2018 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

GMV's growth as a company has always been solid and sustainable, driven by unceasing new developments in our various business lines. This growth has picked up speed considerably in recent times. 2018 was the third year running of two-figure growth, fueling a host of new job vacancies to tackle the increasing demand for our innovative solutions. Increasingly, our products and services call for a shrewd combination of knowledge and technology from several different areas and approaches.

The growth chalked up by our space activity is especially eyecatching. With the contract for maintenance and upgrading of the Galileo constellation's ground control segment (GCS), GMV takes on leadership and responsibility for one of four major Galileo contracts that are now underway, taking us to the level of the main industrial stakeholders in Europe's space market. This contract draws on our proven expertise in satellite control and flight dynamics but also in Cybersecurity. At the same time we are also participating in other major Galileo contracts, holding responsibility for several critical subsystems.

Tailoring its technology to the ongoing needs of the emerging mega-constellations of satellites, GMV this year has developed OneWeb's satellite control center, capable of controlling thousands of satellites at once. GMV's flight-dynamics systems and Space Situational Awareness technology are also worldwide benchmarks, enabling us to offer a new space-debris avoidance alert service. Cybersecurity is now coming into its own in all sectors; it is a sine qua non of any digital transformation process, especially in the public sector. In 2018 GMV brought its wealth of experience in this field to bear on Cybersecurity risk mitigation plans of international organizations and government authorities like NATO, the Portuguese MoD, Eumetsat, the Ministry of the Presidency, The Spanish Land Registry and the World Intellectual Property Organization (WIPO).

The financial, legal and insurance sectors are likewise immersed in the digital transformation process and its companies and organizations need to safeguard their clients' sensitive data. GMV is responding to this growing demand by developing specialist services. We apply technologies like artificial intelligence and big data to fraud- and money-laundering-prevention for banks and insurers, but also to new healthcare solutions for mining clinical and epidemiological data, or to precision agriculture, plugging into the vast amount of earth-observation data on hand nowadays. The industrial sector is another important area of opportunity for GMV, where we are now developing solutions for secure and simple implementation of Industry 4.0 systems.

Even in such a restricted sector as defense we have broken into the international market in a big way. By 2016 our international sales in this sector were already outperforming the national turnover, our roll call of worldwide clients now including FRONTEX, NATO, EDA, the European External Action Service and ministries of defense of the USA, Canada and the Netherlands. Today's complex international panorama is now bringing out the need for a common European defense policy. This has prompted the European Commission to launch its first industrial initiatives in joint European Preparatory Action on Defence Research programs. Many European countries, including Spain, are now overhauling their defense and security organizations. The Spanish MoD has undertaken to launch a series of major national programs for land, sea and air forces, and GMV is already participating in the design of these programs.

Neither is the transport sector short on business opportunities. For the last two years we have been investing heavily in the development of a whole range of new products for intelligent transportation systems, due to come on-stream in 2019. GMV's state-of-the-art ticketing systems allow fare payments with contactless bankcards and cell phones. In 2018 we won the first tenders for setting up these systems in Spain in the Balearic Islands, in Pamplona and Almeria. At the same time GMV has also set its sights firmly on the incipient connected-car market, developing groundbreaking automobile-technology solutions that tap into its Cybersecurity expertise. This year we have also completed the takeover of Syncromatics in Los Angeles, further enhancing GMV's range of solutions and boosting its business in the worldwide market for intelligent transportation systems.

GMV's sharp growth over recent years, a thrilling challenge in itself, would not be possible without the unswerving will of GMV's entire team to take on new technological dares, coming up with solutions to problems of all types that crop up along the way.

The source of this growth is our clients' drive to improve their services, in turn giving us the chance to develop solutions best suited to meet this need. To our employees, our collaborators and our clients: many thanks!

Mónica Martínez

LETTER FROM THE CEO

JESÚS B. SERRANO

This year, GMV has given a big push to its strategic development policy, pulling off important feats that have spurred its growth and enhanced its figures across the board. Both turnover and EBITDA are up from 2017, chalking up two figure growth, the former reaching € 196 million and the latter soaring past € 12.25 million. Net profit is also up, by 17 % to € 5.1 million. Our outstanding 2017 record in public tenders plus our ongoing commercial activity this year, reaching an all-time high, have fueled a huge growth in our new contracts figure, reaching a level of 1.68 x 2018's sales figure. 2018's end-of-year order book thus recorded a figure of 1.56 x turnover, boding extremely well for the coming year and GMV's longer-term future.

GMV was born 34 years ago when it won a European Space Agency contract. Ever since then our space business has thrived on the strength of hi-tech expertise, and, from there, we have also broken into other sectors by technology transfer. Some of the most relevant examples are our intelligent transportation systems, defense and security systems or ICT systems, for banks, telcos, healthcare or utilities. GMV has kept up its strong technological base and a multidirectional internal technology transfer model. So it is that the company's Cybersecurity technology, initially developed in the financial sector over thirty years ago, has now become a crucial input not only in that sector but also in defense, security, the automotive industry and even in the space sector.

We are proud of our past but even more of our future. In the year now coming to a close GMV won the contract for maintenance and upgrading of Galileo's ground control segment in its exploitation phase. The system for which GMV will be responsible from here on is the infrastructure in charge of tracking, monitoring and control of all the Galileo constellation satellites. This contract is important not only qualitatively (as one of the four major Galileo development and maintenance contracts) but also quantitatively. Its total worth, after all, adds up to € 250 million. It therefore represents GMV's biggest ever contract to date, in terms of both level of responsibility and budget.

This contract award shows that our strategy based on cutting-edge technology, innovation and excellence, allied with our customer-centered approach and business honesty, is correct and with a huge potential in the future. This strategy, after all, has won us the worldwide number-one position in satellite control centers as well as a berth in all of Europe's satellite navigation programs right from the start; it has also enabled us to build up a cast-iron reputation in the space and Cybersecurity sectors. The net result of all these skills, this expertise and strategic awareness enabled us not only to take part in the tender but also to win the contract in the end.

We would like to put on record here our gratitude to ESA, GSA and European Commission for the trust shown in us with this contract award. We are proud of this achievement and well aware of the great responsibility it entails, given the huge importance of Europe's Galileo GNSS. It is bound to produce a plethora of quality-of-life-enhancing applications for all Europeans and have a big knock-on effect on the European economy.

This new contract opens up enormous future prospects for GMV in the space sector and shifts us up to a higher gear. It also enhances GMV's image and ups it profile in all our other business lines, demonstrating GMV's outstanding capacities in terms of technology, management and finance, and paves the way for greater strategic growth across the board.

But GMV is much more than this one bumper contract.

In the space sector GMV is contributing to space missions of all types: earth observation, navigation, telecommunications, science, robotic exploration, crewed flights, technology demonstration and launchers. And the number of spacecraft choosing GMV technology never stops growing, several of them being launched in 2018.

GMV's systems, products, inhouse developments and ongoing ICT experience continue to support and enable the digital transformation of government authorities and companies from diverse sectors.

In the intelligent transportation systems market we have now begun to market our new products based on the new strategy launched back in 2016. The first results are very promising and we are confident that this new strategy will make us a worldwide leader.

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 by state security forces. Further developments are now in the pipeline for future implementation in the Spanish MoD's major operational programs, and we confidently expect to play a leading role in the new challenges now appearing at both national and international level.

Our thanks go especially to our clients for the trust they have shown in us over the years. Once more, another special mention must also go to our 1850-strong staff and their remarkable talent, passion and commitment for their contribution to GMV's development. Last but not least, the excellent collaboration of our partners and providers, without whom we would not be able to tackle and solve the challenges we are faced with.

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

MÓNICA MARTÍNEZ WALTER
President

JESÚS B. SERRANO MARTÍNEZ
Chief Executive Officer

JAVIER LÓPEZ ESPAÑA
General Secretary

SUSANA MARTÍNEZ WALTER
Member of the Board

FCO. JAVIER MARTÍNEZ CENDEJAS
Chief Finacial Officer

IGNACIO RAMOS GOROSTIOLA
Chief People Strategy & Infrastructure Officer

MIGUEL ÁNGEL MARTÍNEZ OLAGÜE
Chief Business Development & Marketing Officer
General Manager Intelligent Transportation Systems

JORGE POTTI CUERVO
General Manager Space

LUIS FERNANDO ÁLVAREZ-GASCÓN PÉREZ
General Manager Secure e-Solutions

MANUEL PÉREZ CORTÉS
General Manager Homeland Security & Defense

ALBERTO DE PEDRO CRESPO
Managing Director GMV Portugal

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


gmv

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.

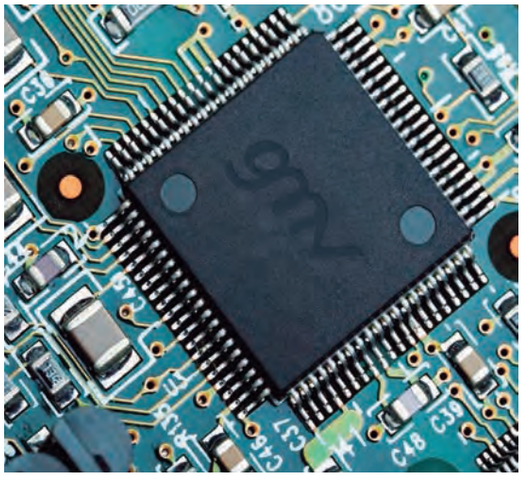
In May 2005 business group GMV upped the stakes in its international growth and development strategy by buying a 58 % holding in Skysoft, a Portuguese firm with very similar business lines and target markets to GMV's. In 2007 the operation was completed with the purchase of 100 % of Skysoft, its operations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

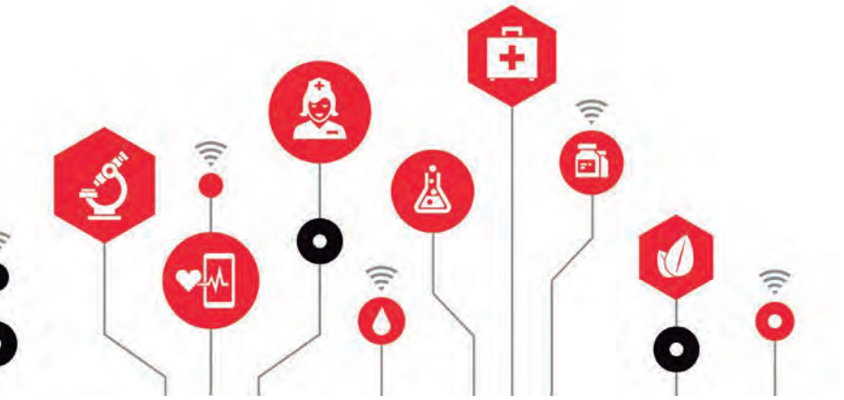
GMV's new corporate identity was officially launched in September 2006, to bring its image into line with the actual situation of the multinational technology group GMV. The group had by now broken into many new sectors and expanded its business internationally. To make sure the corporate brand did not 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 then 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). In 2018, as part of its strategy of investment and growth in the USA's ITS market, GMV completed its takeover of Syncromatics. This latest outlay increases GMV's expansion capacity in the USA and consolidates its position in the worldwide ITS market.

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

By the end of 2018, 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 multinational business group established in Europe, the Americas and Asia, with a staff count close to 2000 and trading in several hi-tech sectors with a swelling client portfolio in all five continents.

Nowadays 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.

GMV IN 2018

MAIN FIGURES

Total Income:	195,74 M€
EBITDA:	12,25 M€
Net profit:	5,10 M€
Number of employees:	1.850

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 2018

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 procedures and systems
- GNSS technical assistance for air-navigation operators and authorities

MAIN MILESTONES

[1] *GMV's inhouse **dronelocus®** family of products is chosen by Spain's air navigation services provider, ENAIRE, for providing tracking, emergency-management and GNSS performance forecasting services for navigation and surveillance within the DOMUS project, one of the five European projects selected by the Single European Sky ATM Research (SESAR) for demonstration of U-Space services for Unmanned Traffic Management (UTM).*

[2] *Likewise in the area of U-Space services and in collaboration with CATEC under the leadership of VVA, GMV is taking part in a project that aims to standardize EGNOS and Galileo services in aircraft such as drones, Remotely Piloted Aircraft Systems (RPASs), Unmanned Aerial Vehicles (UAVs) and Unmanned Aerial Systems (UASs). As well as demonstrating how Europe's GNSS services (EGNOS and Galileo) can outperform other GNSS solutions in terms of navigation, electronic identification and geofencing, the project's test campaigns and trials will analyze the capabilities of EGNOS and Galileo for aircraft of this type, draw up standardization proposals and assess the project's economic viability.*

[3] *Under the European aeronautics research program CleanSky 2, significant progress is made in 2018 within the Utility Building Blocks Integration for Cockpit (UBBICK) project, which proposes a modernization of current cockpit utility management architectures. In 2018 GMV develops a new flexible and configurable onboard support package for integration of GMV's KDY operating system in Zodiac's future RDPC.*

[4] *In 2018 GMV continues to work on the PASSARO, INES and PHANTOM projects. Falling under the umbrella Clean Sky 2 program, the aim of PASSARO (caPAbilities for innovative Structural and functional teSting of AeROstructures) is to work simultaneously in several areas identified by Airbus D&S for functional and structural on-ground tests for advanced fuselage structures. INES (Innovation in the Development of Electronics systems for Aerospace), carried out in collaboration with Boeing R&T, targets the virtual integration and development of complex avionics systems in a model -oriented environment. PHANTOM (Cross-layer and multi-objective Programming approacH for next generAtioN heTerogeneous parallel cOMputing systems), forming part of the Horizon 2020 framework program, aims to improve the computational performance of embedded systems.*

[5] *The Movement Coordination Centre Europe (MCCE), a multinational coordination body to optimize the efficiency of strategic land- and air-transport, takes up GMV's inhouse ATARES solution to improve its air-transport and flight-refueling services exchange system. ATARES (Air Transport and Air-to-Air Refueling Exchange of Services) strikes a balance between all the services exchanged between countries, offering mutual aid at individual level without having to keep up equivalent financial transactions.*

[6] *In 2018 the Electronic Control Unit (ECU) of the crane system of Airbus's strategic long-range transport and air tanker aircraft A400M is put through a rigorous qualification test campaign ahead of its imminent production and supply for use by aircraft. Developed by GMV for the Compañía Española de Sistemas Aeronáuticos (CESA), the ECU has the function of controlling and braking the crane's two motors according to the operator's orders and the data furnished by system sensors (loading cells, proximity sensors fitted along the rails, inclination sensors of the crane cable, temperature and speed sensors of the engines, etc.).*

[7] *During 2018 GMV continues to provide various engineering services for Airbus Defence and Space. As well as its collaboration in the A330 MRTT air 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, electricity and communications*

systems simulation models), plus diverse collaborations in the Eurofighter project.

[8] *In 2018 GMV holds several progress meetings with AIRBUS DS to deal with foreseen upgrades for the RPAS ATLANTE-II, the 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).*

[9] *Among the most important projects undertaken in 2018 to improve the performance of future Integrated Modular Avionics (IMA) systems features a successful series of flight tests within the DIMA program. During these tests GMV's **XKY RTOS** operating system shows its autonomous-mode flight capacity while also demonstrating the outstanding modularity of this trailblazing GMV product.*

[10] *GMV signs a collaboration agreement with AUREA Avionics to drive the commercial development of the unmanned aerial vehicle (UAV) Seeker, an autonomous, rapid-deployment system designed for surveillance and reconnaissance missions. This alliance further strengthens GMV's position in the aeronautics, defense and security and border-surveillance markets. In the former it has proven expertise in in the development of UAV systems as well as the Flight Control Computer of the ATLANTE system.*

ASSESSMENT

In 2018 GMV continues its growing participation in programs to control and manage the use of drones, Remotely Piloted Aircraft System (RPASs), Unmanned Aerial Vehicle (UAVs) and Unmanned Aerial Systems (UASs). Especially noteworthy is its participation in all the following: ENAIRE's DOMUS project under the European SESAR program; U-Space services in collaboration with several companies, also under SESAR; the ATLANTE program together with Airbus DS; and development with Aurea Avionics of the unmanned aerial vehicle Seeker. In this area GMV has developed the ***dronelocus®*** family of products to come up with answers for the growing takeup of unmanned vehicles of this type.

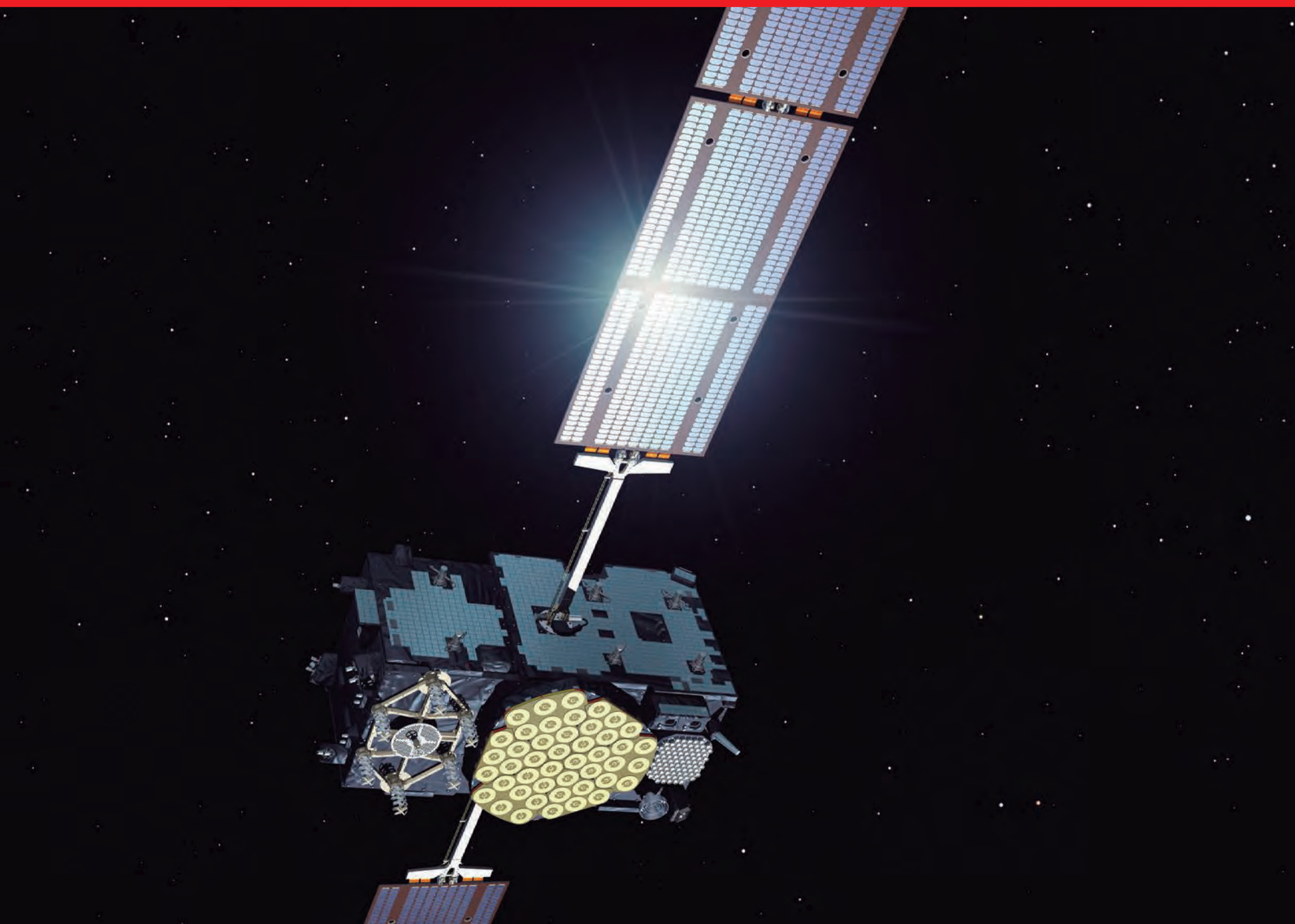
As well as its participation in SESAR, GMV is also involved in another major European aeronautics program, Clean Sky 2, taking part in several projects such as UBBICK, for cockpit utility management architechtures; PASSARO, dealing with materials and structures; INES, for complex avionics systems; and PHANTOM, for embedded computing systems.

GMV continues to collaborate with the first-tier suppliers of Europe's aeronautics sector, Airbus and Boeing, in such programs as Clean Sky 2. Again in collaboration with Airbus GMV is also involved in diverse areas and capacities for development of the programs of the transport aircraft A400M and C-295, the air tanker A330 MRTT and the multipurpose Eurofighter aircraft.

As for the area of integrated modular avionics, 2018 saw various flight tests under the DIMA program of reconfigurable modular avionics, GMV's ***XKY RTOS*** operating system coming through the tests with flying colors.

ACTIVITIES 2018

SPACE



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

With over 34 years of experience behind it and nearly 500 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 processors and simulators for astronomy and earth-observation instruments

NAVIGATION

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

GROUND SEGMENT

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

DATA PROCESSING

- Earth-observation and science-mission instrument processors
- Quality control and calibration systems
- 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. The portfolio of clients in this area now adds up to over 34 operators, after PSN and KACST choose GMV in 2018 as supplier of their satellite ground segments. In 2018 Yahsat Alyah3, Hispasat 30W and SES12 join the roster of over 250 operating satellites controlled by GMV's ground segment systems.*

[2] *In 2018 GMV develops a new mega-constellation control center to provide a service for thousands of satellites. This control center includes solutions deriving from its inhouse* ***hifly®*** *family of products, which is capable of watching over and controlling a satellite constellation of this size and incorporates specific automation features. As a result,* ***flyplan*** *and* ***fleetDashboard*** *are included, as new elements that ensure constant awareness of the fleet and the overall state of the constellation. As well as the systems provided by GMV to Globalstar and O3b, these new functions enable GMV to provide a service for other clients like OneWeb.*

[3] *GMV is one of the main actors spearheading Europe's analysis of the space-debris threat. To mitigate this threat GMV is beginning to provide some of its customers with a service from its* ***focusoc*** *(****focus*** *Operations Center) based on an ad-hoc augmented catalogue derived from the Special Perturbations (SP) catalogue provided by JSpOC (Joint Spacecraft Operations Center). Elsewhere, Catapult takes up GMV's mission planning and flight-dynamics systems for Astroscale's End-of-Life Service (ELSA-d). As for active debris removal, GMV is participating in the e.Deorbit program of the European Space Agency's European Space Research and Technology Centre (ESTEC). This program's aim is the removal of the Envisat satellite at the end of its useful life. It has also set up for ESA a study to weigh up the feasibility of the magnetic removal of space debris by interference with the magnetic field.*

[4] *In 2018 GMV holds onto its leading position as one of the main actors within Europe's satellite navigation strategy. During the year it collaborates with the European Commission, ESA and EUMETSAT in projects to enhance navigation performance or provide new services (GINAMIC and SEASOLAS), to look for synergies between different systems, studies to demonstrate the efficiency of new navigation timing services (PulChron and RSN), and the development of new user terminals.*

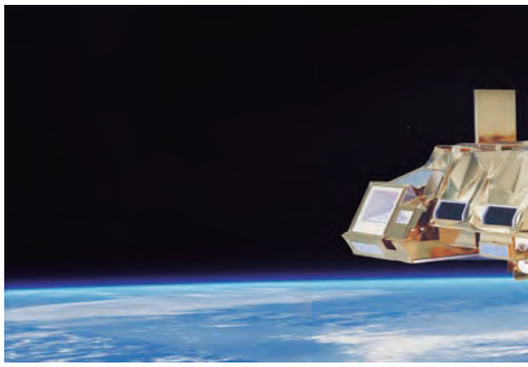
[5] *GMV wins a bumper ESA contract, under the aegis of the European Commission, for maintenance and upgrading of the ground control segment (GCS), responsible for tracking the satellite constellation of the Galileo navigation program. GMV leads the industrial team in charge of critical GCS components such as the Spacecraft & Constellation Control Facility (SCCF), the Security Key Management Facility (sKMF) and the Flight Dynamics Facility (FDF). Apart from the launch of 4 new satellites, this year also sees significant progress in the Galileo Reference Center, the Galileo Services Center, the Time and Geodetic Validation Facility (TGVF) and the Return Link Service Provider (RLSP) of Galileo's Search and Rescue, all led by GMV. GMV is also leading the consortium that will define the ground segment of the program's second generation and is developing the second version of the PRS receiver and the infrastructure of the Spanish Competent Public Regulated Service (PRS) Authority.*

[6] *February sees the launch of the PAZ satellite of Spain's National Satellite Earth-Observation Program (Programa Nacional de Observación de la Tierra por Satélite: PNOTS). GMV forms part of the industrial group that has contributed to the mission's ground segment, holding responsibility for setting up the control center, the precise tracking system and planning system. GMV is also providing the radar-image-distribution and user-management system, both for civil and defense users. In October BepiColombo is launched, a joint mission of the European Space Agency and Japan's Aerospace Exploration Agency. Appart from participating in mission analysis and prior mission-definition studies, GMV has also developed the control center, the science ground center and the orbital control system.*

[7] *November sees the launch of MetOp-C, the last component of the MetOp family of meteorological satellites, guaranteeing transition to the second generation of the Eumetsat Polar System (EPS). GMV holds responsibility for development of the Mission Planning System and Flight Dynamic System. Under this remit it has seen to the ground development, testing and verification of the processor of the GRAS (Global Navigation Satellite System Receiver for Atmospheric Sounding) and GOME-2 (Global Ozone Monitoring Experiment-2) instruments of the EPS program. GMV is also giving engineering and operational support to EUMETSAT in the areas of flight dynamics, mission planning and control centers. It likewise offers support in the development and maintenance not only of LAND SAF for Portugal's Meteorology Agency but also NOWCASTING SAF for Spain's State Meteorology Agency (Agencia Estatal de Meteorología: AEMET).*

[8] *GMV is participating actively in various projects of the Copernicus Global Monitoring for Environment and Security program for both the ground and space segment. GMV is also a member of the Copernicus Relays network in Spain and is priming the framework contract for defining user requirements of the future generation of Copernicus satellites. During this year GMV leads the contract-winning consortium for development of the operational simulator of the C and D satellites of the Sentinel 1 mission and is selected as provider of the mission planning system for the Sentinel-6/Jason satellite constellation.*

[9] *In 2018 the feasibility phase of the BIGMIG (Big Data for Migration)*

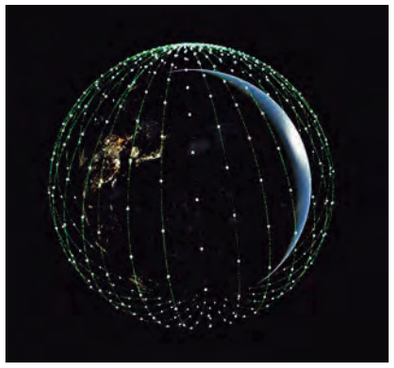


project is brought to completion. The main remit of BIGMIG was to study how Big Data might be applied to the human migration phenomena. Important advances are also achieved in the AfriCultuReS sustainable forestry project. GMV is also leading the consortium of the climate-change resilience project as part of the European Space Agency's Earth Observation for Sustainable Development (EO4SD) initiative. It also has a standout participation in the Canaries Ocean Platform (Plataforma Oceánica de Canarias) for marine research. In 2018 the European Commission projects TYPHON, MARINE-EO and MED-GOLD projects kick off, in which GMV is, respectively, inputting it expertise in database technology for space applications, demonstrating application of satellite images to support maritime monitoring and, finally, demonstrating the potential added value of climate-based information for agriculture.

[10] *GMV reinforces its leadership in flight dynamics systems, ground operations and guidance, navigation and control (GNC) systems, participating in several projects. In the SSA program GMV is participating in the consortium in charge of the study for definition, analysis and design of a solar activity surveillance mission. GMV is leading a consortium to design HERA's mission analysis and develop its GNC system. HERA's goal is to develop planetary defense technologies. GMV is likewise designing the GNC system of the international moon mission HERACLES, the first step towards humankind's return to the Moon. Its role is equally crucial in the Mars Sample Return mission, carrying out activities in the Earth Return Orbiter and the Sampling Fetching Rover.*

[11] *GMV consolidates its leadership position in space robotics technology in the Horizon 2020 program under the PERASPERA cluster, where it is leading three of the six technology building blocks to serve as the base for future orbital missions. The final tests are carried out during this year. Likewise the field tests of the GOTCHA project, which aims to achieve an autonomous framework for space robots to be used in future space systems.*

[12] *GMV is playing an important role in the European Space Agency's Space Rider project, which represents Europe's next step in space access, culminating with a test flight in 2020. GMV is also collaborating in the design of PLD Space's microlauncher Miura; AVIO and GMV sign a contract for analysis of improvements to VEGA's launch engine. The results of the MLAUNCHER project are also presented in 2018, the aim of which is to define, analyze and design a self-sustainable microlauncher service.*



ASSESSMENT

The headline event in 2018 was GMV's winning of the contract for maintenance and upgrading of the ground control segment (GCS) of the Galileo constellation. This ESA contract, under the auspices of the European Commission, underscores GMV's growing role in the space sector, where it has become a benchmark firm in ground systems, satellite navigation systems and Cybersecurity. Under this contract GMV is leading an industrial team and also takes on responsibility for critical GCS components such as the Spacecraft & Constellation Control Facility (SCCF), the Security Key Management Facility (sKMF) and the Flight Dynamics Facility (FDF).

For yet another year GMV proudly stands as the world's number-one independent supplier of ground control systems for commercial satellites and has become one of the most tried-and-trusted collaborators of ESA, CNES, DLR and EUMETSAT. In 2018 the client roster grows to 34, and new solutions are developed for large-scale satellite-fleet operators like OneWeb.

GMV's earth-observation business is on a roll. Two crucial satellite launches in 2018 are PAZ, as part of Spain's National Satellite Earth-Observation Program, and MetOp-C, the last component of EUMETSAT's MetOp family of meteorological satellites, for which GMV is providing various control, flight-dynamics and planning systems, among others. GMV is actively involved in the European Commission's Copernicus program, working on various projects both in the ground and space segment. Business is equally brisk in the area of earth-observation applications, where the company is participating in various programs of ESA, the European Commission and the H2020 program, such as BIGMIG, AfriCultuReS, EO4SD, PLOCAM, THYPHON, MARINE-EO and MED-GLB.

Robotics remains an important part of GMV's overall business strategy. In 2018 GMV consolidates its leadership position under the H2020 PERASPERA cluster and takes part in diverse space robotics projects.

GMV's launcher business includes participation in the development of Space Rider and the MLAUNCHER project for ESA microlauncher services, and also in development of PLD Space's Miura 1 launcher. GMV has also signed a collaboration agreement with AVIO for its participation in VEGA.

GMV continues to collaborate with ESA in fundamental areas for GMV's ongoing business in flight dynamics systems, Space Situational Awareness technologies and, of course, satellite navigation systems, all areas in which GMV has become a worldwide leading light.

DEFENSE AND SECURITY

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

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

DEFENSE

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

SECURITY

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

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

MAIN MILESTONES

[1] *In 2014 GMV wins the tender for transition of the EUROSUR network from pilot project to operational status, since when it has been priming the contract. As part of the European Commission's European Border Surveillance System (EUROSUR), the network establishes a cooperation and information-swapping mechanism, making sure member states are better prepared for preventing, detecting and combatting illegal immigration and organized crime, but also for responding more quickly to save the lives of immigrants in danger on the sea, especially in the Mediterranean. For 4 years now GMV has been responsible for running and supervising the project, which comes to an end in 2018, but GMV has already been awarded the new, follow-on network-maintenance and -upgrading framework contract.*

[2] *After rollout of the necessary upgrades in the second year of execution of the European Union Command & Control Information System (EUCCIS) and the system's successful participation in the CWIX 2018 exercise, GMV signs a new contract with the European External Action Service (EEAS) for activities to be carried out between November 2018 and September 2019. This new project comes under the seven-year framework contract in which GMV is acting as sole contractor for maintenance, support and upgrading of the European Union's Command and Control System.*

[3] *GMV is leading the SEASOLAS project, whose remit is to weigh up the potential of the safety service of this phase of EGNOS for application to the maritime sector. The project comes under the technical supervision of the European GNSS Agency (GSA), as part of the European-Commission-funded umbrella Horizon 2020 program. As well as technological questions, the project also deals with other important aspects such as the market, cost-benefit, strategic questions, service provision, standardization, etc.*

[4] *In 2018, in the maritime safety area, GMV is selected by Portugal's National Republican Guard to implement an information integration solution. The goal of this project is to allow incorporation of information of national interest in Europe's surveillance network, taking in the external maritime borders of Portugal and Spain, based on integration of EUROSUR's surveillance data through Lisbon's Maritime Surveillance Coordination Center. The Harbor Authority of Sine and Algarve (Administração dos Portos de Sines e do Algarve: APS) awards GMV the contract for modernization of its Vessel Traffic Service- (VTS), a project based on GMV's solution,* ***Shiplocus****, and currently implemented in the Seaports Authority (Puertos del Estado) in Madrid as well as the ports of Valencia, Malaga, the Canaries, Balearics, Madeira and Azores.*

[5] *In 2018 two of the four trials scheduled for the DRIVER+ project (Driving Innovation in Crisis Management for European Resilience) were successfully carried out. DRIVER+, a European Commission, FP7-financed project, aims to come up with an answer to the current and future challenges posed by the increasingly serious consequences of natural disasters and terrorist attacks. As well as taking part in all DRIVER+ subprojects, GMV is busy working on development of the pan-European testbed for Crisis Management Capability Building. Furthermore, within the Portfolio of Solutions (PoS) tested during the scheduled trials, GMV includes its complete command and control environment, SOCRATES. Lastly, GMV is acting as coordinator of all solutions included in the first of the project trials, hold in Warsaw.*

[6] *In April thoroughgoing joint work between GMV, the Portuguese Army Research Center (Centro de Investigação, Desenvolvimiento e Inovação da Academia Militar: CINAMIL) and the European Defense Agency (EDA) brings to completion the development and installation of the Cyberdefense Training and Exercise Coordination Platform (CD TEXP) of Portugal's Military Armed Forces Academy in Lisbon. This means the CD TEXP is now up and running, forming a crucial part of Europe's cyberdefense training arrangements and kicking off a new phase of adaptation and upgrading.*

[7] *After the Iberian test held at the end of the year the EU-financed, H2020 R&D Maritime Surveillance Awareness (MARISA) project achieves its initial operational capacity. The 22-partner project includes national and multinational firms from each participating country, national research and NATO institutions and end users (navies, coastguards and the Spanish Guardia Civil). GMV, crucially, is responsible for system design, the development of various fusion- and anomaly-detection algorithms and also the trials to be held in Spain and Portugal in collaboration with the Spanish Guardia Civil and the Portuguese Navy.*

[8] *GMV is playing an upfront role in the technology programs and R&D projects initiated by the Directorate General of Armaments and Materials (Dirección General de Armamento and Material: DGAM) in support of development of the F110 Frigate. The future F110 frigates will replace the current Santa María class frigates, which have been in operation carrying out escort duties since the mid-eighties of last century. They have been jointly designed by the Navantia shipyard and the Spanish Navy. The program comprises a multi-mission design with a variety of capabilities ranging from undersea and surface warfare to asymmetric warfare and anti-aircraft defense. GMV's participation centers on two areas: the SENDA navigation system and infrared search and track (IRST) system.*

[9] *In coordination with the Spanish MoD, the Directorate General of Armaments and Materials (DGAM) and the Spanish navy, GMV forms part of the European OCEAN2020 consortium, to which the European Commission has awarded the biggest maritime surveillance technology development project in the first round of activities of the Preparatory Action on Defense Research (PADR). Led by the Italian multinational LEONARDO, the project pools 42 partners from 15 European countries. GMV's contribution centers on the Command and Control (C2) and Joint Intelligence, Surveillance and Reconnaissance (JISR) projects, in keeping with the company's international trajectory in these areas.*

[10] *In the framework of the command and control system TALOS being developed by GMV for the Directorate General of Armaments and Materials (DGAM) of the Ministry of Defense 2018 sees completion of the feasibility study 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. 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.*

[11] *In November the Spanish army's wheeled combat vehicle (VCR in Spanish initials) 8x8 program successfully passes its critical design review (CDR). Within this Special Program of the Directorate General of Armaments and Material (DGAM) of the Spanish MoD, GMV is responsible for the GNSS/INS navigation subsystem, the shot-detection subsystem, integration with the TALOS command and control system and finally integration of the dismounted-soldier C2 system.*

[12] *In 2018 SISCAP 's Critical Design Review (CDR) is held. Back in 2017 the Spanish Dismounted-Soldier System (Sistema Combatiente a Pie: SISCAP) spelled the relaunch of the Spanish MoD's R&D activity to modernize dismounted soldier technology, an activity that kicked off with the forerunner Future Soldier program (Combatiente del Futuro: COMFUT). GMV, in a joint venture with Indra, is responsible for integration of the Communications and Information Subsystem (Subsistema de Información y Comunicación: SIC) and the Power Source (Fuente de Alimentación: FAL). In particular GMV will be developing the Central Power Distribution and Processing Unit (Unidad central del Proceso y distribución de Energía: UCPE), a component built into the soldier's main computer. Also, in collaboration with CINAMIL, GMV is developing the support platform for Portugal's future soldier program.*

ASSESSMENT

In 2018 GMV's defense and security business goes from strength to strength. The European Commission once more displays its ongoing faith in GMV by renewing the framework contract for development and maintenance of the European Border Surveillance System (EUROSUR) network, where GMV has been responsible for execution, management and supervision since 2014. This renewed contract award represents a vote of confidence in GMV's workmanship and expertise. GMV also signs a new contract with the European External Action Service for support and development of the European Union Command & Control Information System (EUCCIS).

In November the Spanish army's wheeled combat vehicle (VCR in Spanish initials) 8x8 program successfully passes its critical design review (CDR). GMV is responsible for the GNSS/INS navigation subsystem, the shot-detection subsystem, integration with the TALOS command and control system and finally integration of the dismounted-soldier C2 system.

2018 also sees the critical design review of the Spanish Dismounted-Soldier System (*Sistema Combatiente a Pie*: SISCAP). SISCAP is a Spanish MoD R&D program designed to modernize dismounted soldier technology. GMV is responsible for integration of the Communications and Information Subsystem and the Power Source, developing the Central Power Distribution and Processing Unit, a component built into the soldier's main computer.

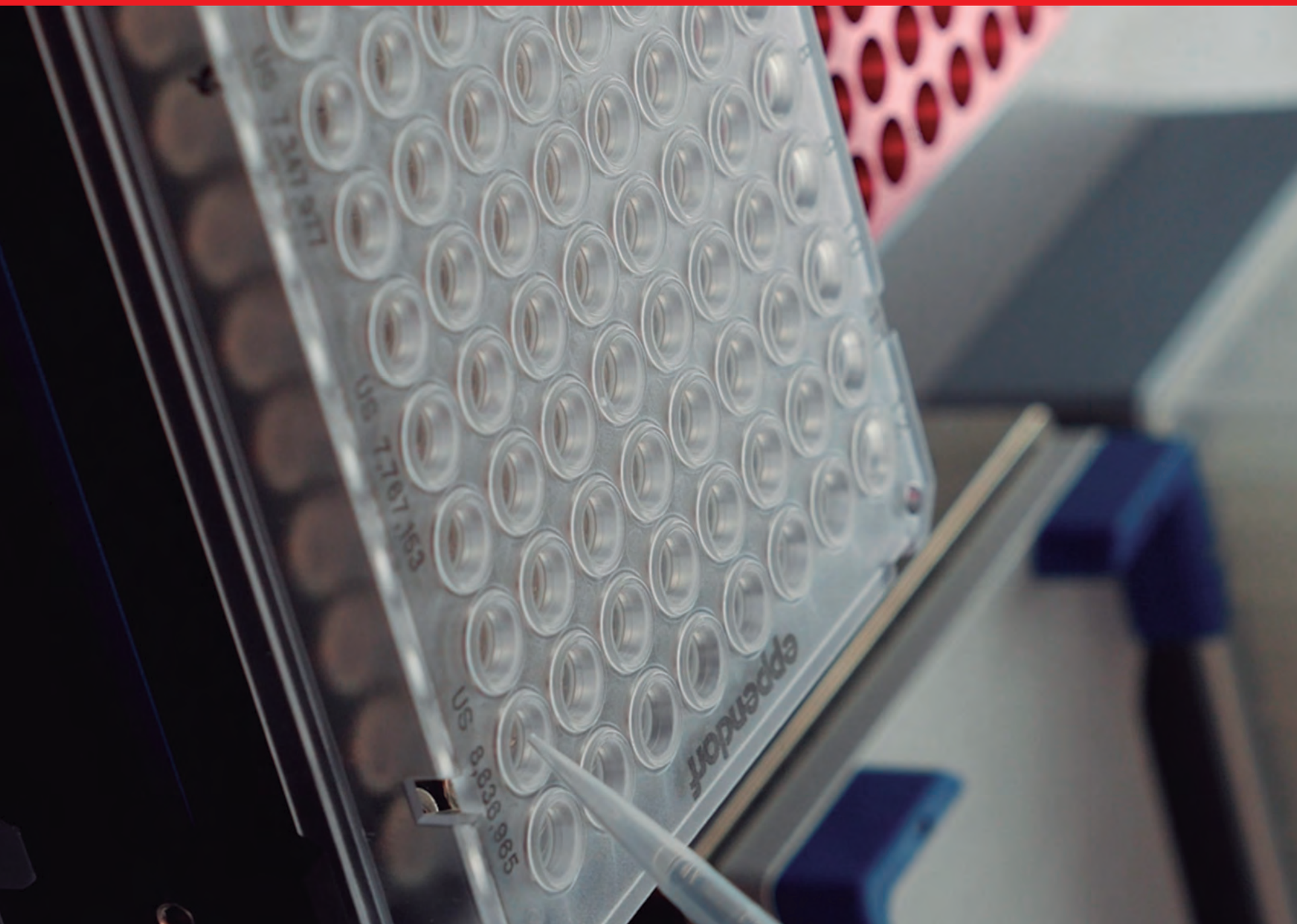
GMV continues to play a high-profile role in the R&D programs of the Directorate General of Armaments and Materials (DGAM). Special mention here must go to the project in support of development of the F110 Frigate. GMV's activities here center on the SENDA navigation system and infrared search and track (IRST) system.

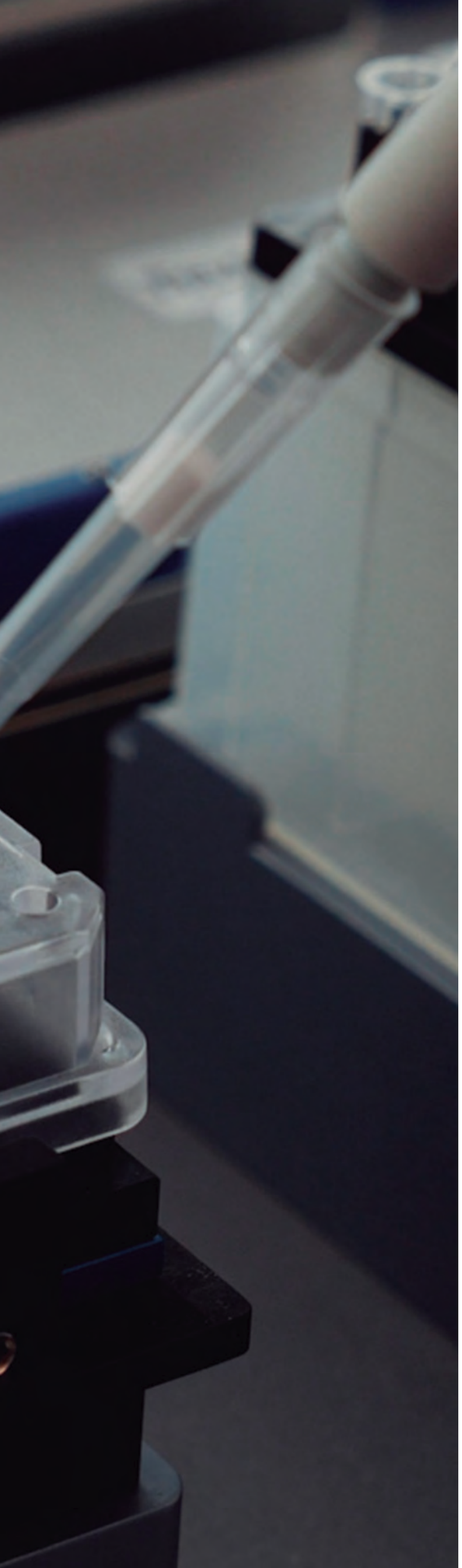
In the framework of the TALOS system, a C4I system for the planning, management and execution of military operations at tactical level, being developed by GMV for the DGAM, this year sees completion of the feasibility study for integration of TALOS in the ASCA interoperability program, enabling TALOS to be integrated with the artillery systems of the countries involved in the program.

In coordination with the Spanish MoD, the Directorate General of Armaments and Materials (DGAM) and the Spanish navy, GMV forms part of the European Commission's OCEAN2020 consortium for the development of maritime surveillance technologies. GMV's contribution centers on the C2 and JISR systems. In this same area of maritime safety, GMV is selected by the Portuguese National Republican Guard (*Guarda Nacional Republicana*) for implementing an information-integrating solution and by the Harbor Authority of Sine and Algarve (*Administração dos Portos de Sines e do Algarve*: APS) to modernize these ports' integrated maritime surveillance system on the basis of GMV's inhouse ***Shiplocus*** system, currently implemented in the Seaports Authority (*Puertos del Estado*) in Madrid as well as the ports of Valencia, Malaga, the Canaries, Balearics, Madeira and Azores. Last but not least the H2020 R&D Maritime Surveillance Awareness (MARISA) project, in which GMV is playing a crucial role, achieves its initial operational capacity.

ACTIVITIES 2018

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] *GMV and IntraOp Medical Corporation, the world's leading company in electron-beam radiotherapy devices, sign an agreement making IntraOp sole distributor of GMV's inhouse intraoperative radiotherapy (IORT) planner* ***radiance™*** *for worldwide electron-beam IORT users. As a result* ***radiance™****, built into Mobetron®, the linear accelerator for administering electron-beam IORT, has been taken up by the University Hospital of Lublin, Poland, for planning administration of intraoperative radiotherapy in gastric cancer treatment.*

[2] *In 2018 twenty new* ***radiance™*** *licenses are issued and it is taken up by hospitals in Europe, America and Asia, featuring the Hospital Provincial de Castellón; Russia's IM Sechenov First Moscow State Medical University; SUBANG Jaya Medical Centre, Prince Court Medical Centre and Pantai Hospital Ipoh of Malaysia; Istituto Europeo di Oncologia of Milan; Hospital Universitario Central of Asturias; Arthur G. James Cancer Hospital - Ohio State University; King Chulalongkon Memorial Hospital in Thailand; Rochester Hospital General, USA; The Philippines Medical City; the University Hospital of California in San Francisco; Guangdong general hospital, Sun Yat-sen University Cancer Center and Beijing cancer hospital of China.*

[3] *Under the European research and innovation project FACET (FrAilty Care and wEll funcTion), GMV adapts its telemedicine platform* ***antari HomeCare™*** *for remote care of the elderly and pre-frail. The platform developed by GMV processes data and gives information on the patient's state, not only physiological but also behavioral, nutritional, functional and cognitive. This then allows the clinician to keep up ongoing monitoring that is constantly brought into line with the findings at each moment. GMV deploys the necessary technology for phasing in new functions while at the same time guaranteeing data privacy, in keeping with the European General Data Protection Regulation and the corresponding legislation in each particular country.*

[4] *WITSA (World Information Technology and Services Alliance) awards a prize for innovative e-Health solutions to HEXIN, the Big Data platform for mining clinical and epidemiological data of the Galician Health Service (Servicio Gallego de Salud: SERGAS). Developed with GMV technology, HEXIN is the first system of its type to be taken up by a Spanish regional authority, furnishing over 300 healthcare professionals with information made up by predefined reports with clinically useful stats, adding up to a total of 800 corporate documents all available to the general public.*

[5] *GMV participates as technology partner in MOPEAD (Models of Patient Engagement for Alzheimer's disease), a project led by Fundació ACE (Barcelona Alzheimer Treatment & Research Center) and funded by the European Union's Innovative Medicines Initiative (IMI) public-private consortium. MOPEAD's aim is to set up an early AD diagnosis system on the strength of active citizen participation, with anonymous inputs. The first project phase involved online recruitment of citizens at risk of suffering cognitive problems, using a platform developed by GMV, applying Big Data technology and healthcare software engineering to anonymize the data and ensure data-subject privacy.*

[6] *In 2018 GMV continues providing technological support for the SwitHome project, using its inhouse telemedicine platform,* ***antari HomeCare™****. The aim of this EIT Health-brokered research project is to improve post-stroke walking rehabilitation in the patient's home under the eye of a specialist.* ***antari HomeCare™*** *allows the therapist to monitor patient progress and adjust the rehab regime to suit.*

[7] *The Spanish Healthcare IT Society (Sociedad Española de Informática de la salud: SEIS) hails the HARMONY project in its 24th National Healthcare and IT Awards. Furthermore, the Big Data platform deployed by GMV under the*

Harmony project successfully rises to the challenge posed by Europe's General Data Protection Regulation (GDPR). 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. 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.

[8] *GMV continues to participate in the H2020-funded RAINBOW project, which aims to build up knowledge in specific areas of clinical simulation. During the year a new generation of creative and innovative researchers has been trained up to render them capable of transforming knowledge and ideas in products and services for the economic and social benefit of the European Union. 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™****.*

[9] *NAVIPHY, a 3-year research project falling within the Ministry of Science, Research and Universities' research challenges R&D call and subsidized by the European Union (EU) through funds of the European Regional Development Fund (ERDF), kicks off in 2018. Its aim is to improve soft-tissue navigation and planning. NAVIPHY, short for "Navigation, physical simulation and imaging in intraoperative procedures" is being carried out by a consortium involving the Research Institute of the Hospital Universitario La Paz (IdiPAZ), the Virtual Reality and Modelling Group (Grupo de Modelado y Realidad Virtual: GMRV) of the Universidad Rey Juan Carlos and the Canary Island Healthcare Research Foundation (Fundación Canaria de Investigación Sanitaria: FUNCANIS); GMV is acting as technology partner and global coordinator of the project. NAVIPHY's technological developments help neurosurgeons, maxillofacial surgeons, radio physicists and radiotherapy oncologists to plan their brain, maxillofacial and breast surgery beforehand and improve their surgical navigation procedures, enabling them to work with greater precision and dependability during the actual surgery.*

ASSESSMENT

In 2018 ***radiance™***, GMV's inhouse intraoperative radiotherapy planner, is taken up by yet more leading hospitals in Europe, the Americas and Asia. GMV also signs an agreement with IntraOp Medical Corporation to incorporate ***radiance™*** into Mobetron®, its electron-beam linear accelerator designed to deliver Intraoperative Radiation Therapy.

Telemedicine is still a top-priority development area for GMV, which already has some of its inhouse developments up and running, like ***antari HomeCare™***. In 2018 a***ntari HomeCare™*** participates in the European research and innovation project FACET, for remote care of the elderly and pre-frail. It also features in the SwitHome project to improve post-stroke walking rehabilitation in the patient's home.

Healthcare application of Big Data is now providing priceless information for the detection and treatment of diverse medical conditions. GMV has been participating in projects of this type for several years. In 2018 GMV takes part in MOPEAD, an early Alzheimer's diagnosis system. The *Sociedad Española de Informática de la salud* (SEIS) awards a prize to the HARMONY project, Europe's biggest public-private research initiative in the fight against blood cancers, where GMV, as technology partner, has developed a Big Data platform to pool huge amounts of data from blood-disease sufferers to help clinicians make diagnosis and treatment decisions. Likewise, HEXIN, the Big Data platform for mining clinical and epidemiological data developed by GMV for the Galician Health Service (*Servicio Gallego de Salud*: SERGAS), is awarded a prize by WITSA (the World Information Technology and Services Alliance).

GMV continues to push back the envelope of healthcare research, participating in the H2020 project RAINBOW, which aims to build up knowledge in specific areas of clinical simulation. GMV is inputting its experience in the development of the surgical simulator insight and the intraoperative radiotherapy planner ***radiance™***. Under the Ministry of Science, Research and Universities' research challenges R&D call GMV is also participating in NAVIPHY, short for "Navigation, physical simulation and imaging in intraoperative procedures", which aims to improve soft-tissue navigation and planning.

ACTIVITIES 2018

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] *GMV'S Cybersecurity expertise, and especially in the application of Cybersecurity to the space sector, are key factors in its winning the Galileo Ground Control Segment (GCS) contract. Under this ESA contract GMV is leading and developing all Cybersecurity aspects, ranging from protection to detection, response and recovery. This activity is especially noteworthy because an essential part of the system to be maintained and developed is management of secure access to information from the Galileo constellation, as well as management of security keys governing access to the high-performance public regulated service.*

[2] *In 2018* ***checker ATM Security®*** *strengthens its leadership as the go-to ATM-protection solution. After an eleven-year track record this inhouse GMV solution has now been taken up by over 160,000 ATMs of 60 clients from 23 countries that are especially prone to cyberattacks and cyberfraud. In 2018* ***checker ATM Security®*** *spreads even further afield to the markets of Morocco and Georgia.*

[3] *GMV has handled the security arrangements of the banking group BBVA for 16 years now. In 2018, jointly with the bank, GMV continues to develop and upgrade the corporate security management product FARO Corporativo. 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 helps organizations to set up a corporate model of security processes, ensuring a more efficient use of human, technological and economic resources*

[4] *Under a NATO-led project in Portugal, GMV is one of the 40 companies and organizations working with the Portuguese Defense Ministry to set up a national center of excellence for training and practice in Cybersecurity and cyber-defense. The first pole of the so-called "Cyber Academy and Innovation Hub" will be installed at the Military Academy in Amadora, Portugal, before being phased into other academic institutions that are part of the project.*

[5] *In 2018 the second phase of the cyberdefense platform kicks off under the PROTECTIVE project. This Horizon 2020-funded project aims to equip Computer Emergency Response Teams (CERTs) and Computer Security Incident Response Teams (CSIRTs) with the necessary wherewithal for dealing with cyberattacks, malware outbreaks and other security problems. They will also be able to draw up prevention and response procedures. GMV's activity under this project focuses on definition and development of alert-correlation and sharing modules, integration and testing of these modules and smart threat analysis for National Research & Education Networks (NRENs) and CERTS.*

[6] *GMV's Cybersecurity services take in the whole lifecycle. In 2018 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, the Ministry of the Presidency, The Spanish Land Registry and the World Intellectual Property Organization (WIPO) with the idea of giving them the necessary visibility for decision making and good governance.*

[7] *In 2018 GMV becomes the technology partner of various lawyers' offices, specializing in inhouse services and solutions to drive the digital transformation of companies of the legal sector, always with Cybersecurity to the fore. Important lawyers' offices turns to the multinational for their security audits, perimeter protection, managed services for alert-management and -monitoring, Computer Emergency Response Teams (CERTs), Red Teaming/ Penetration testing / Digital Surveillance, data protection and privacy management.*

[8] *Under the "Directive of the European Parliament and of the Council concerning measures for a high common level of security of network and information systems across the Union" (shortened to "NIS Directive") GMV has input its expertise and experience for the Spanish government, participating in the public enquiry for bringing the Directive into line with Spanish legislation, both individually and in collaboration with other organizations and associations of which it is a member or with which it collaborates.*

[9] *GMV has by now built up a wealth of fraud-prevention experience in the financial sector. This has enabled the company to use its solutions for new use cases, such as money-laundering prevention or the fight against organized crime. Artificial Intelligence for these purposes has been taken up above all by internationally trading insurance companies that have to counter certain criminal activities in especially high-risk countries. This is yet another example of reusable GMV-created technology that can be adapted to suit various purposes.*

[10] *The shortage of skilled Cybersecurity personnel is becoming one of the main barriers to growth in the business world. For over a decade now GMV has been collaborating with several universities to teach Cybersecurity skills and ensure a constant stream of Cybersecurity-savvy university students. In 2018, as part of this ongoing collaboration scheme, GMV professionals give lectures in various national universities such as the Universidad Politécnica de Madrid, the Universidad Rey Juan Carlos and the Universitat de València, among others.*

[11] *GMV develops **VirtualPAC**, a groundbreaking solution for deployment, management and secure operation of control systems involved in an industrial plant control and operation network. Vendor independent and taking Cybersecurity of productive processes into account in their incorporation of Industry 4.0., this solution allows different control software modules to be deployed to improve processes or solve any defects, all without needing to shut down plant maintenance. Not only does it cut costs but it also offers smart solutions to reduce resource and energy demand. The solution was awarded the R&D Trophy in Seguritecnia's 32nd International Security Awards.*

[12] *During this year GMV's Computer Emergency Response Teams (CERT), designed to analyze the overall state of equipment and networks, renders different Cybersecurity incident response services and also offers advice on system security solutions and threats to various clients like Orange and Spain's National Cybersecurity Institute (Instituto Nacional de Ciberseguridad de España: INCIBE).*

[13] *In the connected-car world GMV develops Secure Smart Key ECU, a smart key design for connected cars based on biometric authentication. Another notable achievement this year is the intrusion detection and prevention system (IDPS), to watch over network traffic and trigger an alert when any malicious activity or abnormal behavior is detected.*

ASSESSMENT

In 2018 GMV's Cybersecurity experience proves to be the clinching factor in its winning of the Ground Control Segment (GCS) contract and illustrates once more the synergies between GMV technology in the space and Cybersecurity sectors.

checker ATM Security®, GMV's inhouse solution to protect ATMs from cyberattacks, strengthens its worldwide leadership. It has now been installed in over 160,000 ATMs around the world. New countries that join the fold in 2018 are Morocco and Georgia.

In keeping with its strategy of becoming a benchmark Cybersecurity firm, GMV participates during 2018 in several security-risk-diagnosis and -analysis projects and sets up mitigation plans in various government authorities and international organizations like NATO, the Portuguese Ministry of Defense, EUMETSAT, the Ministry of the Presidency, The Spanish Land Registry and the World Intellectual Property Organization (WIPO), among others.

GMV also continues to carry out R&D activities to hone its Cybersecurity skills, under the Horizon 2020 PROTECTIVE project.

GMV's working relationship with the banking group BBVA, dating back 16 years now, continues to bear fruit, cementing GMV's solid position in the financial sector. GMV has by now built up a wealth of fraud-prevention experience in the financial sector. This has enabled the company to use its solutions for new use cases, such as money-laundering prevention or the fight against organized crime. Artificial Intelligence for these purposes is taken up above all by insurance companies.

GMV's Cybersecurity business continues to make inroads in the legal sector. Important lawyers' offices turn to GMV for security audits, perimeter protection, managed services for monitoring and dealing with alerts, Computer Emergency Response Teams (CERTs), Red Teaming/ Penetration testing / Digital Surveillance, data protection and privacy management.

Another noteworthy area for GMV is application of Cybersecurity solutions to industry 4.0. productive processes. With this purpose in mind GMV develops ***VirtualPAC*** for deployment, management and secure operation of control systems involved in an industrial-plant control- and operation-network.

Finally, GMV is involved in the development of solutions and products for the connected car, a business area that is expected to pick up speed in coming years. For some years now GMV's smart traffic and autonomous driving solutions have been riding high in this sector.

ACTIVITIES 2018

INTELLIGENT TRANSPORT 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
- Electronic fare collection systems enabling payment by contact smartcards, bankcards and mobile apps
- Ticket Vending Machines (TVMs) and point-of-sale management systems
- Demand-response transport management systems
- State-of-the-art passenger information systems: onboard, bus-stop, APPs, websites with real-time information and trip planners
- 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
- Solutions for the connected car and autonomous vehicle: end-2-end software and services, Cybersecurity, advanced GNSS-based positioning technology
- Advanced mobility services: PAYD/UBI insurance, car-sharing, car-pooling, MaaS

MAIN MILESTONES

[1] *GMV is Spanish leader in implementing EMV technology in the public transport sector. In 2018 GMV wins the public tender for supply of technology components for the new STI-R4 fare systems of the Transport Consortium of Mallorca, which will take in the collective public transport of the islands of Mallorca, Menorca, Ibiza and Formentera. This represents a benchmark ITS contract in Spain. GMV will be deploying the new integrated multimodal fare system (for bus, train and metro) in the Balearic Islands' public transport, also providing technical assistance during the first three years of operation.*

[2] *GMV likewise wins the public tender for supply, installation, integration, commissioning and maintenance of the fleet-management and passenger-information system, the communication system and onboard electronic fare-collection system on the buses of Pamplona's district transport system, Transporte Urbano Comarcal (TUC). The project will pool state-of-the-art, EMV-enabled solutions to cater for payment with contactless bankcards, smart cards and cell phones. GMV is also selected for modernizing the ticketing system in Almeria's urban transport buses, another project incorporating the EMV payment standard.*

[3] *In 2018 GMV becomes even more of a national leader in public intelligent transportation systems, winning a clutch of new contracts. Grupo Avanza turns again to GMV for supplying fleet-control systems for its recently awarded long-distance concessions operated by the companies ALOSA and Llorente Bus. Transports Metropolitans de Barcelona (TMB) also places its trust in GMV once more for developing its system to help visually impaired people move around the city of Barcelona, enabling them to identify and use the buses. Transporte Urbano Guaguas Municipales, the local bus-service firm of Las Palmas de Gran Canaria, has once again turned to GMV for renewal of its advanced fleet-management system and passenger-information panels. GMV also wins the contract for the Eco-Driving System of the public transport fleet of Reus, as well as renewal of the ticketing systems of the operator of the tramline from Cádiz to San Fernando and Carraca.*

[4] *As well as at home, GMV's public intelligent transportation business is also booming abroad. ALSA once again displays its confidence in GMV by awarding it the contract for renewal of the current ticketing system, originally contracted from GMV in 2009, in its Morocco subsidiary ALSA CITY AGADIR (running urban and suburban transport in Agadir city). GMV reaches an agreement with the Limassol Tourism Board for installing intelligent systems in the urban and suburban transport of this region of Cyprus. Across the Atlantic GMV phases in new functions to upgrade Montevideo's electronic fare collection system, originally supplied back in 2008.*

[5] *GMV has been trading in Poland since 2008, installing intelligent transportation systems in numerous Polish cities, like Warsaw, Szczecin, Gdansk, Gydinia, Bydgoszcz and Toruń. Tramwaje Warszawskie (the Warsaw tramline) awards to GMV the contract for modernization of its passenger information system. GMV will supply a set of onboard equipment for the recently inaugurated urban line of MAN buses for Nowy Sącz's municipal transport company (MPK) in Poland. Finally, Gdańsk's municipal transport authority (ZTM) turns once more to GMV for maintenance of its fleet management system, first installed back in 2008, also phasing in new onboard equipment.*

[6] *Turning to the railway sector, Metro de Sevilla chooses GMV for setting up the new onboard video-surveillance system on its fleet of trains, a project in which GMV will also be supplying the back-office software in the control center. Elsewhere, CAF, a global benchmark in the railway sector, turns to GMV for supplying the onboard video-surveillance and video-information system for the new series-5000 and -6000 trains to be manufactured for its client, Barcelona's metropolitan transport company (Transports Metropolitans de Barcelona: TMB). In Chile GMV wins a contract with SICE for the design, software development and manufacture under the SICE brand of all the ticket vending machines of the new lines of Chile's metro, with line 3 being inaugurated in 2018.*

[7] *TALGO awards GMV the contract for supplying the emergency intercom and public-address system, the human-machine interface system and the communications platform of RENFE's new high-speed trains. These new units will be running on both Spanish and French lines, so the systems fitted also have to be adapted for operation in both countries. In Zaragoza the joint venture running and maintaining the city's tramline (FCC and ACCIONA) renews its trust in GMV for carrying out the maintenance and technical assistance tasks of the GMV-supplied tram fleet management system.*

[8] *GMV's 15-year track record in demand-response systems makes it the most experienced firm in systems of this type in Spain and Portugal. In 2018 Castilla y León again finds GMV to be the best option for running and maintaining the region's demand-response transport system. GMV wins the public tender for a demand-response transport system for the Intermunicipal Communities of the Regions of Coimbra and Leiria and the Intermunicipal Community of Ave. Another important contract award for GMV in this area comes with the integrated municipal transport management system of Bragança (Portugal), a contract including supply and maintenance of a demand-response system.*

[9] *GMV and Volkswagen Renting sign an agreement under which the latter's clients will benefit from preferential treatment in setting up the fleet*

*management service **MOVILOC®**. This agreement hits the ground running with a first strategically important client like CELLNEX. Similarly, GMV and the National Association of Mobile Elevating Work Platform Hire Firms (Asociación Nacional de Alquiladores de Plataformas Aéreas: ANAPAT) sign a collaboration agreement giving ANAPAT members preferential access to **MOVILOC®**. Both agreements are to be added to the roster of existing agreements between GMV and ALD Automotive, Alphabet and Réflex.*

[10] *GMV completes the takeover of the California technology company Syncromatics, provider of Software as a Service (SaaS) and Software in the Cloud solutions for the public intelligent transportation systems market. This agreement, forming part of the investment initiated by GMV in 2015, serves as an excellent springboard into the expanding US ITS market. During this year GMV Syncromatics is awarded a contract for providing diverse ITS solutions for Santa Cruz Metro (California), furnishing transport planners with new information management tools.*

[11] *In the road transport area 2018 is noteworthy for the completion of the EU-financed I_HeERO project, which set out to prepare the infrastructure and necessary legal requirements for the Europe-wide launch of 'eCall'. This project cements GMV's position as a key player in the area of telematic services for vehicles, both in onboard equipment and service-enabling platforms. This year also sees rollout of new onboard units under the C-ROADS project, one of Europe's most ambitious mobility and ITS connectivity projects. GMV is playing a high-profile role in both the Spanish and Portuguese platforms, participating in various pilot projects, mainly deploying roadside units (RSUs) and onboard units (OBUs).*

[12] *In 2018 the integration tests of the European Safety Critical Applications Positioning Engine (ESCAPE) are successively carried out. ESCAPE, co-funded by ESA and led by FICOSA, is Europe's autonomous driving response. The preliminary design is also completed this year of the ESCAPE GNSS Engine (EGE). GMV is playing an important technical role in the project while also taking on overall project management. It will be supplying the algorithms to process the readings of the vehicle sensors, the cameras and GNSS receiver, in order to provide the positioning service together with the integrity required by the connected autonomous vehicle. It will also be providing the software in charge of binding all the communication components together into a synchronized, well-oiled system.*

ASSESSMENT

GMV remains national leader in public intelligent transportation systems and a rock-solid performer worldwide. Its 2018 roll call of important projects for public transport authorities include Consorcio de Transportes de Mallorca, Transporte Urbano Comarcal de Pamplona, Transporte Urbano de Almería, Grupo Avanza, Transportes Metropolitanos de Barcelona, Transporte Urbano Guaguas Municipales de las Palmas de Gran Canaria, Transporte Público de Reus, the tramline from Cádiz to San Fernando and Carraca, ALSA CITY AGADIR in Morocco, Limassol Tourism Board in Cyprus, Sistema de Transporte de Montevideo, and the tramlines of Warsaw Nowy Sącz Municipal Transport Firm and the Municipal Transport Authority (ZTM) of Gdańsk in Poland.

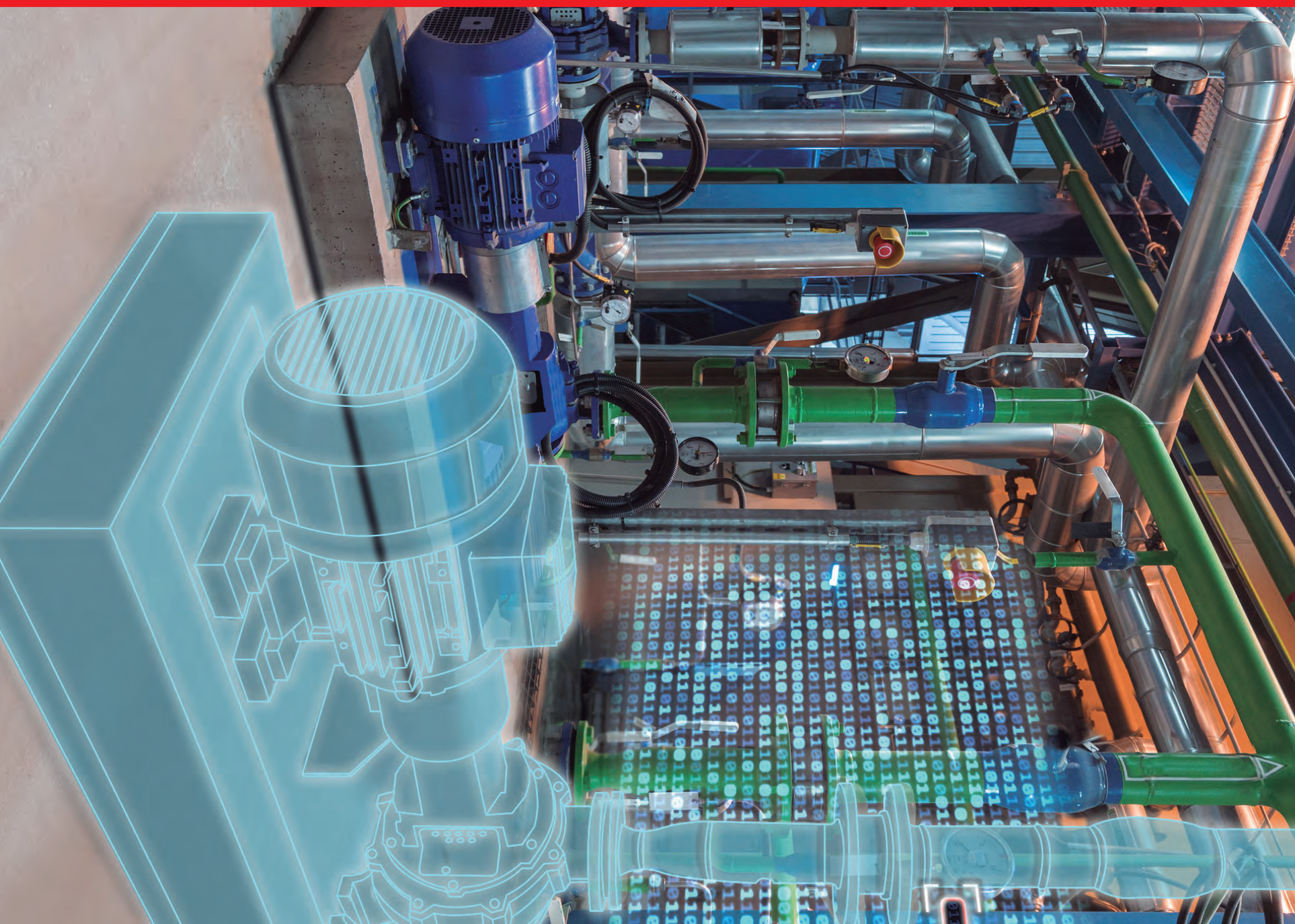
Turning to the railway sector, GMV continues to increase its business with such marquee clients as Talgo, for which it is supplying the human-machine interface system and the communications platform of RENFE's new high-speed trains, adapted for running on both Spanish and French lines. The subway line of Seville, Metro de Sevilla and the Zaragoza Tramline, Tranvías de Zaragoza, both award GMV new fleet management and other equipment-supplying contracts. CAF, for its part, awards GMV the contract for supply of the onboard video-surveillance and video-information system for the new series-5000 and -6000 trains to be manufactured for its client, Transports Metropolitans de Barcelona. Finally, in 2018 line 3 of Santiago de Chile's metro opens, phasing in new ticket vending machines developed and made by GMV.

Demand-response transport systems, a GMV brainchild up and running in the region of Castilla y León for 15 years now, are showing themselves to be the best option for public transport systems in low-population areas or scattered settlements. In 2018 the region of Castilla y León renews its GMV contract and new demand-response contracts are obtained in various regions of Portugal.

GMV completes the takeover of the California technology company Syncromatics, provider of Software as a Service (SaaS) and Software in the Cloud solutions for the public intelligent transportation systems market. This takeover began in 2015, providing GMV with an excellent springboard into the expanding US ITS market.

Finally, GMV continues to up its profile in the automotive market, with R&D projects like I_HeERO and ESCAPE. I_HeERO aims to prepare the infrastructure and necessary legal requirements for the Europe-wide launch of 'eCall', while ESCAPE, Europe's autonomous driving response, successfully passes its integration tests in 2018.

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] *During this year IDEAS, patent-managing software developed by GMV in collaboration with the Universitat Autónoma de Barcelona (UAB), goes from strength to strength. Several institutions and universities like Rovira i Virgili (URV), Universitat d'Alacant (UA), Instituto Nacional de Técnica Aeroespacial (INTA), Institut Català d'Investigació Química (ICIQ), Institut Català de Nanociència i Nanotecnologia (ICN2) and Universitat Autònoma de Barcelona (UAB) itself, have taken up this system for protection of the intellectual property of their researchers. The system is also in the pipeline in other universities such as Universitat Politècnica de Catalunya (UPC), Universitat de Girona (UdG), Universitat Oberta de Catalunya (UOC) and Universitat Politècnica de València (UPV).*

[2] *With the overarching aim of making Spanish industry more energy competitive, on the strength of technology, GMV has joined forces with enerTIC, the platform of technology and innovation firms to improve energy efficiency; at present the platform is made up by 50 major associate firms. GMV brings its ICT expertise to bear on all business processes to help organizations bring them into line with digital progress.*

[3] *In 2018 GMV further strengthens its position as provider of Big Data solutions, where it boasts a highly skilled team of data scientists. During the year the company carries out Big Data projects in very diverse sectors, including artificial-intelligence-based bank fraud prevention, detection of cyberthreats and anomalies in data centers, monitoring and analysis of internet publicity campaigns, management of clinical and epidemiological data, evidence-based clinical rehabilitation, optimization of industrial processes, precision agriculture aided by earth observation, knowledge management, preventive maintenance of IT infrastructure, classification of documents and cognitive solutions with IBM Watson.*

[4] *GMV develops* ***VirtualPAC****, a groundbreaking solution for deployment, management and secure operation of control systems involved in an industrial plant control and operation network. Vendor independent and taking Cybersecurity of productive processes into account in the takeup of Industry 4.0., this solution allows different control software modules to be deployed to improve processes or solve any defects, all without needing to shut down plant maintenance. Not only does it cut costs but it also offers smart solutions to reduce resource- and energy-demand.*

[5] *GMV joins forces with the legaltech movement, bringing hi tech solutions to the legal world. One of the main challenges in this sector is to adapt language-processing techniques to legal jargon and its many idiosyncrasies (ambiguity, legalese, structure), doing so, furthermore, in each corresponding language. Many groundbreaking, innovation-driven ideas are now coming good, such as automatic contract revision, online legal queries, self-generation of legal texts and, of course, an improvement of management tools. Along these lines GMV is now working on tools allowing lawyers to make rapid searches in documentation of any format (text, video and audio) of their cases, to be able to prepare appeals and pleas more efficiently.*

[6] *The Innovating Companies Forum (Foro de Empresas Innovadoras: FEI) presents the book "Re-industrialization in Spain: Industry 4.0 and innovation ecosystems" co-led by Luis Fernando Álvarez Gascón, General Manager of GMV's Secure e-Solutions sector and author of two of its chapters. GMV is also sponsoring this book, which aims to offer company-centered, innovation-levered, science-aided political proposals to drive the country's economic development in a sustainable direction.*

[7] *The Spanish Confederation of Business Organizations (Confederación Española de Organizaciones Empresariales: CEOE), with GMV's support and sponsorship, presents a "Decalogue of measures to drive R&D in Spain". This Decalogue aims to be food for thought, setting out the main reasons why R&D should be a priority for Spain; over and above that, however, it is also an action blueprint, suggesting specific measures to improve Spain's current legislative framework and the so-called innovation ecosystem.*

[8] *GMV collaborates in the project "CiudadesAbiertas.es", the window that opens up the City Councils of A Coruña, Madrid, Santiago de Compostela and Zaragoza to their citizens. GMV is inputting its technological expertise to this initiative, which forms part of the Collaborative and Interoperable Open Government Platform, brokered by the Red.es Smart Cities call. This website will allow the cities' citizens to find out about their councils' activities and input their own suggestions and ideas.*

[9] *GMV supports the Junta de Castilla y León's 3rd Open Data Competition. For some years now the Regional Authority of Castilla y León (Junta de Castilla y León) has been keenly supporting the "Open Government" movement as a direct communication channel between the regional government and its citizens, tapping into the new ICTs and abiding by the principles of transparency, collaboration and citizen participation. One of the regional government's initiatives as part of this ongoing endeavor is to hold the "Open Data Competition", tapping into the data of the Open Data Portal made available to its citizens by the Junta. On all the three previous occasions the Junta's competition has been supported by GMV, as part of the company's ongoing support of data reuse and budding talent, while also recognizing the across-the-board importance of transparency in this endeavor. Not only does the company sponsor the prizes but it also sits on the jury together with representatives of the regional government.*

ASSESSMENT

In 2018 GMV further strengthens its position as provider of Big Data solutions, where it boasts a highly skilled team of data scientists. During the year the company carries out Big Data projects in very diverse sectors, including artificial-intelligence-based bank fraud prevention, detection of cyberthreats and anomalies in data centers, monitoring and analysis of internet publicity campaigns, management of clinical and epidemiological data, evidence-based clinical rehabilitation, optimization of industrial processes, precision agriculture aided by earth observation, knowledge management, preventive maintenance of IT infrastructure, classification of documents and cognitive solutions with IBM Watson.

GMV joins forces with the legaltech movement, bringing technology to the legal world. One of the challenges is to adapt language-processing techniques to legal jargon and its many idiosyncrasies (ambiguity, legalese, structure). GMV is now working on tools allowing lawyers to make rapid searches in documentation of any format (text, video and audio) of their cases, to be able to prepare appeals and pleas more efficiently.

In the e-government area, where GMV has been working for some time now, it is collaborating in the "*CiudadesAbiertas.es*" project, inputting its technological expertise to the Collaborative and Interoperable Open Government Platform, which allows the cities' citizens to find out about their councils' activities and input their own suggestions and ideas. GMV is also supporting the Junta de Castilla y León's 3rd Open Data Competition, part of the ongoing support for the "Open Government" movement as a direct communication channel between the regional government and its citizens, driven by the new information and communication technologies.

GMV joins forces with enerTIC, the platform of technology and innovation firms, to improve energy efficiency, with the overall aim of making Spanish industry more energy competitive, on the strength of technology. GMV brings its ICT expertise to bear on all business processes to help organizations bring them into line with digital progress.

During 2018 the patent-managing software developed by GMV in collaboration with the Universitat Autónoma de Barcelona is taken up several research organizations and universities in Spain.

GMV fulfils its pledge to sustainable development and R&D-driven innovation uptake by sponsoring the initiatives being led by the Spanish Confederation of Business Organizations (*Confederación Española de Organizaciones Empresariales*: CEOE) and the Innovating Companies Forum (F*oro de Empresas Innovadoras: FEI*).

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 always applies a strategic human resources plan based on three mainstays: a painstaking personnel-selection policy, a stable environment in which to pursue their careers and continuous top-up training.

Attracting and nurturing top talent is a cumbersome 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 1850, 83 % of whom 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 90 % in 2018. To meet our commitment to our employees, our personnel policies guarantee equal treatment of all our staff and encourages diversity, 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 18 % of senior management. Our staff is a mix from 38 different nationalities and the average age comes out at about 37.

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 cutting-edge 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, 1810 training courses were held in 2018 on both an individual and group basis, adding up to a sum total of 26,143 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 academic 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 y del Espacio:* ETSIAE), rewards the best students from UPM's various study subjects, thus encouraging ongoing effort and the pursuit of excellence. It also supports the most enquiring minds in various national, European and international competitions like First Lego League, the European Cansat Competition, Robolid, UKSEDS and the French Robotics Cup, 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. It also continues to collaborate with the Regional Authority of Madrid (*Comunidad de Madrid*), providing aid for industrial PhDs.

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*
- *ISO 50001:2011 Energy management 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*
- *ISO 50001:2011 Energy management systems*

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*
- *ISO14001:2015 Environmental management systems*
- *ISO 50001:2011 Energy management systems*

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*
- *ISO 50001:2011 Energy management systems*
- *UN/ECE Regulation 10: Type approval process*

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ECONOMIC AND FINANCIAL
RESULTS

FINANCIAL STATEMENTS 2018

BALANCE SHEET

ASSETS	2017	2018
Fixed assets	38.215.347,41	41.135.579,17
Total fixed assets	**38.215.347,41**	**41.135.579,17**
Inventories	18.165.558,95	22.729.252,87
Accounts receivable	21.601.952,42	14.225.339,49
Trade debtors	*34.672.201,57*	*40.827.903,27*
Trade services on account	*-16.028.111,40*	*-29.696.435,95*
Other debtors	*2.957.862,25*	*3.093.872,17*
Cash	21.695.961,40	23.229.643,78
Total current assets	**61.463.472,77**	**60.184.236,14**
Total assets	**99.678.820,18**	**101.319.815,31**
Working capital	30.396.281,83	31.337.251,59
Working capital/Equity	44,30 %	43,24 %

LIABILITIES	2017	2018
Stockholders' equity	50.178.557,52	54.535.304,49
Capital grants	472.762,60	452.585,81
Minority interests	6.190.336,99	5.596.018,40
Long-term funding	11.769.972,13	11.888.922,06
Interest free credits	*6.328.699,87*	*5.984.975,68*
Long term funding	*5.441.272,26*	*5.903.946,38*
Total Long-term Funding	**68.611.629,24**	**72.472.830,76**
Short term liabilities	29.476.413,14	24.037.224,33
Bank loans and overdrafts	*11.615.785,94*	*7.274.132,99*
Non-trade payables	*17.860.627,20*	*16.763.091,34*
Deferred payments	1.590.777,80	4.809.760,22
Total short term liabilities	**31.067.190,94**	**28.846.984,55**
Total liabilities	**99.678.820,18**	**101.319.815,31**
Working balance	30.396.281,83	31.337.251,59
Working balance/fixed asset	79,54 %	76,18 %

PROFIT AND LOSS ACCOUNT

EXPENSES	2017	2018
Purchase of goods	48.737.714,15	61.205.271,29
Ancillary Services	14.243.641,54	14.143.297,35
Taxes	360.412,40	1.025.517,44
Employee Costs	96.892.023,50	106.667.619,09
Financial Expenses	1.249.589,64	781.153,68
Extraordinary Expenses	33.395,81	25.626,60
Period Depreciation and Amortization	4.940.339,05	5.336.438,79
Appropriations, transfer to Provisions	466.185,05	422.621,64
Total Expenses	**166.923.301,14**	**189.607.545,88**
Corporate income tax	634.764,31	1.029.824,40

INCOME	2017	2018
Turnover	168.299.901,93	191.300.415,32
Own expenses capitalized	2.930.213,46	3.232.230,89
Operating grants	283.438,17	276.873,57
Financial Income	384.826,89	471.608,83
Extraordinary Income	14.235,06	456.954,40
Total income	**171.912.615,51**	**195.738.083,01**
Pre-tax profit	**4.989.314,37**	**6.130.537,13**
Post-tax profit	**4.354.550,06**	**5.100.712,73**

CASH FLOW STATEMENT

OPERATING ACTIVITIES	2017	2018
Profit after tax	4.354.550,06	5.100.712,73
Depreciation and amortization	4.940.339,05	5.336.438,79
Operating Cash Flow	**9.294.889,11**	**10.437.151,52**
Net finance expense	1.249.589,64	781.153,68
Corporate income tax	634.764,31	1.029.824,40
EBITDA	**11.179.243,06**	**12.248.129,60**
(Increase) / decrease in trade and other receivables	-4.441.449,34	2.812.919,01
Increase / (decrease) in trade and other payables	2.615.505,47	-1.097.535,86
(Decrease) / increase in provisions	-1.134.619,03	3.218.982,42
Deferred income (capital grants)	-283.438,17	-276.873,57
Cash flow generated from operationss	**7.935.241,99**	**16.905.621,60**
Tax paid	-634.764,31	-1.029.824,40
Net cash flow from operating activities	**7.300.477,68**	**15.875.797,20**

INVESTMENT ACTIVITIES	2017	2018
Purchase of subsidiary undertaking (Goodwill)	-999.950,08	-1.189.236,32
Capital expenditure - plant and equipment	-3.896.450,93	-3.158.457,66
Capital expenditure - intangible assets	-2.913.985,98	-3.908.976,57
Net cash flow from investing activities	**-7.810.386,99**	**-8.256.670,55**

FINANCING ACTIVITIES	2017	2018
Net new debt (debt increase + debt repayments)	2.565.936,55	-4.222.703,02
Capital Grants and subsidies on capital	269.953,04	256.696,78
Interest paid	-1.249.589,64	-781.153,68
Dividends paid to equity shareholders	-569.704,62	-654.997,20
Paid-in capital / Adjustments to the equity value	-297.005,17	1.127.033,61
Minority Interests	459.808,27	-594.318,59
Results attributable to the Minority Interests	-1.035.450,95	-1.216.002,17
Net cash flow from financing activities	**143.947,48**	**-6.085.444,27**
(Decrease) / increase in cash and cash equivalents	**-365.961,83**	**1.533.682,38**
Cash and cash equivalents at beginning of year	22.061.923,23	21.695.961,40
Cash and cash equivalents at end of year	**21.695.961,40**	**23.229.643,78**