. 2016 also sees the official launch of the Urban Green Up project, which aims to develop a new strategy for re-naturing cities through Nature-Based Solutions. Within this project, funded under the European Union's Horizon 2020 research and innovation program and coordinated by the CARTIF Technology Centre, GMV is participating in the activities planned for Valladolid, one of the project demonstrator cities.
- 10.** In the automotive sector the ENABLE-S3 (European Initiative to Enable Validation for Highly Automated Safe and Secure Systems) project kicks off in 2016. The aim of this European Commission project is to pave the way for accelerated application of highly automated and autonomous systems in the automotive, aerospace, rail and maritime mobility domains as well as in the healthcare domain. GMV is leading the Traffic Jam Pilot use case with Vehicle to Everything (V2x) technology. Elsewhere, the European GNSS Agency (GSA) launches ESCAPE, a project that aims to harness the autonomous-driving potential of the Galileo program. As well as the technical management of the project team GMV is additionally responsible for the EGE positioning engine (ESCAPE GNSS Engine). GMV will be inputting the algorithms to process the measurements from the vehicle sensors, cameras and GNSS receiver, in order to provide the positioning service along with the integrity required by the connected autonomous vehicle.
- 11.** The Spanish Seaports Authority (Puertos del Estado) once more turns to GMV for deployment of its new AIS to replace the network installed between 2005-2006. The first phase in 2016 involves deployment and integration of thirteen new state-of-the-art coastal AIS stations all along the Atlantic coastline of Galicia and Andalucía. This overhaul will improve the network's performance features and capabilities. GMV also initiates a new project for the River Duero Water Board (Confederación Hidrográfica del Duero: CHD) on its WEB-GIS tool Mirame-IDEDuero, CHD's portal for managing the technical data of the River Duero catchment area, a project on which GMV has been working uninterruptedly since 2009.



## ACTIVITIES AND ASSESSMENT 2016

GMV's epoch-making Syncromatics purchase signaled the company's decided move to conquer the US market. In 2016 this strategy began to bear fruit with new contracts won in California, Iowa and Illinois and in the Democratic Party Convention as part of the US election process. This move was reinforced in 2016 with the purchase of Mobilitat Works Inc., a company providing demand-response transport or Paratransit for people with some sort of disability or functional diversity. These takeovers helped GMV to win pole position in the US market and are bound to stand the company in good stead for further US growth over the coming years.

GMV's intelligent transportation business kicked on this year too. New contracts and contract extensions were won in Spanish cities like Seville and Barcelona and also abroad, most notably the contract for equipping the whole 800-bus fleet of the Republic of Cyprus.

In 2016 several Spanish regional authorities like those of Galicia, Valencia and Catalunya, expressed a lively interest in GMV's demand-response public-transport system as set up in several regions of Spain and Europe. This system comes up with an answer to the mobility needs of regional areas with a scattered, low-demand population, helping directly to improve the local population's quality of life.

GMV railway business is flying too. This year the company won new contracts at home and abroad in tracking, passenger-information, video-surveillance and planning systems, including eye-catching customers like RENFE, EUSKOTREN and TALGO. After a recent headline-making train crash, RENFE's award of a contract for supplying and installing a satellite-based safety reinforcement system is particularly noteworthy due to its direct impact on passenger safety. This contract, following on from a previous one with GMV for developing the prototype of this system, will allow RENFE to boost the safety of its non-ERTMS lines.

In the maritime market GMV achieved in 2016 an important contract with the Spanish Seaports Authority (*Puertos del Estado*) for rolling out its new AIS network, building on the longstanding relationship forged back in 2005 with the deployment of its current AIS network, now to be upgraded.

GMV remains equally keen to develop groundbreaking automotive technology, participating in diverse European autonomous-driving R&D and environmental-impact-reduction projects.

Finally, the agreements signed in earlier years with ALD Automotive and Alphabet spawned new fleet management contracts with Securitas Direct and Grupo Hijos de Rivera, bearing out the commercial worth of this alliance policy.



The telecommunications operator, MásMóvil, asks GMV to create its new MásMóvil and HappyMóvil commercial website. GMV's develops a website based on cloud architecture entirely rolled out on Amazon Web Services, providing a highly reliable, scalable, secure and low-maintenance-cost platform.

# ACTIVITIES 2016

# TELECOMMUNICATIONS AND INFORMATION TECHNOLOGIES

## 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 channels 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 support services

## INFORMATION TECHNOLOGIES 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 technological partner. GMV's proven ability to come up with secure solutions has won it the trust of 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 apace, 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 for the public sector
- e-Government solutions
- Corporate email and agenda solutions and synchronization with mobile devices
- Open Data platforms
- Cloud solutions
- ICT infrastructures design, implementation and management
- BI and Big Data solutions
- Mobility and messaging solutions
- User experience and usability consultancy
- 7x24 support and operation services
- Open source software

# TELECOMMUNICATIONS AND INFORMATION TECHNOLOGIES.

## MAIN MILESTONES

- 1.** In coordination with the Information Systems Cabinet (Gabinete de Sistemas de Informação: GSI), GMV sets up the Digital Information Repository on Weapons and Owners (Repositório de Informação Digital sobre Armas e Proprietários: RIDAP) for the Public Security Police (Policia de Segurança Pública: PSP). GMV provides a centralized arms archive accessible not only through a simple and user-friendly web interface but also an API that ensures simple integration with other, existing information systems.
- 2.** GMV is a past master in the development and implementation of web portals on GIS infrastructure. In 2016 it brings on stream RENLAND, a solution developed by GMV for Redes Energéticas Nacionais (REN), a Portuguese firm whose main remit is overall management of Portugal's power distribution grid. GMV also signs new maintenance contracts and phases in new functions under the projects being carried out by the company with its marquee clients, such as the City Council of Lisbon, the Portuguese public corporation EDIA (Empresa de Desenvolvimento e Infraestruturas do Alqueva, S.A) and the Inter-American Development Bank.
- 3.** A consortium formed by the technology multinational GMV and the biometric software solutions firm GEYCE wins the contract for the development of an Integrated Consular Office Management System (eSGC in Spanish initials), after an international bid invitation held by the Portuguese Ministry of Foreign Affairs (Ministério dos Negócios Estrangeiros: MNE). The project stems from MNE's need for integral development of a new online consular management application (eSGC), fulfilling the functions of consular register, civil registry, electoral roll, plus economic management of the consular office's accountancy procedures and processes.
- 4.** Spain's fourth biggest converged telecommunications operator, MásMóvil, asks GMV to set up its new MásMóvil and HappyMóvil commercial website. GMV develops a website based on cloud architecture entirely rolled out on Amazon Web Services, providing a highly reliable, scalable, secure and low-maintenance-cost platform. It also implements "DevOps" methodologies and tools to ensure continual deployment, a key factor in such a fast-moving and fiercely competitive market as telecommunications.
- 5.** Red.es, a public corporation under the Ministry of Industry, Energy and the Digital Agenda (MINETAD), turns to GMV for setting up its open-data portal: datos.gob.es. This new open-data platform is now the biggest in the country, showing the growing keenness of the government in general and Red.es in particular to make further headway in the direction of better, more transparent public services.
- 6.** The Inter-American Development Bank (IBD) draws on GMV's experience in Big Data and Machine Learning to extract value from its information on the basis of an analysis of its systems, processes and data. GMV provides IBD with all its technological Big Data expertise. The company is now spearheading Big Data application in such areas as healthcare, where it has set up the first ever platform for mining clinical and epidemiological data. It is also working on projects for detection of threats, prevention of bank fraud, processing of satellite images and images from agro-climatic sensor arrays, optimization of industrial crude-oil processing, etc.
- 7.** The Regional Authority of Andalusia (Junta de Andalucía) once more places its trust in GMV for technological renewal of its systems. In 2016 Andalusia's Air Quality Evaluation System is updated. The revamped system minimizes response times, homogenizes all air-pollution-reduction systems, migrates previously available data, optimizes software infrastructure to increase the density of the data-acquisition sensor network and generates new tools to facilitate web and cell-phone access to all this information.
- 8.** In 2016 Amazon Web Services joins GMV's fold of customers, with the deployment of infrastructure projects supporting both the company's internal services and Amazon Web Services (AWS) offered to its customers (e.g. CloudFront or Direct Connect). These projects are based mainly on the implementation of fiber equipment, with its corresponding cabling, and integration with the network infrastructure of each datacenter, with the aim of improving performance and the availability of the services in different geographical areas. Kicking off with an initial project in Madrid, collaboration will now spread to other European cities: Berlin, Munich, Marseilles, Prague, Stockholm and Frankfurt.
- 9.** GMV keeps up its close relation with the university world, setting up various corporate portals. Universitat de Barcelona (Barcelona University) now has a new platform that enables it to set up the websites of its schools, streamlining and optimizing processes and procedures. For its part, Universitat Autònoma de Barcelona (The Autonomous University of Barcelona) has unveiled a new website for its Equality Observatory, incorporating the main technological tools necessary for offering access from different devices while ensuring high levels of security.
- 10.** GMV continues to collaborate with the telecommunications operator Vodafone. In 2016 GMV provides its services in different areas such as software development, law- and regulation-compliance and Cybersecurity. In the latter area GMV's in-house tools like **gestvul** ensure detection, analysis and management of vulnerabilities, thus guaranteeing complete protection throughout the whole lifecycle.





## ACTIVITIES AND ASSESSMENT 2016

After the first, budding indications of an upturn in 2015, there were clear signs of a healthier economic pickup in 2016. Government and private ICT investment therefore perked up in line with this improving trend. Current forecasts expect this upturn to hold steady over coming years, with Spain growing at a higher rate than other OECD countries. All this bodes well for this sector in the future.

GMV's ICT experience and expertise enabled it not only to weather the storm, holding on to our longstanding customers, but also to lay down solid foundations for harnessing market opportunities as the recovery kicks in.

In the telecommunications area GMV's business continued with traditional clients like Vodafone. In 2016 it welcomed MásMóvil into the fold, Spain's fourth biggest convergent telecommunications operator, which asked GMV to set up its new commercial website.

In the public sector GMV maintains the trust of its traditional customers like Red.es, Lisbon City Council, EDIA, the Portuguese Ministry of Foreign Affairs, the Regional Authority of Andalucía and the Inter-American Development Bank, while also adding on new ones like the Portuguese Public Security Police (*Policía de Seguridad Pública: PSP*).

In 2016 GMV won a new key client, Amazon Web Services (AWS), a worldwide benchmark in the provision of services on its cloud computing platform. GMV has rolled out infrastructure projects to support AWS's internal services and also those offered to its customers, such as CloudFront or Direct Connect. Kicking off with an initial project in Madrid, collaboration will now spread to other European cities like Berlin, Munich, Marseilles, Prague, Stockholm and Frankfurt. Its business with AWS will undoubtedly help GMV to up its profile and increase its expertise in the promising cloud computing sector. According to forecasts from pundits like IDC, cloud computing is now set to grow at an annual growth rate of 21.5%, nearly seven times higher than the overall IT growth rate.

In the Big Data area GMV is continuing to spearhead developments in diverse sectors like healthcare and finance. In the former it has worked on the Harmony and MOPEAD projects as part of the European initiatives IMI and IMI2 for the development of safer and more efficient medicines. In the latter it has collaborated in projects carried out by the Inter-American Development Bank (IBD).



# SOCIAL RESPONSIBILITY

Mindful of its responsibility 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 them to integrate into society and join the working world.





# HUMAN CAPITAL

Right from the word go GMV has made its personnel policy one of the kingpins of its whole business project. In GMV we are convinced that a staff of top professionals is the best way to gain a competitive edge over the rest. GMV therefore aims to attract the best professionals and then ensure they stay with the company to pursue their careers and realize their full potential. GMV offers them a unique teamwork environment where their talent, imagination and mettle are continually challenged and stimulated.

In line with this overall policy GMV has been applying a strategic human resources plan based on three mainstays: a painstaking personnel-selection policy, a stable environment in which to pursue their careers and a continuous top-up training plan.

Attracting and nurturing top talent is a difficult and time-consuming process. The priority in any economic downturn must therefore be to make good this investment by retaining our whole personnel. By dint of a long-sighted commitment to technology and innovation, diversification of the business into various sectors and breaking into new international markets, GMV has indeed managed to ride out the crisis without shedding staff. This stands us in good stead for maintaining our economic growth into the future. GMV closed the year with a staff of 1470; 89% are university graduates and the average age is about 36.

GMV has always pursued a painstaking personnel-selection procedure; it has been equally determined to provide this pool of talent with a stable environment for developing their careers. This keynote policy has enabled it to maintain a high level of indefinite-term contracts, a rate of about 88% in 2016. To meet our commitment to our employees, our personnel policies guarantee equal treatment of all our staff, from the job-selection process and then throughout their whole careers in the company. In fact 24% of GMV's staff are women, who also represent 15.5% of senior management.

One of the main planks of the human resources policy is training, since the company's business lines call for specialist and bang-up-to-date knowledge of the most advanced technologies. To develop the professional skills of its employees GMV works with an integrated training model to pinpoint its employees' knowledge and skills. In all 354 training courses were held in 2016 on both an individual and group basis, adding up to a sum total of 14,010 training hours.

GMV liaises permanently with study centers and universities both at home and abroad, either by way of temporary agreements, awarding grants to help university students join the job market, or more permanent project-based collaboration agreements. This habitual liaison with universities has been reinforced by an increasing participation of GMV in various employment forums, both at home and abroad.

As part of GMV's unstinting commitment to the development of budding technology talent it habitually carries out a series of activities designed to foment an interest in engineering and technology among the youngest. In 2016, GMV collaborated in several such initiatives brokered by the Regional Authority of Madrid, such as the Educational Enhancement Syllabus for Academically Gifted Pupils (*Programa de Enriquecimiento Educativo para Alumnos con Altas Capacidades: PEAC*) or the 4th ESO + Empresa program, an extracurricular activity to bring Madrid's school pupils into closer contact with the working world. GMV is also taking part in an initiative of the Women's Rights and Equal-Opportunity Institute (*Instituto de la Mujer y para la Igualdad de Oportunidades*) to encourage a higher takeup among women of technological careers.

In 2016 GMV continued with its training, research, development and innovation work, running courses, seminars and lectures. The main vehicle for this activity was the GMV Chair, a joint academic initiative set up between the Polytechnic University of Madrid (*Universidad Politécnica de Madrid: UPM*) and the Higher Technical School of Aeronautical Engineers (*Escuela Técnica Superior de Ingenieros Aeronáuticos: ETSIA*).

# 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 below.

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.

### **GMV Aerospace and Defence S.A.U.**

- CMMI Level 5
- UNE-EN ISO 9001:2008 Quality Management
- PECAL/AQAP 2110, PECAL/AQAP 2210 and PECAL/AQAP 2310 Specific for defense activities
- UNE-EN 9100:2010 Quality systems in the space and defense sector
- UNE-EN ISO14001:2004 Environmental management systems

### **GMV Insyen AG**

- NRTL-C/US
- ISO 9001:2008 Quality Management

### **GMV Soluciones Globales Internet S.A.U.**

- UNE-EN ISO 9001:2015 Quality Management
- UNE-ISO/IEC 20000-1:2011 IT services management
- ISO 13485:2003 Medical Devices Quality Management: Intraoperative radiotherapy planning systems

- UNE-EN ISO14001:2004 Environmental management systems

- UNE-ISO/IEC 27001:2014 Information security management
- ISO 22301:2012 Business continuity management. Resilience
- UNE 166002:2014 R&D&i management

### **GMVIS Skysoft S.A.**

- CMMI Level 5
- UNE-EN ISO 9001:2015 Quality management
- ISO 14001:2015 Environment systems
- UNE-ISO/IEC 27001:2014 Information security management
- UNE-EN 9100:2010 o ISO 9001:2008 Quality Management System (for medical products: radiotherapy planning systems) Quality Management

### **GMV Innovating Solutions, Inc.**

- CMMI Level 5
- ISO 9001:2008 Quality Management System

- (for medical products: radiotherapy planning systems) Quality Management

- UNE-EN ISO 9001:2008 Quality Management
- UNE-EN 9100:2010 Space and Defence Quality Systems

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

- CMMI Level 5
- UNE-EN ISO 9001:2008 Quality Management

### **GMV Innovating Solutions S.R.L**

- UNE-EN ISO 9001:2008 Quality Management

### **GMV Sistemas S.A.U.**

- UNE-EN ISO 9001:2008 Quality Management
- UNE-EN ISO14001:2004 Environment Systems
- CEPE/ONU N° 10





# GMV IN THE WORLD

- BRANCHES AND OFFICES
- PROJECTS





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# ECONOMIC AND FINANCIAL RESULTS

## FINANCIAL STATEMENTS 2016

### BALANCE SHEET

ASSETS			LIABILITIES		
	2015	2016		2015	2016
Fixed assets	31.947.022,84	35.345.299,47	Stockholders' equity	45.745.560,28	47.726.168,20
			Capital grants	435.131,74	486.247,73
			Minority interests	5.494.178,39	5.730.528,72
			Long-term funding	12.369.766,72	16.205.301,52
			Interest free credits	5.991.887,28	5.653.169,67
			Long term funding	6.377.879,44	10.552.131,85
<b>Total fixed assets</b>	<b>31.947.022,84</b>	<b>35.345.299,47</b>	<b>Total Long-term Funding</b>	<b>64.044.637,13</b>	<b>70.148.246,17</b>
Inventories	12.026.498,05	11.341.035,05	Short term liabilities	23.864.512,46	19.859.641,73
Accounts receivable	25.530.872,28	23.985.026,98	Bank loans and overdrafts	5.445.025,47	4.614.520,00
Trade debtors	35.117.693,59	34.925.822,83	Non-trade payables	18.419.486,99	15.245.121,73
Trade services on account	-10.904.429,15	-12.970.303,03	Deferred payments	1.939.249,90	2.725.396,83
Other debtors	1.317.607,84	2.029.507,18			
Cash	20.344.006,32	22.061.923,23			
<b>Total current assets</b>	<b>57.901.376,65</b>	<b>57.387.985,26</b>	<b>Total short term liabilities</b>	<b>25.803.762,36</b>	<b>22.585.038,56</b>
<b>Total assets</b>	<b>89.848.399,49</b>	<b>92.733.284,73</b>	<b>Total liabilities</b>	<b>89.848.399,49</b>	<b>92.733.284,73</b>
Working capital	32.097.614,29	34.802.946,70	Working balance	32.097.614,29	34.802.946,70
Working capital/Equity	50,12%	49,61%	Working balance/fixed asset	100,47%	98,47%

### PROFIT AND LOSS ACCOUNT

EXPENSES			INCOME		
	2015	2016		2015	2016
Purchase of goods	33.090.975,56	38.795.945,41	Turnover	124.258.985,15	140.923.841,18
Ancillary Services	11.460.953,26	12.514.913,03	Own expenses capitalized	2.303.331,20	1.932.449,42
Taxes	207.884,21	255.572,74	Operating grants	343.080,76	336.341,21
Employee Costs	73.028.244,21	82.683.444,29	Financial Income	79.654,54	132.683,54
Financial Expenses	786.746,02	848.080,34	Extraordinary Income	134.013,75	159.102,87
Extraordinary Expenses					
Period Depreciation and Amortization	3.237.897,62	4.565.877,46	<b>Total income</b>	<b>127.119.065,40</b>	<b>143.484.418,22</b>
Appropriations, transfer to Provisions	328.062,79	-269.418,35			
<b>Total Expenses</b>	<b>122.140.763,67</b>	<b>139.394.414,92</b>	<b>Pre-tax profit</b>	<b>4.978.301,73</b>	<b>4.090.003,30</b>
Corporate income tax	708.129,05	660.552,10	<b>Post-tax profit</b>	<b>4.270.172,68</b>	<b>3.429.451,20</b>

## CASH FLOW STATEMENT

OPERATING ACTIVITIES	2015	2016
Profit after tax	4.270.172,68	3.429.451,20
Depreciation and amortization	3.237.897,62	4.565.877,46
<b>Operating Cash Flow</b>	<b>7.508.070,30</b>	<b>7.995.328,66</b>
Net finance expense	786.746,02	848.080,34
Corporate income tax	708.129,05	660.552,10
<b>EBITDA</b>	<b>9.002.945,37</b>	<b>9.503.961,10</b>
(Increase) / decrease in trade and other receivables	7.533.773,76	2.231.308,30
Increase / (decrease) in trade and other payables	1.753.566,41	-3.174.365,26
(Decrease) / increase in provisions	479.317,67	786.146,93
Deferred income (capital grants)	-343.080,76	-336.341,21
<b>Cash flow generated from operations</b>	<b>18.426.522,45</b>	<b>9.010.709,86</b>
Tax paid	-708.129,05	-660.552,10
<b>Net cash flow from operating activities</b>	<b>17.718.393,40</b>	<b>8.350.157,76</b>
<b>INVESTMENT ACTIVITIES</b>		
	2015	2016
Purchase of subsidiary undertaking (Goodwill)	-3.597.242,55	-4.476.910,19
Capital expenditure - plant and equipment	-584.814,66	-1.592.804,40
Capital expenditure - intangible assets	-2.269.899,04	-1.894.439,50
<b>Net cash flow from investing activities</b>	<b>-6.451.956,25</b>	<b>-7.964.154,09</b>
<b>FINANCING ACTIVITIES</b>		
	2015	2016
Net new debt (debt increase + debt repayments)	-625.896,70	3.005.029,33
Capital Grants and subsidies on capital	111.906,39	387.457,20
Interest paid	-786.746,02	-848.080,34
Dividends paid to equity shareholders	-527.003,68	-323.229,60
Paid-in capital / Adjustments to the equity value	419.525,57	-349.026,82
Minority Interests	226.415,57	236.350,33
Results attributable to the Minority Interests	-788.190,09	-776.586,86
<b>Net cash flow from financing activities</b>	<b>-1.969.988,96</b>	<b>1.331.913,24</b>
<b>(Decrease) / increase in cash and cash equivalents</b>	<b>9.296.448,19</b>	<b>1.717.916,91</b>
Cash and cash equivalents at beginning of year	11.047.558,13	20.344.006,32
<b>Cash and cash equivalents at end of year</b>	<b>20.344.006,32</b>	<b>22.061.923,23</b>





