2017 ANNUAL REPORT

gmv
INNOVATING SOLUTIONS

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

Challenges are GMV's growth lever. By taking on increasingly ambitious challenges, our team has built up expertise and experience and won new clients in a blossoming range of activities. This has fueled nonstop growth throughout GMV'S history.

2017 has been no exception to this trend. GMV put on yet another growth spurt; turnover and EBITDA both increased by nearly 20% and staff by over 10%. Most of this growth was organic, generated by our existing firms, amongst them our new site in Munich, this year already operating as an integral part of our German subsidiary GMV INSYEN.

With excellence as our permanent lodestar, we have built up a leadership in many areas. Satellite control and navigation systems, command and control systems, integrated modular avionics, fleet-management and ticketing systems, radiotherapy – these are only some of the areas where GMV has become a benchmark not only in Spain but also at European and worldwide level. However, excellence never stands still; it continually moves on and calls for new capabilities to keep apace. For this reason we are participating in, and often leading, national and international R&D programs, for example under the Horizon 2020 umbrella, in areas such as robotics, Earth Observation applications, detection of suspicious activities at sea or improving the treatment of diseases. Elsewhere, we are developing the avionics

of PLD's new launcher for small and medium-sized satellites, we are setting up a groundbreaking SBAS in Australia and New Zealand, based on our in-house navigation products, as well as rolling out a whole new generation of hardware and software products for our public-transport clients.

Important European institutions like the European External Action Service (EEAS), FRONTEX, or the European Defense Agency (EDA) turn to GMV for development and maintenance of their secure-communication and command and control systems. Cybersecurity, Big Data and artificial intelligence are areas of expertise that are now imbuing all the rest. In addition to honing these technologies with our traditional clients in the financial sector, public authorities and major companies, we are looking into their industrial-application potential, unearthing opportunities with new clients such as law firms and increasingly taking on cybersecurity services for clients from other longstanding businesses like the space sector. We have further reinforced these cybersecurity services with a new Cybersecurity Incident Response Center we have opened in Valladolid this year, which we will use to tackle the growing cybersecurity needs of connected and autonomous transport as well.

GMV's space turnover is now the 6th biggest in Europe. Twelve new commercial telecommunications satellites launched in 2017 are using GMV technology. GMV is

supplying ESA and other space institutions with a whole host of operational and engineering services and participating in several major international robotics and Earth Observation projects, while also playing an especially important role in the new developments of many of the major ground infrastructures of Europe's satellite-navigation systems, EGNOS and Galileo.

GMV stands out from other firms due to the sheer range of activities we carry out. The combination of all this knowledge gives us an increasingly telling edge over the rest, driving the growth of a team of smart, keen and ambitious people continually spurred on by the opportunities for professional growth generated by GMV's cutting-edge technology projects. Attracting and keeping a top quality team like GMV's is a sine qua non of success and our most important challenge as a firm. In late 2017, we purchased an additional office building in Tres Cantos to cater for this ever-expanding team. This office building is now being revamped to create new, comfortable, stimulating and energy-efficient working spaces for GMV's matchless professional team to tackle the challenges our clients present us with.

My thanks and admiration go out to each one of them,
Mónica Martínez

LETTER FROM THE CEO
JESÚS B. SERRANO

This year GMV's systematic development strategy continued to generate across-the-board growth, with substantial improvement in all its numbers.

Turnover and EBIDTA are up by nearly 20% with respect to 2016, chalking up, respectively €172 million and over €11 million. Net profit has grown by 27% to €4.4 million. Although commercial activity once more outstripped the previous year's result, the new contract figure as a multiple of annual sales dipped under last year's all-time high. This was due to the huge number of tenders yet to be decided, almost doubling the new contract figure. Even so, the end-of-2017 order book/sales ratio reached 0.97. Bearing in mind that these pending tenders include some big contracts with a high likelihood of success, the expected bulging backlog bodes well for the coming year and GMV's longer-term future.

GMV is a global benchmark in the space sector, boasting a leadership position in various segments and holding onto its status as worldwide number-one in control centers of telecommunications satellite operators. GMV's engineering skills, its technological prowess, products and systems are now contributing to space missions of all types, including missions with a great citizen impact (Earth Observation, navigation or telecommunications), missions with more of a science or research bent (science, robotics exploration, crewed flights or technological demonstration) and launchers. At the time of writing

GMV's technology has been selected for over 450 space vehicles (counting only the first units of the major constellations, otherwise this figure would be multiplied by a factor of 2 or 3 if complete constellations were taken into account). Of these, only 270 are already in operation while 90 are in final development phase and about another 30 in their initial phase. Such a high figure has been achievable only on the strength of ongoing business with space agencies and institutional organizations from all five continents plus an equally international clutch of over thirty commercial telecommunications-satellite operators and the main space-system manufacturers from Europe, America and Asia.

GMV's in-house systems, products, developments and its IT and communications experience and expertise are continually contributing towards the digital transformation of public administrations and companies from diverse sectors. GMV's cybersecurity activities, in particular, kicked off over twenty years ago; since then we have worked with clients from sectors such as telecommunications, insurance, banking and finance, where our current clients include Spain's biggest three banks, all of which are European and worldwide benchmarks in their own right. The experience built up and the products developed are now being applied in other clients running critical infrastructure such as the operators of satellites and major utility firms. By December 2017, our client base in this sector took in nearly 50 countries from four continents.

In the intelligent transportation systems market we are continuing to pursue the new strategy launched in 2016, designed to turn ourselves into a worldwide leader from our traditional global benchmark position. Our heavy investment in technology, processes and products is now bearing its first positive results. By the end of 2017 over three million automobiles had been fitted with GMV technology; additionally 25,000 public-transport vehicles (buses, trams and trains) operating in nearly 40 countries from five continents are now running with GMV systems. With over 950 clients from all around the world, GMV is helping to improve the public mobility of over 1.9 billion passengers a year, cutting down the environmental impact and improving citizens' quality of life.

In the defense and security market, GMV continues to play a key role in the design, development and deployment of operational systems used by our armed forces and state security forces and continues to develop new technologies for future operational implementation. We also pride ourselves on being responsible for the command and control systems for, among others, the European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union (deployed in the thirty-plus member states) and the European Union's External Action Service, thus contributing to European security and humanitarian and overseas-aid activities. As regards intelligence activities, the bright prospects announced last year have been

confirmed with the sale of surveillance and reconnaissance systems to international organizations like NATO and clients from various countries of Europe and North America.

Our special thanks go out to our clients, coming from nearly 80 countries worldwide. Their ongoing trust in us year after year is reflected in a high repeat rate, with GMV's activities booming not only in economic terms but also in the increasing level of responsibility taken on.

For yet another year express mention must be made of the huge contribution to GMV's success story made by each and every one of its 1,600 employees, whose talent, motivation and commitment drive us ever onwards, aided along the way by the excellent collaboration of our partners and suppliers.

Cordial greetings,
Jesús B. Serrano

CORPORATE
STRUCTURE

Grupo Tecnológico e Industrial GMV, S.A.

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 B.V / Aerospace, Defense, ITS and Telecommunications Markets of the NETHERLANDS

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 ☐

MÓNICA MARTÍNEZ WALTER

Board President

JESÚS B. SERRANO MARTÍNEZ

Member of the Board
Chief Executive Officer

JAVIER LÓPEZ ESPAÑA

Director
General Secretary

SUSANA MARTÍNEZ WALTER

Member of the Board

IGNACIO RAMOS GOROSTIOLA

Member of the Board
Chief Human Resources &
Infrastructure Officer

LUIS FERNANDO ÁLVAREZ-GASCÓN PÉREZ

Member of the Board
General Manager Secure
e-Solutions

MIGUEL ÁNGEL MARTÍNEZ OLAGÜE

Chief Business Development &
Marketing Officer
General Manager Intelligent
Transportation Systems

FCO. JAVIER MARTÍNEZ CENDEJAS

Chief Finacial Officer

MANUEL PÉREZ CORTÉS

General Manager Homeland
Security & Defense

JORGE POTTI CUERVO

General Manager Space

ALBERTO DE PEDRO CRESPO

Managing Director GMV Portugal

RICARDO TÓRRON DURÁN

Member of the Board (GMV
Aerospace and Defence, S.A.U.)

COMPANY
HISTORY

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

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

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

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

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

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

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

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

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

GMV's new corporate identity was officially launched in September 2006, to bring its image into line with the actual situation of the multinational technology group GMV. The group had by now broken into many new sectors and expanded its business internationally. To make sure the corporate brand did not lag behind this new situation we decided to carry out a thoroughgoing overhaul of the group's identity, unifying all the corporate brands under a single denomination. As a result, all the subsidiaries took on the new GMV brand as a single corporate identity.

In June 2007, GMV purchased a 66% stake in Masisconvi, 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, traditionally founded on advanced fleet-management systems. In early 2011 GMV completed the 100% purchase of Masisconvi, S.A. and in 2012 it was wholly integrated into the group structure by means of a merger-based takeover.

In late 2007, giving a new kick to its worldwide expansion, GMV decided to internationalize those business lines that had attained number-one status in the Spanish market, such as the intelligent transportation business. This strategy soon came good; by 2009 the company had won its first contracts in Asia and Eastern Europe. Since then this process has thrived, important new contracts being won in Poland, Malaysia, Indonesia, Morocco, Sweden, Mexico, Chile, United Arab Emirates, Australia and Cyprus, etc.
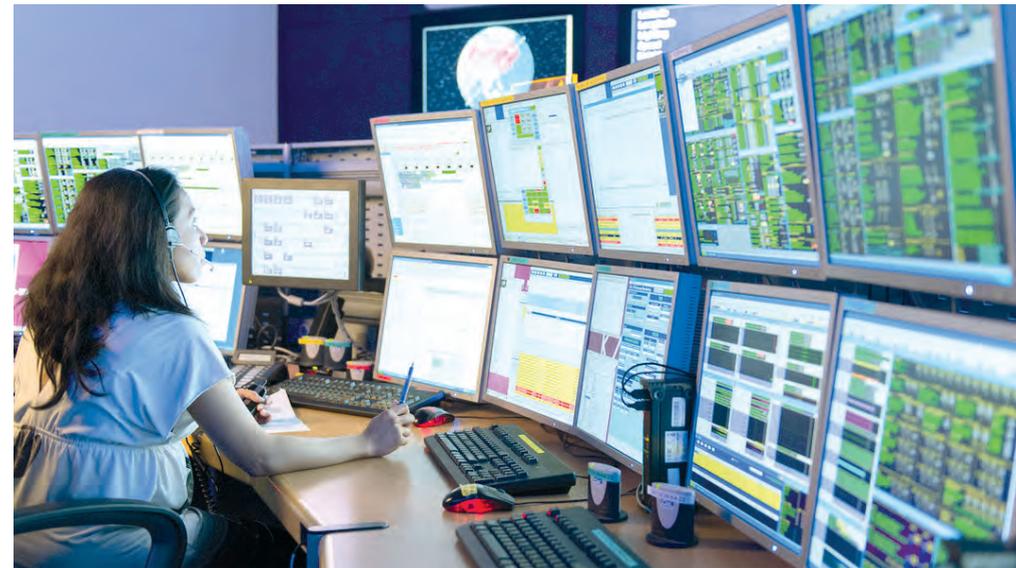
From 2008 to 2015 GMV's growth slackened slightly but never ceased. Its strong suits of business specialization, unbeatable competitiveness and ongoing internationalization helped it to stave off the worst effects of the worldwide downturn. During this period important contracts were also won with new clients, such as telecommunications satellite operators like Measat, Azersat, Nilesat and international agencies and organizations like GSA-Galileo-, EMSA, FRONTEX, the UN and EUMETSAT. The company also kicked on in growth areas where GMV had already built up a healthy client portfolio, such as physical security and cybersecurity, healthcare, automotive software, robotics, big science facilities, Big Data, Internet of Things, testbeds and control and instrumentation.

In July 2015 GMV and the California-based technology firm Syncromatics Corp, a provider of Software as a Service (SaaS) solutions for the intelligent transportation systems (ITS) market, signed an agreement under which GMV made a strategic investment in Syncromatics Corp's capital. One year later GMV's investee company Syncromatics 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 markets, signed a merger agreement with INSYEN AG, a leading German space-missions firm. The resulting company, GMV-INSYEN AG (under the GMV INSYEN brand), was then fully integrated into the whole set of companies making up GMV Group. At the end of 2016 GMV also bought a stake in PLD Space, a young Spanish space startup that has now been working for some years on the design and testing of space launcher technology.

By the end of 2017, on the strength of this international expansion process initiated back in 2004 with the creation of the US company, GMV was running subsidiaries in Germany, Colombia, the USA, France, Malaysia, the Netherlands, Poland, Portugal, the UK and Romania, plus permanent establishments or project offices in Morocco, Cyprus 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 34-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 2017 GMV

MAIN FIGURES

Total Income:	171,91 M€
EBITDA:	11,17 M€
Net profit:	4,35 M€
Number of employees:	1.631

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.

ACTIVITIES 2017

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 development of aeronautical approach- and landing-systems based on satellite navigation systems (GNSS) and is one of the few European companies with comprehensive knowledge of advanced avionics architectures, testbeds and verification systems and their associated regulations.

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

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

MAIN
MILESTONES

[1] *In 2017 GMV wins important contracts under Clean Sky 2, Europe's biggest aeronautics research program, which seeks to cut aircrafts' CO2 and gas emissions and noise levels. Within a consortium of companies GMV participates in the EMA4Flight project, led by CESA and coordinated by Tecnalia and also in the VALEMA project, primed by AIRBUS and coordinated by GMV, focusing on the development of electronic control units (ECUs) and electro-mechanic actuators (EMAs) for the multi-mission regional aircraft (Flight Test Bed 2 FTB#2) based on AIRBUS DS's C-295 aircraft.*

[2] *Within the same CleanSky2 program GMV makes significant headway in the PASSARO and UBBICK projects. PASSARO (caPAbilities for innovative Structural and functional teSting of AeROstructures) aims to work simultaneously in several areas in relation to impact- and noise-resistant aircraft structure and materials, while UBBICK (Utility Building Blocks Integration for Cockpit) proposes a simplification of current cockpit utility management architectures.*

[3] *The European Commission's FP7 project CONTREX (Design of embedded mixed-criticality CONTRol systems under consideration of EXtra-functional properties) is brought to a successful conclusion. The project's aim was to*

develop a methodology and tools for enabling energy-efficient and cost-aware design in mixed criticality critical systems. GMV has participated in the project as industrial partner and leader of the aeronautics use case, developing for that purpose a demonstrator that serves as a prototype to evaluate the methodology and tools developed by the other partners.

[4] *The year also sees continuing progress in the PHANTOM project (Cross-layer and multi-objective Programming approacH for next generAtioN heTerogeneous parallel cOMputing systems), forming part of the EU 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.*

[5] *During 2017 GMV continues to work on several projects designed to improve the performance of future integrated modular avionics (IMA) architectures. Notable here is the successful completion of the ASHLEY product, which will represent a new step forward in second-generation IMA technology (IMA2G), and the start of a new phase of the DIMA project, DIMA-2, in collaboration with the aeronautics manufacturer Embraer for the development of reconfigurable modular avionics.*

[6] *In 2017 GMV also holds several RPAS ATLANTE progress meetings with AIRBUS DS. RPAS ATLANTE is a long-range, tactical, unmanned aerial vehicle designed for Intelligence, Surveillance and Reconnaissance (ISR) missions. It is equipped with state-of-the-art technology and has been designed according to the standards used for crewed aircraft. Under the current program 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] *During 2017 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 boom-control software, onboard monitor software, system simulators, etc.) and also in the development of simulators. These activities are rounded out by participation in simulators for the C-295 aircraft plus increasing work on the A400M, where GMV has participated in engineering simulators (especially the landing gear, electrical system and telecomm systems simulation models), plus various collaborations in the Eurofighter project.*

[8] *With the aim of laying down the bases for regulation of remote-control stations of Remotely Piloted Aircraft Systems (RPAS) within the category certified by the European Aviation Safety Agency (EASA), GMV participates during the year in several studies such as the AIRBUS-led RPS-STANDARD of the European Defence Agency (EDA).*

[9] *GMV initiates a two-year collaborative research project with Geoscience Australia (GA) and the Australia and New Zealand Cooperative Research Center for Spatial Information (CRCSI) for deployment of a Satellite-Based Augmentation System (SBAS). Within the project, also involving Inmarsat and Lockheed Martin, GMV is responsible for development, deployment and installation of a processing platform in charge of generating precise corrections as well as system integrity parameters.*

[10] *In 2017 GMV initiates a collaboration arrangement with the aeronautics manufacturer BOEING. The aim of this project, called Innovation in the Development of Electronic systems for Aerospace (INES), is to study a virtual integration and development process of complex avionics systems in a model-oriented framework.*

[11] *The AeroCMS project kicks off. Carried out by Portugal's air-traffic authority, NAV Portugal, AeroCMS sets out to implement a configuration management system for administrative items and all items related to NAV's projects, in due accordance with applicable regulations and good practices. To this end all communications between NAV and external organizations plus internal management processes will be dematerialized; part of the current physical archive will be digitalized and the application hitherto in charge of recording the organization's internal and external email exchanges will be replaced.*

ASSESSMENT

In 2017 GMV continued to participate in Clean Sky 2, one of Europe's biggest aeronautics research programs. Particularly worthy of mention here are EMA4Flight and VALEMA for the multi-mission regional aircraft, the PASSARO project in the field of structure and materials, and the UBBICK project for simplification of current cockpit utility management architectures. Activities were also carried out under the European Commission's H2020 framework program, the European Commission's FP7 program and for the European Defense Agency, strengthening GMV's position in Europe's biggest aeronautics R&D programs.

In the field of air traffic and navigation aids GMV is involved in several international projects. For Portugal's air-traffic authority, NAV Portugal, the AeroCMS project aims to enhance the management of diverse administrative items. GMV also struck out on a two-year project in Australia and New Zealand in collaboration with two local organizations for the purpose of deploying a satellite-based augmentation system, also involving Lockheed Martin and Inmarsat.

GMV has continued its long-standing collaboration with Airbus in the air tanker programs, the Eurofighter project, the RPAS ATLANTE upgrading project and in the development of simulators for the C-295 and A400M aircraft, among others. In 2017 GMV also initiated a collaboration arrangement with Boeing by means of a complex avionics system project. This new activity reinforces GMV's track record as a key partner of the world's top aeronautical contractors.

As for the area of integrated modular avionics 2017 saw successful completion of the second-generation technology ASHLEY project and a start was made on the DIMA project of reconfigurable modular avionics.

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 technology partner of cast-iron dependability, capable of meeting the most stringent needs under the strictest quality standards. It has now achieved CMMI Level 5 certification, covering the whole range of activities and services within the space sector:

FLIGHT SEGMENT

- System-engineering and mission analysis
- Guidance, navigation and control (GNC) systems
- Autonomy and robotics
- Satellite and mission simulators
- Ground validation and testbeds
- Onboard software and independent validation
- Data simulators and processors for Earth Observation and astronomy instruments

NAVIGATION

- Engineering and algorithms of satellite navigation systems
- Major systems of processing and generation of Global Navigation Satellite System signals
- Precise positioning solutions and augmentation systems

GROUND SEGMENT

- Design and integration of complete ground systems
- Satellite control centers and monitoring stations
- Science-mission operations centers
- Flight dynamics systems
- Mission planning systems
- Payload-optimization, -planning and -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

OPERATIONAL SUPPORT FOR SPACE MISSIONS OF ALL TYPES

MAIN
MILESTONES

[1] *For yet another year GMV underscores its status as the world's number-one supplier of control centers for commercial telecommunications satellites. In 2017, twelve satellites were launched the control centers of which were fitted with GMV technology. Especially relevant were the ones developed for ESA, Eutelsat, HellasSat, Visiona, Hispasat, SES and Galileo. During this year GMV also continues its development work on 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. GMV and Eutelsat also forge even stronger bonds after the award of a new project under which GMV will support the operation of four new Eutelsat satellites.*

[2] *In the area of satellite navigation, and particularly in the SBAS field, GMV and Thales signed a contract to develop the new generation of EGNOS's Central Processing Facility- Processing Set (CPFPS). The CPFPS is the core of the whole system and a critical software*

component that generates the message with the corrections to be used by the end user. This contract hence ensures EGNOS service provision for at least another 15 years. GMV also initiates a two-year collaborative research project with Geoscience Australia (GA) and the Australia and New Zealand Cooperative Research Center for Spatial Information (CRCSI) for deployment of a Satellite-Based Augmentation System (SBAS).

[3] *As well as the launch of four new satellites, this year also sees significant headway in the Galileo program, especially in the developments of the Galileo Reference Centre, the Galileo Service Centre, the Time and Geodetic Validation Facility (TGVF) and the Return Link Service Provider (RLSP) of Galileo's Search and Rescue Service (SAR), all of them led by GMV. GMV also leads the consortium that will define the program's second-generation ground segment and develop a second version of the PRS receiver and the infrastructure of Spain's Public Regulated Service (PRS).*

[4] *GMV consolidates its position as one of the top suppliers of the European Space Agency (ESA)'s European Space Operations Center (ESOC) and of the German Aerospace Center (DLR), both in engineering and operations. 2017 also sees notable progress in the major Eumetsat contracts for the operations, control and processing ground segment of the Earth Polar System Second Generation (EPS SG) and the Meteosat Third Generation (MTG).*

[5] *GMV is one of European space industry's main players in the analysis space debris represents. In the space-surveillance area GMV is leading the development of Spain's SST system operations center (S3TOC), which collates data from optical telescopes and radar and also from external sources to keep a catalogue of objects orbiting the earth; GMV is also a party of its operations team. From its Polish and Portuguese offices, GMV is participating in the European Union's Space Surveillance and Tracking (SST) system as well. GMV is also playing a key role in design and development of the Guidance, Navigation and Control (GNC) system of the European Space Agency (ESA)'s future Active Debris Removal (ADR) missions; it is likewise participating in ESA's e.deorbit program, the remit of which is removal of ENVISAT, Europe's biggest decommissioned satellite.*

[6] *GMV's leadership in Flight Dynamics Systems (FDS), ground operations, and Autonomous Guidance Navigation and Control (GNC) systems also firms up this year with the award of the FCS-ATOMIC contract by the European Space Agency (ESA)'s European Space Research and Technology Centre (ESTEC). The aim of the contract is to develop a platform integrating and defining the FDS and GNC systems that, together, are going to make up the flight control system (FCS) and its corresponding interfaces, to weigh up the feasibility of future missions. ESA further awards GMV the contract for the development of the mission control system of the ExoMars rover and surface platform.*

[7] *The European Space Agency (ESA) once more turns to GMV's experience in both Onboard Software Reference Architecture (OSRA) and Integrated Modular Avionics (IMA) with the award of two new contracts: firstly, MORA-IMA, which combines ESA's three main technological goals concerning Embedded Space Software; and secondly, VBNC, for provision of an engineering model (EM) of high-performance avionics for processing navigation images of the Phobos Sample Return mission. Within this same area GMV also boasts a standout participation in the payload of the Portuguese satellite Infante.*

[8] *GMV consolidates its leadership in space robotics technology in the PERASPERA Cluster under the European Commission's H2020 R&D umbrella, leading three of the six technology-building blocks that will serve as the basis for future orbital missions. In 2017, under the European Space Agency (ESA)'s LUCID project (LUnar scenario Concept validation and Demonstration), a thoroughgoing campaign of trials is carried out under GMV guidance. This year also sees the kickoff of other important projects: SISIFOT for the development of an autonomous transport system and outdoor autonomous logistics for warehouses, and GOTCHA, the goal of which is to achieve an autonomous framework for planetary-exploration robots, for their utilization in future space systems. Yet another notable development is the beginning of collaboration between GMV and Effective*

*Space for development and validation of small spacecraft, with several trials being carried out this year in GMV's robotics laboratory, **platform-art©**.*

[9] *Within the field of earth-observation applications it is worth noting the contracts signed with the EU's European External Action Service. Also, the award of the H2020 Africultures projects, the goal of which is to improve food security in Sub-Saharan Africa; MySustainableForest, for sustainable forestry management; TYPHON, where GMV will be applying its database technology expertise for space applications; and the European Space Agency (ESA)'s BIGMIG project, which looks into the application of Big Data and Earth Observation technology to migratory phenomena. GMV also achieves renewal of the remote sensing services contract for the oil and gas giant SHELL. All these contracts represent a huge leg-up to GMV's push for earth-observation applications.*

[10] *GMV is playing a key role in the Global Monitoring for Environment and Security program called Copernicus on the strength of several projects in both the ground and space segments. 2017 sees the launch of the Sentinel 2B and Sentinel-5P satellites, 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 contract.

[11] *Last but not least, in 2017 GMV renews two framework contracts with France's National Centre for Space Studies (Centre national d'études spatiales: CNES). Since 2011 GMV has been carrying out activities for CNES in all the following tasks: mission simulators and analysis; algorithm libraries; mission centers and spacecraft control centers; science-data and image processing; operational flight dynamics. As a result of this renewal, GMV will be acting as the main contractor in one of them and as a subcontractor in the other one. GMV is also awarded a new framework contract, ACCIOME-S-3, under which GMV will also be able to opt for the development of onboard software, command and control and operations in control centers both in flight dynamics systems (FDS) and the payload and satellite platform.*

ASSESSMENT

For yet another year GMV remains the world's number one independent supplier of ground control systems for commercial satellite operators as well as being a benchmark supplier for institutions like ESA, CNES, DLR and Eumetsat. This year no fewer than 12 satellites operating with GMV's control centers were launched. Development of the control center for OneWeb's constellation is continuing apace and EUTELSAT awarded GMV a new contract for supporting the operations of four new satellites.

In satellite navigation a contract was signed for development of the new generation of CPFPS that will extend EGNOS, Europe's SBAS, for at least another 15 years into the future. Elsewhere, GMV began an SBAS deployment project in Australia and New Zealand. The launch of 4 new Galileo satellites vouches for other GMV-led progress in the Galileo program.

GMV's Earth Observation business was equally brisk in 2017, cementing its already strong position in this area. As well as its crucial participation in the EU's Copernicus program, contracts were signed with the EU's European External Action Service plus other H2020 projects such as the following: Africultures, to improve food security in Sub-Saharan Africa; MySustainableForest, for sustainable forestry management; TYPHON, where GMV will employ its space-application database expertise; and ESA's BIGMIG project, which studies the application of Big Data and Earth Observation technology to migratory phenomena. In the private sector GMV renewed the remote sensing contract for the oil and gas giant Shell.

Other ESA activities revolved around the areas of GNC, FDS, onboard software and space surveillance, where GMV is taking part in various projects and holds on to its runaway leadership.

2017 was also a fine year in the robotics area. As well as leading six technology-building blocks of the European Commission's PERASPERA program to pave the way for future space missions, work also continued this year on ESA's LUCID project while collaboration began with a British firm for development and validation of small spacecraft which are to be tested in GMV's in-house robotics lab, **platform-art©**. A project also got underway for development of an autonomous transport system and outdoor autonomous logistics for warehouses and another that sets out to achieve an autonomous framework for the use of robots in future space systems.

In 2017 France's National Centre for Space Studies (Centre national d'études spatiales: CNES) renewed its two framework contracts with GMV, now dating back to 2011, which have enabled GMV to develop CNES activities in various areas.
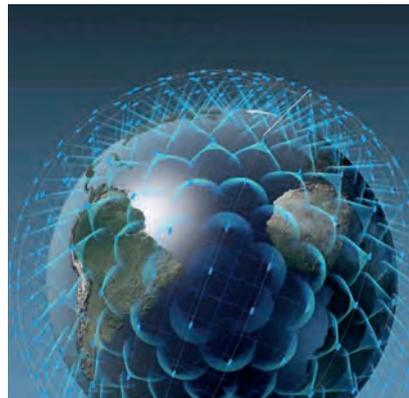
DEFENSE AND SECURITY

ACTIVITIES 2017

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

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

DEFENSE

- Engineering, development and integration of C4ISTAR systems
- 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.

MAIN
MILESTONES

[1] *In 2017 GMV, in a joint venture with INDRA, is selected for development of the Spanish Foot-Soldier System (Sistema Combatiente a Pie: SISCAP). After a brief lull in the foot-soldier program, SISCAP has relaunched the MoD's R&D activity designed to modernize soldier technology, an activity that began with the Future Foot-Soldier Program (Programa Combatiente Futuro: COMFUT). Under the SISCAP project GMV is responsible for integration of the Communications and Information System and the linear power supply. Specifically, GMV will be developing the central power-distribution and processing unit (Unidad Central de Proceso y distribución de Energía: UCPE). The UCPE comprises the soldier's main computer. Finally, in collaboration with the Portuguese Army Research Center (Centro de Investigação, Desenvolvimiento e Inovação da Academia Militar: CINAMIL), GMV is developing the support platform for Portugal's future soldier project.*

[2] *GMV is now carrying out various projects for integrating arms systems with the TALOS command and control system, developed by GMV for the Spanish MoD's Directorate General of Armaments and Material (Dirección General de Armamento y Material: DGAM). 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. In 2017 the first steps are also taken for integration of TALOS in the ASCA (Artillery Systems Cooperation Activities) interoperability program, enabling TALOS to be integrated with the artillery systems of the countries involved in the program.*

[3] *GMV is collaborating 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 with the TALOS command and control system and finally integration of the foot-soldier C2 system. In October 2017 GMV delivers the first shot-detector unit for integration in the testbed of the program's mission system. GMV is at the same time looking into various shot-detection technologies to help the program office choose the system to be integrated in the vehicle's technological demonstrators.*

[4] *Within the framework contract for maintenance, support and development of EUCCIS, the European Union's Command and Control System, awarded to GMV in 2016 by the European Union's European External Action Service (EEAS), GMV this year has not only seen to maintenance of the already provided services but also increased them. Large among these new services feature all the following: migration of EUCCIS to EEAS's new secure network (EC3IS); the next phase of the new tactical viewer; improvements in the portal to include a chat following the XMPP standard and implementation of the new baseline 3.1 of the replication mechanism of the Multilateral Interoperability Programme (MIP). Moreover, GMV is continuing to provide support services including corrective maintenance, helpdesk, training and consultancy.*

[5] *In the first half of the year, as part of its support activities for rollout of JIRS capacity (Joint Intelligence Surveillance and Reconnaissance), GMV supports the Spanish armed force's participation in various exercises. These, most notably, include the following: JFX MOPEX, for evaluation and certification of Spain's structural operational capacity, made up by Operational Command (Mando de Operaciones: MOPS) and the five component commands of the armed forces; NATO's SFCT exercise to trial and validate C4ISR interoperability in support of the Enhanced NATO Response Force (eNRF); and the SOCCEX exercise to prepare the special operations joint command (MCOE in Spanish initials) as NATO NRF18 command.*

[6] *September 2017 sees the kickoff of DRIVER+, the second phase of the DRIVER project (Driving Innovation in Crisis Management for European Resilience), launched back in 2014 as an FP7-funded project whose main aim is to rise to current and future challenges posed by increasingly severe consequences of natural disasters and terrorist threats. As well as participating in all DRIVER+ subprojects, GMV is also working hard on the new pan-European Test-Bed for Crisis Management capability development. Furthermore, within a portfolio of solutions (PoS), to be trialed during scheduled project tests, GMV is incorporating its complete SOCRATES control and command suite. Lastly, GMV will be acting as coordinator of all solutions to be included in the scheduled project trials.*

[7] *In 2017 the FORTRESS (Foresight Tools for Responding to cascading effects in a crisis) project is brought to a close. The aim of this three-year, European-Commission-funded project was to ascertain the cross-border, cascading effects of crisis situations in different contexts of interconnected infrastructure. Within the project, carried out by thirteen partners from eight European countries, GMV has led development of the FORTRESS Incident Evolution Tool (FIET), a user-friendly tool that calculates infrastructure, systems and geographical areas affected by an emergency, even between different organizations or countries.*

[8] *Midway through the year comes the kickoff of the EU-funded, H2020 MARISA (Maritime Surveillance Awareness) project. MARISA brings together 22 organizations, including national and multinational firms from each participating country, national and NATO research institutes and end users (military navies, coastguards and the Spanish Guardia Civil). GMV, playing a key role in the project, holds responsibility for system design, the development of several data-fusion and anomaly-detecting algorithms, as well as the Iberian trial to be held in collaboration with the Spanish Guardia Civil and the Portuguese Marinha.*

[9] *Within this same area 2017 also sees the start of the European Commission's FP7 operational validation project called EUCISE2020. This project comprises 37 partners from 15 different countries, including the Spanish MoD, through the navy, and other Spanish institutions like the Guardia Civil, the Maritime Rescue Service (Salvamento Marítimo) and the taxation authority (Agencia Tributaria). Within this project the industry has been invited to submit R&D bids for the creation of information-exchanging EUCISE nodes. These nodes follow a service-based architecture defined using the NATO Architecture Framework (NAF) and employing technical standards to guarantee interoperability between nodes. GMV is playing a key part in this project on the strength of its interoperability experience and expertise in both civil and military projects.*

[10] *GMV continues throughout this year with implementation for the European Defence Agency (EDA) of the e-Learning platform, CDTEXP (Cyber Defense Training and Exercise, coordination and support Platform). CDTEXP will provide the central access point to available cyberdefense training information and infrastructure. Another new EDA activity starting this year sets out to achieve a reliable cyberdefense capacity by means of the DePoCyTE project (Demand Pooling for the Cyber Defense Training and Exercise). DePoCyTE aims to improve EDA member states' affordable access to cyberdefense courses provided by the private sector.*

[11] *Within the framework contract for maintenance, extension and development of the European Border Surveillance System (EUROSUR), awarded to GMV in 2013 by the European Border Agency, FRONTEX, GMV provides in 2017 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 continues to design, develop and roll 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.*

ASSESSMENT

In 2017 the Spanish MoD's R&D activity picked up appreciably. GMV was selected for development of the Spanish Foot-Soldier System (Sistema Combatiente a Pie: SISCAP), designed to modernize soldier technology, an activity that began with the Future Foot-Soldier Program (Programa Combatiente Futuro: COMFUT). GMV is responsible for integration of the Communications and Information System and the linear power supplies. In collaboration with the Portuguese Army Research Center (Centro de Investigação, Desenvolvimiento e Inovação da Academia Militar: CINAMIL) GMV is also working on Portugal's future soldier project.

GMV is going from strength to strength in C4ISTAR systems. In 2017, in particular, it carried out various projects for integrating arms systems with the TALOS command and control system. TALOS is a C4I system for the planning, management and execution of military operations at tactical level. In 2017 the first steps were also taken for integration of TALOS in the ASCA interoperability program, enabling TALOS to be integrated with the artillery systems of the countries involved in the program.

GMV is collaborating with the Spanish army in the wheeled combat vehicle 8x8 program. GMV is responsible for the GNSS/INS navigation subsystem of the shot-detection subsystem, integration with the TALOS command and control system and finally integration with the foot-soldier C2 system.

GMV is providing support this year for the Spanish armed force's participation in various exercises. Prime among them were JFX MOPEX, for evaluation and certification of Spain's structural operational capacity; NATO's SFCT, to evaluate interoperability of the command and control capabilities of NATO's response force; and SOCCEX, to prepare the special operations joint command (MCOE in Spanish initials) as the NATO Response Force (NRF) command.

In 2017 GMV continued to carry out development and maintenance activities and provide services under two important EU framework contracts: EUCCIS, the Command and Control System of the European Union's European External Action Service, and FRONTEX's communication network EUROSUR.

Under Europe's umbrella R&D program, H2020, work began on the MARISA maritime surveillance project, while, under the seventh framework program (FP7) work likewise began on operational validation of the EUCISE2020 project, to ensure shared information among maritime authorities, and DRIVER+, which aims to come up with answers to the challenges now posed by natural disasters and terrorist threats.

GMV also continued to work on several cyberdefense projects for the European Defence Agency.

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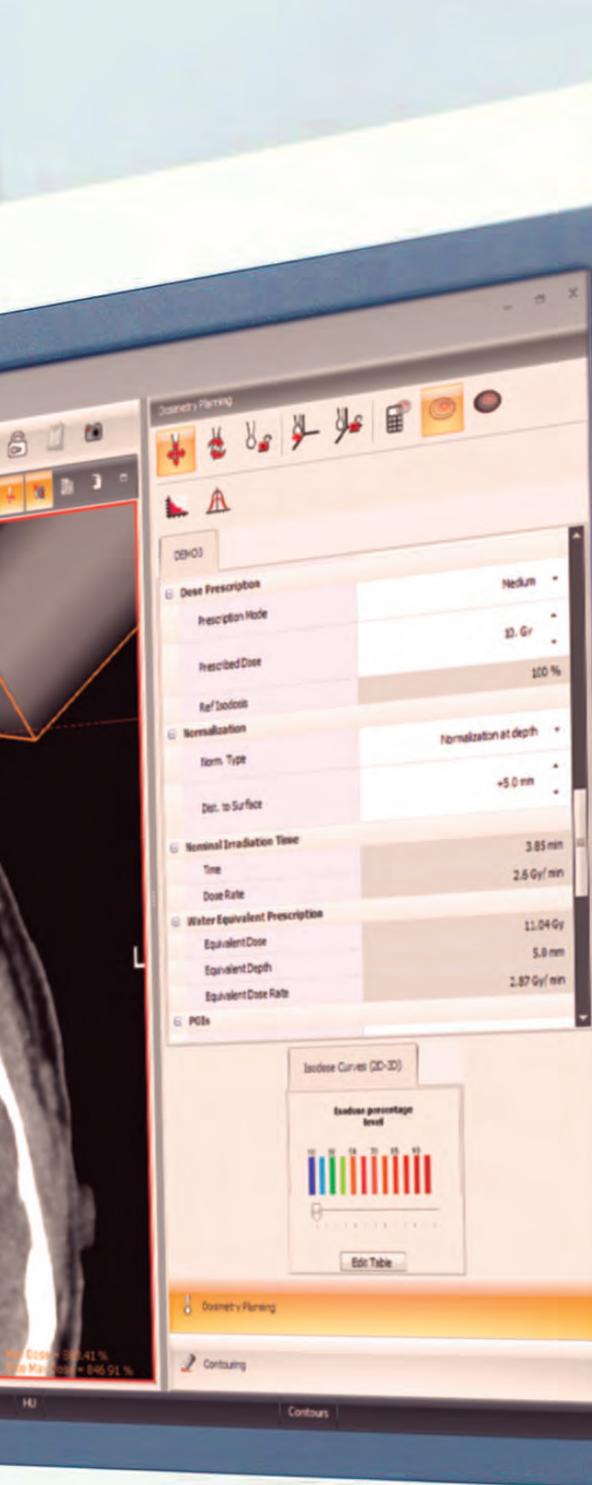
Over twenty years ago now GMV decided to bring its proven R&D expertise to bear on the challenge of improving the world's health. Drawing on its knowledge built up in robotics and space simulation, and working in close collaboration with hospitals, healthcare research institutes, universities and flagship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

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

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

MAIN
MILESTONES

[1] *As fruit of the distribution agreement between GMV and Carl Zeiss Meditec (CZM) GMV's inhouse intraoperative radiotherapy planner, **radiance™**, is taken up in 2017 by the Jackson Memorial Hospital (Miami, USA), Mount Sinai Hospital (New York, USA) and Montefiore Medical Center (New York, USA).*

[2] *Spain's Medicinal and Healthcare Products Agency (Agencia Española de Medicamentos y Productos Sanitarios: AEMPS), dependent on the Ministry of Health, Social Services and Equality, turns to GMV for evolutive- and adaptive-maintenance of the data-uploading process of the IT application with which it reports on all veterinary drugs authorized in the European Union, recorded in turn in the European Medicinal Product Database EudraPharm. To ensure the perfect working of the application, this project will be carried out to meet the quality requirements laid down in the Spanish standard UNE-EN ISO 9001, which is the official Spanish version of the European standard EN ISO 9001, and CMMI level 5.*

[3] *2017 sees the start of the H2020-funded RAINBOW project, which aims to build up knowledge in specific areas of clinical simulation. GMV's project input rests on its wealth of experience in developing successful clinical simulators such as the surgical simulator insight and the intraoperative radiotherapy planner **radiance™**.*

[4] *SwitHome kicks off under the umbrella European EIT Health initiative. SwitHome aims to improve post-stroke walking rehabilitation in the patient's home under the eye of a specialist. GMV develops a telemedicine platform based on its inhouse **antari HomeCare™** solution, allowing the therapist to monitor patient progress and adjust the rehab regime to suit.*

[5] *The PAPHOS project for personalization of clinical treatment comes to a successful conclusion. GMV has set up a Big Data platform that enables illnesses to be foreseen and forestalled while also prescribing treatment to suit each particular patient. The solution copes with patients suffering from several illnesses at once, combining medical records with patient monitoring. Brokered by the European EIT Health initiative, PAPHOS stands as a fine example of a healthcare 4.0 project providing evidence for decision-making purposes.*

[6] *The Colombian Grupo Campbell clinic, a leading specialist in the treatment of traffic-accident victims, takes up GMV's **antari** e-Health system. The sheer versatility of this in-house telemedicine platform, with specific developments for telepediatrics and ophthalmology, has also won the favor of a leading opticians chain, Ópticas 2000, a company of the Spanish distribution group, El Corte Inglés.*

[7] *GMV, Hospital de San Pau and the Open University of Catalonia (Universitat Oberta de Calalunya: UOC) drive the creation of a new app to improve the quality of life of Parkinson's sufferers. During this year the app's pilot scheme is launched, with GMV supervising the technical aspects. The app, also involving the use of music therapy, will help to improve patients' mobility and state of mind.*

[8] *GMV joins the European Commission's FP7-funded medico-scientific and technological Human Brain Project (HBP) as technology partner. HBP, involving institutions from 24 different countries, aims to deepen our knowledge and understanding of the human brain using information and communication technologies (ICTs).*

HARMONY
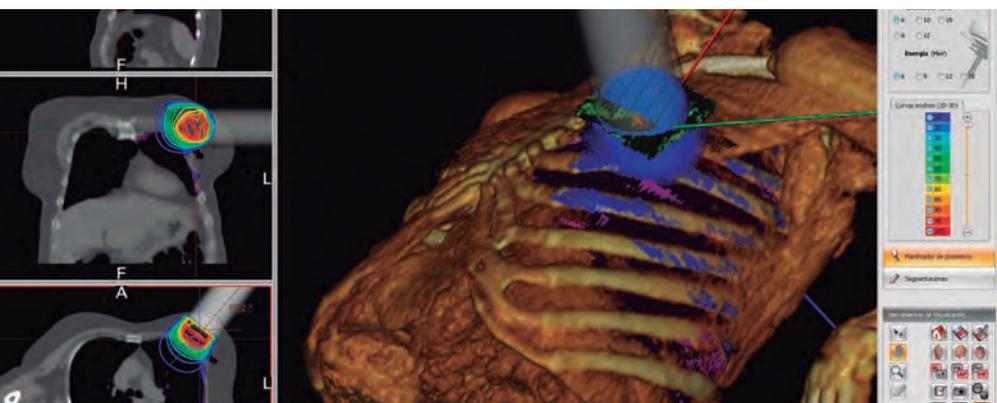
[9] *GMV joins the Healthcare Sub-Working Group of the European Cyber Security Organization (ECSO), the European Commission's new public-private association launched as part of a battery of new initiatives designed to enhance Europe's protection from cyberattacks and reinforce competitiveness within its cybersecurity sector. Within this group GMV is inputting its expertise in the protection and security of healthcare data.*

[10] *At the 2nd General Assembly of the HARMONY project GMV presents its Big Data platform for investigating hematologic malignancies. The Harmony Alliance is Europe's biggest public-private research initiative in the fight against blood cancers. GMV, as the project's only technology partner, has set up a Big Data platform that culls huge amounts of patient information. Once collated and anonymized, this information will then help clinicians make crucial diagnosis- and treatment-decisions. Elsewhere, GMV will also be helping to speed up research into the development of more efficient medicines. Brokered by the European Federation of Pharmaceutical Industries and Associations (EPFIA) and the Innovative Medicine Initiative (IMI), the alliance involves 51 partners from 11 European countries.*

ASSESSMENT

GMV's healthcare range continues to blossom and grow, improving the quality of life of the public at large, while its solutions and its customer base broadens at home and abroad.

Its intraoperative radiation therapy planner, *radiance™*, makes further headway in the US. This year it is taken up by three prestigious hospitals including New York's Mount Sinai Hospital. GMV's wealth of experience built up in the development of *radiance™* and the surgery simulator insight have earned it participation in an H2020 research program to enhance knowledge in specific areas of clinical simulation.

GMV's in-house telemedicine platform, *antari*, is taken up by Colombia's leading clinic for the treatment of traffic-accident victims and by Ópticas 2000, the leading opticians' chain of the Spanish distribution group El Corte Inglés. Within the European initiative EIT Health, GMV starts work on development of a telemedicine platform based on its *antari HomeCare™* solution to improve post-stroke walking rehab in the patients' home under the eye of a specialist.

GMV's Big Data expertise has also been transferred to the healthcare sector, where Big Data is being increasingly used and exploited. For the PAPHOS project GMV has set up a Big Data platform that enables illnesses to be foreseen and forestalled while also prescribing treatment to suit each particular patient. GMV likewise develops another Big Data platform for the Harmony project, which culls huge amounts of information on patients suffering from hematologic malignancies, thereby helping clinicians to make crucial diagnosis- and treatment-decisions.

IT technology is now being taken up with increasing alacrity by the healthcare sector, boding well for GMV's future growth in this sector. Together with institutions from 24 countries, GMV is now participating as technology partner in the Human Brain Project, which aims to tap into IT technologies to gain a better understanding of the human brain. Again in collaboration with other institutions, GMV is helping to develop a mobile App to improve the quality of life of Parkinson's sufferers.

Finally, on the strength of its excellent cybersecurity experience, GMV is working in several initiatives to protect patients' health data.

CYBERSECURITY

GMV has been leading the development of ICT security services and technologies in Spain for over 20 years now.

GMV provides integrated cybersecurity engineering and solutions, security governance and intelligence centers, managing technological risks and ensuring compliance with applicable legislation:

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

MAIN
MILESTONES

[1] *In 2017 GMV's in-house solution to protect automatic teller machines from malware attacks,* **checker ATM Security®***, clocked up its tenth birthday. 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 in over 33 countries, proving itself year after year to be the world's leading ATM security solution.*

[2] *GMV signs two important* **checker ATM Security®** *marketing agreements. The first is with AGS Transact Technologies Ltd., India's leading end-to-end payment solutions provider. The second is with SPL Group Americas, LLC., a multi-vendor ATM security and solutions provider specializing in logical and physical ATM protection.*

[3] *GMV has handled the security arrangements of the banking group BBVA for 15 years now. In 2017, jointly with the bank, GMV continues to develop and upgrade the corporate security management product FARO SECURITY. This platform has by now proven to be beneficial not only for banking but also for other sectors, coming up with a response for new client demands such as the maintenance-management of physical security technology projects. 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.*

[4] *GMV also continues to shore up its position as technology partner of banking firms like Santander, Bankia, CaixaBank and Banco Sabadell, tackling projects such as the discovery of ATM vulnerabilities, improving the fight against fraud or the use of cybersecurity intelligence in incident-response services.*

[5] *GMV's services take in the whole lifecycle of information security. In 2017 GMV vets several specific environments to check their compliance and security risks, drawing up plans for various notable international organizations and government authorities such as Eumetsat, Eurocontrol, ESA and Lusoponte, with the aim of endowing them with the necessary visibility for reliable decision-making and good governance.*

[6] *GMV collaborates with Spain's Industrial Cybersecurity Center (Centro de Ciberseguridad Industrial: CCI) to raise cybersecurity awareness in industrial environments, doing so by means of various initiatives such as collaboration in the publication "Cybersecurity in an Industrial Automation Project Lifecycle". This guide aims to help out in the crucial task of improving the protection of automated industrial infrastructure, filling a glaring gap in this area. GMV also collaborates with the Spanish Chapter of the Cloud Security Alliance in drawing up the fifth State-of-the-Art Cloud Security Study. The aim of this study is to explore the state of the art of cloud computing take-up in Spanish-speaking markets from the users' perspective and the role played by security in this take-up.*

[7] *GMV is designated as an Imperva Platinum Partner, becoming the first firm in Southern Europe to reach this category. To qualify firms have to show a proven track record of success in setting up and supporting Imperva's portfolio of cybersecurity solutions; they must also have great security expertise and equip their staff with Imperva-certified technical resources. This designation is the culmination of seven years of collaboration between GMV and Imperva, helping customers deploy Cybersecurity solutions that protect their data while also ensuring regulatory compliance.*

[8] *The Catalan Statistics Institute (Instituto de Estadística de Cataluña: IDESCAT) once more turns to GMV to ensure its ongoing compliance with Spain's National Security Scheme (Esquema Nacional de Seguridad: ENS) and Personal Data Protection Law (Ley Orgánica de Protección de Datos de Carácter Personal: LOPD). Under this new project GMV runs an audit to pinpoint any nonconformities or improvable shortfalls. It also works on an improvement of organizational aspects to guarantee ENS- and LOPD-compliance, plus a check of all security-improvement actions taken after IDESCAT's 2014 audit.*

[9] *2017 sees the birth of PROTECTIVE, a Horizon 2020 (H2020)-funded project that helps Computer Emergency Response Teams (CERTs) and Computer Security Incident Response Teams (CSIRTs) to be better prepared against cyberattacks, malware outbreaks and other security problems. They will*

also have the wherewithal to draw up prevention and response procedures. GMV's activity under this project focuses on definition and development of alert-correlation and the sharing modules, integration and testing of these modules, as well as the intelligent analysis of threats for National Research & Education Networks (NRENs) and CERTS.

[10] *With the idea of reinforcing its cybersecurity range GMV signs a collaboration agreement for distribution of CyberARK's services and products. CyberARK is the world leader in privileged management account protection. Under this agreement GMV enters the powerful fold of CyberArk distributors and technology partners, providing a complete suite of cyberthreat detection- and response-solutions.*

[11] *GMV diversifies its business into the new field of legal-sector cybersecurity. GMV's solution enables lawyers' offices to safeguard the information they hold and guarantee data privacy, as well as becoming perfect partners for their clients' own law abidance. Top-notch offices like Uría Menéndez entrust GMV with the cybersecurity of their business.*

[12] *In late 2017 GMV opens a new Computer Emergency Response Center (CERT) in Valladolid. This new site will enable GMV to increase the number of posts designed to watch out for the overall security of networks and equipment, providing cybersecurity incident response services and offering consultancy and advice on system security threats and solutions. The Cyber Security Incident Response Team (CSIRT) operating in this center has been accredited as a Computer Emergency Response Team (CERT) by the US University Carnegie Mellon, placing GMV in the vanguard of prevention, incident-solving and cybersecurity intelligence exchange, as one of Spain's few private firms that can boast this certification.*

ASSESSMENT

In 2017 GMV celebrates the tenth anniversary of **checker ATM Security**®. This in-house product has now been installed in more than 120,000 ATMs in over 33 countries and is showing itself year after year to be the world's leading ATM security solution. It has by now been taken up by some of the world's most important banks in areas especially prone to cyberattacks and cyber fraud. In 2017 GMV also signs new marketing agreements to help it break into yet more markets around the world.

Within the financial sector GMV has been handling the security arrangements of the banking group BBVA for 15 years now and working jointly with the bank on development of the corporate security management product FARO SECURITY. GMV also shores up its position as technology partner of banking firms like Santander, Bankia, CaixaBank and Banco Sabadel in the area of cybersecurity.

No less lively is the company's collaboration with public authorities and organizations, both national and international, for whom GMV is continuing to roll out its solutions and provide information security services.

GMV's efforts to break into the data protection and privacy protection market for lawyers' offices bears fruit; top-notch offices like Uría Menéndez entrust GMV with the cybersecurity of their business.

In late 2017, GMV opens a new Computer Emergency Response Center in Valladolid, thereby extending the company's capacities for the provision of services for the analysis and assessment of the overall security of networks and equipment and for the response against security related incidents. This new center places GMV in the vanguard in terms of cybersecurity intelligence exchange and incident response and prevention, making it one of only a handful of private Spanish firms boasting official CERT certification. This year also saw the launch of the H2020 PROTECTIVE project, the aim of which is to endow CERTs with the necessary wherewithal for fending off cyberattacks, malware outbreaks and other security problems, and help them set up prevention and response procedures.

As a leading cybersecurity firm GMV collaborates with various organizations like Spain's Industrial Cybersecurity Center (Centro de Ciberseguridad Industrial: CCI) to raise awareness of cybersecurity by means of diverse initiatives and collaboration agreements.

INTELLIGENT TRANSPORTATION SYSTEMS

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

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

- Advanced passenger-transport fleet management systems
- Transport scheduling and planning systems
- Fare and ticketing systems (electronic fare collection systems for vending and validation of various types of tickets, farecards and other travel credits)
- Ticket Vending Machines (TVMs) and point-of-sale management systems
- Demand-response transport management systems
- State-of-the-art passenger information systems: onboard, bus-stop, APPs, websites with real-time information and trip planners
- Eco-driving systems
- Advanced fleet-management systems for railway transport (*SAE-R®*)
- Onboard video-surveillance (CCTV) systems
- Onboard digital intercom and PA systems
- Special fleet-management systems: public services, emergencies, maintenance, distribution, logistics, etc.
- Advanced car telematics units
- Electronic tolling and information systems on toll-roads, highways and at bridges and tunnels
- Connected-car and autonomous-vehicle solutions: software and end-2-end services, cybersecurity, advanced positioning technologies
- Advanced mobility services: PAYD/UBI insurance, car-sharing, car-pooling, MaaS

MAIN
MILESTONES

[1] *In 2017 GMV consolidates its worldwide leadership in public intelligent transportation systems, winning several new contracts: Grupo Ruiz turns to GMV for technological modernization of Toledo's urban transport fleet, including an advanced fleet-management system with onboard ridership monitoring, an onboard video-surveillance system (CCTV) plus a passenger-information system including onboard multimedia information. Barcelona's Municipal Transport Authority (Transports Municipals Barcelona: TMB) awards GMV a new Barcelona project for upgrading the tracking functions of the communications equipment and driver interface. Elsewhere, AVANZA also entrusts GMV with supply of the fleet-control systems for its long-distance concessions operated by the companies ALOSA and Llorente Bus plus renewal of the advanced fleet-management and fare-collection system of its Etasa and Alacuber operators. Guaguas Municipales, the local bus-service firm of Las Palmas de Gran Canaria, also turns to GMV for renewal of its advanced fleet-management system and passenger-information panels. GMV is likewise asked by AlcalaBus to renew the fleet-management system of the urban transport of Alcalá de Henares.*

[2] *GMV is contracted by the Majorcan passenger-transport company Transabus for supplying **gmv planner**. **gmv planner**, powered by DPK, is a comprehensive planning and scheduling platform that provides public transport authorities and operators with a powerful public transport operation lifecycle management tool. This contract represents GMV's first ever client reference in Spain for systems of this type, topping up its range of ITS products and services. This new system manages the whole transport cycle, from initial configuration of lines and schedules, service planning and operational control to the final passenger-information systems.*

[3] *GMV also strengthens its international leadership in public Intelligent Transportation Systems: as part of GMV's ongoing technological modernization of Cyprus's bus fleet, key events this year were the Factory Acceptance Test (FAT) and Site Acceptance Test (SAT); GMV is also phasing in a series of upgrades such as a CCTV system, a contactless fare card recharging website and an adaptation of light vehicles to be able to integrate the onboard equipment. This year GMV also signs a contract with Malta's public transport network for maintenance of the fleet-management system and rolling out a video-surveillance system (CCTV) and electronic fare-collection system.*

[4] *GMV has been trading in Poland since 2008, installing Intelligent Transportation Systems in numerous Polish cities like Warsaw, Szczecin, Gdansk, Gydinia, Bydgoszcz and Toruń. In 2017 GMV signs a contract with Bydgoszcz Transport Authority, ZDMiKP, for another one-year renewal term of its Intelligent Transportation System, plus a new contract for an after-sales, maintenance and technical-assistance service. Moreover, as part of its longstanding relationship with ZDITM Szczecin (Szczecin Transport Authority) GMV wins the contract for grafting new functions onto the system rolled out earlier, also signing a new contract with ZTM Gdańsk for a driver-interface maintenance service plus assembly and disassembly of a set of onboard equipment on its public-transport vehicles.*

[5] *Barcelona Metropolitan Transport Authority (Transports Metropolitans de Barcelona: TMB) once more places its trust in GMV for renewal of the video-surveillance or onboard CCTV for Barcelona's metro trains. The core of the system under this project is the GMV-designed digital recording equipment to capture images in Full HD resolution, with the capacity of replay and simultaneous exporting. The system caters for simultaneous video streaming from more than four cameras in each train to each one of the system's 17 operation posts. The project comprises the supply of 300 video recorders, 300 communication nodes, 600 antennas, 760 video coders, 740 Ethernet switches and 540 IP cameras. This new system will also be integrated with existing CCTV systems on 8 train series, maintaining a total of 2038 analog cameras.*

[6] *Also 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 and management system. GMV is also selected by Spain's national rail operator, RENFE, for supplying a real-time train-speed monitoring system, while the freight division, RENFE Mercancías, asks GMV to upgrade its fleet management system, including complete migration of the current control center to a virtualized environment in RENFE's corporate datacenter, overhaul of the database management system plus other graphical improvements that give it a more up-to-date look. Lastly, SAE-r's latest available technological upgrades have also been phased in. GMV also reaches an agreement with CAF, the railway multinational, to supply passenger-information, PA/Intercom and video-surveillance systems for the tram network of the Italian city of Cosenza.*

[7] *Also in the railway-transport area, Alstom and GMV have been working together now since 2014, when both companies signed a framework agreement for certifying GMV as Alstom's AVLS supplier. In 2017 even closer bonds between the two companies are forged with GMV's joining of the Alstom Alliance Charter, Alstom's strategic program for reinforcing cooperation with those companies it considers to be its key suppliers. The purpose of this program is to set up a network of premium alliances*
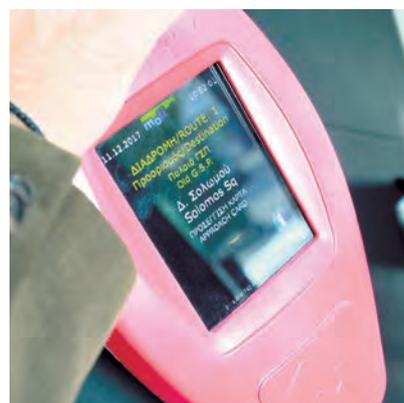
with key companies within Alstom's supply chain. This will help to generate a working framework to achieve common goals based on three main pillars: business development, industrial excellence and product and innovation.

[8] *Under the contract with SICE for the design, software development and manufacture under the SICE brand of all the Ticket Vending Machines of Chile's new metro lines, late 2017 sees the opening of the metro's new line 6. Within this project GMV is supplying a total of 80 Ticket Vending Machines (TVMs) for vending and recharging the Chilean system's bip! farecards, plus 150 compact vending/recharging machines specially designed for working with these farecards.*

[9] *GMV wins a tender held by the State Vehicle Fleet (Parque Móvil del Estado: PME) for setting up a MOVILOC®-based management system for its 400-vehicle fleet. For their part, Retevisión and Tradia Telecom (two of the companies making up CELLNEX) take up this year the Alphabet Telematics service (the MOVILOC® version marketed by the Alphabet vehicle-hire firm, a partner of GMV) for their vehicle fleet spread throughout the whole country.*

[10] *In the automotive area, FICOSA, a Global Tier 1 Automotive Parts & Systems Supplier, with whom GMV has been working for over a decade, continues to place its trust in GMV,*

granting it in 2017 a new contract for software development of the new telematics control units being developed by FICOSA for diverse carmakers. After this new contract, GMV closes the year with over three million vehicles fitted with its in-house software.

[11] *At the end of the year Spain and Portugal join C-ROADS, one of Europe's most ambitious ITS-mobility and connectivity projects. C-ROADS brings together different EU member states, participating through a team of national industrial partners, technology centers and government authorities, to test, harmonize and implement cooperative ITS (C-ITS) services across Europe. GMV boasts a standout participation both in the Spanish and Portuguese platform, taking part in various pilot schemes and rolling out mainly onboard units (OBUs) and roadside units (RSUs).*

[12] *GMV's ITS company in North America, GMV Syncromatics Inc., part of the GMV fold since 2015, goes from strength to strength in 2017, making it market leader in its main business of supplying fleet-management and passenger-information systems in the cloud (SaaS model). Among the new contracts won in 2017 particular mention must be made of Ventura County, West Hollywood, the extension of Anaheim and Victor Valley in California, and Maui in Hawaii.*

ASSESSMENT

GMV remains national leader in public intelligent transportation systems, winning new contracts and extending others in Toledo, Palma de Mallorca, Barcelona, Las Palmas and Alcalá de Henares and, overseas, in Malta, Cyprus and diverse Polish cities.

In 2017 GMV won its first ever client reference in Spain for a comprehensive planning and scheduling platform, on the strength of its application **gmv planner**. **gmv planner,** powered by DPK, provides public transport authorities and operators with a powerful public transport operation lifecycle management tool, ranging from initial configuration of lines and schedules, service planning and operational control to the final passenger-information systems.

In the USA GMV Syncromatics Inc., whose main business is supplying fleet-management and passenger-information systems in the cloud, chalked up remarkable growth in 2017, making it the SaaS market leader in the USA. Among the new contracts won in 2017 particular mention must be made of Ventura County, West Hollywood, the extension of Anaheim and Victor Valley in California, and Maui in Hawaii.

In the fleet-management market the State Vehicle Fleet (Parque Móvil del Estado) awards GMV a contract for setting up a **MOVILOC®**-based management system for its 400-vehicle fleet. For their part, Retevisión and Tradia Telecom (two of the companies making up CELLNEX) take up this year the Alphabet Telematics service, a **MOVILOC®** version marketed by the Alphabet vehicle-hire firm, a partner of GMV).

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 and management system. GMV is also selected by Spain's national rail operator, RENFE, for supplying a real-time train-speed monitoring system, while the freight division, RENFE Mercancías, asks GMV to upgrade its fleet management system.

In the industrial arena GMV reaches agreements with train manufacturers like CAF and Alstom, strengthening its position as a tried-and tested supplier.

In the automotive area GMV closes the year with over three million vehicles fitted with its in-house software, fruit of its collaboration with FICOSA, dating right back to 2007. In 2017 FICOSA awarded GMV a new software development contract for the new telematics control units being developed by FICOSA for diverse carmakers.

GMV also boasts a standout participation in both the Spanish and Portuguese platform of C-ROADS, one of Europe's most ambitious ITS-mobility and connectivity projects. GMV is taking part in various pilot schemes and rolling out mainly onboard units and roadside units.
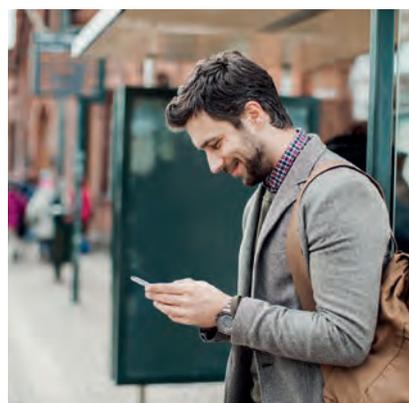
TELECOMMUNICATIONS AND INFORMATION TECHNOLOGIES

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

INFORMATION TECHNOLOGY FOR THE PUBLIC AND PRIVATE SECTOR

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

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

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

MAIN
MILESTONES

[1] *GMV launches **ubic Virtual Mobile Infrastructure**, a development that takes the cell phone interface into the cloud, allowing it and all its Apps to be accessed from any smartphone. **ubic VMI** has been designed with the corporate professional world in mind, to harden the security of handhelds (smartphones and tablets) used by company employees. This technology boosts security and privacy (no data is stored on the handheld), cuts down consumption of the cell phone's hardware resources and manages the cell phone and its installations remotely, including in the user's own handheld.*

[2] *This year sees completion of GMV's project for the Inter-American Development Bank (IDB), combining Big Data and Machine Learning technology to define a strategy for turning its vast store of information to the best account. In this project 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.*

[3] *In 2017 Barcelona University's Human Rights and Penal System Observatory (Observatorio del Sistema Penal y los Derechos Humanos: OSPDH) sets in motion the Institutional Violence Communication and Registration System (SIstema de REgistro y COmunicación de la VIolencia Institucional: SIRECOVI), developed with GMV technology. SIRECOVI is a trailblazing European website that enables victims, incident reporters and human-rights organizations to report abuse through a private communication channel. GMV has developed this platform on the overriding principle of data confidentiality, safeguarding at all times the privacy of the persons involved.*

[4] *2017 sees the commencement of PRODUCTIO (PROductivity InDUstrial EnhanCement through enabling TechnolOgies), a project of the National Business Research Consortia (Consorcios de Investigación Empresarial Nacional: CIEN) under the aegis of the Industrial Technology Development Center (Centro para el Desarrollo Tecnológico Industrial: CDTI). This project is being run by a GMV-primed national multisector and multidisciplinary R&D consortium with the remit of looking into diverse technologies, techniques, tools, methodologies and knowledge designed to boost the operational capability of industrial processes (Overall Equipment Efficiency: OEE) within the context of connected industry.*

[5] *The Directorate General of Planning and Management of Public-Owned Hydrological Resources of the Regional Environment and Land-Use Ministry of Andalusia (Consejería de Medioambiente y Ordenación del Territorio de la Junta de Andalucía) turns to GMV for carrying out a groundbreaking pilot scheme for measuring various water-quality parameters of the Guadalete River as it flows through the Cadiz locality of Jerez de la Frontera. The project involves the deployment of an IoT SEMS platform in the lab of GMV's Seville office, plus various water-quality sensors set up in the hydraulic infrastructure, making up between them a sustainable, low-maintenance-cost monitoring network.*
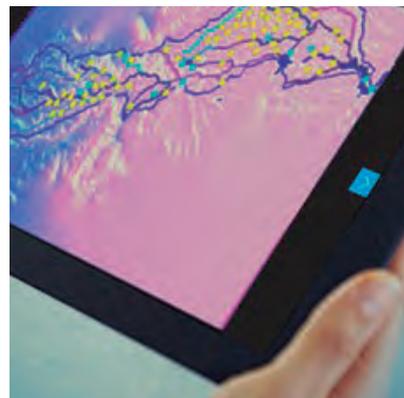
[6] *GMV, with the collaboration of the Universitat Autónoma de Barcelona (UAB), develops patent-managing software called IDEAS. This web application, incorporating the open technology of the Patents Office, protects the industrial and intellectual property of its research organizations such as the universities Universidat Rovira i Virgili and Universidad de Alicante, the National Aerospace Institute (Instituto Nacional de Técnica Aeroespacial: INTA), the Catalan Chemical Research Institute (Institut Catalá d'Investigació Química: ICIQ) and UAB itself.*

[7] *GMV reaches the final rounds of the "IBM Watson Build Challenge", an international competition in which the New York Company challenges GMV's Big Data and Artificial Intelligence team to create an App with the aid of the IBM Bluemix platform and IBM Watson's cognitive technology. The company's data scientists design HelpBot, a chatbot App that will help to improve communications between emergency-service authorities and the victims of extreme situations like quakes, floods, terrorism, wildfires, etc.*

ASSESSMENT

Government and company ICT investments continued to pick up in 2017 and GMV is ever ready with its wide range of solutions to meet their needs.

During this year GMV launched **ubic Virtual Mobile Infrastructure**, a development that takes the cell phone interface into the cloud, allowing any smartphone to access the interface and all its Apps, hardening the security and significantly improving the management of company employees' handhelds.

GMV has by now built up such a wealth of experience and knowledge in so many areas that it is ideally placed to offer groundbreaking solutions in all the areas it trades in. A case in point is industry 4.0, where GMV is becoming increasingly active. This year saw the kickoff of PRODUCTIO, a GMV-primed national multisector and multidisciplinary project with the remit of looking into diverse technologies, techniques, tools, methodologies and knowledge designed to boost the operational capability of industrial processes within the context of connected industry.

In the public sector GMV maintains the trust of its traditional customers and continues to provide groundbreaking solutions. Prime among them this year are the following: the development for the Directorate General of Planning and Management of Public-Owned Hydrological Resources of the Regional Environment and Land-Use Ministry of Andalusia of a groundbreaking pilot scheme for monitoring various water-quality parameters of the River Guadalete; the Institutional Violence Communication and Registration System of Barcelona University's Human Rights and Penal System Observatory, set up with GMV technology to safeguard the privacy of abuse sufferers; and the development together with the Universidad Autónoma de Barcelona of a patent-management solution used by various public research organizations.

GMV continues to reinforce its position as a benchmark Big Data firm, bringing its expertise to various sectors. This year saw completion of GMV's project for the Inter-American Development Bank, combining Big Data and Machine Learning technology to define a strategy for turning the bank's own information to the best account. GMV also designed HelpBot, a chatbot App that will help to improve communications between emergency-service authorities and the victims of extreme crises. This development was carried out as part of GMV's triumphant progress to the final of the international IBM Watson Build Challenge.

SOCIAL
RESPONSIBILITY

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

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

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

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

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

HUMAN
CAPITAL

Right from the word go GMV has made its personnel policy one of the kingpins of its whole business project. We at GMV 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 business. The priority 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 achieve this aim. This stands us in good stead for maintaining our economic growth into the future. GMV closed the year with a staff of 1631, of which 89% are university graduates.

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 open-ended employment contracts, a rate of about 88% in 2017. To meet our commitment to our employees, our personnel policies guarantee equal treatment of all our staff, regardless of gender and ethnicity, 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 17% of senior management. Our staff is a mix from 37 different nationalities and the average age comes out at about 36.

One of the main planks of the human resources policy is continuous training. This makes good sense because 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, 498 training courses were held in 2017 on both an individual and group basis, adding up to a sum total of 26,230 training hours.

GMV liaises permanently with study centers and universities both at home and abroad, whether by way of temporary agreements, academic 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, conferences and chats, etc.

True to the company's university roots, GMV collaborates in various academic events and organizes different activities with the university world. The aim is always the same: stoke up its passion for the world of technology. As in every year since 2004, 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), rewards the best students from UPM's various study subjects, thus encouraging ongoing effort and the pursuit of excellence. It has also accompanied the most enquiring minds in various national, European and international competitions like First Lego League, the European Cansat Competition, IE Data Expedition and Programarobot (URJC), among others.

GMV always supports budding technology talent wherever it blossoms. For example it forms part of Fundación Asti's STEM Talent Girl program, an initiative that kicked off back in 2016 to encourage women of the future to pursue STEM careers.

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 9001:2015 Quality management*
- *PECAL/AQAP 2110, PECAL/AQAP 2210 & PECAL/AQAP 2310 Specific for purposes of defense*
- *UNE-EN 9100:2016 Quality systems in the aerospace and defense sector*
- *UNE-EN ISO14001:2015 Environmental systems*

GMV Insyen AG
- *NRTL-C/US*
- *ISO 9001:2015 Quality management*

GMV Soluciones Globales Internet S.A.U.
- *UNE-EN ISO 9001:2015 Quality management*
- *UNE-ISO/IEC 20000-1:2011 IT service management*
- *ISO 13485:2003 Health product quality management: intraoperative radiotherapy planning systems.*

- *UNE-EN ISO14001:2015 Environmental systems*
- *ISO/IEC 27001:2013 Information security management*
- *ISO 22301:2012 Business continuity management. Resilience*
- *UNE 166002:2014 R&D management*
- *CEN/TS 16555-1:2013 Innovation Management*

GMVIS Skysoft S.A.
- *CMMI Level 5*
- *UNE-EN ISO 9001:2015 (ICT for Business Scope) Quality management*
- *UNE-EN ISO 9001:2015 (Space, Defense and Intelligent Transportation Systems Scope) Quality management*
- *ISO 14001:2015 Environmental systems*
- *ISO/IEC 27001:2013 Information Security management*
- *UNE-EN 9100:2016 Quality systems in the aerospace and defense sector*

GMV Innovating Solutions, Inc.
- *CMMI Level 5*
- *UNE-EN ISO 9001:2015 Quality management*

GMV Innovating Solutions Sp.z o.o
- *CMMI Level 5*
- *UNE-EN ISO 9001:2015 Quality management*

GMV Innovating Solutions S.R.L
- *UNE-EN ISO 9001:2015 Quality management*

GMV Sistemas S.A.U.
- *UNE-EN ISO 9001:2015 Quality management*
- *UNE-EN ISO14001:2015 Environmental systems*
- *UN/ECE N. 10*

GMV
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ECONOMIC AND FINANCIAL
RESULTS

FINANCIAL STATEMENTS 2017

BALANCE SHEET

ASSETS	2016	2017	LIABILITIES	2016	2017
Fixed assets	35.345.299,47	38.215.347,41	Stockholders' equity	47.726.168,20	50.178.557,52
			Capital grants	486.247,73	472.762,60
			Minority interests	5.730.528,72	6.190.336,99
			Long-term funding	16.205.301,52	11.769.972,13
			Interest free credits	*5.653.169,67*	*6.328.699,87*
			Long term funding	*10.552.131,85*	*5.441.272,26*
Total fixed assets	**35.345.299,47**	**38.215.347,41**	**Total Long-term Funding**	**70.148.246,17**	**68.611.629,24**
Inventories	11.341.035,05	18.165.558,95	Short term liabilities	19.859.641,73	29.476.413,14
Accounts receivable	23.985.026,98	21.601.952,42	*Bank loans and overdrafts*	*4.614.520,00*	*11.615.785,94*
Trade debtors	*34.925.822,83*	*34.672.201,57*	*Non-trade payables*	*15.245.121,73*	*17.860.627,20*
Trade services on account	*-12.970.303,03*	*-16.028.111,40*	Deferred payments	2.725.396,83	1.590.777,80
Other debtors	*2.029.507,18*	*2.957.862,25*			
Cash	22.061.923,23	21.695.961,40			
Total current assets	**57.387.985,26**	**61.463.472,77**	**Total short term liabilities**	**22.585.038,56**	**31.067.190,94**
Total assets	**92.733.284,73**	**99.678.820,18**	**Total liabilities**	**92.733.284,73**	**99.678.820,18**
Working capital	34.802.946,70	30.396.281,83	Working balance	34.802.946,70	30.396.281,83
Working capital/Equity	49,61%	44,30%	Working balance/fixed asset	98,47%	79,54%

PROFIT AND LOSS ACCOUNT

EXPENSES	2016	2017	INCOME	2016	2017
Purchase of goods	38.795.945,41	48.737.714,15	Turnover	140.923.841,18	168.299.901,93
Ancillary Services	12.514.913,03	14.243.641,54	Own expenses capitalized	1.932.449,42	2.930.213,46
Taxes	255.572,74	360.412,40	Operating grants	336.341,21	283.438,17
Employee Costs	82.683.444,29	96.892.023,50	Financial Income	132.683,54	384.826,89
Financial Expenses	848.080,34	1.249.589,64	Extraordinary Income	159.102,87	14.235,06
Extraordinary Expenses		33.395,81			
Period Depreciation and Amortization	4.565.877,46	4.940.339,05			
Appropriations, transfer to Provisions	-269.418,35	466.185,05	**Total income**	**143.484.418,22**	**171.912.615,51**
Total Expenses	**139.394.414,92**	**166.923.301,14**	**Pre-tax profit**	**4.090.003,30**	**4.989.314,37**
Corporate income tax	660.552,10	634.764,31	**Post-tax profit**	**3.429.451,20**	**4.354.550,06**

CASH FLOW STATEMENT

OPERATING ACTIVITIES	2016	2017
Profit after tax	3.429.451,20	4.354.550,06
Depreciation and amortization	4.565.877,46	4.940.339,05
Operating Cash Flow	**7.995.328,66**	**9.294.889,11**
Net finance expense	848.080,34	1.249.589,64
Corporate income tax	660.552,10	634.764,31
EBITDA	**9.503.961,10**	**11.179.243,06**
(Increase) / decrease in trade and other receivables	2.231.308,30	-4.441.449,34
Increase / (decrease) in trade and other payables	-3.174.365,26	2.615.505,47
(Decrease) / increase in provisions	786.146,93	-1.134.619,03
Deferred income (capital grants)	-336.341,21	-283.438,17
Cash flow generated from operationss	**9.010.709,86**	**7.935.241,99**
Tax paid	-660.552,10	-634.764,31
Net cash flow from operating activities	**8.350.157,76**	**7.300.477,68**

INVESTMENT ACTIVITIES	2016	2017
Purchase of subsidiary undertaking (Goodwill)	-4.476.910,19	-999.950,08
Capital expenditure - plant and equipment	-1.592.804,40	-3.896.450,93
Capital expenditure - intangible assets	-1.894.439,50	-2.913.985,98
Net cash flow from investing activities	**-7.964.154,09**	**-7.810.386,99**

FINANCING ACTIVITIES	2016	2017
Net new debt (debt increase + debt repayments)	3.005.029,33	2.565.936,55
Capital Grants and subsidies on capital	387.457,20	269.953,04
Interest paid	-848.080,34	-1.249.589,64
Dividends paid to equity shareholders	-323.229,60	-569.704,62
Paid-in capital / Adjustments to the equity value	-349.026,82	-297.005,17
Minority Interests	236.350,33	459.808,27
Results attributable to the Minority Interests	-776.586,86	-1.035.450,95
Net cash flow from financing activities	**1.331.913,24**	**143.947,48**
(Decrease) / increase in cash and cash equivalents	**1.717.916,91**	**-365.961,83**
Cash and cash equivalents at beginning of year	20.344.006,32	22.061.923,23
Cash and cash equivalents at end of year	**22.061.923,23**	**21.695.961,40**