

Aircraft | © teekid_www.istockphoto.com

Aerospace Industry

Leading Technology for Higher Goals

The German aerospace industry has enjoyed unprecedented success over the last two decades. Since the mid-90's, industry **revenues have more than quadrupled** - to over EUR 37 billion in 2016. Today it belongs to the country's most innovative and best-performing industries.

And the sector keeps on growing: Industry analysts forecast that between 30 to 35 thousand new aircraft will be put into service in the next 20 years to meet increasing global aviation demand – leading to a **new golden age of aviation**. As a global aerospace hub, Germany is home to leading players from all civil and defense aviation market segments.

The combination of the country's world class R&D infrastructure with its powerful manufacturing base empowers international investors to develop cutting edge technologies for tomorrow's aviation needs. Compared with other major aviation manufacturing countries like the US, Canada and France, the country's combination of a powerful manufacturing base, ready availability of talent, and cost efficiency are **unique competitive advantages for current and prospective investors**.

Aside from its supply and manufacturing power, the country is also home to two major passenger airlines as well as one of the world's biggest freight and logistics carriers. Take a look at our market numbers and become part of Germany's aerospace success story by **locating your business in Europe's aerospace innovation hub**.

Latest Publication



Fact Sheet: The Aerospace Industry in Germany | © GTAI

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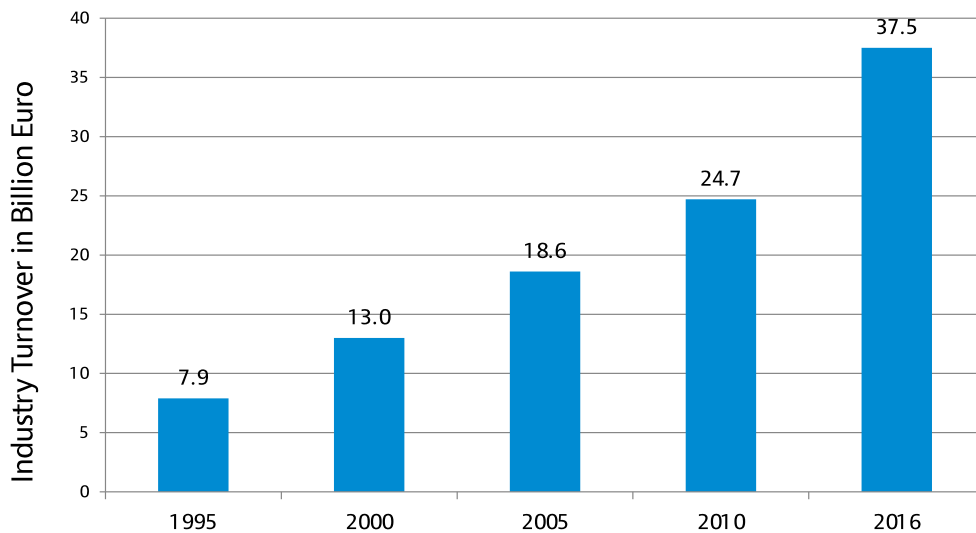
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Industry & Market Numbers

- EUR 37.5 bn in turnover 2014 – a new record
- More than 7% average annual growth since the mid-1990s
- 108,000+ industry employees, whereof more than 50% are engineers or highly qualified professionals
- 220+ companies and related institutions
- In 2016, 11% (EUR 4 billion) of annual revenues were dedicated to R&D – this makes the aerospace industry one of the most innovative industries in Germany

Development of Aerospace Industry Turnover in Germany from 1995 to 2016



Source: BDLI 2017

Development of Aerospace Industry Turnover in Germany | © BDLI 2017

Business Opportunities in Germany

WORLD CLASS AVIATION R&D LANDSCAPE

Companies active in the German aerospace industry invest heavily in research and development, with the industry recording **one of the country's highest R&D spending levels** relative to overall turnover. Around EUR 4 billion was set aside for R&D purposes in 2016 - equivalent to an R&D quota of 11 percent. Strong industry investment levels are enabled and accompanied by the presence of an excellent public R&D landscape with dedicated government R&D support for aeronautics and space.

The German Aerospace Center (DLR), Germany's central aerospace research body, employs approximately eight thousand people at 39 institutes across 20 locations. A number of institutes belonging to the renowned Fraunhofer-Gesellschaft, Max Planck Society and Leibniz Association also conduct aerospace-related research activities.

POWERFUL MANUFACTURING BASE

Germany hosts leading players from all business segments – from equipment manufacturers, material and component suppliers to engine producers and whole system integrators. The high concentration of aerospace-related manufacturing and assembly - as well as R&D, design, recycling and supply - facilities enables compa-

nies to successfully **partner across the whole value chain**. This environment offers numerous business opportunities across multiple technology segments for international investors.

Particular location strengths are seen, for example, in the aircraft interior and aerospace energy-efficiency (including lightweight construction and new material development) segments. Industry stakeholders are organized in multiple regional aerospace clusters such as bavAIRia e. V., HAMBURG AVIATION e.V. and Hessen Aviation.



Oliver Seiler | © GTAI

"International firms in Germany benefit from the country's central role in the increasingly integrated European aerospace industry."

Oliver Seiler, Director Mechanical & Electronic Technologies, Germany Trade & Invest

PUBLIC INCENTIVES AND R&D SUPPORT

Germany offers numerous incentives for all investors – regardless of country of provenance. There is a large selection of **programs designed to support a wide variety of business activities** at different stages of the investment process. These range from cash incentives for the reimbursement of direct investment costs to support for research and development and labor incentives.

Thanks to its strong innovation dynamic, the aerospace industry is part of **Germany's High-Tech-Strategy** which is complemented by other government R&D support programs. Subject to the technology readiness level (TRL), the federal government makes two R&D support programs which provide public payments – either as loans or in the form of non-refundable cash grants – available.

STABLE INVESTMENT ENVIRONMENT

Social, economic and political stability provide a **solid base for business activities** of international investors. The country's judiciary and civil services are highly professional and belong to the most reliable in the world. Contractual agreements are secure and intellectual property is strictly protected. Also first-class and dense airport, road, rail and waterway networks substantiate the country's economic power within Europe and make it one of the continent's **leading recipients of foreign direct investments** – also in the aerospace business.



Logo Web Industries, Inc. | © Web Industries, Inc.

"We have found Germany to be an excellent place to recruit skilled labor, and we are pleased to be in one of the centers of the world composites industry."

Josh Chernin | Director of European Operations | Web Industries, Inc.

Market Trends

GROWING PASSENGER VOLUMES

Passenger aviation is an industry in demand. Over the next 20 years, forecasts predict **demand for between 30 to 35 thousand new civil aircraft** worldwide - worth more than USD 5 trillion. According to one major aircraft OEM, the greatest demand exists for single aisle airplanes (71 percent), followed by twin aisle (24 percent) and very large aircraft (5 percent).

According to aviation experts, worldwide airline traffic is predicted to grow steadily by around five percent per year. Today, around one billion of the world's seven billion inhabitants fly regularly. As such, a significant share of the remaining global population represent an untapped customer pool, with particular potential to be found in emerging Asia Pacific markets.

ECOLOGICAL FLYING

Rapidly growing passenger volume numbers aside, current market developments are also being triggered by the need to replace large parts in airplanes still in service. Airplane operating costs are significantly affected by aircraft fuel consumption levels. This had led to ongoing technology development efforts focused on the **sustainable reduction of fuel consumption**. Alongside technological advances made in aircraft engine design, new materials and composites – as well as changes to overall aircraft design (e.g. retrofit with winglets) – are helping increase fuel efficiency levels through reduced weight and improved aerodynamics.

Innovative aircraft interiors are also helping pave the way towards more ecological and comfortable modes of air travel. These and other measures all contribute to ambitious climate protection goals enshrined in Europe's "Flightpath 2050" aviation strategy. The agenda foresees a reduction of CO₂ and NO_x emissions per passenger kilometer of 75 percent and 90 percent respectively by 2050 (relative to the capabilities of typical new aircraft in 2000). Noise emissions are also to be reduced by 65 percent over the same period. Europe's "Horizon 2020" research framework program also offers **promising R&D support** for the development of more sustainable, safer and integrated mobility solutions.

INDUSTRIE 4.0 AND CONNECTIVITY

From smart manufacturing ("INDUSTRIE 4.0") to the airline planning cycle revolution and the dawn of in-flight connectivity – the digital revolution is having a significant effect on the aerospace industry. **IT solutions will**

penetrate all aspects of airline production and operation (including maintenance and engineering, ground, and in-flight operations).

Real-time data enables quick reaction times to operational environment changes like weather conditions and airport traffic congestion. At the same time, ground operations can be accelerated, thereby increasing airplane utilization times. Growing passenger dependence on personal electronic devices may even allow airlines to replace costly and heavy in-flight entertainment systems with streamed content. Potential areas of application are numerous and provide an opportunity to further improve production, operational and maintenance efficiency, customer satisfaction, and safety.

SUPPLY CHAIN TRANSFORMATION

Notwithstanding the fact that OEMs are also considering suppliers from other world regions, their traditional role as vertically integrated players is changing. In addition to their customer interface role, OEMs are increasingly focusing their attention on their function as system architects and integrators.

Ongoing technological specialization leads to the outsourcing of systems - such as avionic electronics - and the design and production of aircraft structures. The **increased importance of system and module suppliers** means that OEMs require major suppliers to enter into risk-sharing partnerships with suppliers who are prepared to undertake technological and commercial risks. Globalization and outsourcing developments are also visible further upstream on the value chain.

Related Links

- [BDF - German Airline Association](#) ▶
- [BDLI - German Aerospace Industries Association](#) ▶
- [BMW - Ministry of Economics and Energy](#) ▶
- [DGLR - Technological and Scientific Aerospace Association \(in German only\)](#) ▶
- [DLR - German Aerospace Center](#) ▶
- [Horizon 2020 website](#) ▶




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CONTACT US

Stefan Di Bitonto

☎ +49 30 200 099 401

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