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- Specials Vehicles for intervention and recognition
- Tactical communication
- CBRN
- Simulation
- Biometrics
- Intelligent video
- Media Asset Management
- Command and Control
- Systems Integration

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Aerospace, Defense and Security
The Spanish Defence and Security industry is a strategic sector that has known how to see its way around the contraction of the domestic market by boosting exports and taking companies global. SPAIN Defence & Security Industry 2015, now in its third edition, has become a valuable instrument for sector businesses as they strive to grow and carve a name for themselves abroad, showing how Spain is today a ‘Partner Committed to Excellence’.

The development of our Defence and Security industry, driven by the large-scale Special Armament Programmes of the 1980s and 90s, has successfully applied the lessons learnt to become, for some years now, a developer of advanced technologies, exporting excellent systems and associated services in all spheres of the sector.

SPAIN Defence & Security Industry 2015, with the support of the Ministry Defence, Marca España and sector associations takes an in-depth look at latest-generation developments in the country, the weight of RDI in Spanish business, Defence and Security’s demanding quality levels and its orientation towards international markets.

This unique document is an exhaustive showcase of Spain’s industrial capacities, featuring a complete directory of both major corporations and SMEs that compete at the highest level in tender processes in the European Union, Latin America, the Middle East, Asia, Africa and even on the mighty North American market.

SPAIN Defence & Security Industry 2015, published by IDS, is printed in English and Spanish and distributed to commercial and defence attaché offices across the world. The digital version is available at the Infodefensa.com and Infoespacial.com portals to further complete the information described in different formats (pageflips and pdfs) so it can be better managed and promoted. The websites dedicated to this publication are home to the most up-to-date news and opinion pieces on the Defence and Security sector.

The digital version of the Business Directory will be rolled out over the year with news releases and documents on the featured companies to provide the latest information on the challenges facing businesses over the next year. It is an eminently useful tool for the industry and for decision-makers in different Defence and Security administrations around the world.

It is also the document that heads up annual publications specifically addressing the major Acquisitions, Tenders, Defence and Security Budget Programmes in Spain, the digital versions of which will be available over the SPAIN Defence & Security Industry 2015 website, among other means.

IDS presents this comprehensive communication tool to respond to the strict demands of the national Defence and Security industrial network. a net export sector of advanced technologies which has had in the Spanish Armed Forces’ international missions, one of the most important showcases of its ability to provide top-quality systems and on-the-ground responses and those related to overhaul and other services. In both cases, it is the outcome of a major effort in RDI investment, an indisputable part of the industry’s DNA in Spain.
The Kingdom of Spain is a sovereign, social and democratic state under the rule of law and member of the European Union (EU). Its territory is divided into 17 regions, the 'Comunidades Autónomas', and two Autonomous Cities, which are vested with powers of self-rule. The capital is Madrid.

**Form of State:** Parliamentary Monarchy  
**Separation of powers:** The Executive power comprises a Council of Ministers headed by the President of the Government (Head of Government). The Legislative power is a democratically elected bicameral parliament: a lower house (Congress), and an upper house (Senate). And the Judicial power: whose governing organ is the General Council of the Judicial Power (CGPJ).

**Head of State:** HM Felipe VI  
**President of the Government (prime minister):** Mariano Rajoy Brey.

**Area:** 505,991 km²  
**Coastline:** 7,291 km  
**Borders:** 2,032 km (Portugal, France, Andorra, Morocco and United Kingdom—Gibraltar-).

** Territory:** Comprises the greatest part of the Iberian Peninsula, the Balearic Islands (western Mediterranean), the Canary Islands (north-eastern Atlantic) and the cities of Ceuta and Melilla (North Africa).

**Geography:** Second most mountainous country in Europe (average altitude of 650 m above sea level).

**Population:** 46.5 million. Density: 92/km².

**Life expectancy:** Women 85 years. Men 79 years.

**Literacy rate:** 98%

**Language:** Castilian/Spanish (74%), Catalan (17%), co-official in Catalonia and Balearic Islands. Galician (5%), co-official in Galicia. Basque (2%) co-official in the Basque Country and northern most third of Navarre.

**Currency:** Euro. Internet Domain: .es  
**Calling code:** +34.

summary

Spain in numbers and information

Presentation

Institutional backing

R&D+i and Quality in Spain

Advanced technologies developed in Spain

Who offers what?

Contact points
Spain is the 4th largest economy of the EU and the 13th largest in the world. Today is one of the countries of the Eurozone with fastest-growing in the export sector. Its aerospace and defence industry is the fourth or fifth largest in Europe.

- **GDP**: EUR 1,064,300 million (current euro in 2014) GDP by sector: agriculture 2.5%, industry 16.1%, construction: 5.2%, services: 67.5% Income per capita: EUR 22,300.

- **Main industries**: textiles and footwear, foodstuffs, automotive, iron and steel, chemicals, shipbuilding, machinery, tourism, ceramic products, medical equipment, aeronautics, transport, pharmaceuticals, cement, oil refining and telecommunications.

- **Exports of goods and services**: Turnover: EUR 234,239 million Number of exporting companies: 150,992.

- **Energy**: Spain has the greatest installed world capacity of thermoelectric solar energy and is a European leader in wind energy generation.

- **Tourism**: Fourth global destination in number of visitors and second in revenues.

- **Transport**: 38 international airports. Over 3,000 km of high-speed rail. Road network: 165,593 km (14,701 km motor ways). 46 international ports.

- **Industry**: Turnover net amount EUR 570,984 million. Number of industrial companies: 121,576.

- **Defence Industry**: 580 companies on record with the Ministry of Defence. 79% of the industrial fabric are small and medium-sized enterprises with high technology content. 22,000 direct jobs and EUR 5,000 million sales volume. Exports of military Equipment doubled on 2013 over the previous year, from EUR 1,953.7 million to EUR 3,907.9 million.

### COUNTRIES DESTINATION EXPORTS OF MILITARY EQUIPMENT (Data 2013)

<table>
<thead>
<tr>
<th>Country</th>
<th>Percentage</th>
<th>Value (EUR million)</th>
</tr>
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<tbody>
<tr>
<td>United Kingdom</td>
<td>10.3%</td>
<td>183,341</td>
</tr>
<tr>
<td>France</td>
<td>14%</td>
<td>267,244</td>
</tr>
<tr>
<td>Germany</td>
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<td>Sweden</td>
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<td>2.2%</td>
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<td>Turkey</td>
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<tr>
<td>Norway</td>
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<td>United Arab Emirates</td>
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<td>313,981</td>
</tr>
<tr>
<td>Other countries</td>
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</tr>
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</table>

### SOURCES
Ministry of Public Works, CIA World Book, marcaespana.es, AENA, Ports of Spain, Ministry of Economy, Ministry of Defence, INE.
The world today is constantly proving to us that Defence is a fundamental pillar of any stable, prosperous society that seeks to develop in peace and freedom. At the same time as modern society is continuously and unrelentingly making progress in areas such as the Internet, new technologies and the way we communicate, so too have the enemies of our freedom been evolving, using the same advances we have made to attack us and further radicalise their ideology and its implementation.

These days wars are fought in geographic areas and virtual terrains alike. And to fight in both we need to evolve, to increase our capacities and to go into the future one step ahead of those who want to snatch it away from us.

Faced with this panorama, in which the globalisation of good is unfailingly followed by a multifaceted threat that is hard to confront, Defence and the technological and industrial development associated with it are of vital importance. Continuous research and the development of new technologies that enable us to stand up to threats and the challenge of more flexible and cleverer Armed Forces which can adapt to a reality that is changing at breakneck speed are both an exciting challenge and a central priority.

That is the case for those of us with a political responsibility in the field of Security and those who work in the industry. It is a challenge that calls on us to reinvent ourselves, to continually aspire to more and to join forces in a common effort to make Defence a benchmark industry and driving force, an insurance policy for our welfare state.

The Spanish Defence industry is a strategic sector whose capacity for development and continuous innovation is increasingly impacting basic concepts of Security and the abilities and planning of the Armed Forces. A strong industry is a plus for Defence and makes it a reference point for research and development.

An industry that creates synergies to deliver on common goals makes Spain a more modern and advanced country. In the same way, progress in military technology is transferred to civil technology in a way that often goes unnoticed but has a significant influence on people’s daily lives.

Supporting the Spanish Defence industry not only backs a strategic sector; it also supports a highly qualified type of employment in RDI. Initiatives like the one before us here are a further incentive for the sector and for those of us who have a political responsibility to it.
Towards a centralised management model

The Secretariat of State for Defence, and more particularly the Directorate General of Armaments and Material (DGAM), is immersed in a process of implementing a new management model as a result of the centralisation of the procurement and modernisation programmes and those designed to deliver on common sustainability, now and in the future.

For the first time since the Ministry of Defence (MoD) was created, a unique and specialised organisation dedicated to the acquisition of armaments and material is being consolidated, which involves a sea change in the model of obtaining the systems our Armed Forces need.

The Directorate has opted for a new procurement model which more clearly separates what has been called the ‘three domains’ or spheres of power:

• The domain of the need of the client or end user of weapons systems established by the Armed Forces.

• The domain of the solution and acquisition of said systems and which competes with the Directorate General of Armaments and Material throughout the procurement process.

• The domain of development and production, which is in the hands of industry.

The transformation has consisted of moving from a model of ‘centralised management and decentralised execution’ in the procurement process to one that is fully centralised, where all aspects of programme management are planned, led, executed, coordinated and controlled by the DGAM and where the Armed Forces continue to be responsible for defining the operating requirements as users.

Centralised management is a model whose efficacy and efficiency are supported by the fact they have been successfully adopted in other ally countries around us. In our specific case, at no time did we try to replicate other existing models, but rather sought one we considered most suitable to our needs, possibilities and specific capacity requirements and which was in line with the volume of programmes we have to manage.

The new unique and specialised organisation will make it possible to implement a common management doctrine based on standardised procedures and methodologies that will lead
to better coordination and comprehensive and consistent programme management, seeking a more efficient way to reach targets and enhance efficiency and efficacy in their tracking and control, without the domain of ‘the need’ interfering with the domain of ‘the solution’ and maintaining the user as part of the process, taking advantage of all of the user’s capabilities.

With the concentration of responsibilities, we aim to carry out a more effective exercise of powers, as it is an organisational model based on ‘model processes’ rather than ‘types of resources’, with greater agility and uniformity in decision-making and increased reinforcement of the figure of the ‘sole client’ of the Ministry of Defence as an entity.

The DDN classifies the Spanish defence industry as an “ideal supplier of the needs of our Armed Forces”. In this respect, acquisition programmes are the most important instrument the defence industry’s industrial policy has, as they shape market demand and boost economic activity and the development of industrial and technological capabilities that can satisfy internal market and export market needs.

One important aspect is the challenges facing businesses in the defence sector. There is no shortage of them and their influence on national growth is just as significant. There are approximately 580 companies listed in the DGAM’s Business’s Register, of which around 79% are SMEs; companies that produce more than 22,000 direct jobs and which can invoice some 5 billion euros. They have a significant technological content which, generally speaking, is used by highly qualified personnel.

The gradual implementation of a centralised management model for procuring armament and material resources will ensure that the Ministry becomes the single interlocutor with defence companies, facilitating two-way communication whereby they receive a single, clear message from the public authorities and in which the challenges the businesses face, their specific problems and their need for institutional support are just some of the aspects that are better understood by the people responsible for procurement at the MoD.

On this point, it is also necessary to mention the work related to the need to comply with additional provision 9 of the Public Sector Contracts Act in the fields of defence and security (transposition of the Community Directive) which has led us to define the Strategic Industrial Capabilities in the Defence Sector, and to know which industrial entities have the abovementioned capabilities: these studies will soon be completed and then approved by the Council of Ministers and subsequently published.

The international sphere is where the centralisation of programme management will become an effective and flexible instrument for executing Government to Government (G2G) Agreements, whether in supporting the export of national systems or in the sale of excess material.

In short, a new model which will make it possible to standardise processes, shorten the decision-making chain and better define responsibilities, enabling us to have a more global vision of programme management and control. It will also facilitate the unity of doctrine and criteria, which will make it possible to better advance towards a common vocabulary and single procedures.

With regard to human resources, it will make it possible to implement new common strategies and methodologies and secure better management of the organisation’s specialisation and knowledge, enabling the definition of a new organisational culture focused on programme management. It will also be necessary to look more profoundly at training personnel as the only way to deliver on the abovementioned specialisation in top-level logistics sectors, the financial management of complex programmes and the engineering of specific systems associated with them.

Centralising programmes and defining strategic defence industrial capabilities, as well as institutional support and the fostering of R&D, will enable us to have the elements we need to be able to enact a Spanish Defence Industry Strategy that guides sector businesses, when the MoD so sanctions, and, more importantly, to ensure that the Armed Forces have the weapons systems they need and have asked for, establishing the corresponding requirements.
Il Spanish Defence Industry Day in the United States

The Defence Attaché’s Office to the Embassy of Spain in Washington, in collaboration with the General Directorate for Armament and Materiel of the Ministry of Defence, has organized a new gathering of Spanish companies with the goal of presenting their solutions, products and services to the Pentagon.

“The number of companies that have shown interest in this second edition has grown significantly, since they think it very interesting to participate given the chosen format. This kind of meetings is very important for the companies to make themselves known before the U. S. authorities of the Office of Acquisition, Technology and Logistics”, said in the Attaché’s Office.

“For the Defence Cooperation Attaché’s Office in Washington, DC, it is also very useful to rely on a publication like SPAIN Defence & Security Industry since it shows the capabilities of the Spanish industry and its potential in other markets, and it is specially appreciated by the Comparative Technology Office and by the National Defense Industrial Association. Defense Attachés from other countries accredited in the U. S. capital city have also shown their interest”.

The Defence Cooperation Attaché’s Office, part of the Defence Attaché’s Office to the Embassy of Spain in the U. S. capital city, has received fifteen requests from companies representing several areas of defence in order to take advantage of this most useful opportunity. Among the interested companies are CESA, CT Ingenieros, DAS Photonics, Eversis, EXPAL, Indra, ENSALAZA, NADS, Navantia, Piedrafita, Proytecsa Security, SAES, SENER and Tecnobit.

In order to facilitate and coordinate the relations between the Spanish companies and the Pentagon, the Defence Cooperation Attaché’s Office has organized for the second consecutive year a joint session during which said companies will be able to make a general presentation to personnel of the Comparative Technology Office, followed by personalized meetings with members of the Office of the Secretary of Defence (Acquisition, Technology and Logistics), USAF, Army, Marine Corps, Navy and U. S. Special Operations Command.

More information:
http://www.defensa.gob.es/agredwas/organizacion/financiera_armamento/
He development of state-of-the-art technologies linked to the Defence and Security sector has now become the “spearhead for the Spain Brand” -indicates Carlos Espinosa de los Monteros, Government High Commissioner of this institution- “to disseminate a more modern and innovative image of our country”.

Hence, the Spain Brand highlights the “extraordinary work of Spanish Defence and Security companies”, the results of which are ensuring the “signing of extremely important contracts with countries around the world”, thus strengthening the image of Spain “as an exporter of innovation”. Nowadays, “entering foreign markets is no longer an option but more an obligation”, explains Espinosa de los Monteros.

What role does the Defence and Security industry play in the Spain Brand?
The international success of this industry involves associating our country with modern technologies and with research and development, key points in strengthening the Spain Brand. Worldwide, we are famous for our language, culture, heritage and tourism, but unfortunately and unfairly, we are not often associated to the state-of-the-art development of new technologies. Defence and Security has become a spearhead for the Spain Brand to disseminate a modern, innovative image of our country.

What has the participation of our Armed Forces in international missions meant for the Spain Brand?
The presence of our Armed Forces in international conflicts has turned Spain into the fifth power to contribute towards safeguarding world security. The image of Spain has gained significance thanks to its military contributions on peace and international aid missions, with around 2,000 troops spread over twelve operations. This support, among other issues, has helped us ensure a post for Spain as a non-permanent member of the UN Security Council and has strengthened our image as an active, caring country that is committed to peace and security.

What Defence technologies can our country head as a bastion for the Spain Brand?
The extraordinary work of Spanish companies in the development of Defence and Security technologies and the signing of very important contracts with countries around the world strengthen the image of Spain as an exporter of innovation. Integrated land, sea and air surveillance systems, cyber-security technologies, satellite and radar communication systems, naval and air engineering or modern simulators are just some of the Spanish technologies used on a daily basis in hundreds of countries and that head the Spain Brand.

How does the Spain Brand support the internationalisation of companies, including those from the Defence and Security sector?
The Spain Brand acts as an umbrella for all business initiatives and promotions implemented by the Authorities. Companies have ICEX and other special organisations to accompany them during their internationalisation processes. The Spain Brand works on improving the image of our country abroad and, in short, enabling companies to access foreign markets. It is the prestige of a country that attracts interest and disseminates security in the different sectors.

The growth of exports is a sign of change in the current economic situation. Is the Defence industry an example of the commercial trend to head abroad?
The transformation of recent decades has made the Defence and Security industry aware of the need for internationalisation to ensure the feasibility of its business. Accessing foreign markets is no longer an option but an obligation. The sector has been able to start a positioning strategy abroad thanks to the high technological qualifications and its orientation towards the needs of each project, which is reaping its fruits and acting as an example for other sectors that must eventually support internationalisation.
Defence matters at stake

Defence matters. This intriguing and at the same time provocative slogan, with a clear double meaning, clearly and concisely summarises the strategy that has been progressively rolled out over the past year in international defence-related forums, both in the framework of NATO and the EU.

Defence matters and their promotion will undoubtedly be high on the agendas not only at the above mentioned international forums but also in national defence policies in 2015 and that is the context on which I am basing this contribution to the document SPAIN Defence & Security Industry 2015, now in its third edition, which has consolidated a name for itself as one of the reference catalogues of the basic technological and industrial capabilities of the Spanish defence industry.

The framework of international security has changed drastically in recent times. Most of the operations and missions carried out by our Armed Forces and those of our allies and/or partner countries within the framework of the international organisations to which Spain belongs, whether NATO or the EU, take place far from home. The majority of these countries no longer have compulsory military service, which, analysed without going into great depth, obviously impacts the way the public understands the defence industry, i.e., what has been called ‘awareness of defence’. The financial downturn, which began to affect Western economies - and European ones in particular - as of 2008, also played a role in the significant and drastic reductions in public spending, particularly with regards defence ministry budgets and therefore the business strategies of industries related to the sector.

All of this has without question made both NATO and the EU keen to act on the issue, within the sphere of their respective powers and responsibilities. In other words, to prioritise defence matters on the agendas of their strategic meetings, which are the Heads of State or Government meetings in the case of the EU (specifically the meeting of December 2013) and the NATO summits (in particular the Wales summit of September 2014). Above all, it has led both organisations to redouble their efforts to make not only national defence ministries but also, and very importantly, the public aware of the importance of keeping numerous defence-related matters on the table, including the always-controversial aspect of budgets, as fundamental elements that guarantee freedom and prosperity. From there comes the reference, not in the form of a question but as a statement, that defence is important, i.e., defence matters.

As the NATO Secretary General said in his speech to the Parliamentary Assembly in Zagreb in October 2013: “It is clear that defence still matters, but what we all need to do is improve our efforts to explain why”. For its part, within the framework of the EU, the European Defence Agency chose European Defence Matters as the title for its annual conference in Brussels in March 2014, launching a message along the same lines as that of the NATO Secretary General a few months earlier.

In this context, with the logical differences stemming from their particular situations, one as an intergovernmental military alliance and the other as an economic and political association of countries, both organisations have set their 2015 roadmaps to address three basic areas of action. The first, focused on shoring up the political/strategic aspects of agreement, on the one hand, with the principles of the North Atlantic Treaty on which the alliance is based and, on the other, with those derived from the Common Security and Defence Policy (CSDP), as detailed in the EU’s Lisbon Treaty. The purpose is clear: to raise awareness about defence among the public by rolling out common intergovernmental policies.

The second action is aimed at identifying, developing and obtaining the military capabilities needed to address the current and future threats the member countries and stakeholders of the organisations face, including the new framework of international relations arising from the Ukraine crisis.

Finally, and just as importantly, actions in the area of the defence industry as a key strategic sector in related matters. The development of a technologically competent industry, competitive at the global level and able to provide the systems that cover the military capability requirements our Armed Forces must have today and in the future is undoubtedly a key question.

Figures from the European Defence Agency (EDA) show that total spending by EDA member states, i.e., all of the EU states except
Denmark, came to €189.6 billion in 2012, approximately 1.5% of the 27 countries’ aggregate Gross Domestic Product (GDP) and 3% of total government spending, both figures being the lowest since 2006. In other words, there has been a 12% cut in defence spending in real terms since 2006, along with an equally important fall in R&D investment.

In this European scenario, global competition from emerging countries is a major challenge to the Old Continent, with 2015 R&D investment by the BRIC countries (Brazil, Russia, India and China) estimated to more than double the aggregate figures of France, the UK and Germany, the EU’s three leaders in this type of investment.

In this context, defence industries - including the Spanish one - have spent the past few years facing the challenge of remaining profitable in an internal market in clear decline, forcing them to respond with a wide spectrum of strategies, including diversifying the business to get onto civil markets in search of greater efficiencies and boosting expansion on global markets to seek new opportunities.

Opportunities which, in many cases, are associated with tech transfers as demanded by the purchaser countries in order to create strong indigenous business structures, with the obvious risk of increasing the number of competitors.

Faced with this discouraging prospect, the European Council, at its December 2013 meeting, approved the implementation of an ambitious agenda to foster a more competitive and efficient security and defence sector that would contribute to the goals of Europe 2020, i.e., 20% of GDP to come from the industrial sector in general and 3% of GDP to go into R&D.

This agenda is in line with the COM/2014/0387/final report from the European Commission which, under the title, “A New Deal for European Defence”, details the roadmap which the Commission, in close collaboration with Member States, the European External Action Service (EEAS) and the EDA and through regular consultation with the European Parliament and industry, has been developing since the start of the political year last September and for those which it plans to present a situation report on at the EU Heads of State or Government meeting to be held in June 2015.

This consultation mechanism, which the Communication on the roadmap refers to, is of vital importance as it must permit and facilitate the defence ministries of the member states, as the parties responsible for the industrial defence policy, to be a key part of the armament and material policy, as they can be direct and agile interlocutors with the Commission during the implementation of the roadmap.

Considering the set of actions and tools which the Commission has implemented with this list of actions, including financial ones and those that make the most of the opportunities that present with the development of dual technologies and the logical reservations deriving from the specificities of defence matters, principally associated with legitimate national security interests, the Spanish Ministry of Defence considers all of the Commission’s activities in this field to be highly positive. These actions unquestionably involve proposals of huge importance for the future of the industry and the European defence market and therefore for meeting the military capability goals of Europe’s armed forces.

Spain, with an industrial defence sector developed over the past 30 years and which not only has SMEs that are highly competitive in niches of excellence related with defence, but which also participates in important transnational companies, is aware, through its Ministry of Defence and, in particular, the Secretariat of State for Defence, as the party responsible for the sector’s industrial policy, that the work plan which the European Commission has implemented with respect to the defence market and industry requires actions by the Member States at the national level.

The Spanish defence industry posted earnings of more €5.6 billion in 2013, 2.5% more than the previous year’s total. 70% came from exports and there was a 10% reinvestment in R&D, providing more than 50,000 jobs and generating €2.5 for every euro invested, in addition to having an enormous multiplier effect on economic activity and technological innovation. This all makes it extremely well placed to continue to contribute to shoring up the European Defence Technological and Industrial Base (EDTIB).

Within the possibilities that the process of economic recovery allows, the Secretariat of State for Defence has already implemented a new investment cycle in defence which will most certainly not only make it possible to address new requirements with respect to the military capabilities that the Armed Forces need to contribute both to national security and collective security within the framework of our international alliances and associations, but also give a new boost to the maintenance and greater development of the industrial and technological base of Spanish defence.

The definition of industrial capabilities considered strategic to defence, an action which is being carried out parallel to this, will contribute to allowing Spanish industry to help the European consolidation project with the specific weight in accordance with the role that corresponds to Spain.

Finally, institutional backing for the internationalisation of the Spanish defence industry will continue to be a priority factor for the Spanish Defence Ministry. Because, in short, in the interests of freedom, prosperity and citizen safety: Defence matters.
The Ministry of Defence, through the Defence Policy, determines the national defence objectives and the resources and actions needed to obtain them. These objectives are defined in the National Defence Directive, which forms the basis of the National Defence and Military Defence Plan. When we talk about resources and the actions needed to obtain them, we are talking about appropriate Armed Forces and an industry which provides them not only with all of the equipment, armament and material needed to comply with their functions but also that which is necessary in day-to-day operations to live, move and fight. National defence resources are therefore the Armed Forces and the industry that supplies them to carry it out.

When considering the attainment of these resources by the Armed Forces, i.e., all of the equipment and services needed for mission compliance, it is necessary to establish two major groups: firstly, the one related to armaments and weapons systems and secondly, the one related to all the other equipment and services. There is no question that there are significant differences in attainment between one and the other. The procurement policy of a weapons system presents major differences to the policy of acquiring goods and services not related to armaments.

The overall industry that supplies the Armed Forces with these resources is normally called the defence industry but then, when one hears this expression, the first thing one thinks of is armaments. Indeed, it is not only the first thing, it is often the only thing. We therefore forget about an entire industry which builds barracks, provides clothing, means of information and communication, food and a long list of equipment and services which are needed to live, move and fight, as mentioned above.

The latter industry supplies these goods and services not only to the Armed Forces, it can also supply them to all the other government bodies and private organisations that also require buildings, clothing, means of information and communication, food and the same long list of equipment and services to live, move, etc., and these days not to fight but to comply with their functions. That is why said equipment and services are today called dual-use goods and services.

Should we really call this dual-use goods and services industry the defence industry? Well, no, not really; but it is true that many companies have specialised in producing these dual-use goods and services for defence and which, although this portfolio is not their major customer, it is their principal client. So what should we call this industry? The Industry ‘for’ Defence as the AESMIDE Association does.

Spain has long been clear about this which is why, when the Defence Ministry promoted the association of industries which was going to supply it with all of these resources back in 1984 with a view to facilitating a dialogue to discuss the problems concerning contracting, it decided to create two associations: one for the industry most closely related to weapons systems and the other, AESMIDE, the Association of Contractor Companies for Public Authorities, for the industry not related to them.

What should be clear is that the industry for defence requires a differentiated customer care, as if it constituted a sector. Spanish industry is divided into sectors, and when the Government wants to promote it, it determines appropriate measures for each of them. This has recently been acknowledged in Europe.

The European Commission has published a guide to help SMEs tap into EU funding for dual-use projects (which it now defines using this expression). It is clearly fully aware of the need for institutional support and funding for this type of industry. The European defence policy is aware of needing it and that it...
must support it institutionally, and the Spanish defence policy is beginning to be aware of it, too.

The 2nd Defence and Security Congress was recently held at the General Military Academy in Zaragoza. Organised by this Association in collaboration with the Ministry of Defence, the ISDEFE Chair and the University of Zaragoza, over 150 specialists from universities, public research organisations (PROs), businesses and State Security Forces laboratories assembled at the General Military Academy. The Congress urged attendees to make use of the synergies between the civil and military spheres to achieve an interaction between research, innovation and technology that would ensure a safer society. This synergy is necessary to successfully roll out, in favour of the security and defence policy, the outsourcing which has been taking place in the Spanish Armed Forces since the 1980s.

We could classify this outsourcing as elemental, basic and specialised. The first concern clearly auxiliary tasks, the types that were done instinctively from the time armies first began and through to the end of the 1980s. They involve the ad-hoc contracting of different supplies and services concerning: repair work, gardening, catering, food, cleaning, hair-dressing, etc. The second began to take place in the 1990s in the same areas as the previous stage, but prioritising the idea of permanent comprehensive service and with an approach focused on a lasting solution with longer terms. This meant signing contracts of a greater scope and importance: maintenance of installations and infrastructures, surveillance and security services; land, sea and air transportation of both personnel and material, specialised maintenance (vehicles, engines, aircraft), training in languages and IT, manufacturing, storage and distribution of clothing and equipment and waste disposal.

Finally, specialised services are those that have been performed since the mid-1990s in more laborious, complex and specific treatment areas and which are currently still being developed or perfected. They consist fundamentally of the maintenance of weapons systems where the goal is to sign multi-activity contracts with tier-one industrial suppliers which cover not just maintenance activities and spare parts supply but engineering services and deployment support.

All of these activities have shored up an industry which we call the industry for defence and which the Ministry classifies as the auxiliary industry. This industry features a great many small and medium-sized enterprises and they are the ones that need special institutional support. In addition to the support measures that have already been announced and which are taking place, I suggest we add another one which the sector considers fundamental, i.e. facilitating the entry of SMEs in the supply chain, and the best way to do it is to globalise projects and ensure that technical specifications sheets for tenders enable joint ventures to provide a turnkey response to these projects.

Many companies have specialised in producing dual-use goods and services for defence. What should we call this industry? The industry ‘for’ Defence and technology that would ensure a safer society. This synergy is necessary to successfully roll out, in favour of the security and defence policy, the outsourcing which has been taking place in the Spanish Armed Forces since the 1980s.
Innovating with an eye on the markets

Adolfo Menéndez Menéndez
President of the TEDAE

The Spanish Defence and Security industry is committed to continuing to grow, which is why it must strive to permanently improve on efficiency and competitiveness. Knowing too that technological innovation is the competitive edge that offers the most guarantees, it ploughs 10% of its turnover into R&D.

The years of contracting domestic demand, as a result of the restraint in public spending required to emerge from the crisis, have been fraught with difficulties, but they have also provided learning opportunities. Things learnt over this time include the fact that we know we can do things well and can therefore consolidate our position as a technological and industrial frontrunner, a position we have worked hard to earn and which is the outcome of our effort as an industrial sector.

In short, we are aware that our businesses need to persevere in R&D investment to continue to roll out inhouse technologies and products. That will be the spearhead to successfully moving onto new markets and occupying technological niches that can give us an advantageous position over the competition. It’s as simple as selling the products you make yourself, and we make excellent products and technologies, under brand Spain, which already deliver an export figure of 70%.

In order to grow, Spanish industry wants to win new markets and customers for its excellent products and technologies. This can be achieved by focusing innovation on the market, and particularly international markets. In the same the way that Marcus Aurelius said that as an Antonine his fatherland was Rome but as a man it was the world, we are Spain’s industry, but we want, we can and we must think globally because our market is the world. We want to compete freely and under equal conditions on these global markets and that is the direction in which we are moving.

Opportunities of the new cycle

The Defence and Security sector is starting a new investment cycle, to which it is urgent to adapt with flexibility and a proactive spirit. The indications are that this new cycle will be marked by the start of the economic recovery, to which we are keen to contribute in as far as our not inconsiderable possibilities allow.

A new cycle in which we can glimpse potential opportunities and growth in demand in the increasingly tenuous dividing lines between Defence and Security and civil R&D. We can also see opportunities in the progress of European regulations, the prioritising of industrial specialisation, European Union structural funds, the H2020 programme and the new framework being outlined for the Defence industry.

Similarly, we can see an asymmetry in the transfer of powers from Member States to the European Union. Moving forwards quickly in financial areas, although the process has yet to culminate, things are slower in Defence matters, which obviously go to the heart of sovereignty, while at the same time the crisis highlights the difficulties, if not the impossibility, of sustaining the investments in Defence and R&D that will be needed in the future without a close European collaboration.

These are opportunities we are keen to respond to, as I said before, by focusing innovation on the markets, but also by aligning ourselves to an industrial policy of State, perfecting public-private cooperation tools with profitable and flexible business structures to become bigger, more capable and by joining forces. These are all priority targets for our companies.

Inhouse products and technologies

One of our strengths is that as a sector we have delivered high levels of quality, qualification and competitiveness. We are one of the few nations whose businesses can handle the entire industrial process: innovation, production, deployment, maintenance and so on. We have the products, capabilities and competitive technologies in the areas of ground, naval and air platforms, in electronics and communications, in armaments and ammunition and in the space industry, among others. The sectoral structure, distributed into prime businesses, subcontractors and SMEs with their own products, allows us to lead complex projects,
participate in international programmes and have competitive specialised niches.

In short, we have forged an important position on markets which we are not willing to let fall by the wayside out of inertia. To get where we are, our industries have put a great deal of effort into their professionals, along with significant investment and a hearty degree of enthusiasm. These are the same traits we devote to the continuous improvement of existing products and the roll-out of new ones that integrate different technologies.

Examples include the international programmes our industry and products have taken part in, providing advanced technology services to the UK, Australia, Brazil, France, Saudi Arabia and Germany, among other countries. We have consolidated our reputation as partners they can trust and have become benchmarks for many of them.

Our companies are also no strangers to the dynamism that exists with respect to Security technologies and applications, a market with enormous growth potential. Our geographic position has led to us developing ground-breaking applications in border control and sea surveillance matters, to give just two examples, which are being used to a high level of satisfaction in numerous States.

Then there is the major technological challenges concerning cybersecurity today: an area where Spanish industry aims to continue to grow, as it has the expertise and capacity needed to move forwards in effective and competitive solutions that anticipate present and future threats.

To sum up, we are ready to tackle the Defence and Security challenges that must be faced over coming years. It is a challenge we will step up to at this time of transformations and changing scenarios, in which a number of very important variables come into play: security, sovereignty, budgetary restraints, new types of conflicts, economic growth, protection of technology assets and R&D.

It is a challenge to which businesses and governments must find effective and inclusive responses, as no economy, no society, is capable of progressing without a safe and stable environment.

Strategic alliances

The governments of the countries that invest most heavily in Defence and Security, whether through their own programmes or multinational ones, support their national industries growing on foreign markets.

In export activity, most operations are based on cooperation agreements with local companies. In other words, strategic alliances in their different forms, in accordance with their level of integration (establishment of consortia, joint ventures, stakes in companies or mergers and acquisitions).

Spanish companies also have vast experience in cooperation agreements with other countries, where they have efficiently and successfully managed tech transfers and transactions, models of corporate government and the identification, monitoring and management of contingent liabilities. Proof of this is the fact that more than two-thirds of their revenue came from international markets last year.

It is also necessary to consider that, on more than one occasion, commercial agreements initiated between companies of different nationalities end up becoming bilateral cooperation agreements between States that transcend the field of Defence and Security to include other areas, such as infrastructures and telecommunications.

In this respect, Spain not only has the experience of its companies, but also the support of its Government and Ministry of Defence, which have fostered the development of cooperation and export tools such as the government-to-government agreements that facilitate the transactions of certain products.

I believe there are the grounds to say that the Spanish Defence and Security industry has, at this time of profound changes, earned its technological and business stripes and has a decidedly export vocation which demonstrates the powerful multiplier effect of economic activity (each euro invested in Defence generates €2.5 in economic activity). Ours is a strategic sector for the economy, not only in terms of Security and national sovereignty, but also as a generator of highly qualified employment, of the industrial fabric and of added value, as well as tech and knowledge transfers to other industries in the civil sphere.

There is no question that investing in Defence and Security is probably the most effective tool for articulating a country’s technology training which, through the trickle-down effect to the civil sector, ensures economic, technological and social returns vastly superior to the initial investment.
The Technological Surveillance and Forecasting System (SOPT) arose following approval from the Secretary of State for Defence on 5 January 2001 of the Ministry of Defence Research and Development Master Plan, introducing it as an instrument for implementation of the R&D policy.

Its main aim consists of providing the Ministry with technical criteria throughout all of its technological areas of action, strengthening the technological surveillance and prioritisation mechanisms to identify the technological advances and areas of interest through permanent interaction with the technology and industrial base.

The creation of the SOPT is supported by similar decisions made within the Defence environment of Spain and countries such as the United Kingdom, France or Germany have departments similar to the SOPT.

From a technological viewpoint, the Defence sector faces the challenge imposed by the evolution of the environment in terms of technological advances and of the application of these advances. One of the main goals of this challenge lies in identifying new technologies with significant disruptive potential. The problem of investing in new technologies is the fact that a great many of them are promising during an initial stage of development and, if there is one factor that characterises them, it is that their evolution is unpredictable as they progress in their development. The SOPT uses a series of tools such as technological surveillance, forecasting, prioritisation or evaluation to select these technologies. This provides it with the necessary technical criterion to make decisions.

Technology surveillance is a basic tool to ensure no ground is lost in light of the speed of advancing technology and is particularly relevant for building the basis upon which the activities supporting the decision lie. This surveillance seeks to identify initiatives and information for possible support for R&D programmes. To determine the current state of the art of technology, the SOPT performs a systematic analysis of sources of information and cooperates with similar organisations both at home and abroad. Worth noting is its active participation in the main military forums, such as the EDA (European Defence Agency), the STO (Science and Technology Organization) belonging to NATO and the LOI EDIR FA (Letter of Intent for the European Defence Industrial Restructuration Framework Agreement).

In order to support decision making, during the medium and long-term planning of R&D activities the SOPT estimates the medium and long-term technological advances through the implementation of regular exercises performed by experts, research centres, industry and universities, where information on technological trends, advances and challenges are collected in order to guide future efforts, paying special attention to identifying any factors leading to innovations both now and in the near future. To cover this wide technological spectrum, it is structured into Technology Observatories - one for each technological area of interest, although their number is continuously evolving in line with the dynamic role of the technological environment - in which experts from the Directorate General of Armament and...
Material (DGAM) and from other Authorities, universities and companies take part. The participation of these internal and external collaborators is considered essential for providing a view of technology that is as all-encompassing and precise as possible.

Technological surveillance provides knowledge of the state of the art of technologies in order to make better investments. This knowledge enables the SOPT to technologically assess the R&D proposals received by the SDGPLATIN that are associated to the general armament procurement process and the promotion of R&D from international forums or from different national initiatives, such as the National COINCIDENTE (Cooperation in Scientific Research and Development in Strategic Technologies) Programme.

These new technologies are obtained after prioritising them all, optimising the use of resources through the analysis of technological advances, opportunities and potential threats, promoting their incorporation into common areas, such as Defence (Security, ITCs, Air Transport, Space, etc.). Furthermore, the agreement established in the European R&D policy are supported in order to increase the level of joint investment and improve returns, focusing European R&D investments on areas of interest to us.

Technological prioritisation is the basis on which the planning of R&D investments and the obtaining of material lie. Within this area, the SOPT supports Defence Planning in the technological aspects associated to the Planning of Material Resources. 2010 saw the publishing of the Technological and Innovation Strategy for Defence (ETID), a document that includes the lines of action for obtaining the necessary technologies to develop systems that require the capacities defined in the Military Plan. This provides a new tool that helps develop the priority technological lines and organise the management of the Defence R&D activities in a more efficient manner, promoting their situation within the general framework of national innovation and becoming a public reference that encourages the coordination of technological research and innovation activities by the Ministry.

With regards to the sector, the ETID is a reference that indicates which research and innovation technologies and developments are necessary so that the industry can line up its activities with these needs. To highlight the aim of this strategy with regards to integration, a website (www.etid.es) is available and a series of sectorial conferences have been held with the industry, where all those interested formulated their observations and comments freely through forums and questionnaires for later analysis. It is important to note that, for this defence-civilian environment to interact and benefit from the activities performed by the SOPT, the information collected must not only be used as technical advice for the DGAM but must also be distributed through different mechanisms such as conferences and publications, one of the most representative being the Defence Technology Observation Bulletin, which is currently published every quarter and can be downloaded directly from the ETID website.

The Ministry of Defence is responsible not only for anticipating any risks and threats but also for contributing towards improving dual-use technological and industrial capacities for Defence. An example of the existing mechanisms for this adaptation is the SOPT located in the SDGPLATIN. The aim to act as liaison and provide knowledge of the industrial technological base is inherent to the essence of this System and, therefore, it is predisposed to assist this base in applying its capacities in the interests of Defence. The SOPT assesses technological proposals from universities and companies and is an excellent starting point for their distribution. It is also aware of the possibilities of the new lines of technology so that these possibilities can be transferred and the impact on Defence planning in terms of armament and material in both R&D programmes and in procurement can be known, making sure that the future systems have the best technological advantage possible to meet with their commitments in an environment that is also constantly changing.
Quality in the Spanish Defence sector: PECAL/AQAP series 2000 system

It is an accepted principle that the technological advances of humanity are mostly due to the efforts of man to defend himself and to attack his adversaries under the best conditions, using the skills and quality of the weaponry and accessories that have been used throughout history.

The technical evolution, which has progressed at an increasingly fast rate, mostly thanks to the wars fought in the 20th Century, has increased the heritage of technologies that initially applied only to military equipment. The desire to incorporate them has also forced the technical echelons of Defence to evolve in terms of the systems used to control and ensure the quality of its applications.

The complexity of the weaponry systems and elements used by the Spanish Armed Forces (FAS), combined with the necessary reliability, difficulty of replenishment and high cost, has led to the systematisation and technification of suppliers’ procedures to guarantee the quality of their supplies.

Quality in the Defence sector in Spain. Historical background
The FAS in Spain have always provided teaching, units and means aimed at quality management in its procurements of military equipment.

Aware of the importance of procurement quality, the Spanish Ministry of Defence promoted the creation of the instrument (teaching and means) to ensure that any elements used by our Armed Forces are worthy of receiving the stamp of the highest quality.

Following the entry of Spain into NATO (North Atlantic Treaty Organization) in May 1982, our country now signs its agreements and doctrines regarding quality.

STANAG 4107, endorsed by the allied nations involved in the procurement of Defence material, refers to the “Mutual Acceptance of Government Quality Assurance (GQA) and Usage of the AQAP (Allied Quality Assurance Publications)” and establishes the rules for delegating contract-related GQA activities.

On endorsing this agreement, the national authority (the Director General of Armaments Weaponry and Material - DGAM - in Spain) agreed to provide an Official Inspection service in the country for Quality Assurance in contracts signed by another Member State in all areas of Defence supply services.

These GQA activities are primarily developed within the industries by the QAR (Quality Assurance Representative of the Ministry of Defence) appointed by the DGAM for each specific
contractor and his activities are undertaken based on suitably identifying and assessing risks.

However, the scope of the activities associated to Government Quality Assurance can also include assessment of the capacity of the quality management system of potential suppliers and the supervision of activities related to the contract on the appropriate level. The most important aspect of the GQA is ensuring the supplier meets all contractual requirements.

The NATO agreement involves acknowledgements and action such as the following, among others:

- Establish the DGAM, as the National Quality Assurance Authority, for all Official Inspection requests from NATO agencies or countries to Spain and from Spain to the different NATO countries.
- Translate and publish AQAP standards as Spanish Quality Publications, PECAL standards. These standards were translated by the former Technical Industrial Inspection Service, now known as the Industrial Inspection Area (IIA) of the Sub-directorate General for Technical Inspection and Services of the Spanish Ministry of Defence.
- Establish PECALs as standards of reference for work by Ministry of Defence Official Inspection personnel.
- Disseminate PECAL standards among companies in the sector. Once known by the industries in the Defence sector, these publications acted as a catalyst to ensure and boost the implementation process for quality management systems in these industries.
- Assess the companies supplying Defence, ensuring they have quality management systems that meet the requirements of any of the contractual AQAP/PECALs.

Quality regulations in Defence

Quality regulations in Defence are formed by the series of AQAP series 2000 standards. NATO criteria uses international standards to their utmost extension. Hence, AQAP standards are merely ISO 9000 standards with a series of additional NATO requirements. Spanish PECAL regulations are the transposition of AQAP regulations.

The implementation of quality management systems in line with AQAP/PECAL standards in the different organisations ensures that contracting bodies trust the capacity of suppliers to meet contractual requirements, consolidate quality management and contribute towards a sought-after continuous improvement.

In line with its scope, there are two types of PECAL: contractual and guide. This regulatory structure means that the most suitable standard for each contract can be selected and requested at any given time, thus enabling the purchaser and the supplier to effectively schedule resources and optimise the investment.

PECAL contractual standards are the most important, as they mean that the supplier must provide objective proof that he has established and maintains a quality management system related to the contract. The system must contain the necessary elements to assure the QAR that the product meets with contractual requirements.

The standards of PECAL series 2000, which may be included in contracts and that establish quality assurance requirements, are as follows:

- PECAL 2110 NATO Requirements for Quality Assurance in Design, Development and Production.
- PECAL 2120 NATO Requirements for Quality Assurance in Production.
- PECAL 2130 NATO Requirements for Quality Assurance in Inspection and Testing.
- PECAL 2131 NATO Requirements for Quality Assurance in Final Inspections. (Non-certifiable)
- PECAL 2210 NATO Requirements for Quality Assurance in Software, in addition to 2110.
PECAL 2310 NATO Requirements for the quality management systems of aviation, special and Defence suppliers.

The ‘guide type’ publications of the PECAL series 2000 standards must not be used as contractual documents. Their contents do not replace, add, cancel or redefine any of the requirements of a contract and are merely a guide to facilitate the understanding, interpreting and application of contractual PECAL regulations in organisations.

PECAL series 2000 guide-type standards are as follows:

- **PECAL 2070**, which provides guidance for Government Quality Assurance under STANAG 4107 conditions and supports the harmonisation of GQA practice among NATO Countries, Agencies and Headquarters.
- **PECAL 2000 Quality policy** aimed at Integrated Systems during their Lifecycle.
- **PECAL 2009 NATO Guide** for the use of PECAL series 2000 standards, which is currently being published.

Certification of quality management systems in line with PECAL/AQAP Series 2000 standards

Certification by the Ministry of Defence - Directorate General of Armaments and Material dated back to 1986, as of the implementation of STANAG 4107, and has the following objectives:

- Prior to awarding the contract, ensure the capacity of Spanish companies to meet any quality requirements established.
- Inform NATO countries and agencies of the quality system of the companies.
- Facilitate access by Spanish companies to bid for tender in procurement contracts abroad.

The need to implement PECAL standards in organisations and obtain acknowledgement in the form of the PECAL certificate granted by the Director General of Armament and Material is determined by the type of contract for which each organisation can present a bid in an aim to obtain contractual links to the Ministry of Defence.

At present, there are around two hundred certified companies from different sectors and of varying sizes. Initial certification according to PECAL standards is granted by the DGAM following an audit performed by qualified personnel from the Ministry of Defence.

In order to gradually outsource the auditing system supported by the ‘PECAL series 2000 certification system’, the audits for certificate renewal are to be performed, following authorisation by the DGAM Deputy Director General for Technical Inspection and Services (SDGINsert), by Certification organisations duly recognised by the Mixed Defence-IAMD Committee (CMDIN).

The quality management system certification system according to PECAL/AQAP series 2000 standards

To ensure the implementation of this certification system in an environment of independence, confidentiality, transparency and gradual accessibility by all Armament and Defence Material Industries (IAMD), the Mixed Defence-IAMD Committee was formed, which acts on delegation by the DGAM. Furthermore, the mission of the CMDIN is to promote cooperation and participation by the different players involved in the certification of IAMD quality systems according to PECAL series 2000 and to supervise and manage the application of documents supporting the System.

The certification system was presented in May 2003. The following stages of the PECAL/AQAP series 2000 system then started:
The certification organisation selected must perform annual follow-up audits. The results of the follow-up and renewal audits are supervised by the AII/SDGINSERT, which are involved in the certificate renewal process.

The PECAL 2210 standard is not included within this certification system and not all audits are performed by AII/SDGINSERT personnel.

Role of the Spanish Quality Association (AEC)

Within the heart of the Spanish Quality Association is the Defence Industries and Services Committee that acts as a meeting point, disseminates, promotes and improves knowledge on quality regulations.

Recently, this AEC Defence Industries and Services Committee produced a guide book in ‘Certification and the maintaining of the PECAL/AQAP system certificate’, which explained the activities to be performed by an organisation in the sector in order to enter the PECAL/AQAP system.

The document is formed by a series of simple flow charts that represent the following activities:

- Initial procedures for the first PECAL/AQAP certificate.
- Initial audit perform by the Ministry of Defence in the PECAL/AQAP System.
- Renewal of the certificate and entry into the PECAL/AQAP System.
- Notification of changes in scope and facilities.


2. From January 2004 to October 2006: 1st Phase of the PECAL/AQAP series 2000 certification system, applied to 6 Armament and Material Industries (IAMDs).

3. From November 2006 to January 2008: 1st stage of the 2nd Phase of the PECAL/AQAP series 2000 certification system, which consisted of gradual and progressive accessibility to the system by the remaining Armament and Material Industries.

4. From February 2008 to date: final implementation of the 2nd Phase of the PECAL/AQAP series 2000 certification system.

Different aspects of the Quality management system certification according to PECAL/AQAP series 2000 Standards

The following issues must be clarified in relation to the certification process according to PECAL/AQAP series 2000 standards and the subsequent entry into the PECAL/AQAP series 2000 certification system:

To obtain the PECAL certificate and subsequently enter to form part of the System, the interested company must have a quality management system implemented in line with Standard UNE-EN ISO 9001.

The process is initially started by the AII/SDGINSERT, which performs the initial audit and, where applicable, grants the IAMD quality management system certificate for a certain scope. This certificate remains valid for a period of approximately three years. During this time and until renewal, no PECAL follow-up audits are required by any organisation, apart from in exceptional circumstances.

1. Following this period, the certificate is renewed for three-yearly periods following renewal audits performed by certification organisations selected by the IAMDs from those approved by the CMDIN.
Il actions directed at boosting industrial activity in general and the defence sector in particular are welcome. That’s why the announcement by the Ministry of Defence of a budget increase in 2015, the first since 2008, and the launch by the Ministry of Industry of an agenda with 90 measures to foster the reindustrialisation of Spain is news that encourages optimism about the future of Spain’s production industry.

Defence is a key area for European and Spanish reindustrialisation. The industry presently represents around 15% of GDP and the goal is to bring it up to 20% by 2020. The activity of the Spanish defence industry has a clearly multiplier effect for GDP as a whole. We are talking about a production sector formed of approximately 400 businesses that employ over 23,000 people directly and a further 50,000 indirectly. In fact, each euro spent in this sector puts an additional 2.6 euros into the economy, and even its export activity presents a multiplier factor of more than 3.

We must remember that this is a sector with a vast capacity for generating knowledge and investment in R&D which are later used by other sectors. It is a sector with highly advanced technological capabilities but, as the Government also reminds us, it is too small to achieve a “strong international positioning and access funding” and is a fragmented market as an upshot of national contracts that produce a large variety of fairly non-standardised products.

From the budgetary viewpoint, everything seems to suggest that Spain is facing a change of cycle that allows us to look to the future with certain optimism. In his appearance before the lower house of Parliament on 6 October, the Secretary of State for Defence, Pedro Argüelles, spelt out the key points of his department’s budget for 2015. After a number of years marked by the need to correct economic imbalances, the Ministry of Defence will this year increase its budget for the first time since 2008. The improvement is very small, barely 0.38%, but it allows us to speak of a change of trend within the government.

The arrival of the financial crisis resulted in an “ongoing absence of new investments” and the defence industry’s capabilities were not able to be modernised to the standard required. In this context, as Mr Argüelles said, Spain’s industry is losing its technological positioning, “making itself more vulnerable to acquisitions on the part of large foreign companies”. The Government’s reaction was to implement a work plan to define an industrial policy for defence with two main purposes: to achieve sustained investment which would make it possible to maintain the modernisation cycle of the Armed Forces and protect a national defence industry which is “essential” to sovereignty.

Within this work plan, a series of actions have been designed that focus on four main areas which the Government hopes will become the basis of its industrial policy for defence: the drafting of a study of core capabilities is essential, as has been done in other countries; the implementation of an R&D plan linked to boosting and training in the industry; a review of the industrial model for defence, focusing it on consolidation and shoring it up within a general framework for improved competitiveness; and the search for stable funding. We would hope that this investment stimulus will remain steady over time, but it would have to avoid the political vagaries of successive governments and the financial crisis itself, which in recent years has been the catalyst behind this important budgetary adjustment. The strong
financial commitments associated with military programmes have also failed to recover the investment drive.

The action areas proposed by the government and targeted at stimulating demand, improving competitiveness, fostering innovation and boosting financing alternatives to the banking channel are steps in the right direction and cover some of the reforms our industry needs. What is essential now is the effective adoption of specific measures needed to reach the targets.

Global indicators are also encouraging with regards innovation. The latest market surveys indicate that defence and aerospace companies at a global level will significantly increase their investment in R&D over the coming years, although they will opt for creating associations with suppliers and clients to obtain maximum performance from the investment in innovation and to cut costs and improve sales revenue. This is one of the main conclusions of a survey KPMG carried out internationally, called the 2014 Global Aerospace & Defense Outlook. This was a poll on the prospects of the global aerospace and defence sector in 2014, in which nine out of every 10 executives consulted around the world considered that partnerships, more than internal efforts, will determine the future of innovation. Given that only 40% thought this way in 2013, this year’s poll shows a very marked trend towards partnerships in R&D in this specific sector. This trend towards establishing partnerships with clients and suppliers to invest in innovation was shown across the board in all areas of the industry.

Three-quarters of the people polled in this sector around the world said that their companies planned to target between 2% and 3% of their revenue in R&D over the next two years, and 16% said they would invest between 4% and 5%. This would be a considerable increase in this area, as over half said they had dedicated no more than around 1% of their revenue to R&D in the previous two years. 75% of the people polled also said they would focus their investment effort firstly on boosting existing product ranges before they invest in radically innovative technologies.

The defence industry needs institutional support to finance its R&D investments, an aspect we continue to improve on to bring us more into line with other countries. Tomorrow’s sales depend to a large extent on the research we do today, which must come to fruition in the near future in innovative products and manufacturing processes.

At a time when the R&D budget is under increasing pressure, many companies are seeking opportunities to shore up both revenue and profitability, whether by establishing a greater presence on new markets or adapting their product and service ranges to adjacent sectors. Indeed, as is clearly illustrated in the report, sector businesses are more focused than ever on formalising associations and creating more collaborative business models to be able to deliver on these goals. However, almost half the people polled in the survey admitted they are only “somewhat efficient” when it comes to determining their profitability and just 12% considered themselves to be “very efficient”.

Another point to mention with regards the report is that control over the supply chain has been a challenge for the aerospace and defence sector. In fact, almost half the participants mentioned it as one of the two biggest challenges in relation to the supply chain. 51% said they only had a “certain visibility” with regards their tier-one suppliers and none in relation to their tier-two ones. When seeking new growth opportunities, many sector organisations now focus on entering new markets and taking advantage of the right opportunity to get the most from their services and products on adjacent markets. It is no surprise that this year’s poll shows that sector organisations are striving to adapt their supply chains to cover these possible new markets.

The 2014 Global Aerospace & Defense Outlook suggests that the next few years will give way to an era of collaboration which will radically impact the way that sector businesses operate. Adapting operating models to tackle this revolutionary complexity is no easy task for industry executives; it is important that companies start planning now.
‘Boom System’, a Spanish development that improves the security and speed of in-flight refuelling for many different Air Forces worldwide.

The ARBS has been designed by Airbus Defence and Space to refuel receptacle-equipped receivers such as the F-16 Fighting Falcon, the F-35A Lightning II or the A330 MRRTT itself (when equipped with receptacle, Universal Aerial Refuelling Receptacle Slipway Installation, UARRSI).

Located underneath the rear fuselage of the tanker aircraft, the boom mast is remotely controlled from an Air Refuelling Console in the flight deck, where an Air Refuelling Operator uses an advanced technology 2D/3D high definition/digital Enhanced Vision System. Adverse weather, day or night refuelling can be performed, thanks to its stereoscopic vision and laser-based infrared lighting systems.

This gives safer operation and a reduced workload for the Air Refuelling Operator, while enabling the tanker crew to be located together in the flight deck.

The ARBS is equipped with an all electrical, full fly-by-wire flight control system. It is provided with an automatic load alleviation system, and has autonomous disconnect for the receiver and the tanker, and has been designed under the dual redundant architecture (fail operational, fail safe).

Secure communication is possible through the boom. The boom mast and equipment require on-condition maintenance only.

The ARBS boom design provides a geometrical envelope larger than that of previous tankers (KC-135) facilitating safer contacts and refuelling operations.

The fuel flow rate of the ARBS is up to 1,200 US gal/min (up to 4,600 l/min) at 50 psig, making it the most capable new generation flight proven boom available today. This high rate of fuel transfer greatly reduces the refuelling operation time.

The fuel flow rate of the ARBS is up to 1,200 US gal/min at 50 psig, making it the most capable new generation flight proven boom available today.
Total investment in development enabled Airbus D&S to obtain contracts with the Royal Australian Air Force, the Royal Saudi Air Force (RSAF), the United Arab Emirates Air Force, the British Royal Air Force (RAF) and the Republic of Singapore Air Force recently, with the Republic of Singapore Air Force, valued at several billion Euros. At present, Airbus Defence and Space holds the scheduling of the French Government and sign a new MRTT contract.

As a result of the development of the ARBS and the signing of the tanker aircraft contract with Australia, Airbus D&S has become a leader in the world tanker aircraft market, which was a monopoly of its main competitor ten years ago.

Thanks to the capacity and operational flexibility of the A330 MRTT, there are other business lines linked to the incorporation of new missions, such as the VIP transport in aircraft equipped with secure communication systems and self-protection systems, as well as intelligence and surveillance missions.

The ARBS is a flight proven and mature system as hundreds of contacts have been made with different receiver types such as F-16s, F-15, E-3 AWACS and KC-30A. The ARBS has been certified for operations in 2010.

Programme development
The launch of the ARBS development involves support by Airbus D&S for the A330 MRTT programme for multi-purpose transport and tanker aircraft that require a system of this type for the in-flight refuelling of most US-designed fighter planes operated by the air forces worldwide (F-16, F-15, etc.). It was launched for bids in 2001 and, in 2004, enabled Airbus D&S to successfully compete against Boeing for the contract for the new tanker planes of the Royal Australian Air Force (RAAF). This contract turned the RAAF into the spearhead client of the A330 MRTT.

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The ARBS is the only new-generation system with the highest fuel flow speed and shortest in-flight refuelling time.

<table>
<thead>
<tr>
<th>MAIN CHARACTERISTICS</th>
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<tbody>
<tr>
<td>Fuel Flow Rate (max) 3600 kg/min (8000 lb/min) 4600 litres/min (1200 US gal)</td>
</tr>
<tr>
<td>Nominal Pressure: 50 psig (345 kPa)</td>
</tr>
<tr>
<td>Retracted Length: 1160 m (38 ft)</td>
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<td>Extended Length: 1820 m (60 ft)</td>
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The Space Industry in Spain

Six Success Stories, from the Continental Behemoth to the Pioneering SME

Francisco Herranz
Editor of Infoespacial.com

The space industry plays an influential and strategic role in Spain’s production sector. Although it represents only 0.02% of Gross Domestic Product (GDP), its special characteristics make it a highly competitive sector which is attractive to investors and which can drive the economy. What are these attributes? Firstly, it is a segment which invests heavily in research and development (R&D). The latest figures from the Spanish Association of Defence, Aeronautics, Security and Space Technology Companies (TEDAE) suggest that the level of investment in R&D in the space sector is double that of the rest of Spanish industry.

The strong multiplication effect the space industry has proven to have within the Spanish economy is also very significant, due to the cutting-edge technology it develops and the numerous applications that satellites have at present. Examples include the fields of navigation (GPS), weather forecasting and satellite television (DTH). At the same time, it is important to consider its vocation of highly qualified personnel, based on very specialised engineers and technicians, as well as its multidisciplinary core. Finally, and no less importantly, the Spanish space sector is an export and production group. Almost 80% of its turnover is targeted at exporting products and services, which has given it greater resistance to the negative effects of the financial crisis within Spain. Furthermore, from the productivity viewpoint, measured as gross added value per employed person, the sector posted over 106,000 euros in 2012, compared to the average of 53,000 euros for Spanish industry as a whole.

Considering the value chain they generate, within the space sector it is common to distinguish between upstream and downstream markets. The first covers research, defence and security programmes, as well as the industry dedicated to building ground segment facilities (satellite control centres) and flight segment platforms (launchers, satellites, craft, probes, etc.). Downstream market activity focuses on operators who manage space facilities and equipment for civil or military use and satellite applications or services or those based on space technology such as telecommunications (television, radio, mobile phones and broadband), navigation equipment (GPS, Galileo) and remote sensing.

We have more than 35 space-related companies in Spain, from continental...
behemoths like Airbus Defence and Space to small businesses with just two or three enthusiastic and pioneering engineers, such as PLD Space, a startup born in a laboratory in Valencia which is working on the first Spanish liquid-propellant rocket targeted at suborbital missions.

**Airbus Defence and Space** is a good example of what the space industry can do here at home. The heir of the historic CASA-Espacio, the Spanish division of the European multinational has prospered considerably in the past 10 years. It started out developing projects of relatively little value but as these challenges were met and it gradually integrated into Europe, the division now builds very competitive medium-sized satellites and is a player on the tempestuous international market. Airbus D&S is, for example, the lead contractor with Paz, a Spanish radar satellite due to be launched from Russia in 2015 and which is part of the National Earth Observation Programme (PNOTS), signed by the Ministries of Defence and Industry in 2007. All the technology developed in Paz, and especially in its partner satellite, the Seosat/Ingenio optical satellite, enabled Airbus to win the Cheops contract, a medium-sized platform designed to find planets outside of our solar system. Cheops is nothing short of an industrial milestone, being the first European Space Agency (ESA) satellite to be built in Spain. Bidding for the contract was strong and included competitors such as the British company Surrey Satellite, which specialises in this type of low-cost platform.

The name **SENER** is also associated with success and experience in space. Its commitment to technology has made it a benchmark supplier of engineering and production services in three fields of activity: precision mechanisms, optical systems and Guidance, Navigation and Control (GNC) systems. SENER has delivered over 260 pieces of equipment and systems which have been successfully launched on satellites and space vehicles for agencies including NASA, the ESA, Japan’s JAXA and Russia’s Roskosmos. It took part in the Gaia mission, the Curiosity vehicle sent to Mars and the now-famous Rosetta probe, as well as in weather and science satellites. The latest result of this pursuit of innovation was the signing of the contract for the Proba-3 mission, making this company, originally established in the Basque Country, the first Spanish firm to lead a complete ESA mission.

**GMV**, which recently celebrated its 30th anniversary, also warrants a place in this commentary, as it is the world’s leading supplier of ground control systems for commercial telecommunications satellite operators. It is also the leading Spanish company and the third in Europe in terms of participation in the development of the Galileo satellite navigation system, developing key elements in the ground
Its activities include satellite control centres, flight dynamics, mission planning and data processing. One of its star products, launched in October 2013, goes by the name of platform-art; it is an advanced robotic laboratory for testing space systems and missions, the first of its type to be set up in Europe.

Within this variety of business profiles, of note is Elecnor Deimos, which operates out of Puertollano (Ciudad Real) and is the owner of the Deimos-2, the first very high resolution (VHR) Spanish Earth observation satellite. Its characteristics make it capable of taking images with a precision of 75 centimetres per pixel. The Deimos-2, developed in collaboration with South Korean firm Satrec-I, is the private satellite with the greatest resolution in Europe. Launched in June, it has been fully operational from the commercial viewpoint since November and can be used in applications such as extensive agriculture, crisis control and civil protection, the environment, territorial organisation and defence, intelligence and border control. Its most important clients include the Spanish Home Office and the US Department of Agriculture.

Unlike groups such as Hispasat, which only operates satellites, Deimos is present in all phases of the placing in orbit of these types of artefacts: design, construction, launch, operation, tracking and commercial exploitation. It is also experienced, as it already has a remote sensing platform in space, the Deimos-1, whose service life is about to expire.

Hispasat, for its part, is a heavyweight firm in the national space sector. It is eighth in the world ranking of satellite operators, while at the regional level it is the fourth-largest firm in terms of revenue in Latin America, where it has the Brazilian subsidiary Hispamar, with which it operates various orbit positions, competing with major multinationals like Intelsat, Eutelsat and SES.

Hispasat, which was established in 1989 to cover the Barcelona Olympics, today has seven satellites (including the Amazonas 4A which is not operative), as well as the ones controlled by its affiliate Hisdesat. For late 2015 it plans to deploy the Hispasat AG-1 based on a new, more versatile and modern electrical propulsion platform, and one year later expects to launch the Hispasat 1F, which should replace the Hispasat 1D. Its ambitious business plans involve the consolidation of the Latin American market and expansion to
potential clients in the east of the planet, where there is a strong fragmentation of operators in Asia, Eastern Europe, the Middle East and Australia.

The list is completed with zero2infinity, a good representative of what we could call New Space, i.e., space technology companies which prefer to do business without having to depend on public administration contracts (NASA, ESA, governments). For the past five years, this Catalan startup has been running near-space balloon flights with technical, scientific and commercial tools at a height of more than 30 kilometres. Now it is striving to gain a foothold in the space tourism market, against such well-known and powerful brands as Virgin Galactic. The difference is that this firm proposes making suborbital flights in a stratospheric balloon called a bloon, which is not a conventionally propelled craft, thus avoiding the discomforts of gravitational force. It works with around 10 to 12 travel agencies and already has a booked ticket number it prefers not to disclose for voyages that could sell for 110,000 euros each. zero2infinity is presently seeking national and foreign funding to make its first manned flight in 2015 or 2016 from Cordoba, where it has already run a number of engine trials. And it has just announced that it will design the Bloostar project, a launch vehicle specifically for nanosatellites, in other words, those that weigh between one and 10 kilos, which would use a balloon in a preliminary phase, with the rockets being ignited in a gravity-free environment, thus saving costs through reduced fuel spend.
avantia’s Systems unit is the centre of excellence for the design, rollout and integration of high-technology complex systems, providing sysadmin skills as a differentiating element compared to traditional shipyards.

Navantia Sistemas defines, develops, produces and integrates combat systems for the shipbuilding units that Navantia builds, is responsible for the development of command and control systems and platform management systems and works on the new through-life support models.

Its facilities are unique in Spain and it is a benchmark centre for system integration work both on ships built at the shipyard and those already in service in other Navy fleets and which need modernising.

Navantia Sistemas has its own products, with a high level of specialisation, but it is also capable of supplying and selling vessels with third-party systems, and is also responsible for their definition and integration.

Integrated Platform Management System (IPMS)
Its fundamental objective is to supervise and control the different types of equipment installed onboard, except for the combat system. It supplies the knowledge and organises and transmits it for correct decision-making on the part of the vessel’s command.

It comprises an operator console (surveillance, alarm and order-issuie functions), local substations (which collect information, execute control algorithms and send orders to the actuators) and a data transmission network (configurable with any physical medium on the market, adaptable to the ship’s characteristics).

It uses a distributed (not centralised) and redundant architecture with the same functionality for all operator consoles, making it possible to distribute platform management among any combination of operator consoles you desire. The main purpose is to ensure that the platform status information is accessible from any console.

The control of each service is assigned to a single console and only users with the category of supervisor are able to vary this assignation.

All of the ships in the Spanish Navy have this new system, as do other vessels that Navantia has built for other Navy fleets including those of Norway, Australia and Venezuela. It has also been implemented in the modernisation of 16 ships for the Spanish Navy.

Navantia Sistemas has its own products with a high level of specialisation, but it is also capable of supplying and selling vessels with third-party systems.
Land Search and Reconnaissance System (LSRS)
A modern, cutting-edge and multifunctional design adaptable to any vehicle and mission and fully integrated with the other vehicle systems. It is equipped with the following systems:

- Battlefield Search Electro-Optical (EO) System for target location based on latest-generation EO sensors, both passive (IR, visible) and active (laser).
- Navigation and Driving Assistance System.
- Integrated Self-Protection System with small arms (7.62 or 12.70) remote control.
- Battlefield Management System, with automatic tools to aid the specific mission.

It makes it possible to perform surveillance, detection and target identification functions during the day, at night or under conditions of reduced visibility. Plus, the integrated positioning sensors can locate targets geographically with extraordinary precision, automating the process, cutting mission times and improving observer efficacy.

The goal is to provide the vehicle with all-time operability and, compared to current systems, is based on the use of a high-resolution uncooled infrared detector with a navigation system (inert or GPS). This makes it possible to present customised information inside the vehicle on the route, next points along the way, vehicle status, etc., and equip it with a Self-Protection System without the server being outside the vehicle.

Other system benefits:
- Modular, so you can install small arms (7.62 or 12.70), allowing common use of equipment and systems with other Defence programmes, without compromising mission requirements.
- Improves precision, saving on ammunition.

Joint use of the LSRS and the support weapons’ units (mortars and cannons) makes it possible to revitalise these units and elevate them to an extraordinary level of precision and speed of action.

Command and Control Systems (CCS)
SCOMBA is a version for the Spanish Navy, installed in its most modern vessels, such as the BAM series, the LHD Juan Carlos I and the supply ship in combat Cantabria. It was developed on the basis of the F100 frigates, with an important contribution from the Spanish Navy, collecting its doctrine and a specific information and intelligence management in line with its requirements.

It also has an export line, called CATIZ, which includes the functionality of an advanced C2 starting from the SCOMBA reference and its other developments such as a proven system, feeding from the experience of its operative use in Spanish Navy vessels and at the same time prepared to be offered to fleets that require it, adjusting to their specific requirements.

It is a modular system that can be adapted to different combat system configurations, including new ships and modernisations. It capabilities include mission control, tactical information management, classification and identification, doctrine management, threat assessment, sensor management, weapon selection and control, tactical navigation,
Various nations. Multiple challenges. One device. The new R&S® SDTR.

The new vehicular tactical radio is the first member of the R&S®SDxR software defined radio family. It marks a revolutionary change in the field of tactical radio communications, both technically and economically.

- SCA-compliant, open radio platform
- Flexible networking waveform family for different missions
- Simultaneous voice and data communications
- Full IP capability

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mission evaluation, recruitment, air control, data registration and training.

It also has a laboratory where new technologies or developments that could have an application in Command and Control Systems are implemented and tested and integrations are performed on new detectors and weapons via a systematised process based on agreements with its suppliers. Its modular nature guarantees the reusability of the developments and the ability to offer updates with new capabilities to its various customers.

The incorporation of an inhouse CCS (and other systems) is key to optimally guaranteeing customer satisfaction throughout the ship’s service life, both indirectly (assistance) and by transferring it to the end user to a greater or lesser extent (training in maintenance tasks, tech transfers, development centres and training centres). It also enables Navantia to guarantee the times and provisions of its ships for export.

Communications Systems (NAVCOMS)

Two decades’ experience as a communication systems integrator, with over 25 communications systems in service on Spanish Navy vessels, thanks to its support for national development, and those of other Navy fleets, has made Navantia a technical benchmark capable of adapting design, production and acquisitions to the ship’s building strategy.

The Integrated Communications Control System (ICCS) centralises, controls, supervises and administers the vessel’s communication resources.

Because of increasingly more demanding tactical scenarios, the system has evolved at the same time as automatic telephone systems, whose functioning is very similar; from manual commutation to analogue automatic commutation, from these to TDM (Time Division Multiplex) digital commutation and finally to those based on an IP (Internet Protocol) platform.

For this latter generational leap, Navantia Sistemas has decided to develop and make available a product called HERMESYS based on COTS (Commercial Off-The-Shelf) units to reduce prices and boost process power.

Development began in 2011 and the process is presently in an advanced state, as a greater capacity of the information process, a lower rollout cost and the implementation of new capabilities can be checked, along with lower maintenance costs and easy onboard installation and lower weights.

HERMESYS makes it possible to nationalise a system which until now was exclusively a foreign production, as it permits NAVCOMS products to have a larger component of national industry.

At present it has a development platform with an important number of engineers who specialise in software and hardware development, which has been equipped with real units (transceivers, coders, modems, message handling system, analogue simulators). This platform permits the implementation of new capabilities and will allow the debugging and testing of the software versions required for each ship.

‘Dorna’ Fire Control

DORNA is a distributed and modular weapons’ control system that can be adapted to different ships, combat systems, weapons and sensors, including multiweapon and multisensor support. It is currently in service on Spanish Navy ships and those of other countries.

The EO and REO versions are completely integrated with the C2 CATIZ to ensure defence against air and surface threats and provides primary surveillance, combat, maintenance and training functions.

The DORNA Fire Control system has been integrated in and is operative with OM 76 mm, MK 45, MK 42, BAE 57 mm and other naval artillery assemblies and can be configured for any type of cannon or, where applicable, point-defence missiles.

Capabilities:

- Surveillance and detection.
- Automatic acquisition and monitoring of air and surface targets.
- Acceptance of external designations.
- Assignment of weapons and combat, including coastal and indirect fire.
- Training mode.
XPAL has developed a complete range of Integral Solutions for Indirect Fire Support, particularly for Mortar Systems, which includes products from the ammunition till the weapon system and its integration into vehicles (EIMOS) or the Fire Support Information System (TECHFIRE), the microUAV for Forward Observer role and the electronic training aids (eTRAIDS) to facilitate training and logistic support.

EXPAL is a worldwide leader in mortar systems, for platform and ammunition. Its products are supplied to the main Military Forces around the world becoming an excellent fire support in current scenarios. This leadership has been possible due to EXPAL internal developments which have been taking place in propelling charges and modification of mortar mass and aerodynamic characteristics, also seeking for lighter platforms. This combination increases the estimated scope in 10% for calibers of 60 and 81 mm, ranges up to 10 km for 120 mm calibers.

EIMOS, the Integrated Mortar System for 81/60mm ammunition, on a 4x4 Light Vehicle
EIMOS is a unique system in the market integrating an EXPAL 81 mm mortar, in a 4x4 lightweight vehicle. It is the natural evolution of the mortar, the adaptation of a traditional weapon to the current technological situation that fits with the latest Army requirements in the Mortar Fire Support scene.

EXPAL has been pioneer; starting this evolutionary weapon line, answering the necessities of more urgent fire support actions in current conflicts. The combination of an 81 mm long-range mortar and a 4x4 lightweight vehicle, results in a weapon system with firepower and high mobility suited to support the units in nowadays missions, where responsiveness and mobility are crucial.

Automatic aiming and control system facilitates shooting procedures as well as it allows EIMOS to get into Fire Position rapidly. The system improves precision with minimum effort, less instruction and personnel required, and saving firepower. All of this allows EIMOS to give high efficient response to fire support orders.

EIMOS presents an interface to the platform, an elastic device, an automatic aiming system, plus a shooting control system. The elastic device developed reduces the efforts and vibrations transmitted to the vehicle, due to its long crossing design and optimized brake, allowing integration in most of the light all-terrain vehicles, without significant adaptations.

EIMOS can be used in association with TECHFIRE, the EXPAL Fire Support Information System for Mortar and Artillery Guns, allowing to automate the ballistic calculations, getting the maximum advantage to the latest technological advances, including

<table>
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<tr>
<th>MAIN TECHNICAL CHARACTERISTICS</th>
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<tbody>
<tr>
<td>› Positioning time: Immediate.</td>
</tr>
<tr>
<td>› Less than 30 seconds to perform the first shoot.</td>
</tr>
<tr>
<td>› Time for target location in 180 degrees 20 seconds.</td>
</tr>
<tr>
<td>› Precision on pointing: less than 2 thousandths.</td>
</tr>
<tr>
<td>› Standard Long Range 81 mm or 60 mm mortar interchangeable.</td>
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<tr>
<td>› The mortar can also be used on the ground.</td>
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a wide range of sensors as GPS, laser telemeters or inertial navigator, and including additional elements as Forward Observer, Platoon Commander Computer or even Unmanned Forward Observer (based on micro UAV).

TECHFIRE, Fire Support Information System:
TECHFIRE is a Fire Support Information System for mortars and artillery guns, totally integrated from the sensor to the weapon, that automates and accelerates all the tasks related to the direct or indirect fire, in a single gun or in a unit, allowing increased precision and control over supporting fire processes. Through its interactive, user-friendly screen, is a system which enables operators to deal with all kinds of fire control process data.

TECHFIRE improves precision and provides different ballistic solutions for mortar and artillery units. It is compatible with all available communications systems, data management systems and laser telemeters. Through its GIS visual interface, is useful to minimize collateral damage, to improve coordination and to accelerate and facilitate the decision making process; enabling the rapid dissemination of orders among units.

TECHFIRE integrates the SHEPHERD-MIL, Unmanned Forward Observer-UAV as a complement of FO.

SHEPHERD-MIL. Unmanned Forward Observer (UFO)-UAV
EXPAL's SHEPHERD-MIL is an autonomous aerial reconnaissance device in the shape of a bird and silent, which incorporates two Day/Night cameras and allows automatic takeoff and landing, as well as navigation guided by 'waypoints'.

Its perfect camouflage and silent gliding allow for a closer approach and recognition of areas and targets, minimizing the risk to the personnel involved in these operations.

eTRAIDS, electronic applications for maintenance and education.
eTRAIDS is the set of solutions for electronic Training Aids which integrates EXPAL know-how on ammunition, explosives and defence systems with 3D-model technologies.

It offers tools and applications in a wide range of fields, combining traditional technical manuals with 3D interactive models that allow the user to easily get information of items description and identification; functioning and maintenance; internal components and break-down; render Safe Procedure -RSP-, if applicable.

eTRAIDS can be installed on a wide range of digital devices as PCs, laptops, tablets, PDAs or smartphones (even unciphered memory stick), depending on user needs or requirements.
Santa Bárbara Sistemas, part of the European group General Dynamics, is a leader in the defence industry and, in particularly, an authority on the design and manufacture of tested and versatile tracks and wheels platforms. Its international vocation positions it amongst the main suppliers of systems and solutions for the world's most modern Armed Forces, and its products, whether ASCOD tracked armoured vehicles, wheeled armoured vehicles such as the PIRÁÑA 5, or artillery systems 155/52 SIAC, they are highly regarded on the international market.

Its solid track record in serving and satisfying its clients makes Santa Bárbara Sistemas a privileged partner to deliver solutions on the designs, development and production of armoured and armour-plated tracked and wheeled systems, as well as on their upgrading.

We are specifically talking about the ASCOD family of tracked vehicles, based on the experience and know-how gained from the Pizarro programme of the Spanish Army. The Spanish and Austrian Armies already have over 300 units of this vehicle in service, which is known as Pizarro in Spain and Ulan in Austria, with different versions to respond to the most demanding and complex missions. Furthermore, the ASCOD was an international winner of the SV Programme (Specialist Vehicle) of the Ministry of Defence of the United Kingdom, consolidating it as the tracked vehicle of the future and laying down the principles to ensure its ongoing evolution.

**From 30 to 42 tons**

Last September the British Ministry of Defence took a decisive step forward by signing a contract to manufacture 589 SV platforms in six variants, meaning this vehicle is on track to become a central part of British armour-plated units in the 21st century. As part of the arrangement, Santa Bárbara Sistemas will supply all of the landing crafts, running gear, engines and other components of the series. It will also be responsible for the assembly, integration and testing of the first 100 units, with an option for integrating and testing the existing platforms in Spain too.

The SV platform has been developed based on the experience gained through the ASCOD family of vehicles up to 42 tons. It includes different variants such as SCOUT (with turret and 40 mm cannon), PMRS (personnel carrier), Repair and Recovery. To ensure the maturity of the systems, almost 5,000 drawings and over 80 technical documents have been produced, as well as 10,000 of kilometres for tests and trials of all kinds.

The ASCOD family, which includes 30 to 42-ton models, is ready for modular adaptation to present and future technologies and to respond to the most demanding mission profiles.
One example of this versatility is the 35-ton display presented by Santa Bárbara Sistemas to the tender opened by the Danish Ministry of Defence to replace the age-old M-113s in service. The ASCOD-DK has successfully passed the tough field trials performed in mid-2014 and has demonstrated its off-road suitability and capacity for growth as a future platform, thanks to its new features such as rubber tracks and other sub-systems.

Piraña 5, maximum survival

In the area of armoured wheeled vehicles, Santa Bárbara Sistemas also has long-standing experience in the design and manufacture of a broad range of platforms from 8 to 33 tons, manufactured at various sites in Spain, Switzerland and Austria that have demonstrated their capacities in zones of operations as harsh and unforgiving as, for instance, Afghanistan.

With over 10,000 units across the world, the development of the PIRAÑA family, a product used for over 30 years in operations in more than 20 nations, is constantly evolving, as version 5 of this platform shows.

The vehicle offers a wide variety of unique capabilities such as modular protection and a large loading capacity, as well as a high-level of versatility for adding various weaponry systems. The PIRAÑA 5 is a demonstration of its unprecedented superiority in survival, mobility and firing capacity for this kind of armoured vehicle. Its modular designs allows for quick adaptation to a great variety of roles - from troop carrier to electronic warfare, ambulance or forward observer.
having spent 63 years in the defence sector so far, INSTALAZA S.A. remains faithful to the commitment to deliver on its three cornerstones of safety, reliability and efficacy, as well as the vertical integration of its activity, which covers everything from product conception, viability checks, design and development through to industrialisation, authorisation and commercialisation.

Upholding this structure would be impossible if INSTALAZA S.A. did not have fully equipped laboratories, including a ballistics lab with the resources needed to perform all tests with real ammunition that will later allow the products to be submitted for official authorisation by the Ministry of Defence.

Part of the ongoing activity of the Research and Development Department includes three singular projects which will culminate in the next few years with the introduction of new products in the INSTALAZA, S.A., portfolio. These novelties are the C90-CS System, a new type of ammunition for the ALCOTAN-100 system, and the increased range of the VOSEL fire system for the ALCOTAN-100.

C90-CS Systems
As an addition to the extremely successful C90 family, which has various warheads optimised for different infantry missions, now there is the CS (Confined Space) version which makes it possible to fire from inside very small closed spaces, especially handy for new combat scenarios with operations in urban or at least densely built-up areas.

This development, for which there is financial support from the Ministry of Defence in addition to the company’s own funds, allows us to expand the operation of the C90 system to practically all scenarios.

In keeping with the C90 philosophy, the C90-CS is a very lightweight disposable weapons / ammunitions system that is just as easy to use as the other C90s, with a day rangefinder similar to the one on all the C90s and a high first-shot hit probability.

Similarly, it will be possible to use the same VN38-C Night Vision device, also by INSTALAZA, which is regularly employed...
The VOSEL fire system eliminates the need for any type of estimation on the part of the marksman with the C90 and has a dual optical system that can be used not just to fire the C90 but also for observation and surveillance up to 1,200 metres. And, of course, the same TR90 field training system.

This system will be configured with the same warheads that are already traditional for the C90, basically:

- Anti-tank: very high piercing capacity in armour-plating, around 500 mm in steel, able to pierce most combat tanks not protected with reactive armour (in this case, the ideal product is the ALCOTAN, explained below).

- Double-purpose: for use against armoured and anti-material tanks, combining a piercing capacity in steel of 300 mm with a shrapnel effect similar to that of similar calibre artillery ammunition.

- Anti-bunker: for use against defensive walls, including 250 mm thick reinforced concrete walls, creating a hole in the wall with a diameter large enough for a fragmentation warhead to pass through, similar to a hand grenade that explodes behind a protection wall, this being the military capacity needed to avoid having to approach a fortification to engage in combat with other means, as this C90 has a range of 450 metres.

**ALCOTAN-100(M²)**

The ALCOTAN-100 system, the design of which involved the financial participation of INSTALAZA and the Spanish Ministry of Defence, has brilliantly solved the four essential problems its original design considered.

Firstly, to comply with impact probability requirements at 600 metres. This required the design and manufacture of a fire system capable of predicting the immediate route of the enemy tank by simultaneously measuring distances and angles travelled in under two seconds.

The VOSEL fire system eliminates the need for any type of estimation on the part of the marksman. The integrated computer directly shows the marksman the future point at which he should aim to hit the target seconds later, both at day and at night, as it incorporates Night Vision.

Secondly, it was equally as imperative to know the exact initial projectile speed, measured in accordance with the temperature of the propellant at the time of fire and also make sure that it flew with no axial acceleration, in order to ensure that the wind didn’t throw it off-course during the few seconds it was in flight. The solution to the first of these requirements takes the form of a passive sensor which detects the propellant temperature and sends it to the computer for inclusion in the appropriate VOSEL Firing Table. The solution to the second is the addition of a cruise missile which compensates for aerodynamic braking and therefore keeps the projectile flight speed constant.

Thirdly, the anti-tank ammunition had to be capable of succeeding against combat tanks protected even with reactive armour. The configuration with two warheads in tandem with complementary effects and separate operating times delivers enough piercing of the principal armour once the reactive armour is taken out of the equation.

A fourth aspect to solve was that rocket propulsion could not be employed, as had been standard amongst bazookas and on the C90. To that end, INSTALAZA uses the principle of the Davis gun or counter mass weapon, making it possible to fire from closed spaces.

With the ALCOTAN-100 system now consolidated and also in service in other countries, the company is using its own funds and an enhanced use of its technological and industrial heritage for new developments. INSTALAZA is increasing the range of the VOSEL (M²) fire system, making it possible to fire against area targets at distances of more than 1,000 metres away. This feature will be very attractive for its use with current bivalent ammunition, due to its fragmentation effects, but even more significantly with a new ammunition under development which is described below.

This is a new ammunition with a powerful fragmentation warhead which is programmed from the VOSEL firing control to detonate either on impact with the target or when it is flying over a target at distances of even more than 1,000 metres, a distance which has been exactly measured by the VOSEL itself. This application is very important to bring down far-off or disperse targets, or even ones protected behind walls, etc., which stop them from being seen and subsequently attacked directly.
Although composite materials are generally considered to be a new concept in materials engineering, they are quite a lot older than society believes. There are numerous examples in nature which meet the principle of the combination of various different materials to achieve another one with the best properties of its ‘ingredients’. The wood from a tree or bones are examples of natural combinations between various materials present in the animal and plant world which have the basic principles of a composite material.

The former consists of the combination of cellulose fibres of great mechanical resistance and high flexibility in a lignin matrix, while the latter is the combination of short, not very resistant collagen fibres in a mineral matrix. The use of adobe, a combination of plant fibres with great bending strength in a clay matrix, one of the first composite materials created by man, and the simple mixture of sand with cement and stone to form concrete are two clear examples of the use of composite materials, in this case in the world of construction.

It was not until the 1960s that the advanced and developed use of modern composite materials became important, due to their high performance as alternatives to conventional materials. Some of the earliest applications are found in industrial sectors like shipping and aerospace, energy and construction, fostered by the search for highly rigid materials which were at the same time much more lightweight than traditional ones. Their more extensive use is due to composite materials with a reinforced polymeric matrix, mainly fibreglass and carbon. The latter became popular because of the development of carbon fibre in the United Kingdom and other materials such as boron (very high resistance) in the United States. The most important properties of carbon fibre composites include their high mechanical resistance (comparable to steel), their formidable fatigue behaviour and, finally, their lightness, being considerably lighter even than light metal alloys such as aluminium ones.

That explains why the aerospace sector presents a great opportunity to use these types of materials, where aerostructure...
weight is a key factor in making an aircraft. The introduction of composite materials in the military sector. For example, in the early 1970s, the composite content in F-15 fighter craft was 2% of the total mass, but the figure grew to 27% in just a decade, with the Boeing AV-8B. A slower evolution was recorded in civil aviation, where the A320 had a 10% mass content in the mid-1980s and there was a similar percentage in the A340 series (12%) in the early 2000s. It was not until 2006 that the use of composites shot up to around 25% in the A380, reaching more than 50% for the A350-900 XWB (Airbus) and the 787 Dreamliner (Boeing).

The latest forecasts from the aircraft industry speak to an annual growth of around 3.7% in the worldwide aircraft fleet. It is estimated that approximately 31,400 new craft will be required by the year 2033 to cover the needs of both the rise in passenger demand and the replacement of aircraft which will be put out of service. The composite materials market already posts turnover of €90 billion and a total of 10.6 million metric tonnes around the world, and the figures have been growing at an annual rate of some 6% in recent years. 2014 forecasts suggest a new rise, largely due to the increasing use of composite materials in new fields and sectors, but also the intensification of their use in others where they are already applied, such as the aircraft industry.

Spain has been one of the pioneers in composite industrialization and has become a reference point for its development and use in the aviation sector. The Spanish industry decided to implement the use of composites in the A300 tail stabiliser back in the early 1970s. There is no question that this effort put Spain on the map from the start of composite materials. Today our country has significant expertise and long-standing experience thanks to the work of a large number of companies, factories and research centres that specialise in this area. They include the Airbus Group and a number of its Spanish plants, such as the Bahía de Cádiz Centre, belonging to its affiliate Airbus Defence & Space and sited at El Puerto de Santa María (Cádiz), and the Composite Materials Centre in Illescas, in Toledo province. However, these activities truly began with...
the former Construcciones Aeronáuticas CASA, today part of the European aircraft group. I must also mention the company’s high technological level to make space shuttle parts in carbon fibre because of the old CASA-ESPACIO (today Airbus Defence & Space).

There are also a further three major national references and aerostructure suppliers such as Aernnova, Alesis Aerospace and Acturri, with a great many plants across the country and a significant international presence. Plus there are firms such as Sofitec, Carbures, Aeropox (part of the Andalusian aerospace cluster) among many others, assembly and tool manufacturers, suppliers of composite material manufacturing machinery like MTorres, inspection system developers and manufacturers, such as Tecnatom, and firms that specialise in structural tests, for example TEAMS in Andalusia. The big aircraft builders (not just Airbus, but also Boeing, Bombardier, Embraer, etc.) are increasingly committing to Spanish companies’ experience and know-how in composites and the new technologies being researched and developed in technology and research centres across the country. In this regard, it is also important to mention centres that research the manufacturing and tests of composite materials, such as FIDAMC, the Tecnalia Foundation and the CTA in the Basque country (among many others), and the role that Spanish universities have played.

The CATEC Advanced Centre for Aerospace Technologies has joined forces with the latter group in the past five years, supporting the aerospace industry by developing inspection and test technologies and supporting the manufacturing of composite materials. In collaboration with these trailblazing companies, numerous research projects have been developed that cover issues such as the viability and industrialisation of inspection technologies using non-contact methods, manufacturing faults and defects analyses using computerised tomography, structural health monitoring, the development of inspection technologies using ultrasounds and wireless encoders, ageing and structure tests in composite materials, and the automation of aeronautical processes, among others.

Additive Manufacturing
In addition to the various developments in composite materials, Spanish industry is beginning to support the development of additive manufacturing technology. This allows for drastic weight reductions in metal aerostructures using topological optimisation processes. Metal parts can be made around 60% lighter without sacrificing any of the performance of the original. Although topological optimisation processes have been used for decades, the appearance of a technology like AM represents a very favourable sphere for the implementation of these types of processes.

Its high flexibility in terms of geometries makes it possible to design parts with a high degree of functionalisation, designs that were previously infeasible using conventional manufacturing methods. The aircraft and space sector present great possibilities for the implementation of AM technology, delivering a major impact in terms of efficiency and, of course, economics in a part’s life cycle. In particular, in the space industry the cost of a kilo of payload is put at around €20,000, so any reduction in mass represents a considerable benefit.

The process for certifying this technology in the aerospace sector has accelerated in the past year. Although currently applied to secondary structures, it is expected that the technology will also be certified in the near future for use in primary structures, in this case subject to mechanical fatigue. That is why numerous research projects are under development, led by cutting-edge companies and Tier 1 suppliers.

One case of application consists of the collaboration between FADA-CATEC and Airbus Defence & Space (formerly CASA-ESPACIO), who have been rolling out a research project since 2013 that focuses on applying this technology to space shuttle parts for the European Space Agency. It involves not just making and optimising individual parts but manufacturing a complete system, including its functional and mechanical evaluation. It also covers the development of non-destructive test technologies and manufacturing process monitoring strategies, material procurement and surface finish improvements, among others.
The outcome of rigorous R&D in container platforms

The use of container platforms for logistics solutions brought innumerable advantages to military deployments in areas of operation, enabling greater safety and traceability in transport, along with improvements in tent storage, faster assembly of warehouses and specialised fuel areas, bulk water for supply, treatment and subsequent distribution, and all the specialities of energy production, safety, healthcare and field kitchen systems, among others.

Additionally, the equipment’s service life was extended even though the nature of its use meant it had to be subjected to tough tests both in terms of use during transport, along with improvements in tent storage, faster assembly of warehouses and specialised fuel areas, bulk water for supply, treatment and subsequent distribution, and all the specialities of energy production, safety, healthcare and field kitchen systems, among others.

Of course it is important to also mention the improvement in user comfort, in different hygiene versions such as living spaces, toilets, showers and mess halls.

A further step is achieved with expandable container solutions, products where ARPA rolls out a large part of its R&D within different spheres of application.

The principal benefit of these types of containers is that the end useful area of the application doubles or even triples that of the container in transport, making it possible to achieve surfaces with expansive work areas where you can install highly advanced systems such as medical gas systems, telecommunications connections, air-conditioning systems, etc., for a multitude of both civil and military uses.

ARPA develops a number of systems on a container that make it possible to have different logistics solutions with an expanded work area so that, even though the sizes during transportation are those of an ISO 20’ container, once deployed you get 22 or 34 square metres of usable area.

Plus, all the elements needed to use them are transported and travel inside the container itself, without exceeding the standard dimensions, ensuring that the system is protected when it travels and facilitating its carriage using standardised methods.

ARPA expandable container solutions allow great leak tightness inside the living space, meaning they can be used in adverse weather conditions. This makes them particularly efficient for medical needs, such as use as a field surgery, intensive care ward, laboratory or sterilisation room, for which they also have a technical area inside them which includes all of the necessary technical facilities: medical gases, telecommunications and air-conditioning systems.
Comprising a sandwich panel and reinforced iron structure, they can have an air-conditioning system, windows, doors, electricity and water systems or a drainage system, providing for an infinity of logistics and sanitary applications.

These modules have been used, for example, to set up border control positions in the Dominican Republic.

They can also be attached at the sides, making it possible to create larger infrastructures to create sleeping quarters, mess halls and field medical centres and hospitals. Plus, because they can be stacked double height, you can create modular accommodation areas of great quality and comfort.

By adding air-conditioning, lighting, sanitation facilities with toilets and showers, communal relaxation areas, offices and kitchens with a fridge, you can make a modular ensemble that is quick to install and which delivers maximum performance for troops in transit or at refugee camps.

Their modular nature allows for the creation of successive expansions of accommodation areas for thousands of people.

The combination of the different systems, i.e., expandable containers, the side-by-side system and ARPA modular systems and their related specialities satisfy any requirement our customers can have.

ARPA’s vocation is to create comprehensive and turnkey logistics solutions and to continue to work on its R&D areas to improve the systems, especially the efficacy of their operation under extreme weather conditions, and the ease of their deployment.
ECNOBIT is a high-tech engineering company which works principally in the Aeronautics, Defence, Space, Security, Telecommunications and Transport industries, all of which constantly demand ongoing technical innovation and updating in order that the new and innovative solutions which will meet their specific needs can be provided.

The company’s capacity to innovate and its commitment to key technologies for its principal activities – the design, development, manufacture, production and maintenance of systems and equipment – has led to it being the foremost supplier of in house technology on the Spanish market.

In the Simulation area, TECNOBIT currently offers a wide range of training solutions for different aeronautical, naval and terrestrial platforms. It develops all levels of simulators, from Teaching Programmes, Trainers, Simulations and Simulation Centres, up to the Duel Simulators which are the resources used by the Armed Forces for Teaching, Instructing, Training and Evaluating Personnel and Units. The importance of training, skilling-up and instruction is growing steadily, not only for the Armed Forces, but also for the civil sector. The availability of duel simulation and live simulation has become the best alternative to traditional virtual simulators.

TECNOBIT covers all activities in a system’s life cycle, starting with system engineering, design and development, manufacture, testing and maintenance, adapting to the customer’s specific needs, with special attention on the requirements of the sought training level.

The technologies are similar with regards system engineering, manufacture, testing and maintenance, regardless of the division’s products. Where there are differences, and true specialisation, is the design and development, which has evolved with the use of commercial off-the-shelf, or COTS, elements.

Previously, the visuals, instructor positions and simulation models were designed and implemented from scratch, but diverse third-party tools and software are used today, either commercial or free software or even software provided by the Ministry of Defence, such as the SIGMIL military geographic information system or the HLA high level architecture layer.

Our SIMACA Field Artillery Simulator is currently undergoing modernisation and has been up and running at the Segovia Artillery Academy since 2002. It is a simulator targeted at training and assessing various positions in the Spanish Land Army’s Field Artillery Groups and exercises all of the regulatory procedures related to firing techniques. This makes it the most suitable tool for instruction and training, since it provides a virtual representation of the Field Artillery resources used and also the situations arising from operating and using these weapons.

Derived from SIMACA is one of the most important successes that TECNOBIT has
achieved in recent years, the awarding of a contract from the Brazilian Army to supply two Fire Support Simulation (SAFO) Centres. A key factor in winning the contract was the important cost-saving involved with the use of this simulator. Studies carried out by the Brazilian Army estimated that the saving on ammunition by using SAFO would be around $20 million. SAFO will probably be the most advanced military simulation centre in Latin America, not only for its capacity but also its conception.

It has an open and modular architecture that facilitates future expansion, obsolescence management in terms of hardware and software alike, which optimises its service life, and the reuse of some of its parts and components to develop other simulators, e.g., for driving vehicles. Another very significant feature is that its development is fully based on free software, including the visual system, eliminating the dependency on licences, the obsolescence management of which can cause problems.

Finally, its conception is also grounded on future integration with other simulators, using the HLA standard among other capacities. For all those reasons, SAFO is not just a simulation centre but a whole environment, a basis on which to roll out the military simulation strategy for training, teaching and doctrine with an Army’s different military units.

Avionics and Secure Communications

To talk about Avionics at TECNOBIT is to talk about the main pillar on which the company has been growing and solidly establishing its name, seeking participation in major Spanish and European programmes to be able to offer aviation electronics to the market both in terms of its own products, developed from the very initial phase, and those developed by other companies and subsequently produced by TECNOBIT.

This Spanish company is present in major European aeronautical programmes such as the Eurofighter and the A400M, both as the principal contractor or via customers or partners from other key sector companies like BAE Systems, Airbus Defence and Space, Selex Galileo or Thales.

And within the world of aeronautics, TECNOBIT never forgets its strong link with Spanish aeronautics and particularly EADS-CASA, today part of Airbus Defence and Space, with equipment in aircraft such as the C295, CN235, C212 and C101.

In addition to purely avionics systems, this TECNOBIT division has also taken a further step in its diversification by starting to produce structures for onboard equipment. One example are the avionics racks for Lockheed Martin helicopters.

It is also important to recall the effort to cover the entire product life cycle, such as that of the Audio Management System simulator for the A400M aircraft, a system which in turn was fully developed by TECNOBIT.

In the area of secure communications, almost since the time it began, nearly 30 years ago, TECNOBIT has been strongly linked to communications protection, starting with the implementation of equipment for encrypting teleprinters in the Spanish Navy’s ships in the early 1980s and, since then, working on different systems that enable the secure exchange of information to guarantee the confidentiality of communications.

In the area of tactical link communications, note is the LINPRO system, a Multi Link Processor supplied to various Armed Forces and the only one capable of working indistinctly and concurrently on L11, L16, L22 and JRE.

In the area of encrypted communications, TECNOBIT develops generation, storage and code distribution hardware which has been certified by the Spanish Ministry of Defence’s National Cryptology Centre (CCN). Other products include the SCIP encrypting systems on Iridium links, which are being used by the ISAF deployed in Afghanistan via NC3A.

This solution has made a significant contribution to improving the safety of Peace Mission troops in Afghanistan, as communications were formerly being intercepted on a regular basis.

Also of note is the new version of the TMSDEF (Defence Secure Mobile Terminal), based on the Tutus Färist product family approved and certified by the EU, and the TMSDEF certified and approved for NATO Restricted, the new functionalities of which enable encrypted voice with a Secure Communications Interoperability Protocol (SCIP), mail, web browsing and applications permitted on the telephone itself.
The global air surveillance and control market

Competing on the defence systems and airspace management market is within the reach of very few companies. It is essential to have a global business size and proven technological capacity in the civil and defence spheres alike. Indra is one of the multinationals that form part of this exclusive club, as has been demonstrated this past year with contracts such as the one to supply deployable air-traffic management systems to the Australian Air Force and the implementation of the air defence system of Oman, among others.

Controlling the airspace is an essential part of a country’s sovereignty, just as important as land borders and jurisdictional waters. This control, like the other two mentioned, presents the dual aspects of lawful transit and its safeguarding, i.e., air traffic control and the air defence component.

Airspace regulation is a transnational matter which exceeds the unilateral decisions that a particular country can take within the exercise of its sovereignty, having to adapt to a regulatory framework which guarantees efficient and safe management of air traffic and involves the maximum level of stringency regarding the technologies used, as well as the companies that supply and develop them. This point guarantees the robustness of sector companies and is also a strong barrier to the entrance of new players.

In the defence component, the level of stringency is even more important because of the confluence of the lack of cooperation inherent to unlawful flights and the consequences of any defensive action, which involves various cycles of confirmation before being undertaken.

Civil and defence technology

In this sector, the list of companies recognised at a global level is quite small and stable and, to a certain extent, immune to the vagaries that affect other areas of information technologies. Indra, with a renowned top-level offering in both the civil segment of air traffic control and the air defence segment, has the ideal profile to obtain maximum benefit from the synergies which derive from the two worlds.
Similarly, the growing international implementation of Spanish companies means that progressively more operations can be managed with a strong local component with regards the end customer, bringing them the value of a close approach, accessibility, understanding of the scenario and even the culture. In this regard, the competitive positioning of companies that are expanding internationally is also taking on growing importance.

Other factors play an important role in this export effort, such as local implementation and institutional backing. Training is therefore needed to play the game in accordance with these rules and to break onto the international market protected by a solid institutional coverage which usually turns out to be the sole guarantee of being able to compete under equal conditions. The perception of this reality has taken hold in our institutions in an increasingly obvious fashion in recent years, with their presence becoming a rising value via embassies and support for the commercial action of the country’s companies in their role of launch customer and reference user.

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Two recent success stories: Australia and Oman
Indra has had notable success in recent years both in the world of air traffic control and air defence, and most of them have been preceded by some of the destabilising factors mentioned, in addition to the technical competence which is taken for granted. In both disciplines, the national customer as a reference customer and explicit institutional backing in this regard have been key factors in the majority of the competitive processes.

Equally, one-third of the world’s airspace today is in one way or another controlled by systems deployed by Indra, an expansion that goes hand-in-hand with the expansion of the company itself in its implementation in different geographical areas where its systems are operating.

The most recent example is Australia. Indra will supply three deployable air traffic management systems to the Royal Australian Air Force (RAAF). The systems will allow the RAAF’s Joint Battlefield Airspace Controller (JBAC) teams to have a top-level air surveillance capacity of the air space and traffic control, adapted to a highly mobile and deployable environment. The delivery of these systems forms the basis of a contract signed between the Defence Materiel Organisation and Indra for a total amount of $AUS50 million.
Central element: tactical LANZA-3D radar

Central to the system is Indra’s tactical LANZA-3D radar, a dual-purpose 3D L-Band primary surveillance radar. The system complies with International Civil Aviation Organisation regulations while also offering the advantages of a full 3D military radar capable of enhanced electronic counter-counter measures for the highest survivability. The LANZA radar is complemented with the latest generation dual-use monopulse identify friend-foe/secondary surveillance radar offering full Mode S, Mode 4 and Mode 5 aircraft identification, as well as built-in ADS-B. The radar is integrated with Indra’s AirCon 2100 automation system, providing air force controllers with high-end ATM automation for approach/terminal functionality.

The solution uses advanced algorithms for multiradar tracking, 4D trajectory management (3 dimensions + time), electronic flight strips, OIDD handover, display of recognised situational awareness information and recording playback. Indra’s fully interoperable ATM automation is a world leader with proven service supporting more than 8 million IFR controlled flights annually and used by more than 5,000 air traffic control officers worldwide.

The radars are coupled with this airspace management capability into a flexible and scalable operations support segment encompassing integrated ground/air communications and standard and expandable shelters, which provide the operational space conducive to long deployments in demanding operational theatres and harsh environments. This technology offers the Australian Defence Force a quantum-leap in safety and efficiency for the dual use control and management of air traffic in deployed environments. It will assist this force in managing airspace within Australian or overseas, in humanitarian assistance and disaster relief missions, either when operating independently or integrated with allies.

The combination of mobility, modularity, performance and world leading technology ensures that these systems will be at the forefront of worldwide deployable air management capability for decades to come.

In an associated and indissoluble manner to this new contract, Indra will boost its workforce in Australia, a country where it has had its headquarters in Sydney and offices in Newcastle since winning a contract to provide its tactical communications systems to the RAAF air controllers since 2012. Indra’s implementation in the country did not, however, begin with defence contracts, but rather in the civil market, based on its Lanzar radar, as well as in Indonesia, China, Mongolia, Vietnam, Philippines and India, among other countries. This expansion confirms the validity of an export model which has already made Indra a reference point within other areas in the same supply segments, such as Latin America, where it is the market leader.
INFORMACIÓN en ESPAÑOL
para DEFENSA y SEGURIDAD
DEFENCE and SECURITY
INFORMATION in SPANISH
The following directory of different companies displays Spanish industry’s comprehensive offering in a wide variety of defence and security-related fields.

The directory takes the form of company fact-sheets outlining their range of goods and services and their contact details.

The information and images provided on these fact-sheets have been provided directly by the companies themselves.

Companies were selected on the basis of their status as corporations legally existing in Spain and having the capacity to export to other markets and have indicated their desire to take an active part in this publication.
As one of the three Divisions of the Airbus Group, Airbus Defence and Space is Europe's Number 1 defence and space company. It is the world's second largest space company and one of the top 10 defence companies globally with revenues of around €14 billion per year.

Airbus Defence and Space is composed of four business lines: Military Aircraft; Space Systems; Communications, Intelligence & Security (CIS); and Electronics. It brings together a wide portfolio to continue to meet the complex needs of its customers across the world, contribute to Europe’s defence and security, and secure Europe’s sovereign and independent access to space. The Chief Executive Officer of Airbus Defence and Space is Bernhard Gerwert. The new Division started operating as of 1 January 2014.

Airbus Defence and Space is Europe's number one defence and space enterprise. It employs some 40,000 employees generating revenues of approximately €14 billion per year.

Defence/Security Activity Lines: Airbus Defence and Space is Europe's number one defence and space enterprise. It employs some 40,000 employees generating revenues of approximately €14 billion per year.

Subsidiaries and facilities abroad: Worldwide.
Electricity), mining and agriculture. Key services and solutions include: military and commercial satellite communication services, professional mobile radio communication, emergency response centres (such as 9-1-1/112), border surveillance systems, command & control (C4I) systems, cyber security solutions and services and observation satellite based geo-information services.

Electronics, headed by Thomas Müller, provides high-performance equipment for system integrators serving both Airbus Defence and Space within the Airbus Group as well as external customers worldwide. Products are mainly for civil, defence and security markets covering ground, maritime, airborne and space applications. Key products include radars and IFF systems, electronic warfare devices, avionics, space platform electronics, space payload electronics as well as optronic sensors.

**A400M: the most versatile airlifter**

The A400M is the most versatile airlifter currently available responding to the most varied needs of world Air Forces and other organisations in the 21st century. It can perform three very different types of duties: it is able to perform both tactical missions directly to the point of need and long range strategic/logistic ones. And it can also serve as an air-to-air refuelling “tanker”. Powered by four unique counter-rotating Europrop International (EPI) TP400 turboprop powerplants, the A400M offers a wide flight envelope in terms of both speed and altitude. It is the ideal airlifter to fulfil the most varied requirements of any nation around the globe in terms of military, humanitarian and any other “civic” mission for the benefit of society.

The A400M was launched in 2003 to respond to the combined needs of seven European Nations regrouped within OCCAR (Belgium, France, Germany, Luxemburg, Spain, Turkey and the UK), with Malaysia joining in 2005. This is one of the major reasons for its extreme versatility. Its maiden flight took place on 11th December 2009.

**Light and medium transport aircraft**

Airbus Defence and Space is the only supplier of transport aircraft to produce a comprehensive range of airlifters offering payloads from three to 45 tonnes. In the light and medium tactical segment it is the world-leader through its family of three models—the C212, CN235 and C295—offering from three to nine tonnes of payload.

The operational qualities built into the aircraft make them not only the most capable machines for typical military missions, but also give them the...
versatility to undertake that growing group of non-defence tasks that may be described as “civic” missions. These include humanitarian aid, but also law enforcement, surveillance, search and rescue (SAR), environmental control and many others.

A330 MRTT, leadership role in the tanking world
Airbus Defence and Space’s A330 Multi Role Tanker Transport programme ended 2012 in excellent shape with its selection by the Indian Air Force (IAF) as its planned new generation tanker/transport and rapid progress being made by the Royal Australian Air Force (RAAF) and the UK’s Royal Air Force (RAF) in deploying the type in operational service.

The IAF’s choice of the A330 MRTT means that the aircraft has won every major procurement competition outside the USA since launch, cementing its status as the definitive new generation tanker/transport across the world.

Eurofighter
The Eurofighter is the world’s most advanced new generation multi-role/swing-role combat aircraft available on the market. It represents the peak of British, German, Italian and Spanish collaborative technology in avionics, aerodynamics, materials, manufacturing techniques and engines. Eurofighter Typhoon is Europe’s largest military collaborative programme.

Eurofighter Typhoon is the only fighter to offer wide-ranging operational capabilities whilst at the same time delivering unparalleled fleet effectiveness.

Main characteristics: Future-oriented modular avionic and digital Flight Control System; Multi-role, swing-role capabilities; Ultra-modern human-machine interface: LCD screens, Hands on Throttle and Stick (HOTAS) functionalities, Helmet Sight System and Direct Voice Input; Sensor fusion and Multifunctional Information Distribution System (MIDS); Extensive weapons/stores inventory; Stealth features; Automated and mission-tailored defensive aids for high survivability; Designed for growth • Low cost of ownership.
Space Systems
Airbus Defence and Space plays a crucial role in ensuring that Europe has independent and competitive access to space by designing, developing and building today’s Ariane 5 rocket and the future launch systems of tomorrow.

Airbus Defence and Space is the creator and prime contractor of the most ambitious spacecraft and instruments developed for the European Space Agency – Soho, Rosetta, Huygens, Cluster, XMM-Newton, Mars Express, Venus Express, Solar Orbiter, BepiColombo – fascinating adventures ever widening our horizons.

Therewith, Airbus Defence and Space design and build the most sophisticated satellites for environmental monitoring, and developing a wide range of horizons-broadening services.

Airbus Defence and Space provides a full range of space-based security and defence systems and services – reconnaissance and surveillance, secure communications, early warning, and ballistic defence –. In projects like: SECOIA, PAZ, CSO, HISPASAT 1A Y 1B, SKYNET, among other examples.

Airbus Defence and Space, designer and builder of over 100 communications satellites for a vast range of applications: Measat-3b, Eutelsat 9B / EDRS-ADIRECTV 1S, Express AM4R y Express AM7.

Electronics
The C4ISR solutions from Airbus Defence and Space provide information and intelligence for decision-making. C4ISR systems play a crucial role in conveying information between commanding officers and their subordinate military units.

Emergency response solutions from Airbus Defence and Space cover the full circle of preparing for, preventing, detecting, managing, responding to, and recovering from emergency situations.

Unmanned Air Systems UAS and UAV solutions from Airbus Defence and Space are suitable for airborne intelligence, surveillance and reconnaissance missions. Solutions include Future European MALE UAS developed completely in Europe, Tracker mini-UAS, and Tanan 300 vertical take off and landing UAS.

Counter cyber threats, get maximum protection and ensure secure communications with specialist solutions from Airbus Defence and Space.

Radar and surveillance products from Airbus Defence and Space range from active electronically-scanning array (AESA) radar systems and other radars to optronics for the defence, security and space industry. These sensors cover the whole operational spectrum of surveillance and reconnaissance. Detection solutions ensure the identification and tracking of air, land and naval targets.
Founded in 1968, Equipos Móviles de Campaña ARPA designs, manufactures and supplies field logistic solutions on diverse types of mobile platforms (containers, trailers, self-propelled mobile units, field tents, aerial platforms...).

This allows supporting any military operator’s displacement, medical or humanitarian, supplying from essential goods, to the assembly of global infrastructures for complex systems such as vital areas, refugee field camps, field hospitals, military field barracks, etc... with a range of more than 200 experienced and contrasted products for its use in field operations and emergencies, currently allocated in Civilian and Military Organizations of more than 35 countries. These products are or have been deployed in multiple international missions for the interposition or maintenance of peace in Haiti, Afghanistan, Lebanon, Albania, Kosovo, Iraq, Bosnia, Malaysia or Chad, being part of the logistics of numerous Armed Forces.

Integral projects are supplied totally equipped and ready to use from the same moment of the delivery (turnkey projects), realizing a control of the implantation on the final destiny’s location.

Since 2002, ARPA is provided with modern manufacturing facilities of more than 26,000 m², from which 13,000 m² are dedicated to Production, Assembly and Quality Tests.

Arpa has experienced technicians and engineers, especially in the Quality Department, I+D+i and Technical Service.

Products:
- Kitchens, Laundries, Showers, Hygienic Services, Fridge-Freezers, Tents, Hangars, Modular-Tents, Equipment for Field Camps, Cooling, Energy and Water Treatment Units, Gun Racks, Ammunition Containers, Modular Constructions, Field Hospitals, Medical Modules on Container, Self-propelled Mobile Units.

More than 15 years have elapsed since Gondan Shipyard commenced as defense material worldwide supplier; starting with successful delivery to the Kenya Navy of the 63 m length Landing Crafts “Tana” and “Galana”, together with the also 60 m length Patrol Boats “Shujaa” and “Shupavu”, followed by the Corvette “Jasiri” with her 85 m length. Then the “KP Bisma” and “KP Baladewa” 61 m Patrol Boats delivered to Indonesian Marine Police, the Surveillance and Intervention Vessel “Fulmar”, built for the Spanish Tax Authorities Maritime Service and lately the “Rio Segura” 73 m length, “flagship” of the Guardia Civil Maritime Service. And the new GRP Patrol Boats for the Spanish Guardia Civil, that currently are being built in our Fibre and Aluminum Division. The Shipyard track-record with over 250 “wide-variety-characteristics” vessels built, is a corroboration that Gondan Shipyard faces the projects with an innovative approach and also that it has a deep knowledge of the latest technical developments as well as an attitude to adapt its design and production process with a flexible and creative attitude.

Economic strength and responsible behavior:
The professional and sensible leadership of the Company has been at the heart to achieve the present situation of economic and financial soundness of the Shipyard. The present situation allows both, that all projects will not be affected by “financial ups and downs” and the strict fulfillment of the contract obligations and commitments, specifically the delivery time of the units.
The services of Altran within the industry of Defence cover engineering and consultancy processes in a wide and diverse offer of high technological value. The activity of the company in Spain in this sector starts in 2002, and since then, Altran collaborates in several of the most representative projects taking part in the development and application of innovative solutions.

>Defence/Security Activity Lines: Engineering and consultancy services in the following areas: Mechanical Engineering, System Engineering, Industrialization and Maintenance of platforms and systems.

>Subsidiaries and facilities abroad: Spain, France, Italy, Germany, UK, Portugal, USA, India, China, Colombia.

AITEX

Plaza Emilio Sala 1 / 03801 Alcoi / Alicante
Tel: 965542200 • Fax: 965543494
E-mail: mcairols@aitex.es • www.aitex.es
Contact: Maria Cairols

>Defence/Security Activity Lines:
• Notified Body nº 0161 for the appliance of the Personal Protective Equipment European Directive (89/686/CE).
• Ballistic laboratory.

>Subsidiaries and facilities abroad:
Internationals delegations in USA, Colombia, Bangladesh, Lithuania, Pakistan, India, Brasil and China.

CESA (Compañía Española de Sistemas Aeronáuticos, SA)

Paseo John Lennon nº4, CP 28906 Getafe Madrid
Tel (34) 916240111 • Fax (34) 91 624 01 14
E-mail contactcesa@cesa.aero • www.cesa.aero
Contact: Eduardo Chamorro

>Defence/Security Activity Lines:
• Development, production and support of fluid-mechanical components (Hydraulic, Pneumatic and Fuel) for Flight Control, Landing Gear and ECS systems. Currently on C212, CN235, C295, A400M, KC390, S92, Eurofighter Typhoon, Atlanter UAV, Hürkus and Civil Aircraft.
• Overhaul, Maintenance and Analytical inspections of Landing Gears and Components of CESA’ design and from third parties for the Army.
• Overhaul F18 Landing Gear for Air Force.
CASLI is a group of companies, founded in 1943 with 100% Spanish private share capital.

It represents worldwide reknown firms, and provides added value in terms of technical advice, supply and maintenance to OEMs, customers and end users, optimizing products life costs through an excellent service.

Our staff consists of more than 150 highly qualified employees, mainly focused in service and technical advice. The industrial facilities have about 5,000 m² and around 2,000 m² of warehouses, officially approved test stands, special tooling, sales engineering, mobile units, official service network, calibration facilities, training.

CASLI is certified in accordance with ISO-9001, PECAL-2120, etc.

In the Defence sector, being the official distributor of MTU-DETROIT DIESEL, ALLISON TRANSMISSION AND KÄRCHER FUTURETECH, CASLI develops maintenance programs and supply systems for vehicles, such as M-113 (TOA), M-109 (ATP), M-60, ASCOD, LEOPARD, VAMTAC, RG-31, etc, as well as the management of programmes integral maintenance and modernization of shielded and armoured vehicles.

CASLI distributes equipment for Army deployments, water Systems and CBRN Defence Systems.

CASLI also participates actively in the development and innovation of products and integrates them to the specific needs in each case, and develops energy Solutions (economic, functional and clean) based in cogeneration, Micro-Cogeneration and Bio-Energy.


CATEC is a technology centre that helps to improve the competitiveness of aerospace companies through research, technological development, innovation and technology transfer. Services and technological equipment include: systems for non-destructive inspection (NDT), mechanical characterization on aerostructures, environmental and mechanical tests, additive manufacturing, automation of manufacturing and assembly processes, multi-robot cooperation, unmanned aircraft systems (UAS/RPAS) indoor testing, RPAS fleet and singular instrumentation for experiments in flight (LIDAR, GNSS, etc.). FADA has a technological associated facility, the ATLAS Test Flight Center in Villacarrillo (Jaén), with unique technological infrastructures in Europe for testing UAS and segregated airspace for the development of these tests. FADA actually works on over 45 projects and has a staff of over 60 highly qualified professionals. It has the following certifications: EN 9100, ISO 9001, ISO 14001 and UNE 166.002.

COBRA INSTALACIONES/ASON ELECTRONICA

Calle Castrobarto 10/28042/Madrid • Tel. +34 91 329 57 17 • Fax: +34 91 329 54 96 • E-mail: rleandro@grupocobra.com • www.cobra-aeronautics.com

Contact: Raúl Leandro Vázquez 687823346

>Defence/Security Activity Lines: Design, manufacture and maintenance of test facilities for aircraft engines and other types, including ancillary systems (mechanical, hydraulic, pneumatic, electric) and electronic control equipment and data acquisition.

>Subsidiaries and facilities abroad:
More than 26,000 employees in over 45 countries and offers a wide range of services through more than 300 branches, providing added value to all kinds of customers, from individuals to large corporations.

MBDA España, S.L.

Ed. Torre Picasso, Pza. Pablo Ruiz Picasso. 1
28020 Madrid • Tel. +34 91 7693800 • Fax: +34 91 7693801 • E-mail: mbdaes@mbda-systems.com • www.mbda-systems.com

Contact: Eugenia Serrano

>Defence Activity Lines:
Defence/Security Activity Lines: Detegasa is a company with over 45 years of experience, specialized in the design and manufacture of equipment and systems regarding the environmental control and the management of waste.

We can also supply temperature control systems, security, control, monitoring and other mechanical equipment.

Subsidiaries and facilities abroad: More than 75% of our production is exported, and we have agents in more than 40 countries, some of them with capacity for technical assistance.

We have participated in the most important international programs, and we have supplied our equipment to some of the main navies worldwide.

Our main sectors of activity:

- defence
- naval
- offshore
- industry

And our business lines are equipment designing and manufacture, and services of maintenance, retrofitting and technical assistance.

Detegasa has developed a global waste management system that permits the complete treatment of the main types of waste on board, including sewage, oily waters, organic and solid waste. This system has been implemented in some of the most modern war ships in the world.

Contact: David Hernández (dhernandez@detegasa.com)
DF NÚCLEO

Avda. de la Industria, 24, 28760 Tres Cantos (Madrid) • Tel: +34 91 8073999 • Fax: +34 91 8031804 • E-mail: sales@nucleodf.com • www.dfnucleo.com


>Subsidiaries and facilities abroad: DF Núcleo is present in more than 50 countries and maintains permanent offices in strategic countries such as Brazil, Chile, Mexico, Turkey, Saudi Arabia, Morocco, India, and Ecuador.

DF Núcleo is renowned and endorsed for providing robust and reliable solutions to the sectors in which it operates, being one of the leading Spanish companies in the installation of Security and Defence systems for nearly 50 years, bringing innovation to technology, products, and unique systems for double military and civil use.

In addition, the company is strongly positioned in the Security and Defence market after acquiring EPICOM a year and a half ago. This company has been specialized in producing certified cryptographic systems and high-security systems that guarantee data protection and the invulnerability of their clients’ communications for more than 20 years.

DF Núcleo is present in large-scale multi-year communications programs with the Navy / Navantia and with the Spanish Air Force. With the Navy, it has mainly participated on-board communication systems for various existing ships and submarines (Patrol boats, F-80, S-70, PDA) and new construction (LPO’s, AOR, Minesweepers, F-100, LHD, BAM, S-80, etc.), as well as systems for land installations, and very specifically the modernization of HF tactical communications for Radio Stations and CECOM’s with NATO programs entitled BRASS 1 and 2. For the Air Force, the renovation of all T/A communications systems was carried out at air surveillance systems (EVA’s / ECAO’s) and their integration with the various Command and Control Centres, as well as the design and execution of the T/A/T/ sheltered, portable communication stations. In addition, it has participated in the on-board communications networks for Australian destroyers (AWD) in the development and production of on-board avionic systems, the generation and control of electric power, operating on the entire Eurofighter - Typhoon fleet, as well as in the “tailored” design and manufacture of towable generator units with redundancy, environmental, and shock specifications required by NATO’s NCES agency destined to equip tactical communication systems in various allied countries.

Other projects to highlight include the military messaging systems with the SOCAMAR II version of the MHS used by the Spanish Navy, communication control and management systems for the ground station (GCS) from the first unmanned European combat plane.
DF Núcleo is a leader in the manufacture and integration of communication and control systems in defence and civil protection.

**Areas of activity**

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<th>Command and Control and Communications Systems</th>
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<td>• Communications, control, and command centres (C²) and Communications Centres (CECOM's)</td>
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DF Núcleo is an international company belonging the the DF business group (Duro Felguera) that develops its activity in the area of engineering, products, and solutions for the markets of: Ground, Sea, and Air Security and Defence. In this sense, DF Núcleo is present in more than 50 countries distributed on five continents with permanent offices in 13 countries. Currently DF Núcleo heads the “Intelligent Systems” business line of the DF group, one of the main specialists in executing “turnkey” projects with a presence in Europe, the Americas, Asia, and Africa and more than 150 years of experience.

DF Núcleo also maintains its activities in the area of communications for Air Traffic Control, having modernized its own product from the ULISES family, the communication systems from a large portion of control TWRs from the Air Force, the Army (FAMET), and the Navy (Rota Naval Base), as well as supplying new transportable and mobile TWR's.

The company has also successfully carried out the installation and integration of High Mobility Tactical Vehicle communications as well as mobile communications laboratories and mobile C² centres for defence.

Standing out this year among its most noteworthy references is the provision of equipment to jam radio frequency bands for State Security and Armed Forces; new redundant tactical generator units with different voltages for NATO's NCES agency; the implementation of a remote control system (SCR) for communications from the new Command and Control centre from NATO's ACCS programme in the bunker at Torrejón; the expansion and modernisation of the ULISES 4000 communications system in place at the NATO air traffic control centre, CAOC-T; the expansion of communications systems for NATO's ACCS air defence programme in Portugal; new power generation and control units for the Eurofighter - Typhoon programme for OMAN; ship-dock connection systems for the Perú training ship, or the expansion of the tactical communications networks for Spanish F-100s.

Likewise, DF Núcleo has also maintained its activity in the area of communication systems maintenance for both air traffic control, having won bids for these systems with three armies (Land, Sea, and Air), and miCECOM's (Military Centres of Communications).

Finally, it should be noted that DF Núcleo is awarded the maintenance contract for NATO's Automatic Message Management System from the Communications and Defence Centre, as well as the entire communications network entitled SMCM-SCTM from the Chief of Defence.

(UCAV's), nEUROn, and the Maritime Traffic Control Centre of the Cape Verde Government.
Epicom was founded in 1993 and since then has been designing, developing, manufacturing and servicing systems and encryption solutions in close collaboration with her customers.

In November 2013, Epicom’s full capital was acquired by DF Group (DuroFelguera), a multinational company born and settled in Spain that gathers more than a century and a half of industrial experience.

Epicom is the leading company in Spain in the protection of critical communications at the highest level of security for the use of the Government and the State’s Administration.

Epicom is the owner of the complete design of the cryptosystems and solutions that manufactures, being able to adapt and customize them to the customers’ needs and requirements. Our company attends and is present in all phases of the “life cycle” of their products, providing training, technical assistance, maintenance and technical support among other services.

The security of the products integrated into the Epicom’s portfolio is independently certified according to specific international (CC, Tempest, FIPS 140) and/or national standards.

Epicom keeps ongoing a constant R+D+i investment effort within a clear commitment to consolidate and improve the capacities of their products, which allows the company to be at the forefront of technological knowledge in the field of cryptology and secure communications.

Epicom’s portfolio of products and services includes among others:

- Cryptosystems for communication networks.
- Encryptors, Management Centre facilities for them and secure key transport devices.
- Cryptosystem customization.
- Crypto Algorithms.
- Crypto modules.
- Secure VoIP (voice and video) solutions.
- Security applications.
EINSA (Equipos Industriales de Manutención S.A.) is a Spanish company with more than 30 years of experience in the aviation industry. EINSA is involved in some of the most advanced programs of the international aeronautic sector: JSF Programme, EF-2000 Programme, A-400M Programme, Helicopter NH-90 Programme and Helicopter Tiger Programme among others.

The experience and professionalism of the company, in addition to its constant commitment to investigation and technological innovation, have contributed to establish EINSA as a benchmark in the international aviation GSE market.

Products designed and manufactured by EINSA:

- External Weapons Loaders (from 1000 lbs to 6000 lbs) for fighter A/C.
- Air transportable cargo loaders for loading/ offloading military transport aircraft (Hercules C-130).
- Multi-Role Tactical Vehicle.
- GPU’s (self-propelled and towable) up to 140 KVA’s AC and 2,500 A DC.
- Aircraft and ramp tow tractors from 3000 lbs to 20000 lbs dbp
- Hydraulic service trolleys up to 5000 psi and 200 lpm.
- Aircraft and helicopter (skid-ounted and wheelmounted) handlers.
- Special equipment to make operations more efficient at airports, air and naval bases.

> Defence/Security Activity Lines: Leader in the design, development, manufacturing, installation and support (including maintenance and upgrading) of the most technologically advanced military and civil Ground Support Equipment (“GSE”).

> Subsidiaries and facilities abroad: EINSA UK, to service the 25-year maintenance Contract Logistic Support for the 100 External Weapon Loaders model VAP-60 for the Ministry Of Defence. The company has settled in Peterborough as the UK location ensuring good travel links to all of the RAF bases served.
ESCRIBANO

Avd. Punto ES, 10 Tecnoalcalá 28805
Alcalá de Henares (Madrid)
• Tel: +34 911 898 293 • Fax: +34 916 794 273
• E-mail: info@mecaes.es • www.mecaes.es • Contact: Angel Escribano

>Defence/Security Activity Lines: Manufacturing, assembling and testing of mechanical components. Remote weapon stations. Image Intensifier and IR Systems. Our own engineering in the areas of electro-optics, stabilization, control devices and real time SW.

>Subsidiaries and facilities abroad: 75 % of our production is export market. Commercial presence in Middle East an LATAM.

ESCRIBANO is a private family owned company specialized in the Aeronautic and Defense markets.

Our production plant, with de 5,400 square meters, is located at Technological Campus in Alcalá de Henares. Our Company, have the most advanced technology, the most innovative equipment and processes and the means of production the most innovative for designing and manufacturing of high precision mechanical components as well as the necessary facilities for assembling and testing.

Additionally, we have developed our own engineering in the areas of electro-optics, stabilization, control devices and real time SW, providing our customers with engineered solutions, systems and applications according to their needs.

We have the ISO9001 Quality Certification, as well as EN9100 and NADCAP for no destructive testing and right now we are in the process of qualification for PECAL 210 (AQAP 2120). ESCRIBANO is preferred supplier of most of the European and Americans Defence Companies.

We have participated in Missiles Programs manufacturing section control actuation systems for the following missiles: Meteor, AMRAAM, Iris-T, Iris-T SL, Taurus, RAM y Strike. Additionally we have manufactured the infrared seeker for Spike missile and the main body for the Meteor. Finally we have manufactured mechanical elements for the torpedo DM2A4, TIGRE helicopter, Eurofighter aircraft and A400M transport aircraft.

As result of this experience, we have developed our own products and systems:

• Night vision monocular
• Thermal camera (uncooled) for tactical applications
• Remote Weapon Station, stabilized system for 12.7 mm and 7.62 mm caliber for naval and land applications.

Defence/Security Activity Lines:
Manufacturing, assembling and testing of mechanical components. Remote weapon stations. Image Intensifier and IR Systems. Our own engineering in the areas of electro-optics, stabilization, control devices and real time SW.

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Subsidiaries and facilities abroad: 75 % of our production is export market. Commercial presence in Middle East and LATAM.
For over 25 years, GMV has been a trusted supplier of the Spanish Armed Forces and International Defense Organizations. Its activities in this field include engineering, design, development, integration and maintenance of defense systems.

GMV provides innovative, flexible, scalable and sustainable solutions, easily able to satisfy the most demanding needs and under the strictest quality standards.
EXPAL develops, manufactures, integrates and maintains a wide range of products, systems and services for the Defence and Security sectors. Its portfolio includes weapon systems, munitions and propellants, technological systems and applications, as well as vehicles and aeronaautical systems maintenance and demilitarization and EOD services.

EXPAL is the leader in the ammunition and explosives sector in Spain, as well as one of the top 10 producers of ammunition and explosives worldwide. Its clients are Ministries of Defence and armed forces from around the globe, as well as international organizations and other leading defence companies.

With more than 1,000 professionals, EXPAL has production centers in Spain, Denmark, Italy, Bulgaria and the US.

Knowledge, experience and capabilities:
EXPAL’s products and services are employed by over 40 countries all over the world. Its clients are Ministries of Defence and EOD and international organizations.

The development of the range of EXPAL products is based on continual improvement, a strong commitment to technology and a clear focus on the customer and their needs.

This customer orientation together with its capabilities, experience and knowhow in the development and manufacture of weapon systems, ammunition and explosives allow EXPAL to offer a wide range of solutions for supporting and improving the operational capabilities and the Defence and protection of their troops.

The Defence/Security Activity Lines:
EXPAL develops, manufactures, integrates and maintains products, systems and services for Defence and Security sectors.

Subsidiaries and facilities abroad:
EXPAL has production centers in Spain (6), Denmark, Italy, Bulgaria and the US.

Contact: expal@expal.biz
Tel: +34 91 722 02 35
www.expal.biz
offer of services and solutions in the Defence field

**EXPAL** maintains a clear and strict policy with regards to quality control with the commitment to offering to its customers the best products and services.

**R&D and Technology**

R&D and Technology is the engine of **EXPAL**’s progress. The own R&D and Technology programs that the company develops are focused on the following lines of action:

- Support of the operational capabilities of our troops
- Improvement of the protection of our military platforms and their crews
- Development of high mobility and rapidly deployable weapons systems
- Increasing the range, effectiveness and precision of ammunition, whilst reducing collateral damage
- Development of intelligent ammunition through the integration of electronic subsystems
- Reduction of the vulnerability of the ammunition stored against external threats
- Designs and innovations that assure the safe use of the ammunition in all environmental conditions
- Rocket engines for space applications
- Development of non-lethal weapons

**EXPAL** is responsible as well as the design and development of new products such as the improvement and adequacy of the existing ones to the specific requirements of the customer and comes collaborating from his beginnings with Ministries of Defence and Armed Forces, as well as with leading companies technologically in the Sector, in a great number of programs of development successfully.

**EXPAL** also collaborates in international programs of research and development with official organisms and companies of first level to give response to the technological developments demanded by the armies across principally European programs of cooperation.

**Weapon systems**

**EXPAL** has different weapon systems adapted to the requirements and demands of the current scenarios.

It is worth mentioning it’s mortar systems, a traditional weapon system that has become an excellent fire support and **EXPAL** has been able to develop versions improving its performance and use in both platform as ammunition.

Also in the last two decades, **EXPAL** has committed to the development of command and control systems integrated into their platforms, which has resulted in proprietary products that offer concrete
solutions within the current operational needs of troops.

- GAB underwater grenade
- SAZEC Surface control system
- MILA underwater Limpet Mine
- Mortar systems
- EIMOS integrated mortar systems

Munitions
EXPAL develops and produces a complete range of high performance ammunition to meet the needs of armies and security forces. EXPAL has many years of experience and in-depth knowledge of ammunition and its manufacturing processes, which enables continual improvement of these products:

- Air armament
- Mechanical and electronic Fuzes
- Small arms ammunition
- Artillery ammunition
- Medium caliber cannon ammunition
- Mortar systems ammunition
- Naval ammunition

Energetic Products
EXPAL has a wide range of Energetic Products for Defence, grouped into: initiation systems, demolition stores, EOD systems, IM warheads, Propellants and pyrotechnics. Our products are always constantly evolving in search of the maximum efficiency, ease of use and safety.

- Demolition stores
- IM Warheads fill
- EOD equipment
- Pyrotechnics
- Propellants and propellant systems
- Initiation systems

Technological Systems & Applications
EXPAL develops and integrates systems and technological applications for its products and other platforms, in order to equip them with technologically advanced features to enhance and improve their performance, handling and functional capabilities.

EXPAL has completed weapons systems projects with solutions, applicable to equipment and complete systems for Defence, offering its own technological products and reliable, innovative solutions to our customers.

- TECHFIRE, the EXPAL FireSupport Information System for mortars and artillery guns, totally integrated from the sensor to the weapon. TECHFIRE automates and accelerates all the tasks related to direct or indirect fire be they in a single gun or in a unit, allowing increased precision and control over supporting fire processes.
- Ballistic Computers that provide the required fire data automatically for artillery and mortars and compatible with any laser telemeter and updated and interoperable with any other advanced system.
- SHEPHERD MIL an autonomous aerial, silent, prey bird-shaped reconnaissance device. It incorporates Day/Night cameras and allows for automatic take-off and landing, as well as “waypoints” guided navigation. SHEPHERD-MIL is integrated into the fire support information system TECHFIRE by EXPAL, as a complement of the
Forward Observer (FO). Its gliding and camouflage capacity, together with the possibility of equipping it with cameras and geo-location software, allows the application of SHEPHERD-MIL in control and security missions.

- Protector, the family that represents a new generation of medium-scale robots, where versatility and modularity are key to deal with the growing and changing IED threats, increasing the capacity to fulfill the requirements of EOD, CBRNE and intelligence operations.

**Maintenance Services & Integrated Logistics Support (ILS)**

EXPAL maintenance services and logistics support offer solutions for the maintenance and modernization of platforms and equipment of the military in order to optimize and extend their life cycle, both in the systems already in service and future acquisitions.

EXPAL’s capabilities, along with its commitment to cooperation with other leading companies to cover major programs, are the base that supports EXPAL’s capabilities in maintenance and modernization of platforms.

- Aeronautical systems maintenance
- Vehicle maintenance and Integrated Logistics Support (ILS)

**Demilitarization & EOD Services**

EXPAL is leader in Demil due to its experience, capabilities and processes in recovering, recycling and reuse of the extracted materials. The recovered explosives are recycled to be used in different sectors such as the mining industry, infrastructures and demolition, benefiting society by saving renewable resources and reducing the carbon footprint.

EXPAL has more than 40 years of experience in clearance and soil remediation, with more than 5,000,000m² of decontaminated terrain and more than 3,000 UXO’s neutralized for the armed forces as well as also for civil companies.

- EOD and soil remediation
- Ammunition and Explosives Disposal and Recovery
- Pyrotechnics disposal and recovery (flares, air bags and pyrotechnical devices)
Santa Bárbara Sistemas, part of the General Dynamics European group, specialises in the design, manufacture, modernisation and maintenance of tracked vehicles (ASCOD); artillery systems (SIAC howitzer); wheeled vehicles (PIRAÑA), bridge, powder, large calibre munitions and propellant charge systems. It has also manufactured the Leopard 2E battle tank under licence for the Spanish Army.

The ASCOD vehicle family
The ASCOD (Pizarro in Spain) is one of the best infantry/cavalry fighting vehicles in the world today. The ASCOD is also the basis of the Scout SV programme for the UK Ministry of Defence, designed in accordance with a weight category of 42 tonnes with a modern power train prepared for a 30-year service life.

It is highly mobile and has a top speed of 70 km/h. With a basic common platform, it adapts to different variants including: personnel and engineer carrier; command post, ambulance and recovery vehicle.

The 35 tonnes rubber-band track version has been invited to take part in the Danish Ministry of Defence’s international tender to replace the antiquated M-113 currently in service.

SIAC, an artillery revolution
The 155/52 APU SBT is a howitzer developed with Spanish technology for fire support and protection missions with high performance, low maintenance cost and a reduced crew. It includes a modular and adaptable system called DINAPS, which combines a hybrid navigation system (inertial + GPS), muzzle velocity radar and modern software that settles ballistics for fixed and moving objects in real time. It can be
PIRAÑA, the best option
The PIRAÑA 8x8 family of vehicles, (PIRAÑA 3 and PIRAÑA 5) offers the features and performances required of a modern, multi-role vehicle, with the best mobility, protection and payload ratio, adapting to any battlefield and contributing solutions to cover the existing vacuum between light deployable forces and heavy tracked platforms. The different members of the PIRAÑA family, the best on the market in its category, offer the highest levels of ballistics, mine and IED protection. They are fitted with many other systems, such as the digital MiCAN, a transmission system with efficient fuel spend and a 120 kW integrated start-up generator (ISG), which improves the vehicle performance and flexibility.
everis Aerospace and Defense group is a division that integrates critical systems in the aerospace, defense and security multi-industry. Its capabilities are based on:

- Expertise in the industry and experience in project management acquired in over 15 years of trajectory in the consulting market.
- Solid business structure displayed in the south of Europe, Middle East and Latin America.
- The technological and innovative capacity of the investee SMEs.
- Agreements with strategic and technological partners that complement the offer.

everis Aerospace and Defense has designed a strategy based on the following principles:

- Approach to a global market, with a prioritization in the first phase in three regions: Spain, Middle East and Latin America. Currently, opportunities and projects are managed in more than 40 countries.
- Involvement in the local industry strengthening, acting as a leading company with the investee SMEs group, and encouraging free competition in the industry as well as collaboration between key market players in relevant international opportunities.
- Commitment with the technological transfer, in projects that involve Spanish technology overseas, where local industry development contributes through the creation of joint ventures between SMEs and local companies, as well as committing to developing Spanish knowledge and abilities in projects that incorporate foreign technology.

All of this with the support of the everis group, a multinational consulting firm that offers business solutions, strategy, development and maintenance of technological applications and outsourcing with over 11,000 employees. Since 2014, everis has been integrated in the NTT DATA group, which is the sixth company in IT services worldwide with 70,000 employees and global presence.

Sectors

- **AEROSPACE**

  In a continuous commitment to research and development, the aerospace division works in order to obtain more innovative solutions in the following areas:

  - Engineering and consultancy
  - Airport Infrastructure
  - Unmanned Aerial Vehicles (UAV)
  - Embedded and real-time systems
  - Flight-control systems
  - Certification and airworthiness
  - Satellite communication systems
  - Independent Software Verification and Validation (ISVV)
  - Simulators

- **UAV**

  everis Aerospace and Defense is a technological reference in the UAV (Unmanned Aerial Vehicles) scope. Thanks to our deep knowledge of the sector we participate in all the product’s life cycle phases, from its designing and production until its marketing and support.
As a prime contractor for the Spanish SME, everis Aerospace and Defense has a share in SCR (Sistemas de Control Remoto, S.L.), with the aim of strengthening its differential capacities in the aerospace field and increasing its market share globally. Nowadays SCR is the only Spanish company manufacturing UAV’s and has sold over 600 aircrafts since being created in 1994. The enterprise has a wide range of products such as flying targets, naval targets and UAV’s surveillance and reconnaissance.

Airport infrastructures
Nowadays, everis is a Framework Agreement awardee for engineering, consulting, supply, commissioning and maintenance of the AENA Public Information Systems, operating in the 47 airports of the AENA network.

In addition, due to the strategic alliance between the everis Aerospace and Defense group and SIMAVE, joining their capabilities and knowledge in the airport infrastructure field, a broad portfolio is configured with high value products and services included for terminals as for aerial navigation. With over 30 references in airports, as well as control centers and clients of the public and private industry, everis offers integral solutions from operation management, safety, CPDs, support machinery on the tarmac or simulation of handling machinery in terminals to radio navigation, ground-air and ground-ground communications, meteorological stations or ATC simulators for aerial navigation.

• DEFENSE

Like in other areas of the company, in the defense division we are committed to offering our clients solutions and systems based on innovation, in applied technologies as in designs, making our products to fit our clients’ requirements and real needs. Our capabilities allow us to develop solutions that cover the entire product or system life cycle, from the design engineering, going through the development, manufacture and integration, to the integral logistic support and the system sustainability. For this purpose, we have a large group of expert engineers in all the technological areas involved in the defense sector, such as mechanical, hydraulic, electronic, software, communications, etc. This allows us to provide advanced solutions aligned with our clients’ needs.

everis Aerospace and Defense group develops a complete range of solutions along with NTGS, TORO Vehículos Especiales y Sistemas, Ibetor and Quatripole. It includes products and services for the defense sector.

Defense systems
The design, development, manufacture and integral logistic support of the defense systems in military and safety areas is carried out through NTGS work.

The highlighted tasks among them are:
• High mobility terrestrial weapon systems.
• Tactic and operational communication systems.
• Mobile Air Traffic Control Towers.
• Alert and security systems.

Manufacture and solution integration of Toro Vehículos Especiales y Sistemas (Company jointly created by everis and NTGS) is a company of the group with capabilities and facilities to undertake
Grupo everis Aeroespacial y Defensa

projects for the manufacture and integration of solutions and systems, both civil and military. This company has an important design and development engineering area; mechanic, hydraulic, and electronic laboratories; and industrial and warehouse areas.

Aside from its industrial activity, it also allocates important resources to I+D+i, developing new technologies and innovative solutions. A new multipurpose and flexible vehicle platform is highlighted, with a hybrid power plant with not axle between the wheels.

**Satellite Communications**

Ibetor is the group company that designs and produces terminals for satellite communications and wireless networks, among other solutions, since 1995. Focused on I+D+i, Ibetor develops its own technology manufacturing customized products with an important innovation degree and high performance. The most outstanding products are:

- High performance SatCom Terminals, that fulfill strict military requirements (SOTM, mobile, and ATQH) and operate within military and civil groups.
- Point-to-multipoint RF Technology, based on DOCSIS open and standard architecture.
- High reliability navigation and positioning technology.

**Logistic systems for defense** is one of the capabilities we offer through Quatripole. It provides a quite diverse camp material and support equipment for military deployment in operations, including shelters, tents, power equipment, water treatment, etc. Likewise, Quatripole has a whole range of systems and solutions for the prevention and mitigation of NRBQ technological risks. It covers all the phases of this type of incident, from the alert and prevention, through NRBQ recognition, sample collection, identification, decontamination, polluted water treatment, etc.

Additionally, Quatripole has vast experience in supporting tactical, armored, wheel and crawler vehicle platforms, as well as special vehicles destined to support and backing up Army Guard, Air Force and Army related operations.

**SAFETY**

Safety division offers a wide solution range in the following areas:

- Critical infrastructure protection
- Security in events
- Citizen security
- Vigilance and border protection
- Corporate security

In the physical security line, he following types of solutions are offered:

**Analysis and Management of Image and Audio:**

- Facial biometric recognition systems for vigilance, access control and intelligence.
- Behavior analysis solutions and smart video for risks and threats detection, people and vehicle checks.
- Management systems and automated and manual storage of large multimedia files.

**Command and Control Systems:**

- Systems based on a hyperrealist user interface and native integration of diverse devices.
- Presence control and allocation of people and assets in out-door as in-door surroundings.

**Intelligence Systems:**

- Solutions for information collecting, storing, analysis and management.
- Information analysis, identify and relationship detection, taxonomies, semantic analysis, etc.
In the cyber-security line, **Aerospace and Defense everis** action is focused on five main points:

- **Assessment**: services oriented towards safety incident prevention based on the proactive approach of system review and internal services, as well as the response to safety incidents and subsequent analysis to obtain continuous improvement. It is based in monitoring services, hacking, response to incidents and forensic analysis.
- **Intelligence**: security incident prevention based on a proactive approach of system review and external services.
- **Compliance**: services to validate and ensure the regulatory and normative compliance of organizations. From the initial phases of the GAP analysis and the compliance plan, through the accompanying and implementation of measures, to the official certification.
- **Critical infrastructure protection**: support to the industrial organizations that apply cyber security services, not only in their external networks, but also in their industrial control systems and SCADA systems.
- **Cyber security strategic plans**: performing security management plans for companies, critical infrastructures, industries, countries and regions.

**everis Aerospace and Defense** supports their capabilities in the security industry, on innovative technology companies in their corresponding industries:

- **ISID** specialized company in media asset management (Media Asset Management – MAM) with solutions focused on managing and storing large amount of media information in a structured and indexed manner. In addition it obtains information contained in the media files by applying diverse analyzers, documenting all results for is posterior exploitation.
- **HERTA** offers the most advanced solution in facial recognition, for video surveillance as for forensic analysis.

Exploiting the capabilities in the latest GPU processing technologies, our products detect multiple faces in real time. Suitable solutions for crowded surroundings, video massive and high velocity processing.

**SIMULATION**

The simulation area is the one showing most growth expectations. Throughout the year, **everis** involvement in **Simmer** was finishing, turning this into its simulation brand. The manufacture of the first simulator phase, in the Toro industrial plant in Segovia, has been completed to provide the Brazilian market of driving schools.

The wide range of advantages that formation and training through simulation tools provide (cost reduction, reduce loss of lives, simulation of not replicable situations) encourages **everis Aerospace and Defense** to continue investing in this field.

The current product catalogue, including car simulators, heavy-duty vehicles as well as industrial and military machinery, is continuously expanding with new designs and developments. Among the simulators available in upcoming dates, a motorcycle simulator, a truck and bus premium simulator and a new series of sea simulators to be developed are found.

In addition, the alliance with key companies in the simulation and training industries allows **everis** expand its catalogue with products, as the welding simulator and the tactic-shooting simulator.

However, hardware sale does not set **everis/Simumak** apart, but the use of simulators for training service rendering. A typical project model usually includes the creation of a simulator adapted to the specific needs of a requested training. In addition, a training integrated model that includes simulator use can perform this type of service rendering. This differential approach allows clients to use the simulators with their associated advantages without representing a considerable investment.
Defence/Security Activity Lines: Operator of Secure Satellite Communications services for international government agencies, as well as Earth Observation (PAZ and Ingenio) and maritime traffic information (AIS) satellite services.

Subsidiaries and facilities abroad: Xtar LLC: USA Joint venture with Loral Space & Communications. exactEarth: Canadian joint venture with COMDEV.

Company founded in 2001 as a government satellite services operator to act primarily in the areas of defense, security, intelligence and foreign affairs. Since 2005 we have been providing secure satellite communications services in X- and Ka-bands to government agencies from various countries, and we are currently developing new Earth Observation and maritime traffic information (AIS) satellite constellations.

We entered into various partnerships with other companies to offer its services in an ever-expanding and global marketplace. These include: A joint venture in the United States with Loral Space & Communications to create Xtar LLC, in order to provide satellite communications services to government agencies. Another joint venture in Canada with COMDEV to provide maritime traffic information services (AIS) through the company exactEarth.

We are working in three business lines:

Secure communications: We have innovative generation of satellites, called SpainSAT and XTar-Eur; that provide more flexibility and security to satellite communications in the military X and Ka bands and covers over two-thirds of the Earth.

Earth Observation: This system consists of two satellites, PAZ (radar technology) and Ingenio (optical technology) designed for multiple purposes: border control, intelligence, environmental monitoring, protection of natural resources, military operations, enforcement of international treaties, surface monitoring, city and infrastructure planning, monitoring of natural catastrophes and high-resolution mapping, among many others.

The satellite-based maritime traffic information system is managed through the ten satellites in this new constellation receiving AIS signals from the over 90,000 vessels that are equipped with this system. The data are then relayed to ground stations, where the information is collated in accordance with the requirements of the users. This system will provide an accurate picture of the world’s maritime traffic in real time. This information can be of great use to government, maritime, port and fishing authorities.

We also have ground control centres for our satellites which operate 24/7.
Hércules de Armamento

Ctra. Palencia-Magaz Km 2.5
34190 Villamuriel de Cerrato (Palencia)
Tel: +34 979 165 048 Fax: 979 165 152
E-mail: direccioncomercial@herculesdearmamento.com
www.herculesdearmamento.com
Contact: Juan Gómez Rey

> Defence/Security Activity Lines: Hércules de Armamento, S.L., is a new company with the latest technology in electron beam welding and surface treatments specialized lines, and also it has the capacity of developing nanotechnology-related activities and forging rifled barrel, something that is unique in Spain.

This new company has the experience and know-how of a team from the old Arm’s Factory of La Coruña, composed of the best engineers, technicians and skilled workers.

> Subsidiaries and facilities abroad: Hércules de Armamento, S.L., is able and ready to equip the armed forces of many countries around the world, providing them complete modules of all types of equipment and weapons.

Industrial Matricera Palentina, S.L.U.

Ctra. Palencia-Magaz Km 2.5
34190 Villamuriel de Cerrato (Palencia)
Tel: +34 979 165 048 Fax: 979 165 152
E-mail: tecnico@inmapa.com
www.inmapa.com
Contact: Miguel Angel Sagredo

> Defence/Security Activity Lines: Turnkey projects for all kind of technology sectors: Automotive, Aeronautical, Railway, Naval, Defence, etc.

Design, Manufacturing, Assembly, Setting up and Technical Support for:

In addition:
Machining in General, Large Mechano-Welded Structures and Special Metalwork, Metallic Parts Manufacturing for Aerostructures.
Indra is a reference company in the Defence and Security sector. It provides systems based on proprietary technology to Ministries of Defence and Home Offices, other organisations and administrations, and the leading naval, land and aeronautical platform providers.

In this context, Indra forms part of the top multinational consortiums. It works on the Eurofighter and A400M programmes, the Tiger helicopter, the Leopard vehicle, the LHD and F100 ships, the S80 submarine, the Galileo system, the Copernicus programme the Ingenio and Paz satellites and the Space Surveillance and Tracking System (SST). It develops custom systems for the five operations areas: Land, Sea, Air, Space and Cyberspace.

In the field of Air Defence Systems, Indra offers complete Integrated Systems that cover all the facets of these missions. It has developed the family of Lanza 3D radars for surveillance. The Command and Control functions are covered by its advanced AIRDEF system, and the coordination functions of air and anti-aircraft missions are covered by its SCV and COAAAS systems, respectively.

Indra has been awarded the Radar programmes announced by NATO since 2005. As a result, the defence of the entire south west flank of Europe is based on Indra radar networks. In the naval field, the Spanish ship LHD Juan Carlos I is equipped with the naval version of the Lanza 3D radar system. Indra has references in the five continents.

In the field of Integrated Command and Control Ground Systems, in 2013 Indra...
implemented the European Commission’s Emergency Response Centre (ERC), which coordinates resources and forces of 32 states. In terms of doctrine systems for military use, Indra implemented the Command and Control System that the Spanish Military Emergency Unit (UME in Spanish) uses to plan and lead its operations. In the civil area, Madrid and Buenos Aires have entrusted Indra with the implementation of emergency management centres.

Indra is also a leader in the development of Advanced Communication Systems. It supplies satellite communication terminals to Spain (SECOMSAT network), France (Syracuse network) and Brazil (SISCOMIS). It also plays a key role in the European SOFT programme, which develops the software radio system and the high capacity radio of the future.

In the field of Electronic Defence, its integrated self-protection systems are certified and operational in more than 20 types of platforms. It is the supplier of the Radar Threats Alert System for the entire A400M community, and it has self-protection systems operating in fixed and rotary wing platforms throughout the world. In the naval segment, it supplies its systems to the leading shipyards. Finally, in the land segment, it is one of the three companies in the world with a certified Friend-Foe BTIDS interrogation system for interoperating in multinational forces. It also supplies systems that operate in tactical and strategic areas.

For simulations, Indra is one of the global leaders in the sector. It has delivered 200 simulators to 50 customers in twenty countries. Indra is the company with the most certified rotary wing simulators.

In the field of emerging technologies, Indra is positioned in segments that include Unmanned Platforms and CBRNe Systems.

As far as dual-application coastal surveillance, more than 5,000 km of borders throughout the world are protected by Indra technology. Indra’s MRI light aircraft combines perfectly with these networks and extends the surveillance range beyond the horizon. It also competes in the secure identification market, where more than 30 million documents have been issued with its systems.

In the field of cybersecurity and cyberdefence, it has implemented the iCSOC, a centre specialised in cybersecurity operations that offers 24x7x365 service.

Indra sales are around €3 billion and the company employs 43,000 professionals. In the last three years, it has allocated more than €575 million to R&D&i projects.
ITP is the ninth aircraft engine company in the world by revenue (627 million euros in 2013) and ranks among the top one hundred companies in the aviation industry globally.

ITP includes among its activities areas such as Design, Research & Development, Manufacture and Casting, as well as the Assembly and Testing of aeronautical engines and gas turbines. It is also the official maintenance service provider for the majority of the world’s currently active engine manufacturers.

Technological innovation is among ITP’s strategy pillars, as evidenced by the fact that it repeatedly ranks among the top three Spanish companies that invest most in R&D in relation to its sales (54 million euros in 2013, 8% of sales).

ITP’s story dates back to 1989, when the company started involved in a defense program, the Ej200 engine for the Eurofighter, as one of Eurojet’s shareholders. From this original program it has evolved and it currently participates in nineteen programs in commercial aviation and defense.

Due to the accumulated experience of participating in international programs through the Ej200 engine, ITP has subsequently gotten involved in the more powerful turboprop in the Western world, the TP400, and in the most advanced attack helicopter in Europe through the turboshaft MTR390-E.

Furthermore, ITP offers a wide range of customized MRO support solutions to engines, accessories, components and parts through ITP In Service Support (ISS). Its experience includes clients operating in the civil, industrial and defense markets worldwide.
INSTALAZA, S.A., founded in 1943, is a leading company that applies the highest technology to design, develop and manufacture its equipment, with the aim of offering the Infantry the most efficient solutions.

Instalaza’s experience is very well known as Spanish (and other countries around the world) Armed Forces supplier. Its products have always been tested according to the most stringent quality controls in order to offer full service and support at any time, even in the hardest conditions.

Moreover, Instalaza’s products and equipment are being used by different armed forces all over the world, reaching the maximum level of operational reliability and effectiveness.

>**Defence/Security Activity Lines:** Main Products:
  - **ALCOTAN:** High accuracy and performance for static or moving targets up to 600m and more than 1000m for area targets.
  - **C90:** Best compromise performance/weight of the market, extremely easy to use.
  - **ALHAMBRA:** World’s best Hand Grenade, with unparalleled safety, reliability and performance.

>**Subsidiaries and facilities abroad:** Instalaza’s experience, founded in 1943, is very well known as supplier of the Spanish Armed Forces and more than 30 countries around the world.

NOVATRONIC SISTEMAS

c/ Lezeaga, 23 48002 Bilbao (Bizkaia) • Tel: 902198725 • Fax: 902198794 • E-mail: info@novatronicsistemas.com • www.novatronicsistemas.com • Contact: Eduardo Elorduy

Novatronic Sistemas is the official distributor for Spain and Portugal of Innodisk manufacturer, whose flash and DRAM storage modules fulfill the strictest military regulations and standards, being totally protected against extreme temperatures, dust, shocks, vibrations and other adverse environmental factors.

Additionally, we own leading technology in data protection industry, which allows customizing safety functions of data and information, as military sector requires.

Our dedicated engineering team offers additional services of consultancy, post-sale support and repair management.

>**Defence/Security Activity Lines:** Supply and technological support of Flash and DRAM rugged storage devices for military applications. (Manufacturer: Innodisk).

>**Subsidiaries and facilities abroad:** Taiwan, USA, China, Japan, Holland.
Navantia S.A.

The Spanish shipbuilder Navantia, 100% owned by SEPI the Spanish Government Industrial Holding, is a world reference in the design, construction and integration of state-of-the-art war ships, as well as ship repairs & modernizations. It is also engaged in the design and manufacture of Integrated Platform Management Systems, Fire Control Systems, Command and Control systems, Propulsion Plants and through life support for all its products. Even though its main line of activity is in the naval field, Navantia designs and manufactures systems for the Army and the Air Force, and is, as well, a first class company in the development, construction and maintenance of engines, generating groups and steam turbines.

Traditionally, the main client of Navantia has been the Spanish Navy, but in the last years a major internationalization of the company has taken place. As significant information, in 2014 they presented more than 110 commercial bids out of our borders. On the other hand, Navantia’s internationalization has been reinforced on four commercial delegations, opened on the key markets of the company: Turkey, Persian Gulf, Latin America; and India. As well as the subsidiary company that Navantia already opened in Australia, his principal client in these moments.

Presently it has contracts with Australia, for whom amphibious, destroyers and landing crafts are being built; The United States, Norway, Turkey and Mexico.

Navantia is committed to continuous innovation and the very latest technology, offering its customers — both the Spanish Navy and other international navies — a top quality, high value-added product. It achieves this with a strong technical office and significant investment in R&D.

Defence/Security activity Lines: Navantia, global leader in design, shipbuilding, systems integration and life-cycle support. International benchmark in the industry for its ability to offer customers a comprehensive service.

Subsidiaries and facilities abroad: Melbourne (Australia), Doha (Qatar), Rio de Janeiro (Brazil), Istanbul (Turkey), New Delhi (India).
As important works, nowadays, Navantia builds fast landing crafts (program of 12 units in different constructive phases) for the Royal Australian and two OPV’s (Meteoro class) for the Spanish Navy. In addition it provides the design and the transfer of technology for the construction of 3 destroyers for the Royal Australian Navy and a LPD for the Turkish Navy.

As maintenance and life cycle support works, it is to highlight the contract with the US Navy to repair and support the destroyers, part of the Anti-Ballistic Missiles, based in Rota. The company is also doing the same in Norway with five frigates built by Navantia in last decade, and is bidding for a similar contract in Australia for the ships also built by them.

As for his area of Systems, it has a specific production unit, centre of excellence for the design, development and integration of complex and high technology systems, providing a systems capacity that distinguishes it from the rest of the traditional shipyards. It designs, develops, produces and integrates the combat systems for the naval units that Navantia constructs, is responsible for the development of the command and control systems, communication systems and platform control systems, and works with the new models of life cycle support.

**Star products**

**F-105 FRIGATE**

Designed with maximum capacity in anti-aircraft and anti-submarine and anti-surface operations. Incorporates Lockheed Martin’s AEGIS combat system, which offers high combat capability and allows the integration of weapons and sensors.

**LHD**

Amphibious, multi-purpose and multi-role ship designed with the mission of enabling the projection of Army and Navy Corps and of serving as a possible platform for embarked aviation and non-combat operations.

**S-80 SUBMARINE**

New concept of conventional submarine with air independent propulsion system, allowing it to stay down longer than any other conventional submarine, making it less detectable.

**MARITIME ACTION SHIP**

Moderately sized ship with reduced manning and good habitability and permanence at sea. It is highly versatile in terms of the missions it can perform and has a high degree of commonality with other vessels and reduced costs.

**AUXILIARY OILER REPLENISHMENT VESSEL**

Ship capable of supplying liquid fuel (diesel and JP-5), water and solids (food, ammunition and spare parts and supplies) to a maritime group or battle group, serving as support for combined Army and Navy expeditions.
Nammo Palencia supports the Spanish armed forces and their allies with both small and medium caliber combat and training ammunition for army, navy and air force. Nammo Palencia is also supplying ammunition to other allied countries in Europe, South America, Asia and the Middle East. In addition to this Nammo Palencia is a provider of critical ammunition components to other defense industries in Europe, South America and the Middle East.

Nammo’s dedication to safeguarding the environment, the development of innovative solutions and precise engineering has resulted in a range of specialist technologies. Able to recognize the dangers faced by troops in the air, on the ground or at sea, the company has pioneered cutting-edge technology that helps soldiers through any conflict, in any environment.

Nammo’s wide ranging products and services are implemented world-wide. Its broad portfolio includes shoulder-launched munitions systems, military and sports ammunition, rocket motors for military and space applications and environmentally friendly demilitarization services.

Within safety & security Nammo delivers products for safety at sea, homeland security and boarder control, illumination signals and initiation systems.

> Defence/Security Activity Lines: Broad range of military ammunition products from small to large calibers; shoulder launched munitions systems; rocket motors for missile and space applications; and environmentally friendly demilitarization.

> Subsidiaries and facilities abroad: Nammo is located in 9 countries; the Spanish head office is located in Madrid with production facility in Palencia.
Nightvision Lasers Spain (NVLS) leads the Spanish optronics market, due to the development of innovative, versatile and totally ruggedized products.

The devices are being used by units of Spanish Army, Air Force and Navy, as well as other Security Forces.

In the last three years a strong exporting activity has been consolidated in different countries of Southeast Asia, Persian Gulf and Europe, due to the supply of night vision goggles for pilots, nightvision monoculars and other devices and services.

The exclusive representation of Photonis Nightvision, manufacturer of the world’s most advanced image intensifiers and digital sensors, eases the offering of the latest night vision technologies.

NVLS uses the most advanced technologies for the production of optronic devices and employs highly technically and tactically experienced technical staff, which results in the delivery of very operative systems and the best training for each circumstance.

The Group TCA has implemented and maintains a Quality Management System according to the UNE EN ISO 9001:2008 and AQAP/PECAL 2130.

The most relevant products are:

- Balanced ANVIS autogated goggles for helicopter and fix wing pilots.

- Multifunction autogated monoculars, configurable as combat monocular, diving monocular, weapon sight or collimated binoculars goggle for drivers or aircrew.

- Thermal weapon sights for assault rifle, LMG and HMG.

- High sensitivity and high resolution miniaturized digital night vision.


> Subsidiaries and facilities abroad: Representatives in Germany, Denmark, Sweden, Greece, Portugal, Chile, Mexico, Argentina, Saudi Arabia, Oman, Singapore, Malaysia, Indonesia, Thailand.
OTO Melara Ibérica

OTO MELARA IBÉRICA S.A.U. was established in November 2003 as a wholly owned subsidiary of Oto Melara S.p.A, a Finmeccanica Company, to operate in the Spanish Territory. OTO MELARA IBÉRICA S.A.U. headquarters is located in Loriguilla, close to Valencia.

Throughout its history, OTO MELARA IBÉRICA S.A.U. has become a foothold in the market as a solid company in the field of defense. It is also supported by Oto Melara S.p.A that has a consolidated experience regarding military products in terms of organization, quality management system and operation mode.

Main objective is to continue and expand the products and services supplied to different areas of the Spanish Army.

Among its products and services, Centauro 105mm Turret currently in service in the Spanish Army and its small and medium caliber turrets: the HITFIST® 25-30mm, the OWS® 30mm, the HITROLE® Light 12.7mm and HITROLE® 12.7mm Land and Naval versions as well as systems overhauling such as the OTO Melara’s Howitzer 105/14.

The challenge that future plan supposes is a huge incentive to continue forward, discovering new concepts and new technologies oriented towards a continuous development in the defense sector.

OTO MELARA IBÉRICA S.A.U. is in expansion process beyond the Spanish borders, in order to get also a significant presence in other geographical areas.

It has a highly trained professional’s team with high level of experience in various sectors who works daily in order to secure its objectives and with full knowledge that a competitive weapon system requires a high level of reliability.

PROYTECSA SECURITY is a Spanish company with a clear international outlook whose headquarters are in Madrid and main facilities are in Huesca. Our mission is to design, develop, produce and sell our own technological solutions that adapt to the specific Security and Defence needs of our national and international customers.

PROYTECSA SECURITY has been collaborating closely with the Spanish security forces and corps, financial entities, railway companies, public administrations and private corporations for the last 25 years. This has given us a strong position on the international scene and made us a reference brand in the security industry.

The company focuses on four lines:

• **aunav robots** are extremely strong and powerful, more than any other on the market. Together with their precision and exactitude when in operation, they are ideal to use in police and military operations to defuse improvised explosive devices (IED) and Explosive Ordnance Disposal (EOD), as well as for CBRN activities.

• **The argus range of access control features** interlocks and security doors designed and manufactured to offer the best access protection. The aluminum or metal frames, the anti-degradation or bullet proof glass, the incorporation of a metal arch detector or control systems guarantee the best protection against intrusion attempts. The numerous modes and the capability to integrate diverse access control systems result in a tailored solution to every customer need.

• **thewall is the perimeter protection solution** for critical infrastructures. It features an anti-scaling mesh combined with integrated and concealed detection. The detection technology used doesn’t require any calibration, neither initial nor periodical. It is also immune to climatic events, animal activity or vegetation. The false alarm rate is 0% which makes it a resilient, reliable and safe solution. It can be assembled on prefabricated concrete blocks something that makes it ideal for changing environments like harbors.

• **Our range of training and services are designed to offer a tailored solution to every customer:** We have 10,000 m² premises featuring both urban and non-urban areas to perform complex exercises or field testing.

>**Defence/Security Activity Lines:** IED/EOD robots operating in police forces, Guardia Civil, Army, Air Force, and Mossos d’Esquadra, exporting to over 15 countries.

>**Subsidiaries and facilities abroad:** Local presence in LATAM, Maghreb, Middle East and India. LATAM and Caribbean areas regional office in Miami (Flo.).
QUATRIPOLE is a private technological Spanish Company with a staff with more than 20 years of experience in design, development and manufacturing of taylor-made solutions and services for Defence, Security and Environmental Sectors. The company has a strong commitment to partner with world-wide reknown technologists and export activities.

Staff consists of 45 professionals highly qualified in engineering and solutions development. The company is certified in accordance with ISO 9001, ISO 14001, AQAP 2110 and OHSAS 18001 with more than 3,000 m² industrial facilities in Madrid.

The Business Areas are developing, among others, the following projects:

1. Environmental Division:
Design, development, integration and supply of different meteorological equipments and CBRN projects such as the Integrated Technological Risks System (SIRT – CBRN) for the Emergency Military Unit, upgrade and maintenance of the CBRN subsystems of the Contaminated Areas Reconnaissance Vehicle (VRAC) and maintenance of the NATO Headquarters Deployable Facilities located in Bétera (Valencia – Spain) as well as equipment for biological laboratories, water treatment plants, etc.

2. AGE and Special Vehicles Division:
Design, development, manufacturing and integration of different vehicles and equipments, such as Military Land Rover Defender, Parachute Deployable Special Tactical Vehicle (VEA), High Mobility Light Vehicle (VLAM) and Aircraft Ground Equipment (ground power units, towing tractors, sweepers, deicers, hydraulic and electric test stand, etc.)

3. Projects and Systems Division:
Design, development, manufacturing and integration of reverse osmosis water treatment plants, waste shredder compactors, shelterized equipment, logistic and tactical trailers (VEMPAR), waste water pumps, tactical lighting towers, gensets, heating and cooling machineries, field camps, etc. All these equipment are prepared to be fitted on all kind of truck chassis.

4. Maintenance Division:
Design, development, upgrade, retrofit and maintenance of armoured battle tanks and APC’s (including different applications and configurations) tracked or wheeled, such as Leopardo 2E, BMR/VEC, TOA, Launched-Bridge and Engineering Battle Tank, AAV’s, Piranha, etc. as well as maintenance and spare parts supply for logistic and tactical wheeled vehicles (Anibal / VAMTAC).
than 200 international and national airports use Rohde & Schwarz radios for air traffic control.

Frequency management and radiolocation for internal and external security
Rohde & Schwarz develops and produces stationary as well as mobile systems for detecting, locating, and analyzing radiocommunications signals. With its receivers, direction finders, signal analyzers, antennas, and customized systems, Rohde & Schwarz has been a reliable partner in the area of internal and external security for many decades.

Test & Measurement Solutions
Our experience in spectrum analysis, our advanced technology in network analysis and wide portfolio of signal generators and power meters, offer the best tools to guarantee the highest performance of your Radar & Electronic warfare systems, Avionics & Navigation systems, Air traffic Control systems, satellite communication systems, Military communications systems…

System Calibration and Maintenance
R&S counts on an Integrated Service Center in Madrid specialized in multibrand calibration, repair and technical support, also on-site.
SAES – S.A. de Electrónica Submarina

Ctra. de la Algúmeca S/N, 30205, Cartagena (Murcia)
Tel: +34 968 508 214 • Fax: +34 968 507 713 • E-mail: saes@electronica-submarina.com • www.electronica-submarina.com


SAES is specialized in underwater electronic equipment and systems for undersea security and defence. With over 25 years’ experience in the naval industry, SAES provides technologically advanced solutions and fully for both the military and civilian sectors.

- Sonar Systems: SOLARSUB RDTAS, SOCILSUB, DDS-03.
- ASW systems for air or naval platforms: SPAS, SDL, FTAS.
- Underwater Signatures Measurement & Control: Range systems, MIRS, DEWARS, SET-200/P, ONMS, CRV.
- Multi-influence Naval Mines: MINEA, MILA.
- Acoustic Classification and Intelligence Systems.
- Protection and Maritime Surveillance: Integrated multi-sensor systems.
- Simulation, Stimulation, Training, Systems.
- Engineering Services, Technical Support, Maintenance and Training.

Sainsel Sistemas Navales. S.A.U.

Avda. Castilla, 2 – Edif. C
28830- San Fernando de Henares (Madrid)
Tel: +34 91 678 15 50 • Fax: +34 91 677 43 07 • E-mail: sales@sainsel.es • www.sainsel.es


>Subsidiaries and facilities abroad: Company owned by Navantia (51%) and Indra (49%).

Company leader in Integrated Navigation Systems (ECDIS / WEC DIS) and Bridge Systems both military and merchant ships and Search and Rescue Systems.

Sainsel is also supplier of equipment and solutions for Combat Systems modernization of surface ships and submarines.

For the aeronautical sector has a range of process and special presentation equipment for use onboard aircrafts, including 3D and panoramic monitors, cockpit displays, EFBs and mission processors.
Propulsion for vehicles (high performance transmissions)
- Development and manufacture of the Multi-Gear Transmission Family, entirely mechanical, without torque converter and electronic control for tracked vehicles from 400 up to 1500 HP and wheeled vehicles from 300 up to 800 HP.
- Final Drives.

Electrical energy generators/motors/auxiliary power units for vehicles
- Design and development of generators/motors (up to 170 kW) and APU’s (up to 17 kW).

Antiaircraft artillery systems (35-40mm)
- Overhaul, upgrading and maintenance of antiaircraft guns.
SENER is an engineering and technology group founded in 1956 that is known worldwide for providing excellent projects and innovative solutions. In defense, SENER carries out engineering, production and integration of mechatronics, actuation and control systems for missiles and precision electrical mechanisms; GNC systems and ISR-related technology. In addition, it produces and maintains its own complete series of the product throughout its entire life cycle.

It also provides systems integration in aircraft and vehicles as well as updates and extension of their operational life.

Some of its major clients are the Spanish Ministry of Defense; the Spanish Navy; the Spanish Air Force; the Spanish Civil Guard; and the companies MBDA, Diehl BGT Defense, TAURUS Systems GmbH, Kongsberg Defence & Aerospace, Saab Dynamics, Thyssenkrupp Marine Systems / HDW, BAE Systems and Navantia.

SENER collaborates in defense programs involving integrated systems.

One of the main references in this field is the missile IRIS-T in both its air-to-air (AA) and air defense (Surface Launch, SL) versions, in which SENER is the design authority and only supplier of the control and actuation sections (CAS) for the German Diehl. SENER is also responsible for the redesign production and delivery of the Meteor missile FAS (Fin Actuation System) for MBDA. Regarding the cruise missile TAURUS KEPO 350, SENER manufactures the control series units of the fin actuation subsystem (FASS).

In this program, SENER has signed an agreement with South Korea to supply 179 missile actuator subsystem units to the air force. Likewise, SENER has produced and delivered the actuation and control...
system for the NSM (Naval Strike Missile) developed by the company Kongsberg Defence & Aerospace. Finally, SENER also participates with the company Saab Dynamics in its RBS 70 NG system as design authority and sole supplier of the stabilized mirror unit (SMU).

In ISR (intelligence, surveillance and reconnaissance) SENER has devised SAGEOS, a very high performance electro-optical sensor platform. Furthermore, it has developed and supplied solutions for the image and video signal treatment and processing, especially for recognition systems used in different countries for several aircraft fleets. It has also implemented COMINT (communications intelligence) and SIGINT (signals intelligence) solutions.

In defense systems integration, SENER, as the prime contractor of the TAURUS missile for Spain, had an important participation in the integration of the cruise missile in the EF-18 as well as in the support to the Spanish Air Force in the achievement of the initial operational capability (IOC) of this system, including production of auxiliary equipment and support at the initial test firing campaign conducted in South Africa. Currently, SENER continues to collaborate with the Spanish Air Force in life cycle support for this missile.

In aeronautics and vehicles, the company is carrying out a modernization program of the Augusta Bell 212 (AB212) helicopters of the Spanish Navy that will extend their operational life at least fifteen years, and that will incorporate latest generation avionics and systems, which will considerably improve their operational capabilities. Likewise, it has also developed vehicle solutions for defense applications such as the heating, ventilation, and air conditioning (HVAC) program for combat vehicles operating in desert environments.

Finally, in the military naval field, SENER has a CAD/CAM system, FORAN, for the design and production of ships and offshore devices which has been selected by clients like Navantia shipyards, BAE Systems, ASMAR in Chile, Severnaya in Russia or the Brazilian Navy to design military ships. Among them is worth mentioning BAE Systems’ HMS Queen Elizabeth, the aircraft carrier for the Royal Navy, and the submarine series Successor, which is the largest engineering project in Europe for the last decade.

In addition, SENER has signed an industrial agreement with HDW for the production of an air independent propulsion (AIP) system for submarines based on a methanol reformer. SENER is responsible for developing, among others, the CO₂ subsystem capable of dissolving gases in seawater silently and without any influence on the signature of the submarine in terms of noise and bubbles.
SEDENER S.A.
Pol Ind. Els Algars. C/ La Safor 2.
03820 Cocentaina (Alicante)
Tel: (34) 96 533 18 31 • Fax: (34) 96 533 26 30
E-mail: info@sedener.com • www.sedener.com
Contact: Carlos de Miguel

>Defence/Security Activity Lines:
Manufacturer of security equipment and solutions with proprietary X-ray technology. Baggage and cargo scanners and vehicle inspection systems.

>Subsidiaries and facilities abroad:
Part of the Multiscan Technologies Group, with subsidiary and production capabilities in Chile.

Unmanned Solutions, S.L.
C/ Milán. 34. 28043 Madrid
Tel: +34 91 7161424 • E-mail: alopez@usol.es • www.usol.es
Contact: Alvaro López, Commercial Director

>Defence/Security Activity Lines:
Manufacturing of unmanned aircraft systems for surveillance and security missions (ISTAR).

TRIEDRO (grupo Revenga)
Ronda de Valdecarrizo. 41. 28760 Tres Cantos (Madrid)
Tel: +34 91 8042075 • Fax: +34 91 8041955
E-mail: info@triedroes • www.triedroes
Contact: Rafael Orbe, CEO

>Defence/Security Activity Lines:
TRIEDRO is specialized in High Sec Solutions and became one of Spain’s leading developers of thermography-applications destined to civilian and military applications.

>Subsidiaries and facilities abroad:
Offices in Spain, USA, Brazil, Poland, Turkey, Saudi Arabia, Qatar and projects deployed in more than 15 countries worldwide.

TRIEDRO belongs to the Revenga Group (www.gruporevenga.com). Specialized in High-Sec Solutions and Value Added Services based on Thermography. Own Unmanned Aerial Systems (UAS) providing surveillance and IR recognition.

TRIEDRO Solutions:
- Thermography Systems: IRISVIEW (perimeter security), IRISTUBE (safety in tunnels), IRISTRUCK (safety in highways), IRISTHERMAL (safety in datacenters), etc...
- Unmanned Aerial Systems (UAS)
- Electronic Security: Access Control, Video Surveillance, OCR, Automatic Licence Plate Recognition (ALPR), Biometrics, ...
- Special Equipment: Remote Automatic X Ray and Gamma Ray Scanning Systems.
TECNASA is the first Spanish manufacturer and supplier for the 5th Generation combat aircraft Joint Strike Fighter F-35 (JSF). In collaboration with Martin-Baker Aircraft, leading manufacturer of ejection seats for combat aircrafts, we have developed a new firing handle specifically designed to comply with the requirements of this aircraft. Moreover, TECNASA manufactures the o-rings used in the gas circuits that guarantee a correct ignition and subsequent ejection of the seat.

TECNASA is certified with the ISO9001:2008 and UNE EN9100:2010 specific for the aeronautical industry. We have our own laboratory equipped with all necessary instruments to carry out any normalised tests referred to rubber products. Our artificial vision equipments allow us to review all our products dimensionally and superficially, guaranteeing an excellent quality assurance.

TECNASA has always developed an innovative culture based on the continuous improvement of our processes and technologies in an effort to grow and reinforce our position in the industry. With this philosophy in mind, we have developed the skills to manipulate very special rubber compounds such as perfluoroelastomers (FFKM). FFKMs enjoy an extreme chemical and thermal resistance, which allows them to work in hostile environments for such long time it was before unthinkable.

COECA, a sister company of our business holding GRUPO 4BIMA15, manufactures track pads for the track systems of the LEOPARD 2E and PIZARRO armoured vehicles. We have the required know-how to manufacture any kind of rubber and rubber-metal products such as tyres, fasteners, forestands, etc.

COECA also has experience in the Aerospace industry as it actively participated in the development of the Capricornio project for the production of the first space launcher manufactured in Spain.
TECNOBIT is a Spanish multinational Advanced Engineering specializing in electronics for defence. Develops designs, manufactures and maintains products avionics, optronic, command, control and communications, simulation systems and training and information systems.

TECNOBIT increasingly strengthens its position in the national and international market, consolidating its leadership in various technological areas, among which stands Avionics area, with the design, development, manufacture and production of equipment and systems for various aircraft types, with critical and non-critical units of flight and special solutions to meet the needs of systems integration onboard. Between Avionics equipment supplies, include those of aircraft from EADS-CASA, as well as participation in international consortia such as the Eurofighter program (EF-2000) or the Program of the Airbus A400M. It performed the production of structures for onboard equipment also, as if the manufacture of consoles of computers to helicopters of the Navy North American MH-60 R, having achieved during the process the degree of “Star Supplier”, this being the highest qualification for suppliers of Lockheed Martin.

Another area to emphasize is the Command and Control Systems, whit systems that allow the exchange of information securely to ensure confidentiality of communications. In the Tactical Communications Area, highlight the LINPRO, a Multi Link Processor; supplied to different Armies. In fact, the data link LINPRO is the only tactical communications processor able to work interchangeably and concurrently on L11, L16, L22, and JRE.

In the encrypted communications, TECNOBIT develops hardware modules for the generation, storage and distribution of key, certified by the Cryptologic National Center (CCN) of the Ministry of Defence Spanish. Also highlight the systems with SCIP encryption based on links Iridium for the ISAF deployed in Afghanistan through NC3A (Agency NATO C3 systems), or the TMSDEF, a secure communication system using the SCIP protocol which is certified and approved for NATO Restricted.
>**Defence/Security Activity Lines:** Complete portfolio of products and systems to meet the requirements of air, land and naval to meet the interoperability demand and the C4ISTAR capabilities.

>**Subsidiaries and facilities abroad:** Thales is located in 56 countries; furthermore, Thales Spain has 10 offices in Spain and its own branch company in Turkey.

Thales provides the different Armed Forces with a comprehensive range of fully integrated ground, sea and air equipment, systems and services to meet the new demand for interoperability and C4ISTAR capabilities (Command and control, communications, IT, intelligence, surveillance, identification of objectives and recognition).

Thales España collaborates with the Armed Forces, providing technologies for communications, surveillance radars, minehunting sonars and terrestrial systems, among others.

It has also provided support for the maintenance of the systems of the most modern aircraft and helicopters.

In the sphere of security, Thales España is an expert in the design and delivery of critical systems for the security and protection of persons, places and sensitive information.

Our technologies comprise secure communication systems, encryption technology, command and control of systems and CBRN solutions (chemical, biological, radiological and nuclear).

As a leader in security for critical infrastructures, Thales offers innovative security solutions to protect key elements such as identity management, cryptography, physical and logical security.

During 2014, Thales España finished the acquisition process of its investee company Amper Programas, creating Thales Programas de Electrónica y Comunicaciones, Spanish company leader in Command and Control and Tactical Communications Systems - CIS (Information and Communication System) for Defence, with a strong export capacity, thanks to a Thales’ powerful international sales network. With this integration, Spain will be in an excellent position on the market in Command, Control and Communication Military and Avionics Systems, key systems for the Armed Forces.

**Key Data**

- European leader in defence electronics in all types of sensors and combat systems and secure communications.
- Experience in Spain in Communications, Optronics, Intelligence, Sensors and Simulation.
- Exports of 55%, mainly Command and Control technology.
- Industrial Alliance with SAES.
- Recognised experience as a systems integrator.
- National and international projects in command and control systems for transport, urban security, sensible sites and critical infrastructures.
URO. Vehículos Especiales, S.A. (UROVESVA)

Virtual3dGun

>Defence/Security Activity Lines: Development of tactical simulators in virtual environments to complement the training of soldiers, police and emergency services.

Virtual3dGun is an Infantry Tactical Simulator used for the training of dismounted soldiers.

- The primary purpose is to make more realistic the training of the soldier inside a virtual environment, while practicing:
  - Combat tactics.
  - Individual and team work.
- It consists of a set of displays and sensors which allows a deeper immersion, replacing traditional peripherals.
- Complements the actual real training and mission set up.
- Allow to work on the current training rooms or use in unpremeditated spaces for 24 hours a day.

UROVESVA is a fully private owned Spanish company, devoted to design, manufacturing and marketing of land platforms for military, law enforcement and industrial applications. Its product range covers a wide range of logistical and tactical light vehicles from 1 Ton of payload, up to All-Terrain trucks with 12 Ton of capacity.
Directory of companies by activity sector

2015

GROUND INDUSTRY

AIRCRAFT INDUSTRY

SPACE INDUSTRY

SHIPBUILDING INDUSTRY

GENERAL SUPPORT AND SERVICES INDUSTRY

OTHER
## GROUND INDUSTRY

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One mission, one team, one direction.
WEAPON SYSTEMS, AMMUNITION AND ENERGETIC MATERIALS

TECHNOLOGICAL SYSTEMS AND APPLICATIONS

MAINTENANCE OF ARMoured VEHICLES AND INTEGRATED LOGISTIC SUPPORT

MAINTENANCE OF AERONAUTICAL SYSTEMS

DEMILITARIZATION AND EOD SERVICES

INNOVATION

EXPERIENCE

TECHNOLOGY

SOLUTIONS

CAPABILITIES

KNOWLEDGE