

The Aerospace and Defence Industries Association of Europe



2018
Facts & Figures



Words from the President

Supporting over 860,000 jobs, the Aeronautics, Space, Defence and Security industries are playing a crucial role in Europe. They are powerful indicators of the skills, leadership, innovation and cross-border cooperation that make these important sectors competitive in highly sophisticated markets worldwide.

The 2018 Facts and Figures set out the strength of our sectors in making a substantial contribution to the European economy, creating highly-skilled jobs and pioneering cutting-edge technologies in a context marked by stronger competition, economic uncertainties and complex security challenges. This positive result is driven by significant efforts in research and development activities helping Europe to compete globally and to improve the daily lives of millions of people in the European Union (EU) and around the world with ever more innovative and efficient technologies.

In the civil sector, the industry plays a key role in safeguarding our future and reducing the environmental impact of civil aviation, in particular in relation to noise and emissions. Each new generation of aircraft is up to 25% more fuel efficient than the one it replaces. EU research programmes such as Clean Sky and SESAR play a key role in this respect. Investing in research and innovation is investing in Europe's future: the industry is determined to keep up efforts and encourage the EU to do the same.



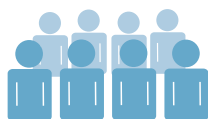
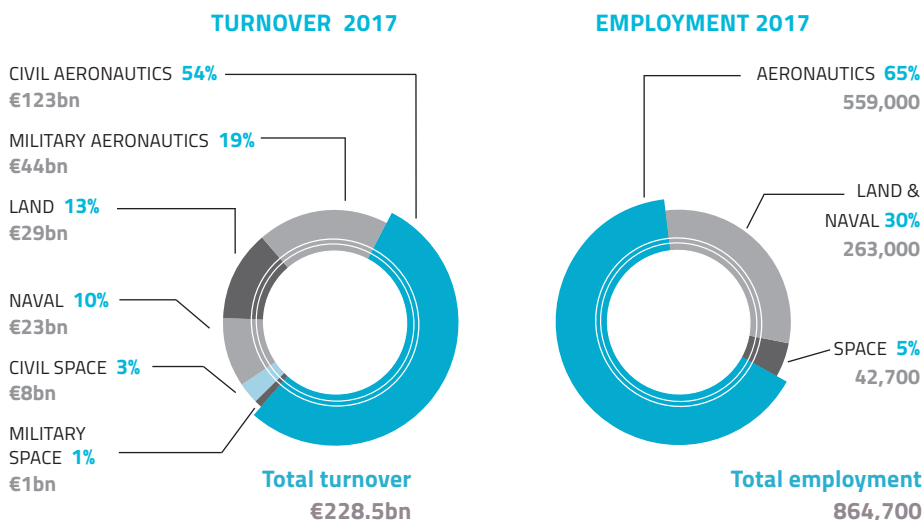
ASD President, Eric Trappier
Chairman & CEO of Dassault Aviation

At the same time, security has become one of the biggest concerns of European citizens. Geopolitical uncertainties and new threats make it more important than ever for Europe to assume greater responsibility for its own security. Recent EU defence initiatives such as the European Defence Fund and the Permanent Structured Cooperation are important steps towards a European Defence Union. ASD calls on all Member States and EU institutions to implement these initiatives as a matter of urgency. Only with sufficient support and political will at national and European level, Europe will be able to protect and defend its citizens in the future.

**ASD President
Eric Trappier**

Major Trends in the European Aerospace and Defence Industry

In 2017, the European aerospace and defence industry confirmed its position as global leader in the market despite continued economic and political uncertainties.



865,000 highly-skilled employees in Europe

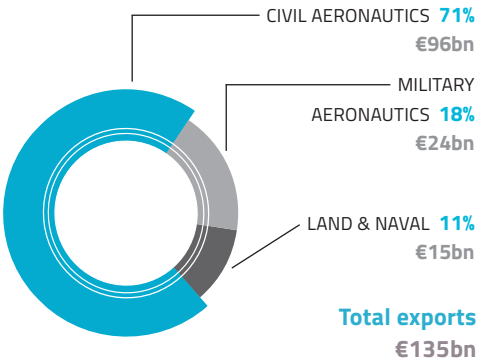
The growth trend of recent years has been expanded further: sales growth for the industry as a whole amounted to almost 4%, with total revenue reaching €228.5bn (compared to €220.2bn in 2016). The total number of employees also increased to 864,700 workers (compared to 843,400 in 2016) marking

a new record for the companies represented by ASD.

The European aerospace and defence sectors are amongst top leaders on the global markets which is crucial for jobs and growth within the EU. In 2017, the sector reinforced its leading role in ex-

Leading role on the global markets which creates jobs and growth within the EU

EXPORTS 2017



ports with an increase of almost 11%, amounting to €135bn (compared to €123bn in 2016). In this context, our industry generated a positive net trade balance to the European economy.

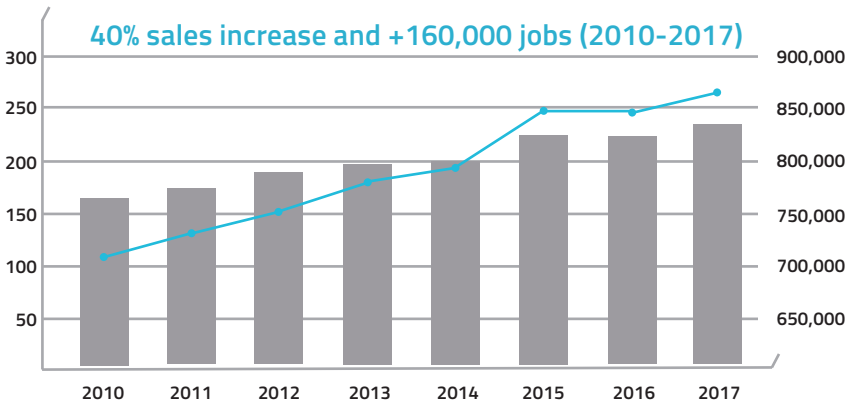
Overall, the sector delivered strong economic performances with increased deliveries, export orders and backlog in most segments, in a global context marked by the growth of civil and military demand, as well as a stronger com-

petition, economic uncertainties and complex security challenges.

This is the result of sustained competitiveness driven by significant efforts in R&D and efficiency improvements of industrial processes through digitalisation and cutting-edge technologies. Fostering innovation and technologies is mandatory in order to deliver sustainable and competitive products and services that are sold worldwide.

TURNOVER €bn

EMPLOYMENT



Aeronautics

REVENUE

€
167bn

EXPORTS

€
120bn

JOB



560k
70% civil, 30% military



European Aeronautics Sector

Supporting 560,000 jobs across Europe, the aeronautics sector, covering civil and military domains, is a world leader, generating high-skilled jobs, innovation and sustainable growth in the EU.

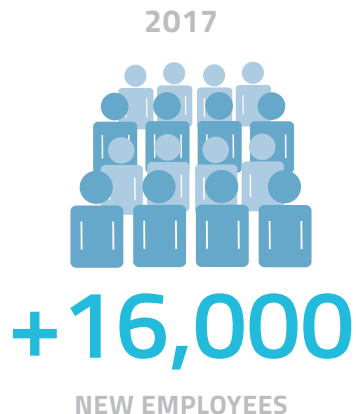
In 2017, the aeronautics sector continued its growth with revenue increasing by 3.3% to €167bn (compared to €162bn last year). This sector remains by far the leading sector in aerospace and defence and accounts for 73% of total industry revenue. These positive results are driven by the dynamism of the commercial sector, which represents 2/3 of the aeronautical revenues and jobs.

The increasing global demand for mobility and the replacement of older aircraft, which use more kerosene, with the latest low-noise, fuel-saving generation of aircraft continue to be the major drivers of growth.

Aeronautics plays a leading role in exports amounting to €120bn, which is 13% higher than the previous year (€106bn exports in 2016). This figure includes 1/3 of intra-EU industrial flows, which shows the high level of cross-border cooperation across the EU. Exports outside Europe correspond to 2/3 of the total amount, including both sales to final customers and supplies to original equipment manufacturers.

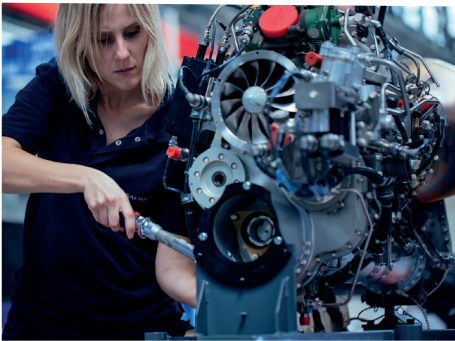
Civil aeronautics exports are significant, at €96bn, representing more than 18%

European aeronautics is a highly competitive sector, delivering value and prosperity to Europe

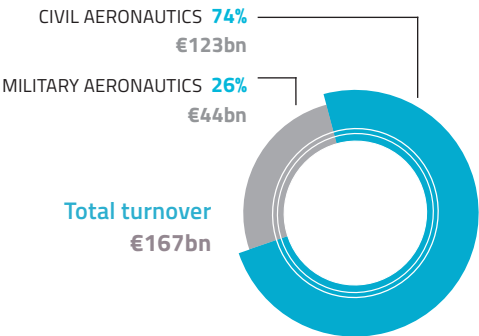


increase compared to the previous year (€81bn exports in 2016). Military aeronautics exports for their part reached €24bn, accounting for 20% of aeronautics exports. In general terms, exports provide an important net trade balance to the European economy.

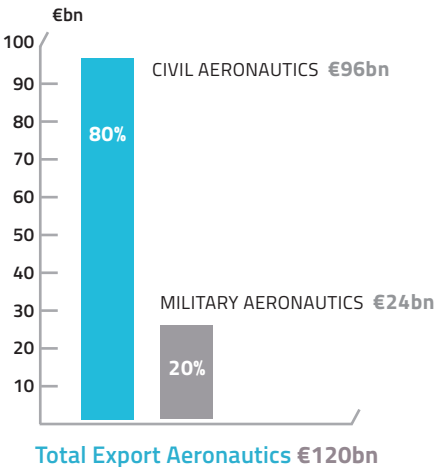
The activities of the aeronautics sector, including large companies as well as a great variety of small and medium-sized enterprises, are spread across Europe and are concentrating a full spectrum of technologies and integrated capabilities. The aeronautics sector includes all certified flying objects, manned and unmanned, along the life-cycle, i.e. the complete range of categories of commercial aircraft, business jets, regional jets, general aviation, combat aircraft and trainers as well as a broad range of transport aircraft and rotor-wings, training and simulation services, Maintenance Repair & Overhaul (MRO) and air traffic management ground systems.



TURNOVER AERONAUTICS 2017



EXPORTS AERONAUTICS 2017



EXPORT
CIVIL AERONAUTICS

+18%
COMPARED TO 2016

EXPORT AERONAUTICS
CIVIL & MILITARY

+13%
COMPARED TO 2016



Defence

REVENUE

€
98bn

EXPORTS

€
39bn

JOB

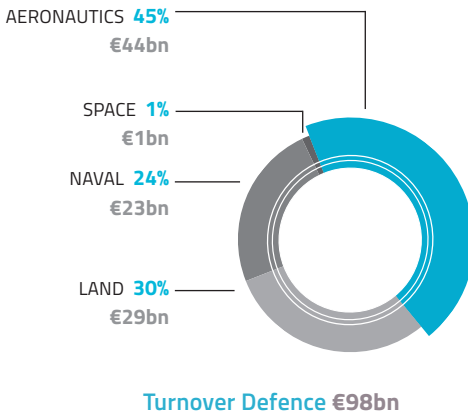
436k



European Defence Sector

Supporting over 430,000 high-skilled jobs in Europe, the defence sector plays a vital role in helping to safeguard our security and contributes to Europe's economic prosperity.

TURNOVER DEFENCE 2017

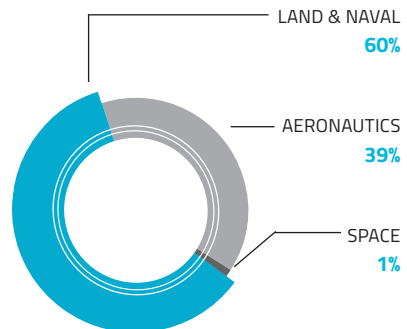


The defence industry supported 436,000 jobs in 2017. Of that total, 263,000, or 60%, were attributable to the area of land and naval systems. The remaining 173,000 jobs, or 40%, were attributable to the aerospace sector.

Military exports reached €39bn in 2017, representing nearly 30% of the total industry exports. €24bn is attributable to military aeronautics and €15bn to the land and naval sector. In the defence sector, exports provide a solid basis and perspective for legacy programs, improvements and developments of aircraft and systems as well as achievements of significant industrial rationalization processes and cost-efficient measures.

Expressing the big differences in national defence spending, the defence industrial and technological base in Europe is concentrated in some Member States. The main system integrators are located in the six so-called "Letter of Intent (LoI) countries" - France, Germany, Italy, Spain, Sweden and the UK; smaller platform builders, sub-suppliers and niche producers can be found across the European Union. Companies established in the LoI countries alone generated revenue of €80bn out of the €98bn total. Similar to 2016, defence companies in Switzerland, Norway and Turkey generated combined revenues of €6.5bn.

EMPLOYMENT DEFENCE 2017



Employment Defence 436,000



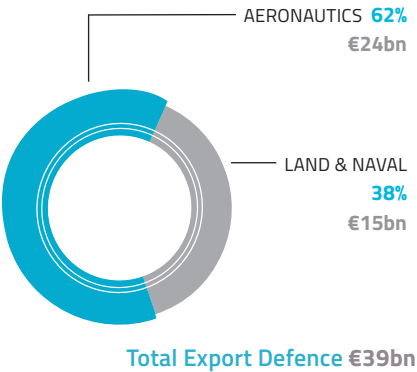
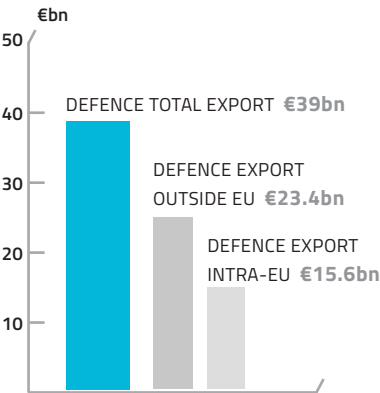
*€39bn exports,
including
40% intra-EU*

Aeronautics

The military aeronautics sector generated a revenue of €44bn in 2017, of which about half is exported. Compared to 2016, output declined by 2% or €1bn. Employment in the military aeronautics sector, estimated at 168,000 jobs, accounts for 39% of total defence employment.

The military aeronautics sector is a strategic sector providing high-tech products for military as well as humanitarian and civil operations (i.e. search and rescue, monitoring of illegal immigration, fight against drug smuggling, piracy, illegal fishery and maritime pollution).

EXPORT DEFENCE 2017



Land and naval

Turnover in the land and naval sector increased by 4.8% in 2017 to €52.4bn (compared to €50bn in 2016). Employment remained stable at roughly 260,000 jobs, accounting for 60% of the total defence employment.

The land sector's portfolio is diverse, spanning from main battle tanks to families of armoured vehicles, artillery, guided ammo, integrated systems and components for the battlefield, protection of soldiers and infrastructures, etc.

The European naval industry produces platforms of all sizes as well as embedded systems such as electronics and armaments. The sector encompasses the full spectrum of vessels, including aircraft carriers and nuclear submarines.



The European defence industry is an important contributor to Europe's technological strength and strategic autonomy

Research & Development

TOTAL R&D
INVESTMENT

€
19bn

DEDICATED
TO R&T

€
3.4bn

18% of total investment



Research & Development (R&D)

Research, technology and innovation are essential catalysts for a competitive and sustainable future.

The European aeronautics and defence industry is driven by significant investments in Research and Development (R&D). R&D refers to innovative activities undertaken or funded by private and public stakeholders for improving and developing new products and services. It includes the Research and Technology (R&T) activities which concern the design, feasibility studies and maturation processes for technologies.

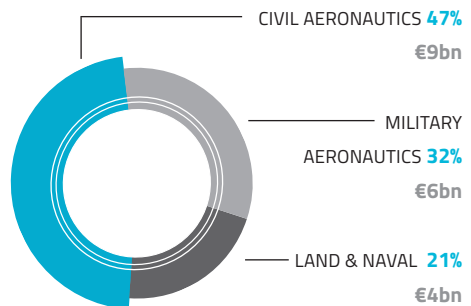
In 2017, the industry's expenditure on aeronautics and defence-related R&D from both industry and governments remained at a very high level. Investment is estimated at €19bn, with an equal split between civil and military activities. According to the European Commission, every euro invested in aeronautics R&D creates an equivalent additional value in the economy annually thereafter.

The aeronautics and defence industry invests massively in R&D to develop sustainable and competitive products and services and to provide high-skilled jobs. Support from national governments and the EU provides an irreplaceable contribution for European industry to stay ahead in a fast-changing global innovation race.

The investment gap between the EU and the United States (US) is massive when it comes to aerospace and defence-related R&D. In 2017, the R&D investments in the US (from industry and government) were four times higher than in Europe. If this long-term investment gap persists between Europe and other regions of the world, this will add further difficulties to maintain Europe's leadership.

Private and public fundings are key for Europe to remain a world leader in aerospace and defence, in spite of fiercer competition from established as well as new challengers.

RESEARCH & DEVELOPMENT 2017



Total R&D Investment €19bn



R&D in civil aeronautics

In 2017, it is estimated that €9bn were invested in civil aeronautics R&D activities by private and public stakeholders. Most of the investment comes from an increasing number of private investors (suppliers and customers) while government support is increasingly marginal.

R&D play a pivotal role in achieving the ambitious targets set to reduce emissions, noise and fuel burn. Today's aircraft and engines are much more fuel-efficient than earlier generations. However, the societal demand for air travel is booming, and constant research is critical to further reduce the emissions of the next generation of aircraft.

R&D CIVIL AERONAUTICS

€9bn

Invested by private and
public stakeholders

Besides, the aeronautics sector is marked by the high complexity of its products and systems, subject to significantly long R&D cycles up to 20 years, all of which require long term and large investments.

The long development cycles and the high technological risks that characterise the aeronautics industry require cooperation between all the key actors along the supply chain (private and public organisations) to reinforce and streamline research.

Innovative European public-private partnerships (PPPs) such as Clean Sky and SESAR are delivering substantial socio-economic impacts:

- Clean Sky develops innovative, cutting-edge technology aimed at reducing CO₂, gas emissions and noise levels produced by airplanes and helicopters. To this end, more than 30 main demonstrators of different sizes are being developed at a very high technological maturity level. Clean Sky

1 results confirmed an overall 32% CO₂ emission and 50% to 86% noise decrease potential, which will be crystalised as the Clean Sky 1 technologies are applied to commercial products.

- SESAR is delivering a catalogue of solutions to modernise European Air Traffic Management, ensuring the safety and sustainability of European air travel and aviation. When deployed, the 60 solutions delivered in SESAR 1 should increase airspace capacity by 34% and decrease flight time variance by 30%, meaning reduce delays on all EU flights (95% of flights staying within their time plan), and lead to a 2,3% decrease of fuel burn and emissions per flight.

R&D in defence

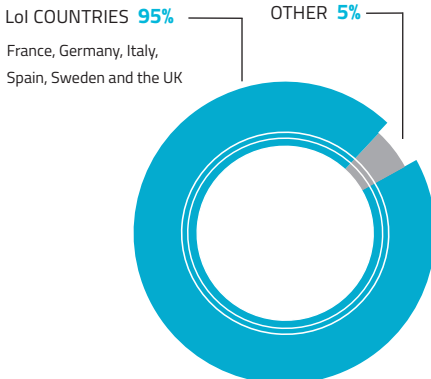
Combined European investment in defence R&D amounts to roughly €10bn. The bulk of investment comes from national governments as the key

customers. Private investments are very limited and concern only lower complexity or lower value research.

Defence R&D spending in Europe is highly concentrated in the six LoI countries (France, Germany, Italy, Spain, Sweden and the UK), accounting for 95% of the R&D investments. France and UK account alone for more than half of the total, followed by Germany, Italy, Spain and Sweden.



R&D INVESTMENTS DEFENCE



R&D DEFENCE TOTAL
Invested by governments

€10bn

€6bn

AERONAUTICS

€4bn

LAND AND NAVAL

Words from the Secretary General

The European aerospace and defence industry, represented by ASD on the European and international scene, continued to develop positively in 2017. Supporting over 860,000 jobs across Europe, our sectors offer global growth opportunities and are vital to the EU's future as a high-tech, high-skill and high-wage economy.

To continue this success story in a fast-changing world, a number of initiatives will be instrumental in maintaining Europe's excellence and competitiveness.

In the civil sector, it is essential for the new EU leadership to establish an EU civil aeronautical industry strategy to spur all European actors into action regarding the challenges that the sector faces. The industry plays a key role in reducing the environmental impact of aeronautics in a way that calls for us to further boost innovation, and to deliver environmental sustainability, growth and job creation through flagship programmes such as Clean Sky and SESAR. An equally important point is to foster a higher uniform level of safety in the EU by applying the revised EASA Basic Regulation.

In the defence sector, the European Defence Fund (EDF) is, in particular, potentially a quantum leap, as it mobilises for the first time ever the EU budget for defence. This can be a major contribution in fostering European



ASD Secretary General, Jan Pie

cooperation, and further developing the strength of our industry, the capabilities of our armed forces and competition at the global stage. The link between the EDF and the other intergovernmental initiatives – CARD, PESCO and CDP – will be indispensable to ensure that EDF money is spent on what really matters. Finally, the EDF should complement the Member States' investment and must not lead to a reduction of national budgets.

As a key component of Europe's economy, this high-tech sector needs the support of the EU more than ever to provide a comprehensive approach towards the challenges ahead and to secure global leadership in the future.

**ASD Secretary General
Jan Pie**

About ASD

ASD is the voice of European Aeronautics, Space, Defence and Security Industries, representing over 3,000 companies and actively supporting the competitive development of the sector in Europe and worldwide.

Methodology

The ASD Facts & Figures result from the contribution of the National Associations that are members of ASD, with ASD as a coordinator. In 2017, ASD National Associations members were spread across 19 European countries*.

The data published in this industrial overview takes into account the following factors: exchange rate fluctuations, different statistical accounting in the UK, unconsolidated data for aeronautics and defence and consolidated data for space. The analysis was conducted using a consolidated process based on crosschecks. The perimeter of this analysis is different from that of the EU, the European Defence Agency or the North Atlantic Treaty Organisation. Due to membership changes in ASD and its members, any year-to-year comparison should be considered in terms of trends and order of magnitude.

The definition of aeronautics includes civil and military aeronautics.

The definition of defence combines all sectors, i.e. military aeronautics, space,

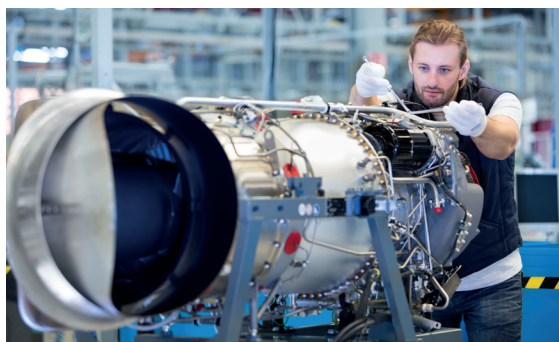
land and naval. Each sector combines systems, platforms and components, while electronics and missiles are embedded transversally.

The brochure doesn't specify information on dual use nor the security sector whose perimeter has not yet been fully defined.

Process coordination and data analysis were performed by Fabrizio Braghini, Chairman of the ASD Data Analysis Committee. Pierre Lionnet, ASD-Eurospace Research Director provided space data and advice.

All photos used in this brochure belong to ASD members. Editor: ASD Communication Manager, Marine D'Hollander.

*Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Italy, Norway, Poland, Portugal, Spain, Sweden, Switzerland, The Netherlands, Turkey, and the United Kingdom .



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