



This consists of the use of **unmanned aerial vehicles** (UAV) both automatic and remotely flown to increase **security** and reduce manual **labour intensity**. The drones for civilian use have applications in multiple sectors such as **industry** (industrial facilities, power lines, wind turbines), **transport** (surveillance and inspections, rail, roads, rivers), **construction** (structural inspections), **precision agriculture**; the field of **civil protection** (security and civil emergencies); and **audiovisual** (professional photography and video).

ORIGIN OF THE INVESTMENT OPPORTUNITY



The drones emerged from the military field and have become popular for civil uses due to **their low commercialisation price**. This is because the sensors in unmanned aircraft are the same as those used by smartphones. The strong momentum of the smartphone industry has aided the miniaturisation and the economies of scale in manufacturing GPS sensors, accelerometers, gyroscopes and altimeters. The agricultural, mapping and distribution sectors can benefit from the **development of technical applications** with a business focus to perform tasks with greater **efficiency, enhanced safety and less manual labour**. As an example, performing topographical work in large public and private works; in agriculture, agricultural spraying; and in logistics, delivery of small packages.

Royal Decree-Law 8/2014, date 4 July, is the current regulatory framework for the operation of remotely piloted aircraft and less than 150 kg weight. It is a very restrictive framework currently allows flight in non-urban areas and where there are no crowds of people. Currently, the approval of a new decree is in progress. This decree will regulate the civil use of RPAS.

LOCATION OF THE INVESTMENT OPPORTUNITY IN THE SECTOR VALUE CHAIN



The greatest potential lies in **commercialisation and sales**. There is currently a bottleneck between supply and real demand. The potential demand is satisfied due to the limitation of uses established by the legislation. An **increase in the number of uses** foreseen in the short term is expected to substantially increase the demand for drones.

DIFFERENTIATING FACTORS OF THE INVESTMENT OPPORTUNITY

CONSUMER/USER	COMPANY/INNOVATION	SOCIETY
<ul style="list-style-type: none"> ● ● ● Innovation ● ● ● Price ● ● ○ Quality 	<ul style="list-style-type: none"> ● ● ● Operations ● ○ ○ Supplies ● ● ● New business lines 	<ul style="list-style-type: none"> ● ○ ○ Environment ● ○ ○ Well-being ● ● ● Safety
<ul style="list-style-type: none"> • There are two types of consumers: business and individuals. • Among the business consumers infrastructure maintenance companies that require sophisticated drones to fly over and supervise the state of infrastructure stand out. • Individual consumers have recreational uses, such as recording sports from the air or the observation of natural landscapes. 	<ul style="list-style-type: none"> • The multitude of commercial applications that drone flights have in multiple sectors requires the manufacturing of specific aircraft. The opening of differentiated manufacturing lines will allow for the development and adaptation of components to the needs of the final customer. • In the links of the auxiliary supply chain of suppliers with the design capacity, the research work and continuous improvement will fall on them. 	<ul style="list-style-type: none"> • Infrastructure observation applications directly affect the area of worker safety. • Workers who have drones as work tools can reduce the hazards to which they are routinely exposed and which threaten their personal safety. • The drones emit zero emissions because they run on batteries and are therefore environmentally friendly.

INVESTMENT OPPORTUNITY LIFE CYCLE



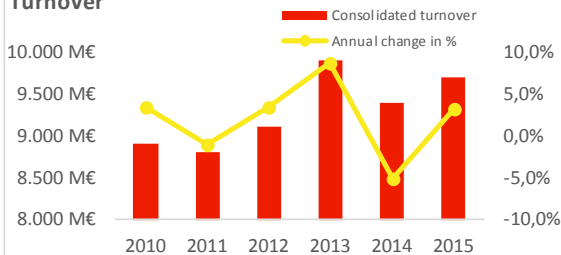
The unmanned aircraft industry is **emerging** and, after having successfully gone through the stages of technological development and introduction into the market, a **growth phase** with a sharp increase in demand is foreseen, both from individuals and private companies.

Growth will be driven, firstly, by the deregulation of the sector and, secondly, by the gradual improvement of its components and the technologies becoming cheaper due to the mass production of its components to meet demand.



CHARACTERISTICS OF THE AEROSPACE SECTOR (1)

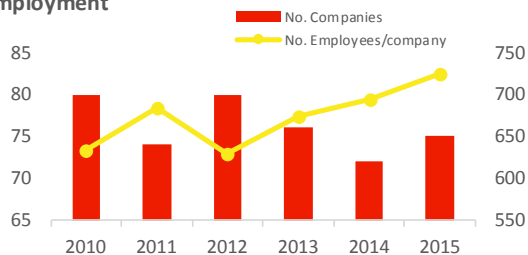
Turnover



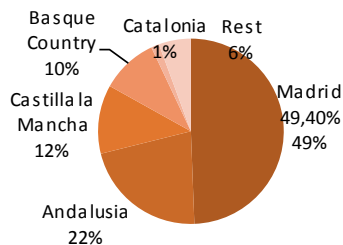
Exports



Employment



Territorial distribution of turnover (2015)



SUPPLY

TOP 5 COMPETITORS IN SPAIN

#	Company	Net sales	Last available data
1	UAV Navigation	€1.39 M	2015
2	Advanced Radar Technologies	€ 776,644	2015
3	Atyges	€ 750,000	2015
4	HEMAV	€ 588,189	2015
5	Embention	€ 545,155	2015

DEMAND

GROWTH

- Market research by the Teal Group estimates that UAV spending will double in the next decade, reaching 91 billion dollars worldwide.
- According to estimates by the European Commission, in the next 20 years, it will have generated **100,000 jobs** and will generate about **10 billion euros** of profit per year.
- From within the sector, it is predicted that the European market in general, and Spain in particular, will experience strong growth in the **coming months**.

SUCCESS STORIES



UAV Navigation is a company created in 2004. The company sells solutions for control of flights to a series of RPAS producers, such as high-performance tactical unmanned planes, targets, mini UAVs, helicopters and quacopter aerial vehicles. Its star product is Autopilot AP04, that allows the autonomous flight of the vehicle from its take-off to its landing. This autopilots are characterized by their safety and robustness. Through its trademark Alpha Unmanned Systems, the group has created their own vehicles, such as the Sniper helicopters.



Advanced Radar Technologies is a Spanish company whose business model is based on more than 20 years of innovation in radar, microwave technology and systems engineering focused in the Defense and Security Market. ART team has more than 15 years of experience in the development and deployment of SIVE, the integrated external surveillance Spanish system and in various systems in East Europe.

One of the systems of the company is ART Drone Sentinel, an integrated surveillance system, composed by a little UAV.



ATyges is an engineering company that designs and manufactures complete systems with RPAS. Aerial robots that incorporate advanced technology to stabilize and fly by themselves by GPS, embarking sensors for a multitude of uses: surveying, aerial video, precision farming, security surveillance, SAR, etc. The company has the systems Topodron, Thermodron and Visiodron, acquired by public institutions and research entities in Spain, Peru, Bolivia and Colombia and by private customers in more than ten countries.



POSITIVE FACTORS FOR INVESTING IN SPAIN

Favourable factors in Spain for the development of the opportunity

Spanish aviation industry has weight at European level	The Spanish aeronautical industry is ranked 5th in Europe in terms of turnover and has a high investment in R+D+i at 10.8% of turnover in 2013, 8 times the average for R+D in Spain in 2013. Aerospace is, alongside the biotechnology and information and communication technology (ICT) sectors, the sector with the highest percentage of resources allocated to innovation in Spain. At company level, Airbus defence and space is the 2nd largest manufacturer of military transport aeroplanes and the largest for helicopters in the world. (2)
Potential domestic customer sectors	Among potential customers for the drone industry the agricultural, industrial and energy, and construction sectors stand out. These sectors are significant in the Spanish economy. In particular, the construction sector accounts for 5.6% of GDP and agriculture 2.5% .
Tax breaks to boost R+D+i	There are advantageous tax arrangements aimed at making innovative projects profitable in Spain. The research and development of technological innovation are subject to a system of tax breaks that can reach 42% of annual business spending. The tax system is compatible with domestic and European subsidies such as those from the Clean Sky 2 programme, part of Horizon 2020. (3)
Social factors and habits	The incorporation of working tools such drones represent an advantage for workers, such as reduced the hazardous situations to which they are routinely exposed and which threatening their personal safety when carrying out the observation of electrical infrastructure or cornices of buildings.

Favourable factors for the sector in Spain

Macroeconomic situation	The Added Value of the aerospace sector in 2014 was 1.87 billion euros , representing 1.47% of the manufacturing sector. Sector exports totaled 4,67 billion euros , representing 2.18 % of the exports of the industrial sector. (4)
Labour market	The average productivity per employee in the aerospace sector is 93,600 euros per year. Their average individual remuneration is 61,500 euros per year . The Unit Labour Cost accounts for 65.7% of the ratio between the remuneration per employee and the individual productivity (productivity defined as value added per employee). (4)

Remuneration per employee (thousands of €)



Graph created using data from Sectoral Presentation: construction and aerospace sector. April 2015. Ministry of Industry, Energy and Tourism

Incentives	Spain has the Strategic Plan for the aviation sector 2008-2016 , which includes a framework for aid under the collective name of the National Aeronautics Plan . Among the aid programs envisaged, the Strategic Technology, Research, Infrastructure and Programmes stand out, as well as the Technology Development Plan for the Auxiliary Industry. Furthermore, there are other cross-sectional programmes promoted by the CDTI such as the <i>línea Directa de Innovación</i> , the <i>línea de Innovación Global</i> , <i>Invierte</i> and <i>FEDER (ERDF) Ininterconecta</i> .
I+D+i	There are 33 innovative companies in the automotive and aerospace sector and the percentage of innovative companies is 64.7%, spending a total of 511 million euros on innovation. (5)
Suppliers, Supplies, Raw materials	Spain has a complete manufacturing chain including aircraft and systems certification. TEDAE also states that the Spanish supply chain is structured to be able to expand its capacity to supply internationally , highlighting first level and second level suppliers.
Geographic location	Spain is within reach of three main regions : the European region , the Mediterranean region and the Atlantic region . Spain is considered to be the gateway between North Africa and Europe , and a key link to Latin America , not only because of its geographical location but also because of its strong historical and cultural ties with the region. In Spain the Canary Islands play a key role with regards to maritime traffic with West Africa .
Technological and research infrastructure	Spain has R+D+i centres available to the industry. In particular the horizontal stabilizers centres of excellence responsible for the worldwide fame that Spain has in their manufacturer. In terms of development of new materials, Spain is 3rd on a European level in terms of turnover and has an Airbus Advanced Composites Centre , one of three centres of excellence across the world for carbon fibre, and the FIDAMC (Foundation for the Research, Development and Application of composite materials).
Transport infrastructure and logistics networks	There are 168 airlines operating in Spain in its 47 airports; its high-speed rail network is the 2nd best in the world and the best in Europe; it is ranked 1st in the EU for its motorway network ; and it has excellent sea connections to its 46 ports distributed along the Atlantic and Mediterranean coasts. (6)

Spanish airport network.



Graph created using airport locations listed on the AENA website (2015).

Sources: (2) Brand Spain, "Spanish Companies in the World" (2014). (3) Alma Consulting Group. (4) MINETUR, "Sectoral presentation: aerospace and construction industry" (2015). (5) Innovation in companies Survey 2013 (NACE 30) (6) Brand Spain, "Foreign investment in Spain and its socio-economic contribution" (2014)