Wallonia’s Technological and strategic roadmap for the defense sector

June 2024
Belgian and Walloon Defense Industry Overview
The **Belgian defense industry** generates an estimated turnover of around €6 billion (around **€4.5 to €5 billion in Wallonia**) and employs around **12,000 full-time equivalents in Wallonia** (2022).

- Current turnover of **€6-7 billion**, including 4.5 to 5 billion for Wallonia
  - just under **100 companies**
  - **12,000 jobs**, including 9,000 in Wallonia

- Stable arms activity until the outbreak of war in Ukraine and the increase in the defense budgets of NATO member states

- Drop in the number of jobs in aeronautics post-COVID-19 (2021), before stabilizing until 2026 despite the resumption of sales growth.

- **Export licenses** have been granted for €2.6 billion in 2020 and €2.7 billion in 2019. These exports will continue in 2021:
  - the European Union and North America (84%)
  - Asia and the Near and Middle East (7%)
  - Central and South America (3.25%)
  - Europe (excluding the EU) and Turkey (2.08%)
  - Africa (1.83%)

Source: Roland Berger, IBISworld, Agoria
The Walloon industrial landscape is balanced between OEMs, subcontractors and service companies.

**Economic landscape in # of companies**

- **Services**: 26%
- **OEMs**: 21%
- **Technology**: 14%
- **Subcontractors**: 29%
- **Others**: 10%

Some **40 Walloon companies** active in the defense sector

There are **more than 2 times** as many subcontractors and service companies as there are OEMs
- Component manufacturers (half of them)
- Consultancy or engineering services (a quarter)
- CDMO or MRO (the rest)

**A few small technology companies active**, for example, in sensors, radar and x-rays, UAVs/UAMs, artificial intelligence and robotic targeting systems.
The Walloon defense industry is overwhelmingly geared towards land-based applications, followed by airborne applications.

**LAND**
- Strong position throughout the chain
  - OEM’s (John Cockerill, FN Herstal)
  - Group of subcontractors
  - CDMO and MRO
  - Technology companies (sensors and radars, robotic targeting systems, x-rays, etc.)
  - Consulting and engineering services
- Arms and Munitions companies are particularly well represented (FN Herstal, Mécar, Poudrerie Belge de Clermont)

**AIR**
- Strong position
  - Group of subcontractors
  - Several OEMs (Safran, Sonaca)
  - CDMO and MRO
  - Technology companies (AI, UAV/UAM, and x-ray)
- Subcontractors serving the Air component are also likely to serve the Land component, but the reverse is not true

**SPACE**
- Expertise in launchers, satellites and optical instruments
- Not very present, but development expected in the short term (development of the value chain, ‘New Space’ program, Aerospacelab in Charleroi, etc.).
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Walloon companies are active on **6+1 technology platforms**

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• 6th generation fighter aircraft

+ WG7
Space4Defense
1. Scope

• **Autonomous System**
  - Air, naval and land vehicles
  - Human control adapted to type of activities
  - Platform collaboration capability
  - Long-endurance missions
  - Mission-specific embedded equipment integration

• **Means required for**
  - Deployment in operations theaters
  - Support systems
2. Priorities

• **Protecting systems against threats**
  – Ballistic protection
  – Electromagnetic and cyber resilience
  – Stealth and signature reduction

• **Capabilities, functions and features**
  – Teaming - swarming
  – Threat detection and interception
  – Evacuation and assistance capabilities
  – Complex environments & Intelligence

• **Integrated modules**
  – Inter, intra and operator communications
  – HM Interface
  – Energy management
  – Navigation in complex environments

• **Support, training, certification and testing**

• **Additional opportunities**
  – Droning, command center integration
  – Regulations and ethics challenges

3. Partners (*)

* Sample of key players
1. Scope

• **Information**
  – Collect, process, transmit information intra and inter-system
  – Security & cyber (not corrupted, stopped or diverted)
  – Increase number and type of data & reducing the human load
  – Integration in embedded systems for Air, Land and Sea

• **C4ISR**
  – Control, command, Communication, Collaboration, Intelligence, Surveillance and Reconnaissance

• **C8ISR**
  – + Combat systems, Collaboration, Coordination and Code (C8ISR) by manned or unmanned platforms
2. Priorities

• **Information processing**
  – Augmented/virtual reality
  – Image & data processing
  – User interfacing
  – AI for decision support, trusted AI

• **Information communication**
  – Communication in hostile environments
  – Robust communications (short & long range)
  – Optimization of throughput/range ratios

• **Information security**
  – Cyber threats (secured-by-design)
  – Data encryption techniques
  – Hardware security

• **Integration into products & systems**
  – Electronic components, OS, simulation & modeling
  – Specific sensors & actuators

• **Normative constraints (ASD)**
  – Norms, standards & certification process
  – Qualification test environments & resources

3. Partners (*)

* Sample of key players
1. Scope

- **Effectors**
  - Small arms, rifle & machine guns
  - Airborne pintle & pods
  - Rocket launchers
  - Remote Weapon systems
  - Turrets

- **Ammunitions**
  - Small, medium, large calibers

- **Systems Integration**
  - Land, Air & Naval platforms
2. Priorities

- **Improved effectors and conventional ammunition**
  - Mass reduction of ammunition and systems
  - Improved effectiveness and reduced collateral damage
  - Integration of sensors and intelligence in ammunition
  - Reduced (illegal) proliferation of weapons and energetic materials

3. Partners (*)

- **Integration of sensors and effectors on air/land/sea platforms**
  - Reduced interference effector & vehicle
  - Improved HMI
  - Integration of weapon systems on UAVs
  - Sensor data fusion, calculations and decision support for the weapon system

- **Development of new generations of effectors**
  - Cargo munitions > non-kinetic charges
  - Hypersonic vectors (> Mach 5)
  - Directed-energy effectors & new propulsion systems

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1. Scope

• **Next Generation Materials and Structures for the Defense sector**
  – Advanced Structural Materials
  – Advanced Manufacturing Processes
  – And associated Numerical Tools for Design & Manufacturing

• **To improve the performance of:**
  – Next Generation Aerial, Land, Marine & Space vehicles
  – Effectors and ammunitions
  – Soldier Equipment
2. Priorities

• Advanced composite structures
  – Pertinent Material & Process selection
  – End-to-end development with optimized design
  – Process simulation

• Balistic protection
  – Pertinent Material & Process selection
  – Simulation of effects

• Environmental resistance
  – Improvement of High Temperature resistance
  – Improvement of Erosion & Corrosion Resistance

• Additive Manufacturing
  – Focus on Metallic Materials
  – Follow Process/Equipment evolution
  – Materials & Process qualification

3. Partners (*)

* Sample of key players
1. Scope

- **Technologies, products and services**
  - to support the user during entire asset life cycle from acquisition to decommissioning

- **Cross-cutting topics**
  - air, land and sea vehicles, weapons and munitions, soldier equipment, satellites

- **Dual applications**
  - Possible synergies for both military and civilian assets applications

- **Defense Life Cycle specificity**
  - Systems in service for several decades → sustainability of technologies, products and their supply chain
2. Priorities

- **Simulation technologies for**
  - maintainability, operation and maintenance activities

- **Embedded technologies for**
  - data acquisition and use in the context of maintenance

- **Predictive maintenance**
  - technologies and methodologies for components, modules and systems failure prediction

3. Partners (*)

- **Repair management**
  - technologies and processes for components, modules and systems repair

- **Life Cycle Engineering**
  - advanced technical management of obsolescence and upgrades
  - AI & digitalization solutions
  - prescriptive analytics

* Sample of key players
1. Scope

- 6th generation fighters
- Drones, especially those working with 6th generation fighters
- Hypersonic launchers and interceptors

**Trend & opportunities**: Increasing of on-board electrification

EDF: European Defence Fund (R&T)
EDA: European Defence Agency (R&T)
SCAF: Système de Combat Aérien du Futur (France, Germany, Spain)
GCAP: Global Combat Air Program (UK, Italy, Japan)
NGAD: Next Generation Air Dominance
2. Priorities

- **Propulsion**
  - Variable cycles, Operability, Compactness, Electrification
- **Thermal cooling systems**
  - Compactness, Electrification, Stealth
- **Smart actuators for critical applications**
  - Electrification
- **Electronic control systems and on-board software**
- **Stealth structures**

3. Partners (*)

- Enhancing resistance to external aggression
- Understanding aerodynamics and heat exchange at hypersonic speeds
- Thermal protection for hypersonic vehicles

*Sample of key players*
• June 30, 2023: Finalization of the Technological and strategic roadmap “Defense” – the Space4Defense theme has not been addressed

• July 2023 – Adoption of the European space strategy for security and defense.

• 2024 – Decision to complete the roadmap by adding the Space4Defense theme

➢ Establishment of working groups based on NATO themes to map the capabilities of the Walloon ecosystem as well as its ability (competence) to innovate
Wallonia’s Transverse Working Topics
7 Strategic transverse working topics

- Internationalisation
- R&D
- Sovereignty & Robustness
- Diversification
- Dual Applications
- ESG
- Talents

Strategic Themes

7 Strategic themes:
- Sovereignty & Robustness
- R&D
- Diversification
- Dual Applications
- ESG
- Talents
- Internationalisation
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