BREMEN
BREMERHAVEN
CITY OF AEROSPACE

TAKE OFF WITH US

BREMEN AS A CENTRE FOR AERONAUTICS AND SPACE INDUSTRIES

Ministry of Economic Affairs, Ports and Transformation

Free Hanseatic City of Bremen

AVIASPACE BREMEN

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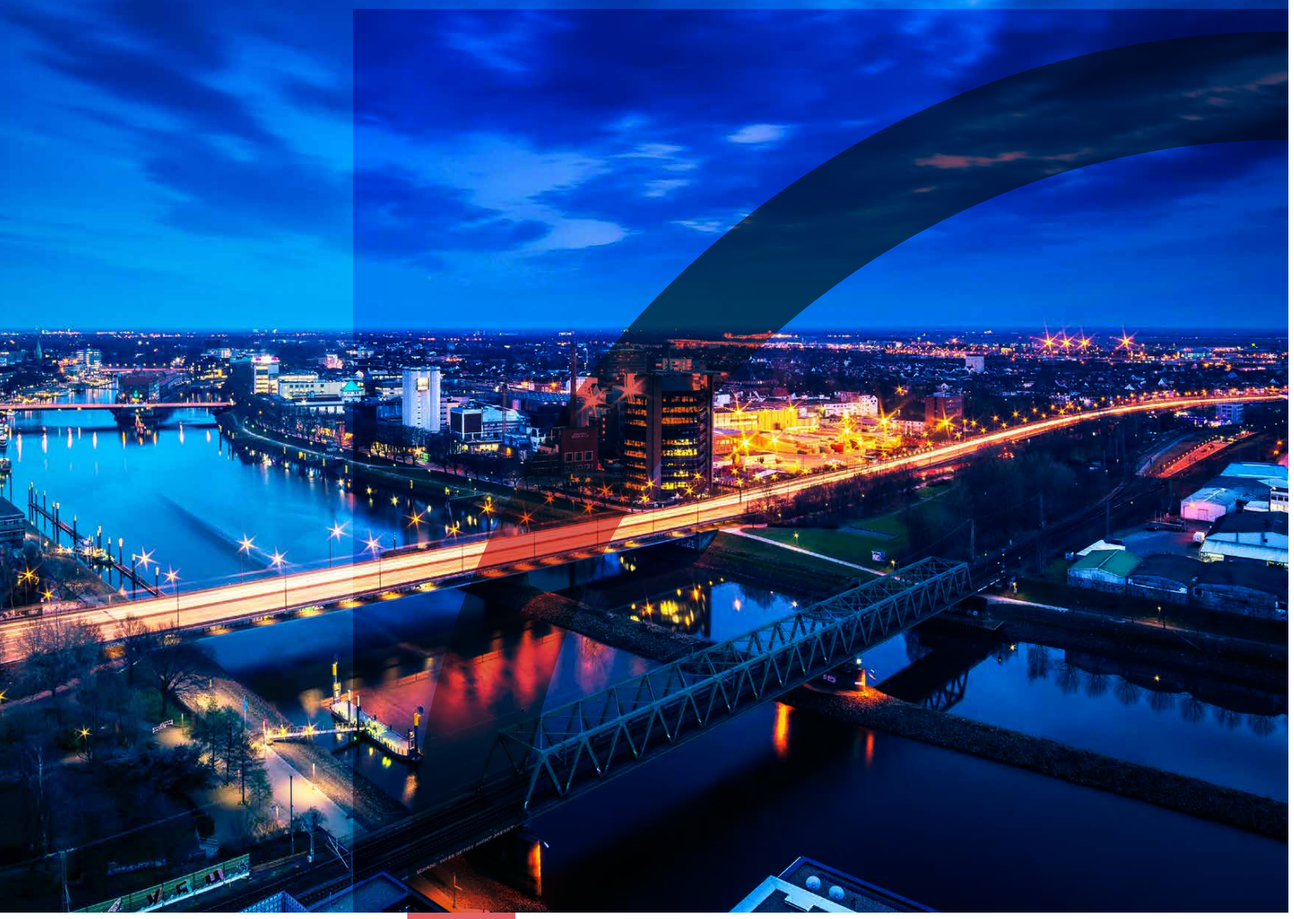
TAKE OFF WITH US
MINISTRY OF ECONOMIC AFFAIRS, PORTS AND TRANSFORMATION

Our ministry is responsible for all matters related to economic affairs, ports and transformation, Europe, and international business policies of the German federal state of Bremen. The city-state of Bremen is one of the leading industrial hubs in Germany and also home to outstanding research institutes and universities. Innovation, knowledge transfer and new technological challenges are increasingly important for the success of business locations. This requires a strong network of economic and political structures for strategic planning: a consistent innovation policy, effectively and efficiently consolidated under the single roof of the Ministry of Economic Affairs, Ports and Transformation. The ministry delivers essential support to industry networks by implementing its cluster and innovation strategy. Aeronautics and space industries play a crucial role for Bremen and Bremerhaven's industrial ecosystem – not only as an employer, but especially as a technology driver.

This brochure gives an overview of the „aeronautics and space" cluster in the German Federal State of Bremen. It illustrates Bremen's significance in this field and provides an overview of the stakeholders and network that contribute to this location's strengths.

Kristina Vogt
Senator for Economic Affairs, Ports and Transformation of the Free Hanseatic City of Bremen



TWO CITIES – ONE STATE
BREMEN, A TOP LOCATION FOR INDUSTRY

The seaside City of Bremerhaven and the Hanseatic City of Bremen form together the federal state of Bremen. With approximately 680,000 inhabitants, it is one of the top ten industrial locations in Germany.

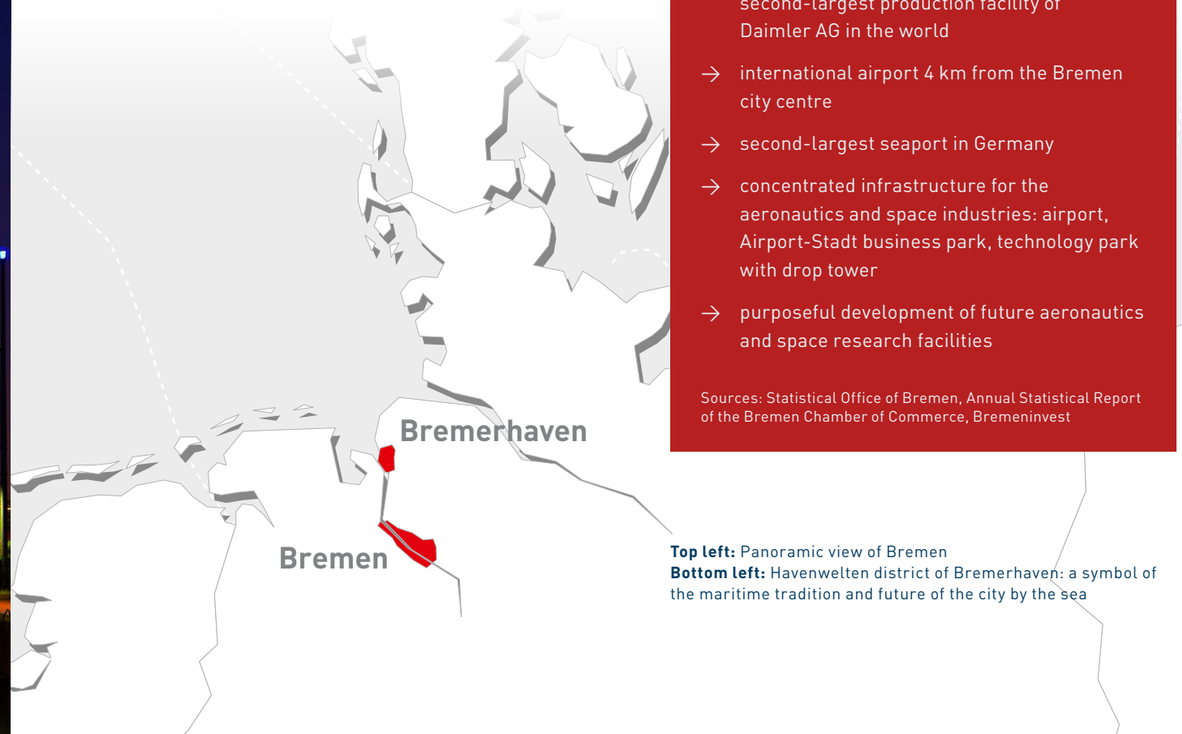
Bremen is the economic centre of a region with two million inhabitants. It presents itself as a powerful, dynamic motor for Northwest Germany. Research and development activities of local universities, with more than 37,000 students, make significant contributions to the region.

Science and technology
In addition to the exceptionally high concentration of scientific institutions, highly renowned international tech companies contribute to Bremen's reputation as an industrial location that has always been a competence-driven premium location for the aeronautics and space industries.

Key facts of the federal state of Bremen

- 680,000 inhabitants
- hub for Northwest Germany
- highest export ratio of all the German federal states
- eight universities with approx. 37,000 students
- University of Bremen ranked one of the best universities in Germany since 2012
- approx. 50 technical research institutes (e.g. Alfred Wegener Institute (AWI), German Aerospace Centre (DLR-RY), Centre of Applied Space Technology and Microgravity (ZARM), German Research Centre for Artificial Intelligence (DFKI), Fraunhofer and Max Planck Institutes)
- second-largest production and development location of the Airbus Group in Germany
- Mercedes-Benz's Bremen factory, the second-largest production facility of Daimler AG in the world
- international airport 4 km from the Bremen city centre
- second-largest seaport in Germany
- concentrated infrastructure for the aeronautics and space industries: airport, Airport-Stadt business park, technology park with drop tower
- purposeful development of future aeronautics and space research facilities

Sources: Statistical Office of Bremen, Annual Statistical Report of the Bremen Chamber of Commerce, Bremeninvest

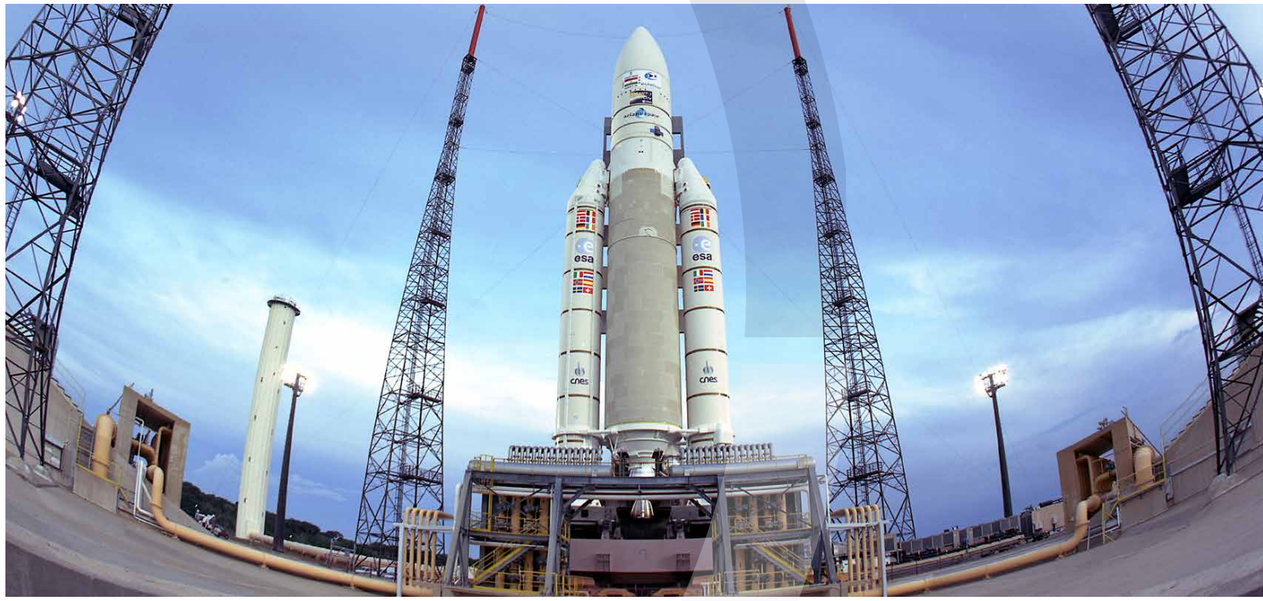


Top left: Panoramic view of Bremen
Bottom left: Havenwelten district of Bremerhaven: a symbol of the maritime tradition and future of the city by the sea

TAKE OFF WITH US

BREMEN AS A CENTRE FOR AERONAUTICS AND SPACE INDUSTRIES

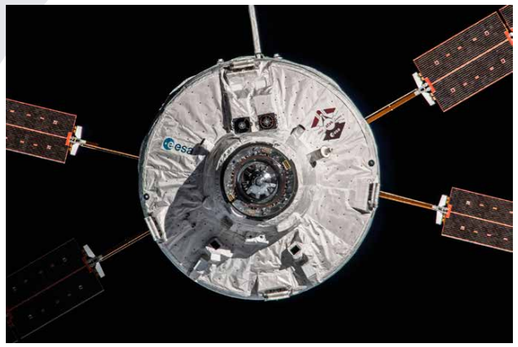
More than 140 enterprises and 20 science institutes power the aeronautics and space industries in Bremen. The order books are well filled. More than 12,000 employees in the industry generate revenues of more than 4 billion euros per year. Leading companies such as the Airbus Group, ArianeGroup, Rheinmetall Electronics, OHB, and their suppliers contribute significantly to this success. The companies' economic success is founded on their employees' excellent qualifications. To ensure that this situation can be maintained and further improved, Bremen invests heavily in future developments: interdisciplinary and intersectoral research and development strengthen the location and create synergy effects with other strong industries in Bremen. Cutting-edge research in the state of Bremen sustainably supports the industries in the fields of materials sciences and production technologies, space systems, remote sensing, bionics and robotics among others.



Bottom: A wide variety of study and training courses ensure training and development.
Right side: Made in Bremen: wing units of Airbus planes, the upper stage of the Ariane rocket, or the GALILEO satellite navigation system

SPACE IN BREMEN
THE SKY IS NOT THE LIMIT

Space expertise from Bremen is orbiting all around the globe. Satellites and carrier rockets for space have been developed and manufactured in Bremen for more than 50 years. Bremen can look back at its achievements with pride: the science laboratory *Columbus* and the cargo spacecraft *ATV*, which were Europe's contribution to the International Space Station *ISS*, were both built by Airbus. The service module of the new NASA spacecraft *Orion* is also integrated at the Airbus site in Bremen. In addition *Ariane* rockets have always included parts made in Bremen, as ArianeGroup has been integrating the upper stages of the launch vehicles here since 1979, and can now look back on more than 240 successful launches. OHB SE with its Space Systems division is the prime contractor for the satellite navigation system GALILEO. Based on this unique portfolio, Bremen plays a leading role in shaping the national and European space programs.



Top: The Automated Transfer Vehicle (ATV) in use
Bottom: Integration of the Eu:CROPIS satellite at the German Aerospace Centre (DLR) in Bremen

AIRBUS WING PRODUCTION
AERONAUTICS IN BREMEN

With approximately 4,500 employees, Bremen is the second-largest Airbus plant in Germany, manufacturing the high-lift systems of all Airbus programs. The entire process chain, from the design to manufacture and integration through to testing, is established here. This includes the project office, technology and systems engineering, flight physics, structural development and assembly, verification tests, wing equipping and delivery.

For the A400M transport aircraft, Bremen develops and manufactures the integrated fuselage section including the cargo loading system. In the field of materials and process development, new technologies are being researched and developed through to series production in Bremen. In short: Airbus relies on the aeronautics expertise of Bremen, which can be traced back to 1910.

Top: The A330neo plane developed by Airbus
Bottom: View of the wing assembly floor at Airbus

REAL ESTATE IN THE FEDERAL STATE OF BREMEN

EXCELLENT LOCATIONS FOR SETTING UP BUSINESSES

In the 30 years of is existence, the Bremen Technology Park has evolved into a leading high-tech location. The drop tower of the Centre of Applied Space Technology and Microgravity (ZARM), where non-gravity experiments can be carried out in short-term weightlessness, is a landmark visible from afar.

Here, close to the university, companies like OHB encounter the cutting-edge research done at the DLR, DFKI, Max Planck and Fraunhofer Institutes. More than 550 companies from a wide range of industries are working together on an area of 172 hectares, in cooperation with the University of Bremen. And even though the demand for high-quality office and process spaces is high, there are still properties available.

The Airport-Stadt business park is located next to the international airport, just eleven minutes from the city centre. Numerous companies use the generous office spaces and benefit from the close proximity of other strong industries in Bremen, such as the maritime sector, automotive, wind power and logistics industries.

Bremen Airport is an international transport hub for Northwest Germany, with daily passenger and cargo flights to approximately 50 destinations in Europe and North Africa.

The seaport of Bremerhaven is known for its capabilities in the field of container and high & heavy transport. It is one of the most important transshipment ports for global RORO shipments. The DLR Institute for the Protection of Maritime Infrastructures in Bremerhaven intends to play a decisive role in shaping the maritime situation of the future. They collaborate closely with the DLR Maritime Safety and Security Lab Bremen that develops algorithms that extract data on the state of the oceans from radar images of various satellites, and provides these data to users in close to real time.

The Helmholtz Robex research alliance under the roof of the Alfred Wegener Institute (AWI) in Bremerhaven conducts *Robotic Exploration under Extreme Conditions*. Space experts and deep-sea explorers from 15 research facilities develop robot systems capable of carrying out independent missions on the moon and in the deep sea. Important space-based applications are being developed and commercialized here.

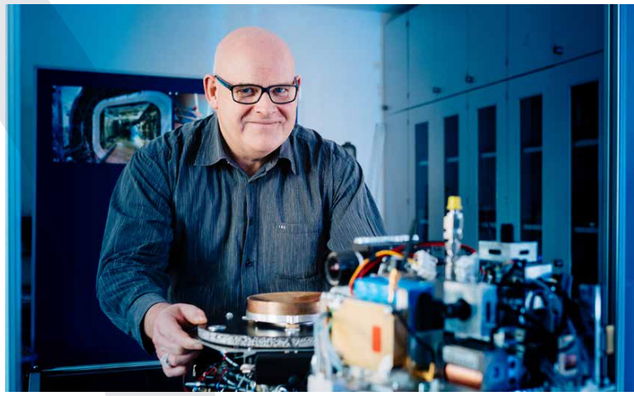
Bremerhaven provides ample industrial and commercial areas located near its technology centre. At the Lune Delta, a designated sustainable industrial area, 150 hectares are in planning. Another 100 hectares at Westlicher Fischereihafen (Western Fishery Harbour) and the LogIn-Port industrial park are set aside for development.

Bottom left: Aerial view of the Airport-Stadt business park and Bremen Airport
Top right: Aerial view of the Technology Park surrounding the University of Bremen
Bottom right: Aerial view of the Luneplate industrial park in Bremerhaven

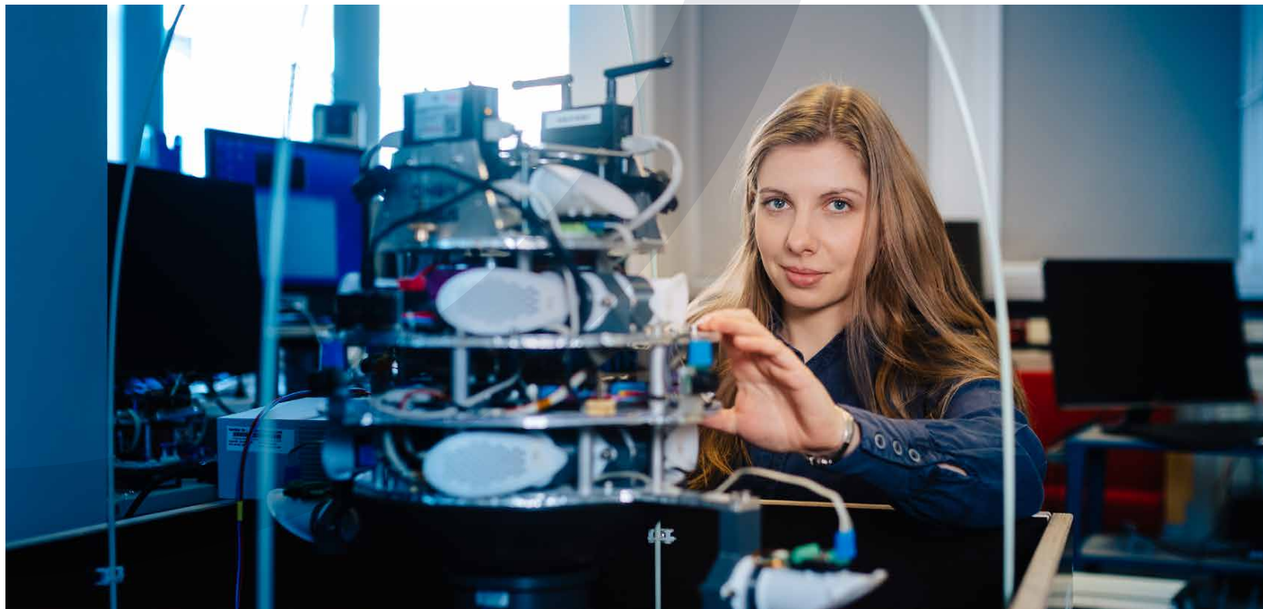
CUTTING-EDGE RESEARCH IN BREMEN
ECONOMY MEETS SCIENCE

At the aeronautics and space location Bremen, economy and science gather within the framework of a unique research infrastructure. Cutting-edge research in Bremen and Bremerhaven is consistently driving the development and progress. In particular, in the fields of materials sciences, manufacturing technologies, space systems engineering/research and space applications, remote sensing, bionics, and robotics, the aeronautics and space companies benefit from the close proximity to scientific institutes and research facilities.

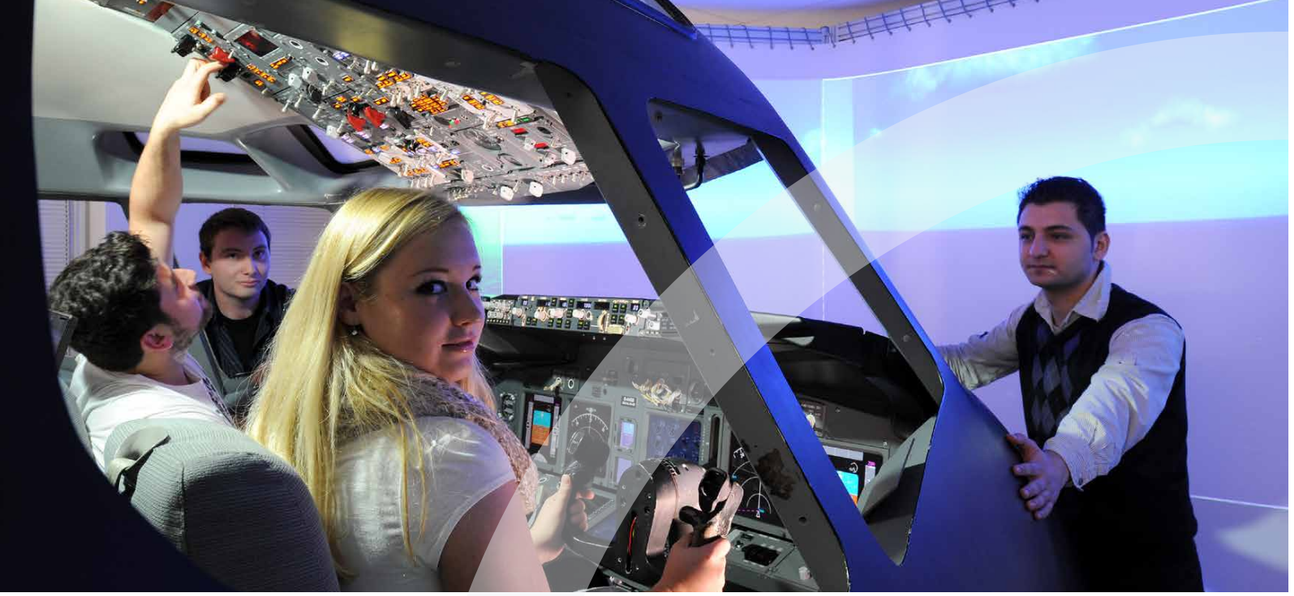
Highly efficient networks have formed in proximity to the universities and their various institutes such as the Alfred Wegener Institute (AWI), the German Research Centre for Artificial Intelligence (DFKI), the German Aerospace Centre (DLR), the Fraunhofer Institute and the Institute of Environmental Physics. Innovative companies located in the region reflect the wide range of competencies and skills present in the federal state of Bremen.

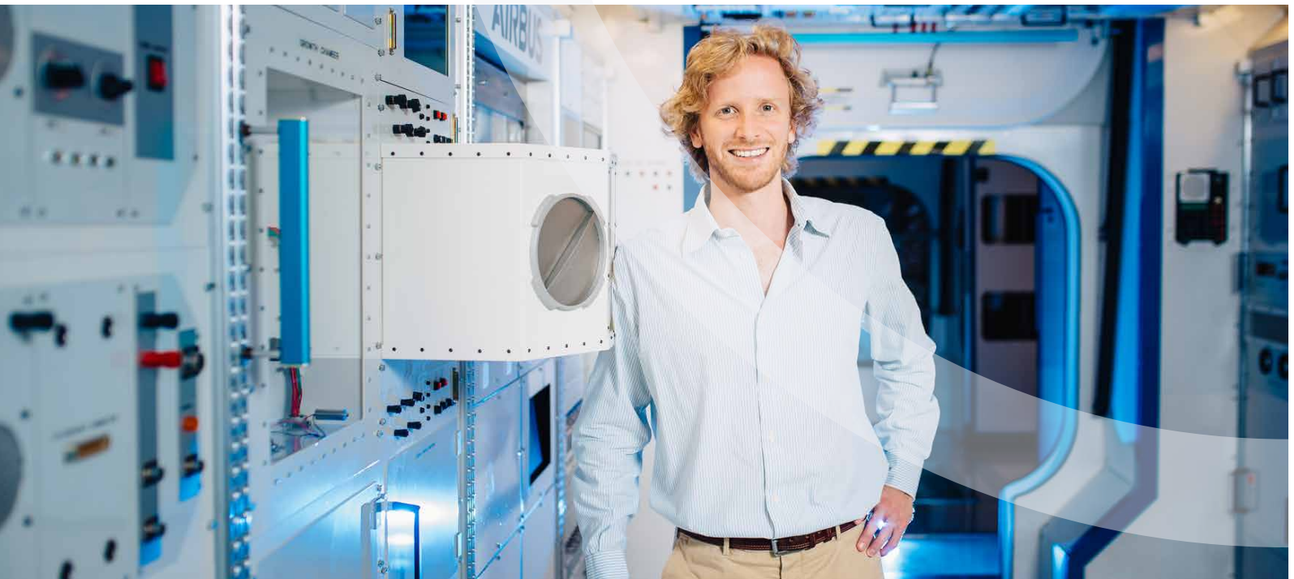


Top: Prof Dr Uwe Apel works at the Institute of Aerospace Technology at Bremen University of Applied Sciences.
Middle: View of the assembly of the unmanned cargo spacecraft ATV3 for the ISS
Bottom: Dr Valerie Schröder works at Airbus, developing a robot for the ISS.



A selection of companies located at the aeronautics and space location Bremen





WORLD LEADING PROFESSIONALS
QUALIFIED GRADUATES

The aeronautics and space industries combine virtually all the high technologies of the Digital Age: electronics, robotics, instrumentation and manufacturing engineering, environmental and climate science, materials and control engineering. Consequently, the qualification of professionals and executives is essential for the aeronautics and space industries. Therefore the federal state of Bremen specifically targets promotion and training of young talents in these high-tech domains.

In Bremen, employers are able to connect with specialized graduates. All the graduates are well prepared for the challenges they will face. Future engineers of various disciplines study at both, the university and the universities of applied sciences of Bremen/Bremerhaven. In terms of research, the University of Bremen has been one of the leading universities in Germany for years. Research at the University of Bremen is interdisciplinary, with collaborations across the individual departments.

Nowadays, Bremen is well known as a location for IT companies accompanied with an above-average growth and the settlement of new companies. Professionals with digital skills are not only sought after by the IT companies. They are also an important resource for the companies in the innovation clusters.

Top left: Students and the flight simulator they programmed and built.
Middle left: At the DLR Institute of Space Systems, Paul Zabel is researching how plants can be grown in space.
Bottom left: Daniel Pika works at ArianeGroup, developing rocket propulsion systems.

University degree programmes in the federal state of Bremen

University of Bremen

- Production engineering — Mechanical Engineering and Process Engineering B.Sc. & M.Sc.
- Economic Engineering — Electrical engineering and Information Technology B.Sc. & M.Sc.
- Economic Engineering — Management and Production Engineering B.Sc. & M.Sc.
- Environmental Physics M.Sc.
- Space Engineering M.Sc.
- Space Sciences and Technologies — Sensing, Processing, Communication M.Sc.

City University of Applied Sciences

- Aerospace Engineering B.Eng.
- Aviation Systems Technology and Management for Airport Operation Engineers B.Eng.
- Aviation Systems Technology and Management for Aviation Safety Engineers B.Eng.
- Aviation Systems Technology and Management for Commercial Aircraft Pilots B.Eng.
- Aviation Systems Technology and Management for Maintenance Engineers B.Eng.
- Aeronautical Management M.Eng.
- Aerospace Technologies M.Sc.

Jacobs University Bremen

- Supply Chain Engineering & Management M.Sc.

Bremerhaven University of Applied Sciences

- Manufacturing Engineering B.Eng.

LIGHTWEIGHT DESIGN IN BREMEN
EcoMaT, THE INNOVATION HUB

Research and development areas relating to lightweight construction technologies and their industrial application are united in one central location in Bremen: The Airport-Stadt business park is home to the Centre for Eco-efficient Materials & Technologies – or ECOMAT for short. The ECOMAT research and technology centre accommodates the key players in the field of lightweight construction under one single roof, making interdisciplinary and cross-industry cooperation highly efficient. Additive manufacturing (3D printing) being just one of many examples.

About 500 scientists and industry professionals conduct cutting-edge research and development on an area of 22,000 square meters. Here, close to the Bremen Airport technologies are systematically observed and analysed from an application-oriented perspective.

Similar to the process of agile software development, technological findings are integrated into the manufacturing process. Through short distances and joint projects, innovation processes are accelerated – and can therefore be applied across industries at an early stage of development. Furthermore, the proximity facilitates the shared use of laboratory facilities.

Airbus, Testia, the German Aerospace Centre (DLR) and Faserinstitut (FIBRE) are anchor tenants at the ECOMAT. More than ten other partners, from science, industry and medium-sized enterprises are also on site. Investor and owner of the ECOMAT is WFB Wirtschaftsförderung Bremen GmbH.

VIRTUAL CERTIFICATION IN BREMEN
THE VIRTUAL PRODUCT HOUSE

The Virtual Product House (VPH) is a flexible, dynamic network platform where various DLR Institutes work together with their partners on virtual design, virtual testing and certifications. The VPH is a key element of the digitization strategy of the DLR's aeronautics program. In cooperation with university partners, DLR software and aeronautics research institutes are developing a common-source architecture.

The software engineering tasks of the VPH are:
→ model-based and distributed simulation
→ multi-fidelity design and high-performance computing
→ software engineering for virtual certification

The VPH concept relies on a flexible work environment based on workshop, plateau and concurrent engineering principles. This ensures efficient cooperation.

The Virtual Product House represents the entire virtual certification process, reducing the duration and cost of future certification tests. This long-term vision is one of the guiding principles of the DLR aeronautics program: Making it possible to virtually represent an aircraft throughout its entire lifecycle.

The Virtual Product House as a project is being subsidized by the federal state of Bremen and the European Regional Development Fund (ERDF).

NEW SPACE BREMEN
THE SPACE BUSINESS INCUBATOR

The ESA Business Incubation Centre (BIC) Northern Germany is headquartered within the BITZ, Bremen's largest business and technology centre for high-tech companies and start-ups. ESA BIC Northern Germany brings new opportunities to the region by strengthening Bremen's aeronautics and space sector.

It complements the existing aeronautics and space innovation cluster association AVIASPACE BREMEN e.V. and is supported by "Starthaus", the institution responsible for implementing the financing of new businesses and start-ups in the Federal State of Bremen.

ESA BIC Northern Germany is managed by AZO, an international networking and branding company for the European space programmes that also manages ESA BIC Bavaria with three locations in southern Germany in its portfolio. ESA BIC Northern Germany is set to expand in the future to the northern federal states of Hamburg, Lower Saxony, Schleswig-Holstein, Mecklenburg-West Pomerania and Berlin-Brandenburg.

Advantages at a glance:

- zero equity funding
- access to the space industry and user community
- business support
- co-working spaces

The ESA Technology Transfer and Business Incubation Office coordinates the ESA BIC network throughout Europe. The objective of the ESA BIC is to support start-ups and young entrepreneurs in the space industry and pave the way to the space industry for companies from other technology sectors. A total of 30 ESA BIC are already part of this international network.

Already a start-up or interested in founding a company? You too can apply to the ESA Business Incubation Centre Northern Germany.

STRONG NETWORKING PARTNER
AVIASPACE BREMEN

AVIASPACE BREMEN is an association of aeronautics and space companies and application-oriented research institutes in and around the federal state of Bremen. This network implements the federal state of Bremen's strategy for the aeronautics and space industries.

The association's main objective is to improve cooperation and develop innovative projects in and around the federal state of Bremen as a business and science centre. Its activities cover the aeronautics and space industries and other technologies related to this area. AVIASPACE BREMEN connects companies, scientific institutions and authorities. It focuses on developing networks, technology transfer and economic growth through promotion of start-ups and young entrepreneurs. The purpose is to develop a technical and organizational network of manufacturers of end-products, suppliers, service providers and scientific institutions in the fields of materials science, high-lift systems, engineering, manufacturing technology, earth observation and robotics.

Trade fairs 2023 — 2024 (selection)

- Paris Air Show, June 2023, Paris
- Space Tech Expo Europe, November 2023, Bremen
- Aircraft Interiors Expo, May 2024, Hamburg
- ILA Berlin Air Show, June 2024, Berlin
- Farnborough International Airshow, July 2024, Farnborough

More than fifty of the companies and institutes working in the aeronautics and space industries in Bremen have already joined AVIASPACE BREMEN; and its membership continues to grow.

NO STATE MORE BEAUTIFUL
AN ATTRACTIVE PLACE TO LIVE

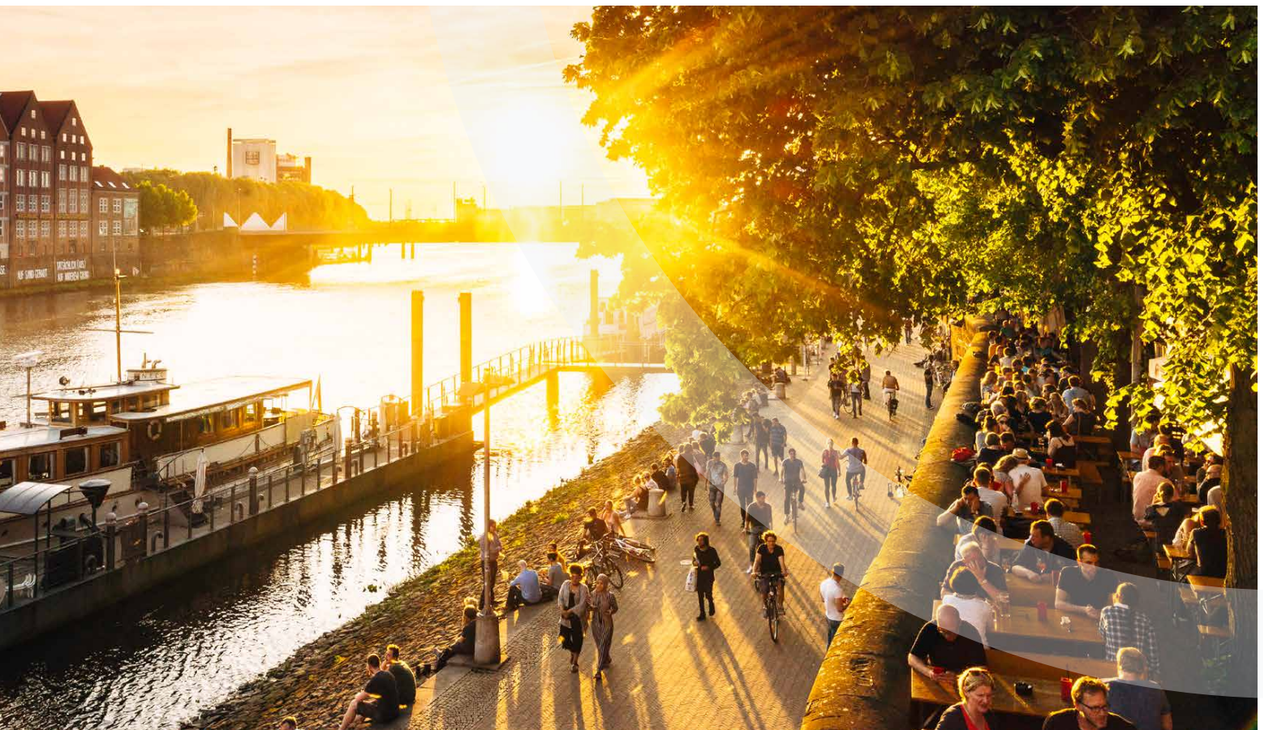
Bremen
Life in the city of Bremen is characterized by tradition and innovation. Once a trading town and port, now a modern city filled with the quality of life an urban centre has to offer, its residents appreciate the city of short distances. And in return the residents shape Bremen: cosmopolitan and welcoming. People here are open to new things: in the traditional quarters as much as the Überseestadt district. Here, in one of the largest urban development projects in Europe, the old port districts are being revitalized with new residential and office spaces. Lively new opportunities are being created in this city characterized by the aeronautics and space as much as automotive industries, trade and logistics, and maritime services. A city where aeronautics and space have established a sound identity for themselves.

Bremerhaven
Bremerhaven is characterized by its maritime flair and its proximity to the North Sea. Large ships, harbour ambience, a breath of sea air on the dyke of the Weser River, delicious fish ... this is what the residents of Bremerhaven and their guests associate most of all with the largest city on the German coast.

The residents of Bremerhaven appreciate the short distances of their city, the regional centre that provides all the essentials of a major city. A wide range of retail businesses and a variety of culinary offers draw both locals and guests from the region to the Weser River.

Living in Bremerhaven offers added value: Real estate prices are attractive, and the quality of life is good. The housing market in Bremerhaven has a lot to offer new residents.

Bottom left: Weser Promenade "Schlachte" in Bremen
Top: Bremen City Hall — Unesco World Heritage site
Middle: Sögestraße Bremen: Gateway to the city centre
Top right: Hundreds of thousands of visitors are excited by the maritime events in the seaside town.
Middle right: The German Emigration Centre was named the European Museum of the Year in 2007.
Bottom: Skyline of Bremerhaven viewed from the water



STRONG LOCAL PARTNERS

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OUR SERVICES

- → Advice on all industrial location issues
- → Assistance with all approval procedures
- → Development of commercial premises, estate brokerage
- → Investment support, promotion of SMEs, promotion of start-ups
- → Funding programs offered by the development bank for Bremen and Bremerhaven (BAB)
- → Procurement of useful contacts
- → Bremeninvest offices located in China, Turkey and Vietnam

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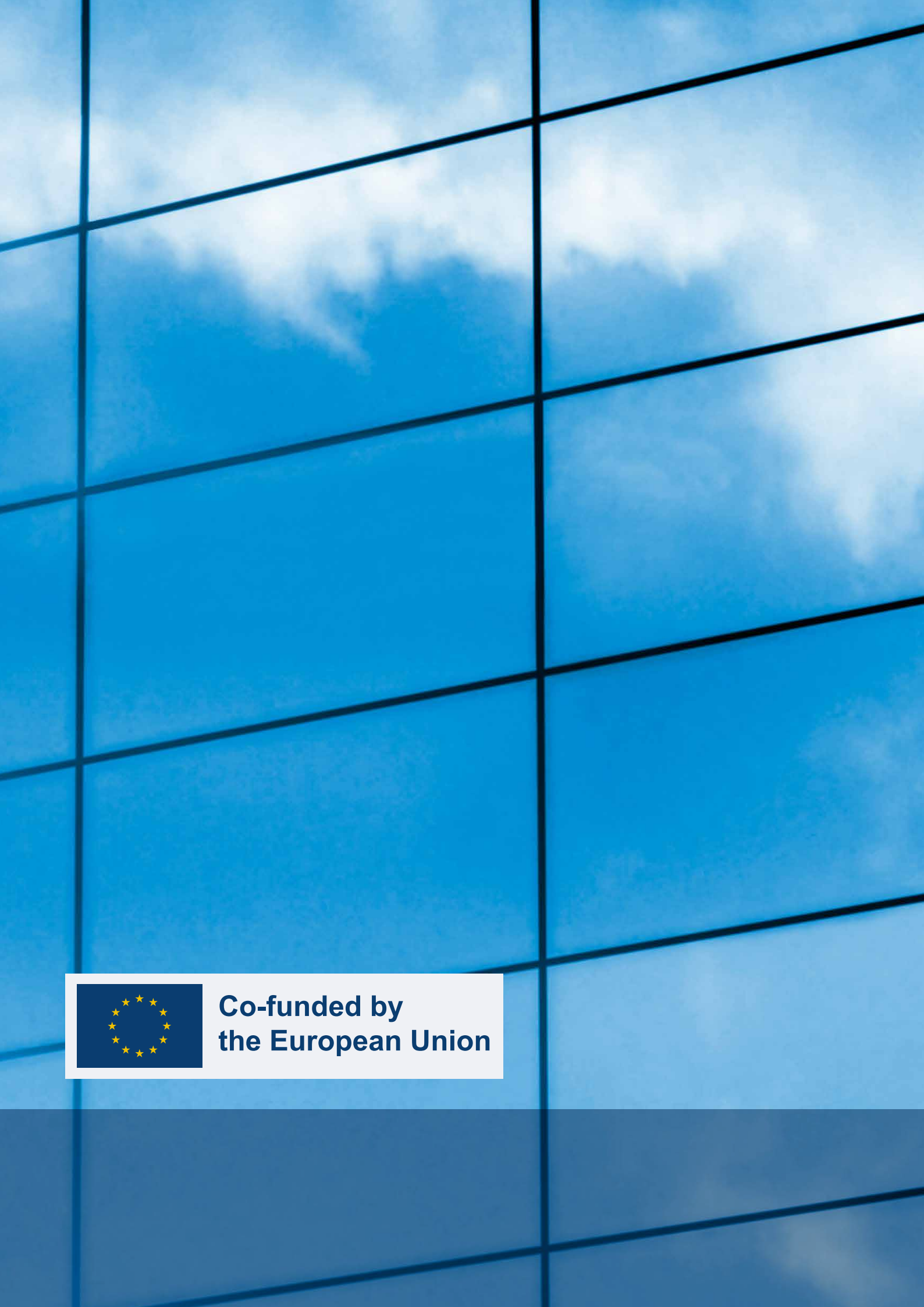
As of: 10/2023

This brochure does not claim to be exhaustive, but reflects the diversity of the aeronautics and space industries in the federal state of Bremen.
We thank all the companies and institutions involved for their kind support with this project.

Gender notice
Where the text refers to persons, the masculine form is used for reasons of readability.



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