Ajuntament de Barcelona

Barcelonactiva

The most In-Demand jobs in the Aerospace Sector

Report 2014

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1. Introduction to the Sector

The aerospace industry includes all those activities related to the aviation, space and satellite applications, which can be classified into four areas:

- **Aeronautical Engineering**: activities and professions related to the different engineering such as the materials and aircraft structure estimators; which refers to the aeronautical structural design and calculation.
- **Research and innovation**: includes all those tasks related to knowledge, research and development applied to the aviation sector.
- **The aerospace production**: this area consists of all the activities related to operations and prototyping aerospace craft and all services and products related to the sector, such as modeling, technical and service offices, storage, etc.
- **Technology and operations**: mainly encompasses all the activities related to aerospace electronics, telecommunications, software, etc.

Due to the rapid modernization of services associated with the airline industry and the development of satellites, it is a very dynamic sector. Another feature of the aerospace industry is its growing presence in our lives and its strategic importance in terms of usefulness to society. Aerospace insdustry faces many technical challenges, related to improving the efficiency and the respect for the environment during the production processes. Another major technological challenge is the development of satellites and micro-satellites applied, for example, to meteorological monitoring services or traffic control.

2. Current Environment

Global Trends: In Europe, it is remarkable the city of Toulouse, known as the European capital of aeronautics. It has a high level of R&D and several offices of companies related to the sector. This fact results in a high demand for professionals. In 2012, Toulouse recorded a 3.8% growth in activity, an increase in the employment rate of 2.8% and had 535 Spanish companies generating employment. According to the annual "Deloitte 2014 Global Aerospace & Defense Outlook",for the last 30 years, space aviation has increased by 298%. This increase has taken place due to Asia and the Middle East. Regarding defense aviation, forecasts show a decline of 2.5% during 2014.

Spain: the economic crisis has led to a reduction of about 4% in R & D, which had previously experience a decrease in research. In this sense, and facing a lack of funding sources, the Spanish aerospace industry has had to adapt to the reality conditioned by economic difficulties, seeking to exploit the fact that production costs in the industry are 20% lower than in other countries of Europe. The growth of the Spanish aerospace industry remains stagnant around 2%, focusing especially on the field of satellites. However, it is noteworthy that there has been a commitment to the development of this sector from the Ministry of Industry, given its outreach and its ability to develop technological innovations, a fact that was reflected in the recent general State budgets for 2014.

Catalonia: the sector is moving to another direction and shows a greater degree of consolidation. According to recent data published, Catalonia was the autonomous community where aerospace companies had larger projects. In line with these improvements, the European Space Agency has chosen Barcelona and its metropolitan area to create the first business incubation center in Spain. This business incubation center is a multidisciplinary center where it is possible to create and develop applications, services and products for various uses and will be linked to eight centers in England, Netherlands, Germany, Belgium and France. Based on the data report published by the UPC, the aerospace industry has experienced a high growth throughout the Spanish state, 13% a year according to information published in the last sector report of Barcelona Activa.

Aerospace indicators	Contribution to the Spanish GDP (1)	Total turnover in Spain (2)	Sales to R&D (3)
	0,9% (2012)	*11.700 millions of euros (2012)*	*10% (2012)*

(1) El Sector Aeroespacial a Espanya. A Fondo. Revista del Colegio Oficial de Ingenieros Aeronáuticos de España. (2012)
(2) El Sector Aeroespacial a Espanya. A Fondo. Revista del Colegio Oficial de Ingenieros Aeronáuticos de España. (2012)
(3) El Sector Aeroespacial a Espanya. A Fondo. Revista del Colegio Oficial de Ingenieros Aeronáuticos de España. (2012)

3. Key Sectorial Trends

Sectorial Trends		
	**Innovation**	The aerospace industry needs to innovate in order to defend their current position and to show to other economical sector their high degree of commitment.. Therefore, it is possible to say that innovation is key for the competitiveness of companies in the sector and its future. In this sense, new projects are being developed related to the search for new techniques and also to a virtual system to test the quality of aeronautical materials with remote tools. Innovation derives in another trend that is the creation of partnerships between companies in the sector with the aim of expanding the range of innovative opportunities due to its high cost and the priority to face together the new challenges of the aviation industry.
	**New applications and satellites services**	The aerospace industry, in line with other economic sectors, is undertaking a major transformation in order to develop new applications and new services. Therefore, sector priorities are shifting towards services for telecommunications satellites, and to respond to public demands and benefit society. For example, one of the initiatives that are being carried out is related to GPS programs in order to the quality of life of individuals, meteorology, civil protection, etc.
	**Advanced technology systems**	Due to the high potential of the sector, new technologies and advanced technological systems are being applied to different areas of the industry. It is necessary that the main axis of the sector focuses on acquiring a good level of technologies to develop successfully, with efficient and competitive outcomes. For example, the Spanish state faces the challenge of creating aircraft capable of flying without human presence addressed mainly to the military. Finally, for the development of these advanced technology systems, it must be taken into account the respect for the environment and the objective of creating a sustainable space; considering the parameters of environmental safety in all phases of production. In this respect, the EU has created the "Clean Sky" initiative aimed at developing technologies to create more sustainable aircraft.
	**Public funding and elevated costs**	Governments are establishing synergies between them and with private companies in order to implement aeronautical projects which may improve the sector position and are expected to have results in about less than a year. These synergies between public authorities and companies or research can be generalized to other European countries or China. In Spain, despite the uncertain economic situation, the ability to cover the development chain can encourage synergies between the Spanish state and can lead to less fragmentation of the sector's activities. Therefore, despite the costs faced to maintain the industry at a high level of demand, innovation and research are significant. This fact seems to suggest that both the government and private companies are doing everything possible in order to improve the sector.
	**Internationalization**	As a result of the synergies discussed above, the industry is increasingly characterized by an integrated international network of aerospace companies and research centers, which helps to concentrate efforts in decreasing the costs of projects thereby causing a greater investment in this sector. Thus, in the case of Europe, more and more countries are seeking to establish cooperative arrangements due to the difficulties that are facing their aerospace sector projects.

4. Employment in the Aerospace Sector

In terms of occupation, some experts have concluded that the development of new models is necessary to create future employment opportunities. The keys for this development are: talent, investment, competition and people. According to recently published reports, considering all the existing engineering, aerospace industry is the one wit less unemployment. The sector is currently facing a situation in which the number of graduates per year is insufficient to cover all the positions required by companies, so professionals with education in aerospace industry will still be demanded in the future.

Analysis of employment in the Aerospace Sector	Current situation	Forecast growth
	↑	↑

↑ Recovery / Growth; ➲ Maintenance; ↓ Decrease

4.1. The most required highly-qualified jobs

	Job Position	Description	Requirements valued (Education, experience and skills)	Additional considerations
1	Aircraft structural engineer	This professional is responsible for the design and calculation of aeronautical structures and components capable of withstanding the stresses to which they are subjected in a safe condition to meet project requirements (generation economy ladder cost manufacturing and maintenance).	• Education: Technical or Industrial Engineering and, for certain positions, knowledge of CATIA V.5 tool. Programming skills are also useful. • Experience: Previous experience in similar position and knowledge of certain materials increase candidate's value.	• The most common education refers to a university degree in engineering or other technical, scientific or technological profiles. • It is imperative that all the professionals have an advanced level of English, and in some cases it is also necessary to have knowledge of a second foreign language. • In terms of experience, it is necessary that professionals might have developed tasks in similar positions and even better if this positions were inside the aerospace industry. • The following skills are required: team work and cooperation and concern for order and quality.
2	R&D Engineer	Engineer R&D (Research, Development and Innovation) is responsible for research, plan and develop possible improvements to the products developed by the company, both in reference to the core technology of the product and the manufacturing process.	• Education: Although it is essential to have an university degree, technical preparation is often provided by the contracting company, depending on the type of specialization. • Competencies: Orientation towards achievement and analytical thought.	
3	Operations director	The Operations Manager is responsible for managing all business activities in procurement, quality control and production planning. This professional acts in the environment for small and medium enterprises in aircraft construction.	• Education: Degree in industrial engineering technical or higher, and having a master's degree in quality issues. In line with other sectors, training in logistics is recommended. • Experience: It is advisable to have previous experience in the use of management software.	

	Job Position	Description	Requirements valued (Education, experience and skills)	Additional considerations
4	Quality control engineer	This professional is responsible for the quality system of the company. Provides leadership in the development stages, implementation, execution and maintenance of the quality plan, with special attention to incorporating the production process of innovation in R & D.	• Education: Technical and Aeronautical Engineering, as additional education, courses or programs on certain standards and regulations. • Experience: It is recommended to have previous experience in construction or similar positions.	• The most common education refers to a university degree in engineering or other technical, scientific or technological profiles. • It is imperative that all the professionals have an advanced level of English, and in some cases it is also necessary to have knowledge of a second foreign language. • In terms of experience, it is necessary that professionals might have developed tasks in similar positions and even better if this positions were inside the aerospace industry. • The following skills are required: team work and cooperation and concern for order and quality.
5	Avionics software engineer	The main features of his work are to use real-time operating systems and subject to the requirements of the rules of aviation on software development. The real-time operating systems are those that are designed to support software applications that process information immediately and provide a quick response to the user's system.	• Education: Computer or telecommunications engineering. Normally, specific courses in avionics are performed by the company after hiring the candidate. • Experience: Previous experience in programming is highly valued.	
6	Telecommunications software project manager	This directs professional advice projects and development of telecommunications software; is responsible for the management of human resources allocated to the project and the technical quality of the final product. Generally, these projects include the design of hardware components where the software system will operate.	• Education: Specific university degree in telecommunications engineering or computer science. • Competencies: strategic orientation, planning and organisation.	

4.2. The most required less-qualified jobs

	Job Position	Description	Requirements valued (Education, experience and skills)	Additional considerations
1	CAM Programme - Milling machines	The CAM (computer aided manufacturing) programmer working on prototyping phase, preparing and developing the programs necessary to operate the mills, which are machines that manufacture the prototype and shape.	• Education: Professional training in information technology, manufacturing, mechanical and maintenance. • Experience: It is advisable to have previous experience in programming. • Competencies: learning and use of knowledge.	• The training required refers to professional training with specialization in electronics, computers, etc. • Previous experience in similar positions and prior learning are essential for less-qualified positions. • The following skills are required: analytical and conceptual thought.
2	Space electronics quality technician	The technical quality control of space electronics controls the quality of electronic communications equipment that incorporate space satellites.	• Education: Professional training in electricity and electronics. • Experience: At least one year in similar positions. • Competencies: concern for order and qualityd.	

5. Conclusions and Future prospects

Top technology and innovation

- As a sign of its commitment to technological development and innovation, Barcelona's city council has signed an agreement to create a Centre for Technology and Applications for micro satellites (CENSAT) in collaboration with several universities addressed to design technologies and exploit scientific and commercial applications for micro satellites.
- The industry is focusing their efforts on improving the technology of aeronautical products and services due to its increasing impacts on society and other economic sectors. Closely related to this fact, the quality of materials and processes is also improving, in order to ensure greater sustainability.

The professionals in the Aerospace Sector

- There is a significant demand for highly qualified professionals, with high level of education but also with relevant previous experience. Moreover, the demand of professionals with knowledge of business management is becoming more frequent. Those profiles with are strongly required are those related with research and development of both applications and processes. It should be also highlighted, that professionals prepared to take part positively and proactively in research groups.
- Although aerospace usually requires highly qualified professionals, less-qualified profiles may also find employment opportunities. Highly qualified profiles require an extensive training in scientific and technological knowledge. Due to the nature of this industry, innovative and strongly motivated profiles are sought. Regarding less qualified profiles, their demand is related to mechanical, maintenance, production or more automated tasks.
- The existence of research centers, research and development investments, and finally the prestige of the educational centers in this sector, ensure a level of human capital and technology fully adapted to the needs of the sector, both at global and national scale.

Alerts

- Although companies of this sector are moving towards creating synergies and promoting new joint aerospace projects and ventures, their reliance on funding from institutions and public administrations can be seen as a weakness, specially in the current environment of public spending cuts.
- Some aerospace companies located in Madrid required a high amount of qualified professionals, a fact which may lead, in some cases, to a brain-drain of Catalan highly qualified professionals, negatively impacting on the consolidation of the sector in Catalonia.
- Due to the broad scope of projects developed in the aerospace sector, the fragmentation of the production network can become an obstacle the appropriate coordination mechanisms are not established.

Strengths

- The Spanish State has a good position in areas such as telecommunications satellites and weather observation. This leading position has favored Spanish participation in several European projects, improving the positioning of the sector and increasing foreign investment.
- According to the latest published news in July 2014, the industry is characterized by quality and innovative employment that represents about 40,000 jobs. Therefore, it seems that the aerospace industry has some stability in terms of occupation.

In the aerospace sector, there is a clear trend towards the demand of professionals with a high level of education and senior scientific knowledge.

Sources: Últimos datos disponibles: Interempresas, Barcelona Loves Entrepreneurs, Universitat Politècnica de Catalunya. Press: Cinco Días, El País, La Razón, ABC.

Articles and consulted reports:

- ✓ Redacción. (2014). España invertirá 3714 millones en el sector aeronáutico hasta 2014. *La Razón.*
- ✓ Arxiu (2014). Xavier Trias: "Barcelona posa la tecnologia punta i espacial al servei de les persones, del seu benestar i qualitat de vida". *Servei de Premsa – Ajuntament de Barcelona.*
- ✓ Gómez, M.A. (2013). España, punta de lanza de la tecnología aeroespacial. *ABC.*
- ✓ Ramos, César (2012). Aeronàutica: un sector que enforteix l'economia. *Interempresas.*
- ✓ Redacción. (2012). Innovación para un sector aeronáutico más competitivo. *Diario de Sevilla.*

6. Sectorial complementary Webography

- ✓ Actualidad aeroespacial
http://www.actualidadaeroespacial.com/
- ✓ Asociación Cluster de Aeronáutica y Espacio del País Vasco – HEGAN
http://www.hegan.com/
- ✓ Instituto Nacional de Técnica Aeroespacial
http://www.inta.es/
- ✓ Foro Aeronáutico
http://www.foroaeronautico.org/
- ✓ Plataforma Aeroespacial
http://www.plataforma-aeroespacial.org/

Barcelona Treball (The job seeking website of Barcelona)

Do you want more information of the main occupations of the Industry? You can know in detail the tasks required for each professional, the training needed to work, the key competencies and associated jobs posted on the major job seeking websites.

www.bcn.cat/treball > Economic Industries
> Job profiles search engine

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