

INDUSTRIES

MAINTENANCE & AEROSPACE

Maintenance or MRO (Maintenance, Repair and Overhaul) covers the activities and technologies needed to achieve control, maintenance and optimization of technical systems as efficiently and effectively as possible, within the parameters determined by availability, safety and costs. In this sense, maintenance is the container concept for the complete 'operating-life upkeep' of a system. It is a broad area of expertise and part of almost every sector in the economy.



Maintenance

In Brabant, the maintenance industry mainly concentrates on lifetime extension, new products, lower operating costs, sustainable processes, safety and environment.

Brabant has a very strong foundation for growth and development within the maintenance industry, including:

- A long Dutch maritime history
- Background in the aviation industry
- Strategic position between the major ports of Rotterdam and Antwerp
- Location in the largest petrochemical cluster in western Europe
- Serving as a home base to eminent players in the process industry (Dow Chemicals, Sabic Innovative Plastics)

The maintenance industry's main focus in Brabant is the Aerospace industry. The Netherlands, particularly Brabant, offers a complete package of aerospace services and products, including line and base maintenance, engine and component repair, aircraft, painting, engineering, spare parts provisioning and trading, logistics, aircraft overhaul and conversions, repair, testing, control and developing aircraft end of life solutions.

Industry overview

The Maintenance industry is an obvious growth market in the Netherlands. It is an essential aspect of the real estate, infrastructure, fleet, process industry, manufacturing, food and beverage and pharma sectors, has an estimated turnover of € 30 billion and employs about

342,770 people.

In Brabant the maintenance industry consists of

12,555 companies, accounting for **56,610**

jobs, or more than **16%**

MAINTENANCE: BRABANT COMPARED TO THE NETHERLANDS

| | Establishments | Jobs |
|-----------------|----------------|---------|
| Brabant | 13,555 | 56,610 |
| The Netherlands | 86,144 | 342,770 |
| Share Brabant | 15.7% | 16.5% |

Source: Vestigingenregister Noord-Brabant/LISA (2020), definitie ETIL/Provincie Noord-Brabant, bewerking Fanion onderzoek & advies

AIR TRANSPORT MARKET DRIVEN BY EMERGING GLOBAL ECONOMIES

The global market for MRO for aerospace and defense (A&D) represents one of the world's largest markets in terms of size, scope, and revenue. In 2019, the overall revenues for the commercial aviation alone is expected to be \$ 82.9 billion, and it's expected to rise to \$ 117.7 billion by 2031¹.

The military aviation MRO market is estimated to value US \$ 37.6 billion in 2020, and is projected to grow to a value US \$ 49.3 billion by 2030².

The bulk of MRO for A&D is focused on maintenance, airworthiness, and support operations for the physical assets of airline carriers and military fleet operations. In other words, it consists of maintenance performed on aircraft by technicians, mechanics, and personnel in maintenance facilities, depots, and in the field.

Maintenance is a value chain activity, meaning that its performance is only as strong as the weakest link. Many different types of service providers are active in the value chain, including:

- Users/owners
- OEMs or builders
- Contractors
- Consultants and specialists
- Businesses offering complementary knowledge, products or services

By learning from best practices, improved implementation and innovations, those involved in the value chain can:

- Improve performance
- Reduce costs (direct and indirect, increased usage and decreased downtime)
- Reduce quality losses (product degradation, off specs)

Sources:

¹Oliver Wyman, Global Fleet & MRO Market Forecast Commentary 2021-2031

²Report Buyer, The Global Military Aviation MRO Market 2021-2030

PROMINENT MAINTENANCE COMPANIES IN BRABANT

| Company | City | Product | Country |
|-------------------------------|---------------------------|--------------------------------|-------------|
| ABB | Etten-Leur | process control equipment | Switzerland |
| Axxiflex Turbine Tools | Rijen | turbine and MRO tools | Netherlands |
| BASF | Oosterhout | construction chemicals | Germany |
| Bosch Rexroth | Boxtel | machinery | Germany |
| Bradford Engineering | Heerle | aerospace | USA |
| Chromalloy | Tilburg | gas turbine engines | USA |
| Daedalus Aviation Group | Rijen | aircraft maintenance | USA |
| Dynniq | Breda | electronics installation | Netherlands |
| Equans (ENGIE) | Various locations | technical services | France |
| Fabory | Tilburg | fasteners | Netherlands |
| Flowserve | Etten-Leur | pumps, valves | USA |
| Fluor Consultancy | Bergen op Zoom | business services | USA |
| Fokker Landing Gear | Helmond | aviation | Netherlands |
| Fokker Services | Woensdrecht | aerospace services | Netherlands |
| Fugro | Breda | engineering (infrastructure) | Netherlands |
| KMWE Aerospace | Eindhoven | aerospace | Italy |
| Kuijpers Maintenance | Helmond/Roosendaal | installation & maintenance | Netherlands |
| Mag45 | Eindhoven | maintenance | Netherlands |
| Royal Netherlands Airforce | Various locations | airforce | Netherlands |
| Sabic Innovative Plastics | Bergen op Zoom | plastics | USA |
| SPIE Nederland | Breda, Tilburg, Eindhoven | technical services | Germany |
| SPIE Numac | Breda/Den Bosch/Oss | machinery maintenance | Germany |
| StandardAero Defence Services | Hoogerheide | aerospace (gas turbines) | USA |
| Terma | Hoogerheide | radar/electronic warfare | Denmark |
| Tüv Rheinland Sonovation | Oosterhout | ultrasonic research techniques | Germany |
| Wärtsilä Propulsion | Drunen | propulsion systems | Finland |

Source: BOM / Fanion research & consultancy

Aerospace industry

Overview

In 2018 a total of 160 establishments and 18,700 jobs are involved in the Aerospace industry in Brabant. About 35 establishments with 7,620 jobs have a direct connection with aerospace. Within this group the Dutch Royal Air Force (5,310 employees) and Aerospace HTSM (1,900 employees) are the largest sectors. On top of that there are 125 establishments with 11,080 employees related to Aerospace as supplier of components, parts, services or knowledge. Of which 70 establishments and 7,580 employees in HTSM and 16 establishments and 2,730 employees in materials.

Turnover

In 2016, the turnover (net worth) of Aerospace related activities in Brabant has an estimated value of 6.8 billion euro. The direct aerospace activities have a net turnover of almost 1.2 billion euro and the companies that are related to Aerospace as second Tier of third Tier have a turnover of in total 5.7 billion euro.

Profile

With the bankruptcy of Fokker in 1996 the Aerospace industry in the Netherlands lacks an OEM company, but a lot of the knowledge of Fokker and its suppliers has been preserved and expanded. On the basis of its strong HTSM roots Brabant has a lot to offer to worldwide Aerospace industry.

Source: Fanion onderzoek & advies, Aerospace, A General Overview of the sector in Brabant (2018)

The Brabant Aerospace industry consists of two important groups:

1. HTSM
2. Maintenance, Repair and Overhaul.

The first group follows out of the strong HTSM cluster in Brabant. In fact there is almost no machine that can't be built in Brabant. The whole value chain of HTSM is present, from the processing of raw materials towards OEM's like ASML, Philips Healthcare, DAF and VDL busses.

Brabant has a strong profile in Tier 1, Tier 2 and Tier 3 that work together in an open innovation structure.

Relevant for Aerospace are Brabants' Tier 2 companies that are specialized in turning, CNC milling, deep drawing, bending of high quality precision parts. These companies deliver small and large volumes of high complex products at low cost and within a low lead time. These companies also work for different end markets: semiconductors, automotive, health and also aerospace.

For Aerospace these companies supply engine parts and aerospace structure parts and assemblies.

In Brabant Dutch Aero, KMWE and Fokker Landing Gear are most important companies in this field.

Then there are companies in Brabant that are Tier 1 on systems integration: robotics, control systems, cryotechnology, etc. They supply semi-finished products and modules.

Within HTSM there is a number of Tier 1 and Tier 2 towards OEM's like for example Boeing, Airbus, Lockheed Martin, Pratt & Withney and Rolls Royce.

The second group in Brabant are HTSM companies that focus on Maintenance, Repair and Overhaul. Most of these activities are clustered around the Netherlands Air Force bases in Woensdrecht and Gilze-Rijen. Here maintenance to aircraft is executed, but there is also a focus on training and education. In Tilburg Chromalloy is an important player that repairs and maintains gas turbines of civil aircraft from all over the world.

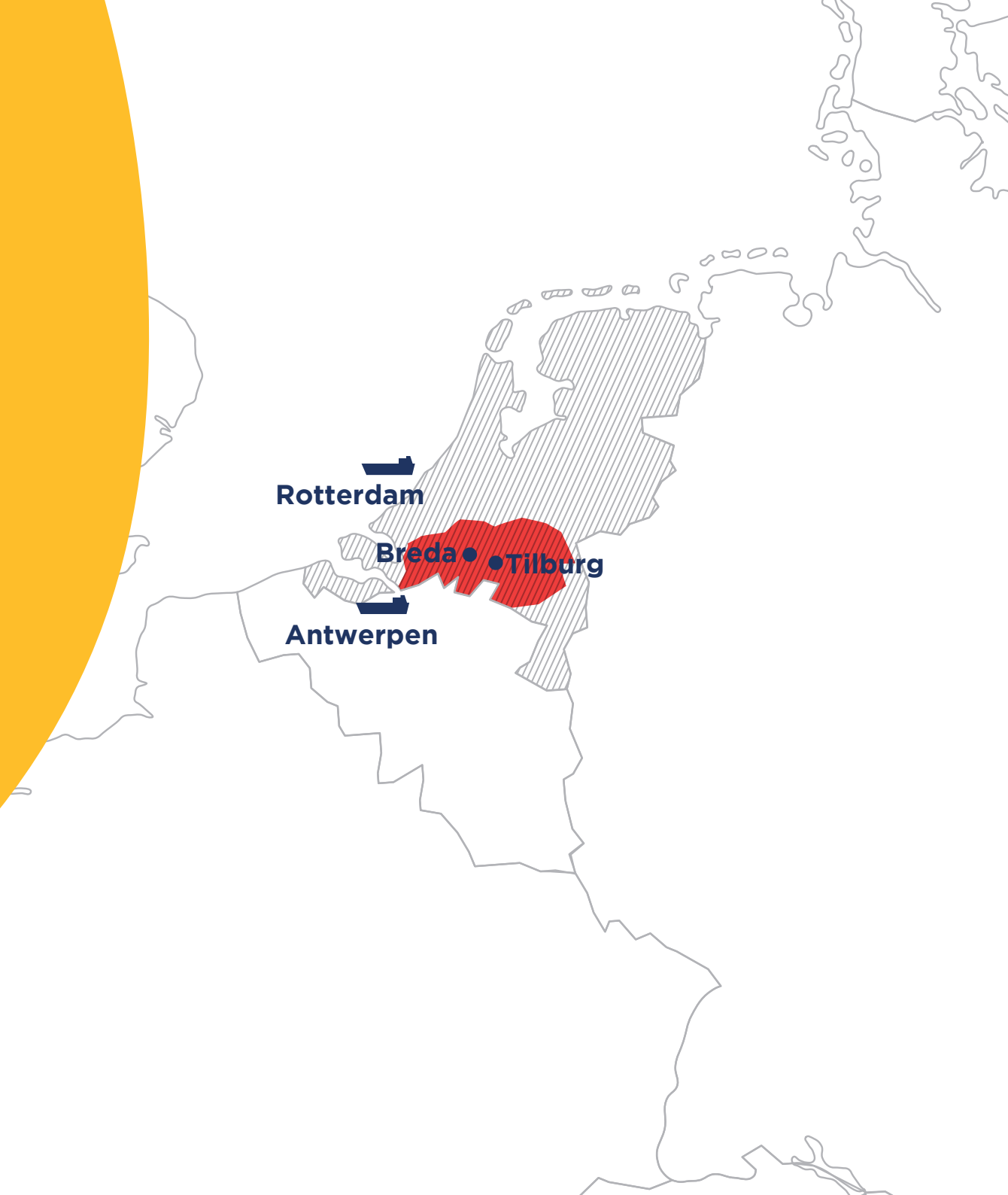
Next to these main groups there are specialized companies that are active in aerospace, for example: Vanderlande Industries is one of the leading companies in the world on luggage handling systems and Desso is producer of carpets but also active in airplane covering.

Source: Fanion onderzoek & advies, Aerospace, A General Overview of the sector in Brabant (2018)

Regional strengths

The Netherlands' aerospace industry is independent and neutral with outstanding training facilities. The manufacturing of aircraft parts is highly profitable in the Netherlands, second only to France worldwide.

Brabant, Breda and Tilburg in particular, offer excellent opportunities for maintenance. The province is strategically located at the gateway to Europe between the major ports of Rotterdam and Antwerp, and positioned in the largest petrochemical cluster in western Europe. The province also offers the best logistics performance in Europe, allowing for the most efficient European distribution of spare parts possible.



KNOWLEDGE INSTITUTES AND NETWORKS

AVIOLANDA AEROSPACE

The Aviolanda Aerospace project group aims to become the European center for aviation-related Maintenance, Repair, Overhaul & Upgrade. Project partners include the Province of Brabant, Woensdrecht, Stork/Fokker, the World Class Aviation Academy, the Ministry of Defense, the Brabantse Milieufederatie (BMF) and World Class Maintenance, with BOM and REWIN development agencies as stakeholders. Project goals include the redevelopment of the Stork/Fokker site in Hoogerheide, the attraction of international companies and reinforcement of labor opportunities. Following from the 'Maintenance Valley' initiative, Aviolanda started in 2008 and has since then attracted the establishment of companies such as the Dutch Air and Space Laboratory, Standard Aero, Terma, Center of Maintenance of Composites, Boeing, AAR and TiaT Europe, which all have offices and work floors at the site. In addition, a joint venture was initiated to allow new aviation companies to set up operations in the vicinity of the landing strip, financed by several parties, including the Province of Brabant (60%), the municipality of Woensdrecht (20%) and Stork/Fokker (20%).

www.aviolanda.nl



GILZE RIJEN - GATE2

The Gate2 facility hosts the rotary wing specialists situated in the Mid-Brabant Aerospace & Maintenance cluster. Home to the Royal Dutch Air Force helicopter fleet and Rotary Wing Training Centre, Gate2 is ideally positioned for Helicopter MRO activities as well as MRO for training and simulation tools for both maintenance and flight personnel. Gate2 provides a knowledge, training and development center, facilities for simulation and serious gaming, and incubator facilities for manufacturers and companies in maintenance, repair and the overhaul of high tech systems.

www.gate2.nl



KNOWLEDGE INSTITUTES AND NETWORKS

WORLD CLASS MAINTENANCE

World Class Maintenance (WCM) is the first cross-sectoral maintenance platform for the process, infrastructure, energy, maritime and aviation industry sectors. The first five consortium members, Essent, Gasunie, Logistics Center Woensdrecht, Schelde Marinebouw and Wärtsilä Propulsion Netherlands, joined forces in March 2007, with five additional organizations signing up in April 2008. Today, the WCM counts almost thirty business, nine knowledge institutes, fifteen intermediary organizations and one government organization as partners. The consortium aims to:

- Improve performance and stimulate smarter production
- Reduce production costs
- Generate sustainable employment through improved production
- Become a supply chain leader in maintenance
- Increase export of maintenance
- Reinforce and enlarge labor market potential

World Class Maintenance was initiated by BOM and REWIN development agencies. BOM and REWIN support continued growth by stimulating networking between capital-intensive industries (for example, the aircraft or process industries), suppliers, capital goods producers, intermediate organizations, knowledge institutes and Dutch government bodies to develop new strategies and joint project execution, creating new products, processes and business propositions. At the moment there are thirteen projects running under the WCM program.

www.worldclassmaintenance.com



KNOWLEDGE INSTITUTES AND NETWORKS

AIRCRAFT MAINTENANCE AND TRAINING SCHOOL

AM&TS offers aircraft (maintenance) training for both students and professionals and it is located at the Aviolanda Business Park in Woensdrecht. The school originated from the former Fokker business school and was certified (Part-147) in 2004 by EASA, the European organization that manages the aviation legislation.

AM&TS works together with business, education, research institutions and government on continuous innovation in the field of aircraft maintenance and areas including Composite Maintenance and UAV.

www.am-ts.nl



MAINTENANCE VALUEPARK TERNEUZEN

Valuepark Terneuzen is a joint venture between local port authority Zeeland Seaports and Dow Benelux. With 140 hectares of land available for further investment, companies settling at Valuepark benefit from both the proximity to Dow Benelux's extensive petrochemicals facility as well as Zeeland Seaports' expertise on park infrastructure and regional economic development. Maintenance Valuepark will provide space to a number of companies, primarily suppliers and contractors, currently established at the Dow industrial site and space will also be reserved for education and research facilities. The site has potential to become an important regional maintenance cluster. Current partners include Katoen Natie, VSL Silo Logistics, Oiltanking, Bertschi AG and SGS Group.

www.maintenancevaluepark.com

