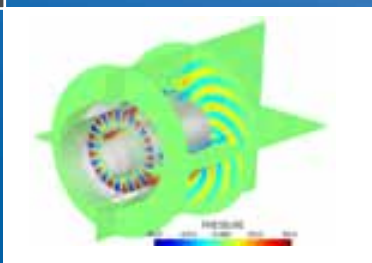


Wallonia Aeronautical Industry, Research & Education... together!
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Skywin Wallonie is the Aerospace Competitiveness Cluster of the Walloon Region of Belgium. Created in 2006 in order to increase the competitiveness of Walloon companies in the Aeronautics and Space sectors.

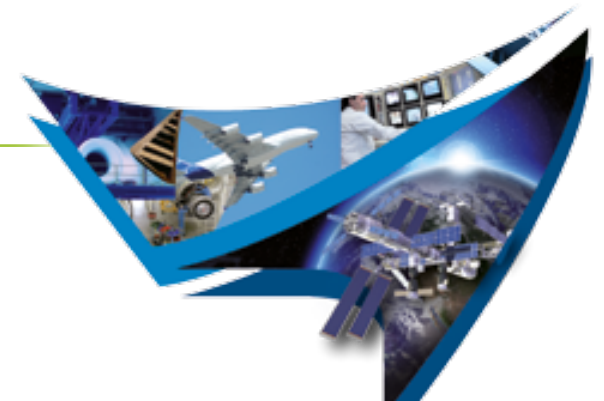
Skywin represents 100 members coming mainly from Industry, but also from universities and dedicated research centers.

This represents a total of more than 7,000 jobs in the region for 1,4 billion Euros turnover. Skywin gathers several major regional players such as Thales Alenia Space, FN Herstal, Forges de Zeebrugge, Sabca, Sonaca, Spacebel, Techspace Aero, Thales Communication Belgium as well as numerous innovative and proactive SME's working in engines, structures, systems and equipment technologies. Members activities consist of R&D, design, virtual prototyping, manufacturing, MRO and upgrades of aircrafts, helicopters, UAV, engines sub-assemblies or rocket components and space equipments and related services.

Skywin's objective is to foster and promote the technological advance of the Walloon Region in the Aerospace sector and therefore to supply competitive products and services which are the mainstay of business development.

Strongly oriented toward industrial projects and benefits, Skywin activities can be categorized into 3 orientations :

- **Innovation Projects:** Since 2006, Skywin manages 35 R&D Investment and Training projects totalizing 163 contributions from industries, research centres and universities with a total budget of 130 Million Euros.
- **Clustering activities:** The Clustering process is based on Business Development actions, setting-up of partnerships, benchmarking, and technology watch programs.
- **International business development:** The Cluster also supports international business development actions and promotes its members know-how in various trade fairs and dedicated Aerospace events. Besides, the Cluster also promotes transnational or trans-regional cooperation and operates in good intelligence with similar clusters located in Europe. (EACP, Transcomas, Care project, NEREUS, ...).



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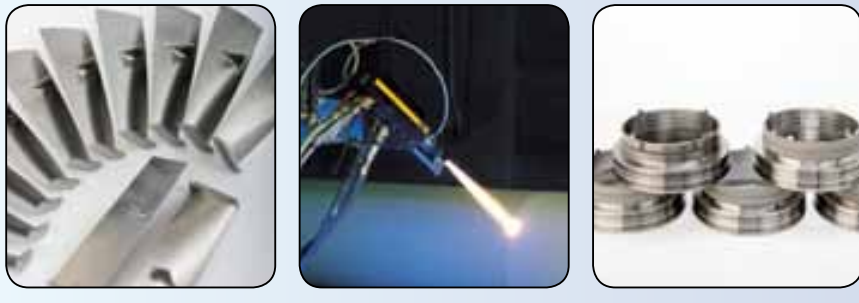
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Aeronautic Industry

Advanced Coating



Advanced Coating is an optimally sized, customer-oriented company with the skills to provide its customers high added value.

Quality, reliability and flexibility are the watchwords of our family company who can meet the tightest design, development and manufacturing deadlines on the market.

Advanced Coating is a reference in thermal spray coating technology, as well as in flat and cylindrical grinding, super finishing and balancing of mechanical parts of any dimensions.

→ Products :

- Advanced thermal sprayed coatings (metals, alloys, ceramics and carbides) onto mechanical components up to Ø2000x6000 mm
- Main properties :
 - wear resistance (abrasion, erosion, fretting),
 - high temperature corrosion resistance,
 - thermal barrier,
 - abradable,
 - electric insulation,
 - power conductivity ...

→ Capabilities :

- Modern thermal spraying processes including plasma, HVOF, HVAF and Cold Spraying
- Flat grinding up to 4000x500 mm
- Cylindrical grinding up to Ø1524x6000 mm

- CN cylindrical grinding up to Ø350x1000 mm

- Super finishing up to 0,01 µmRa
- Balancing up to Ø1200x6000 mm and 3,5T

→ Certifications :

- EN9100 : 2003
- ISO 9001 : 2008
- ISO 14001 : 2004
- NADCAP in progress (coatings)
- Qualified as test laboratory (Metallography) for Safran Group

→ Main References :

- References of intermediate and final customers : AIRBUS – SAFRAN Group (SNECMA, TECHSPACE AERO) – SONACA
- Working of following programs : GP7200 - CFM 56 – SaM146 - ATAR

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Aerofleet



Aerofleet is specialized in High-Tech composites.

Nowadays we produce all kinds of high technical quality prepreg parts under vacuum and in autoclave.

Composite materials, using prepreg materials offer technical and environmental qualities.

Among other realizations, our company has built the domes for the Very Large Telescope, developed for ESO on the site of Cerra Paranal (Chile), the nozzles and the fairings for the A380 Airbus, weapon protection for the «FN», ...

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AKKA Technologies



AKKA Technologies (5700 employees) is the preferred partner of major OEMs and manufacturers in aeronautics. The AKKA Technologies Group is helping aeronautic OEMs and manufacturers at every step of their product lifecycle, from design to mass production. With over 1,500 consultants operating in this field, or about 1/3 of its workforce, the Group offers industrial companies the know-how acquired by their centres of expertise.

We are present throughout the whole project life cycle

Industrial Computing & Embedded Systems: definition and architecture of embedded systems and ground systems, basic software, real time software, software applications, algorithms, image and signal processing, simulation and test benches.

Product Engineering: studies and design, computation, simulation, materials, tests and quality control...

Process Engineering: lean manufacturing, engineering, supply chain quality, design to cost, industrial methods, manufacturing process...

Examples of projects:

Installation mechanical and electrical system for the new military transport aircraft: cockpit layout, routing of electric harnesses, definition of hydraulic and fuel lines, installation of computers, flight test facilities.

The AKKA Group company, is designing the embedded airport navigation system for the latest wide-bodied, long-range airliner: specifications, design, development, integration and validation, maintenance and upgrades of the complete software (drivers, basic software, MMI and applications).

As a specialist in engineering and technology consultant, AKKA Technologies has developed expertise in sectors such as automotive, space/defense, consumer electronics, telecommunications, chemicals, pharmaceuticals, energy, rail, naval activities and services.

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Responsible: Roland DE WILDE

Barco Silex



Barco Silex, your partner for DO-254 ASIC and FPGA design services

SILEX, Barco's center of competence for *FPGA and ASIC design*, has established a solid reputation in the development of *DO-254 certifiable hardware designs*. We design for different Design Assurance Levels from DAL-D till DAL-A. These FPGAs and ASICs are used in equipments that have been ETSO and TSO certified.

Starting from your upper level requirements, we provide all services needed to create the necessary hardware design life cycle data according to a DO-254 requirements process. Thanks to our broad suite of development and verification tools as well as our long-standing expertise and strong relationships with ASIC and FPGA providers, our services are valued by industry leading professionals worldwide.

Do-254 competences: Specific plans like HPAP, HCMP, HDP, HVVP and PHAC are developed.

All documents and their content, generated during the design life cycle process, are defined by means of templates.

Tool qualification effort is limited by using different types of tools from numerous EDA vendors. Validation and verification is maximally performed at component (ASIC or FPGA) level. Quality assurance is guaranteed by independency of reviews, audits and processes.

Currently, DO-254 is mainly used in the civil aeronautics market. However, since this recommendation targets the quality and safety aspects of a hardware design life cycle process, our expertise is strongly appreciated by other markets where safety or quality (and maintainability) is mandatory like: Medical, Automotive, Aerospace and Railroad market.

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BASF



BASF

The Chemical Company

BASF, the world's leading chemical company, offers a wide variety of products for the aeronautic sector. Numerous of our products are used in planes like our heat-resistant thermoplastics, sound insulation products, coatings, brake fluids and so on.

We also have products with application in the airports: de-icing agents, ground coatings ...

Whatever the question or the problem of the customer, our specialists analyse it and come with the best possible solution.

Bodair



BODAIR sa is active in the development, the design and the production of carbon fiber rods.

- As a result of the R&D conducted by Bodair, new technologies in carbon fiber rods are emerging.
- BODAIR is eager to offer high quality rods and advanced designs allowing significant weight reduction that largely exceed the current designs & performance of aluminum and/or stainless steel rods.
- Thanks to the combination of a completely new manufacturing process with a new carbon fiber design, BODAIR has acquired a unique competitive advantage over traditional rod technology & design.

BODAIR USES the pre-impregnated carbon fiber filament winding technology.

- This technology will allow maximum control of the process and will guarantee porosity levels that are significantly lower than the traditional RTM processes. It will also allow maximal reproducibility and consistency in overall product quality.
- BODAIR uses patented production methodologies and design which enable the production of parts which previously were impossible to manufacture.

The BODAIR's design makes possible to integrate metal inserts in a carbon fiber tube , these inserts are positioned during the carbon fiber tube filament winding process.

Different types of rods are produced:

- **Rods with adjustable ends:** In the case of rods equipped with adjustable ends, the rod's body features one or two inserts in stainless steel , aluminum, titanium or HR polymers with a thread. The adjustable ends are screwed in the inserts.
- **Rods with fork type ends:** In this case, generally used for structural rods, the metal fork or carbon fiber fork are integrated into the rod body during the manufacturing process.

Britte-Mustad



Britte-Mustad: "A New Company is born"

Today we could certainly say that we are a "Pole of excellence in high precision mechanics for Aerospace Components".

"Britte Mustad" belongs to the mechanical division of the family group MUSTAD INTERNATIONAL GROUP founded in Norway in 1832. This Family Group has built his reputation, not only on the Quality of their products, their diversified and industrial strategy, but also on the respect of their commitments.

Britte Mustad's main mission is:

- to machine high precision mechanical components in all existing materials including composite, superalloys Milling, turning, grinding and machining on CNC production centers constitute our basic tasks. We can manufacture prototypes or production components in very special alloys, providing high added value in terms of technology, competitiveness of price and service.
- to design and manufacture very complex tools, including measuring and control systems.
- to produce assemblies with final testing for all industrial sectors.

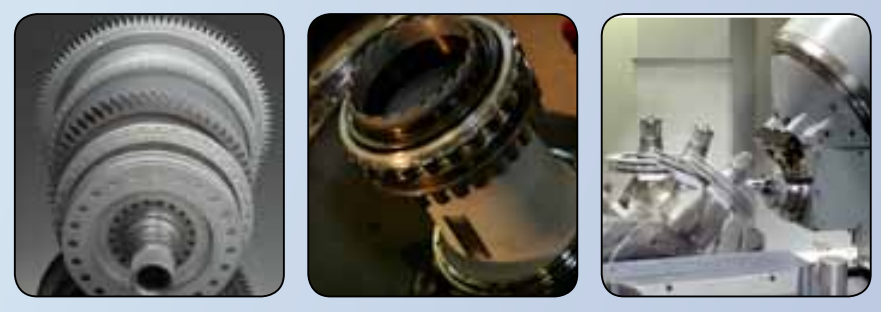
Our Main Customers are considered as key players in the Aerospace World and we are machining critical and very complex parts for many of different engines which equip many Airbus or Boeing airplanes.

Our products are designed not only for Aerospace but also for Defence, Spatial, Energy, Transportation, and Machinery Construction.

In the association with the other nearby division "Mustad Belgium", which produces also mechanical components but by screw-cutting and machining on CNC production centers, we are able to cover a huge range of machining capability and a high level of technology.

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Capaul



Capaul - High quality service - Uncompromising precision - Excellent delivery performance. Highly qualified workforce as well as the flexibility of a medium-sized enterprise is the keys of the success of Capaul.

Capaul masters the complete metal-cutting manufacturing of mechanical components and complex subassemblies: modules for aircraft engine - Subassemblies for complex medical equipment - complete installations from the procurement of raw material to the finished product.

Capaul offers high-precision CNC machining and 5-axis simultaneous machining till diameter 1250mm x 1000 mm in a 1500m² fully air-conditioned hall. It facilitates to manufacture parts with the highest precision at a constant temperature of 20°C and to control these parts on one of the high-precision 3D-Measuring machines.

Products and fields of application

A modern plant can offer the following capabilities:

- CNC turning on 2 to 5 axis Turn-Mill Centers up to 1250 mm
- 3, 4 & 5 axis machining (pallet & pendular machining) up to 1250x1000x1000 mm
- Machining on Horizontal Centers (pallet machining) up to 500x500x500 mm
- Broaching (turbine disk slots)
- Hard Turning in air-conditioned environment
- EDM machining
- Complete integration of subassemblies (CFM56)

Main References:

Certified: EN9100:2003

References of intermediate and final customers: AIRBUS – BOING – GENERAL ELECTRICS - SAFRAN Group (TECHSPACE_AERO) – SONACA

Working of following programs: A330/340 - Airbus A400M - CF34 - CFM 56 - EMBRAER - F7XC - GE90 - GP7000 - TP400 – TYNE – VITAL

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Cegelec



Cegelec S.A. is one of the leaders in the sector of technological service for private and public companies. Cegelec Control Systems has developed expertise in the domains of:

- Automation and Process Control
- Communication and Hard Real Time Software
- Measurement and Control
- Functional Safety
- Global Support Package

Cegelec Control Systems is used to provide services in the aeronautic and space domains since more than 40 years

Measurement and Control Systems

The MCS2000 is a decentralized measurement and control system:

- open system, always evolving to meet the customer needs and to integrate technological evolutions
- operating on multiple hardware and software platforms
- broad range of interfaces (standard and specialized conditioning, high speed acquisition, industrial and specialized interfaces, ..)
- hardware-in-the-loop (HIL) simulation
- easy to use and intuitive configuration and programming software

Amongst the numerous deployment of MCS2000, these are the most significant and recent ones:

- SABCA in Brussels, where several generic test benches were provided in the frame of the Aircraft System Validation Rig (ASVR) project, to develop and qualify the Electro Hydrostatic Module (EHM) within the framework of the Power Optimised Aircraft (POA) programme
- SABCA in Brussels, where several test benches (100 logical and analog inputs/outputs, 1553 specialized interface) were provided for the development and qualification of the various actuators of Vega launcher
- DLR in Lampoldshausen (Germany), where a high performance test bed (2000 logical and analog inputs/outputs, high speed analog acquisition and storage of up to 5,000,000 samples per second, multi-user programming software) is installed to test the evolutions of the Vulcain engine.

Cissoid



CISSOID is the leader in high-temperature semiconductors, delivering integrated circuits for power management, power conversion and signal conditioning. CISSOID active components provide best-in-class reliability that outperform traditional components and silicon technologies; they enable energy, weight and cost savings in lighter, cooling-free and more compact electronic systems.

CISSOID provides high reliability electronic components guaranteed from -55°C to +225°C, and commonly used outside that range, from cryogenic lows to upper extremes. These temperature capabilities translate into outstanding lifetime expectancy, as accelerated aging can be carried out at a much higher temperature than the normal operating temperature of the systems. Such aging tests are just not possible with traditional semiconductor products as most of them cannot operate reliably above 125°C. With CISSOID products, mission-critical systems and high-reliability electronics can now effectively achieve lifetime in the order of hundreds of thousand hours of operation at 125°C, which hits the most recent reliability requirements coming from leading avionic and aerospace players.

CISSOID products address a wide spectrum of aeronautic applications from motor drives (including applications like electrohydrostatic and electromechanical actuators, electric brakes, oil & fuel pumps, VSV control...), to power distribution and power converters, sensor signal conditioning and energy-harvesting devices. CISSOID already supplies leaders in aeronautic and aerospace markets such as SAFRAN and NASA.

Citius Engineering



Citius is an engineering company specializing in design and realization of turnkey solutions for industrial facilities. Its engineering office offers key competences in mechatronics, mechanical and electrical engineering. As an independent and autonomous partner, Citius develops tailor made systems dedicated to the improvement of the production of its customers' products.

Citius core business is focused on:

- **Special machines and test benches:** design, study and realization of tailor made systems integrating various technologies
- **Energy and Fluids applications:** pressurized system, cooling and heating systems, gaz and fluids distribution for standard industrial application or for specific development needs
- **Industrial project management:** Its recognized experience in project management allows Citius setting rigorous methods to successfully develop unexplored solutions.

Citius ensures the development of complete systems, from the early beginning by defining concepts, to the full development of the solution, as well as the commissioning and start-up of dedicated applications. Its works cover all aspects of a project:

- Design and studies of concepts and detailed solutions
- Selection and integration of on-the-shelf components and systems
- Planning and follow-up of installations, site management, coordination of work forces, reporting to clients
- Testing, commissioning, start-up
- Quality aspects, procedures, regulation, security
- Budgetary follow-up and reporting
- Risks management

Working in different sectors as various as aeronautics, aerospace, food & beverage, energy, defense & security or pharmaceuticals gives Citius a powerful experience and a capacity to develop innovative solutions. Citius offers its clients full management and implementation of their projects, ensuring a significant risk sharing, and solves the clients' problems as they were its own. With a global service offer, Citius is an independent partner committed to delivering results

Coexpair



Coexpair is an engineering company that combines a study office and a prototyping shop. We develop processes and equipment to transfer the best technologies to the customer. Coexpair is the European Partner of Radius Engineering (USA).

In partnership with our shareholder Radius Engineering, we focus on near net shape composite technologies: RTM (Resin Transfer Molding) and SQRTM (Same Qualified Resin Transfer Molding). Since 25 years Radius Engineering is the leader of these technologies. Coexpair team gather the experience of 11 highly qualified engineers, technicians and administrative.

Engineering. Our expertise covers design, material & process selection and analysis. Our engineers masters Samcef and Nastran finite elements models and they organize mechanical tests. Designers at Coexpair use Catia V5 modeler both for composite part design and for tool design.

Equipment. We provide our customer with Radius Engineering bolster press and injection system. All equipment are C.E. rated and supported by our European Technical Team. Two Presses and three Injection Systems are available in our shop for demonstration, prototyping & training activities.

Tools. The quality of the mold is 90% of the part quality. Our team use finite element analysis for thermal, deformation and kinematics studies. From material selection, NC machining, fitting, surface treatment, system installation to validation article: we master all critical step of tool design & manufacturing.

Training. Coexpair proposes a three day general introduction to RTM for Aerospace. The course covers the process, the design, the materials and the equipment used. Two components are fabricated by the participants.

Prototyping. Our shop is dedicated to prototyping, no serial production at Coexpair. The usage of our state of the art equipment reduces development costs and cycles.

Coexpair mission is completed when our customer runs successful serial (SQ)RTM production of aerospace components.

Dardenne



Dardenne sprl is a Company of high accuracy mechanics.

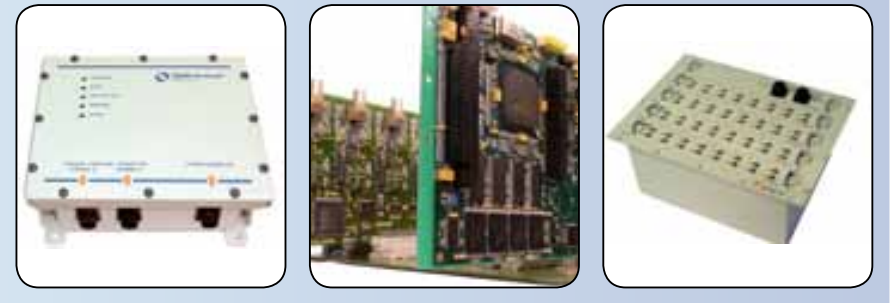
Established since 1978, we have a workforce of 20 employees. The main activities are high tech like Aeronautics and Space with critical parts.

Dardenne sprl manufactures prototypes, and also, parts or subset in small or average series or specific tooling or jigs.

We are EN9100 certified.

We are equipped with brand new CNC machines, with 3D measuring technology in an air-conditioned environment.

Deltatec



Created in 1986, DELTATEC is a design house specialized in advanced hardware and software technologies.

With a design team of 30 engineers, DELTATEC is active in various sectors: industry, broadcast TV, space, aeronautics...

Its current main activity in aeronautics is currently the design of high-performance elements of test beds.

DELTATEC has designed, for TECHSPACE AERO, a powerful network-based data acquisition system to test aircraft engines, with up to 3000 measuring points. This system provides high accuracy values thanks to high-quality acquisition, high-resolution A/D conversion and to its physical installation near to the engine, meaning shorter cables. The challenge has been to work properly in a very harsh environment.

Another example is the design of an electronic actuator based on synchro/resolvers to emulate the engine throttle gas. Security and safety were addressed using redundant functionality on all the critical paths, ensuring EN954-1 level 2 directive compliance.

DELTATEC has also developed several control systems for solenoid valves.

Now DELTATEC is targeting the development of on-board equipment, thanks to similar experience in the space sector and to a research project executed in the scope of the Marshall Plan.

Dumoulin Herstal s.a. Group

Owner of : DUMOULIN AERO and M.P.P.



In 2003, drawing on more than 35 years' experience in manufacturing luxury weapons, DUMOULIN HERSTAL S.A. decided to diversify into manufacturing parts for the civil aviation sector.

ISO 9001 certified (EN 9100 certification is pending), the company respects scrupulously the production, organisational and control requirements that are indispensable for the manufacturing of high-precision parts intended for aircraft manufacturers.

In addition, the SME has a flexible and efficient structure, which enables it to respond to wideranging customer needs.

DUMOULIN AERO is positioning itself increasingly as a key partner of aeronautics companies that want to establish a close relationship with suppliers on whose rigour, know-how, reliability and cost-effectiveness they can rely.

The activities of DUMOULIN AERO cover:

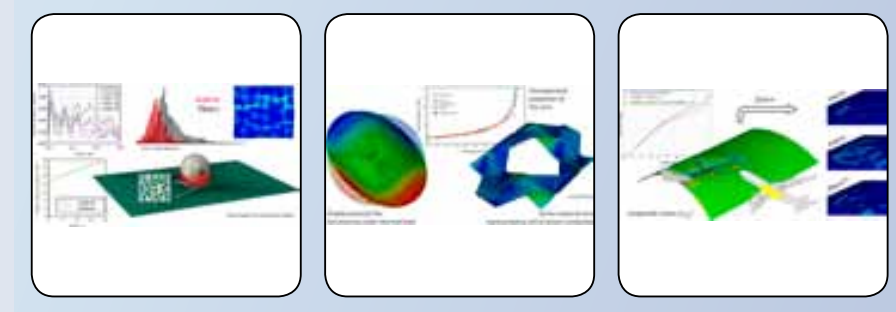
- manufacturing parts
- passivation
- dye-penetration
- thermal treatment
- metrology (in house three-dimensional inspection laboratory)

M.P.P. is an SME, which boasts ten years of experience.

Its staff specialises in the finishing of machined parts, i.e. fitting, grinding and trimming, in accordance with the requirements of the plans, specifications and even the customer's special wishes.

The infrastructure of our workshop as well as all of our resources and our high-performance tools are at the disposal of our operators in order to ensure the quality of our projects, while allowing us to respond flexibly to any requests related to this industry.

e-Xstream engineering



Give your composite materials a new power with DIGMAT; The standard nonlinear multi-scale material and structure modeling platform developed by e-Xstream engineering, simulation software & engineering services company, 100% focused on advanced material modeling.

The aerospace industry is looking for new technologies to bring optimal and innovative products time and cost-efficiently to the market. Composite materials offer great promises as per their low weight to stiffness ratio, freedom of design and extra outstanding properties, but also present many challenges to engineers...

DIGMAT nonlinear multi-scale material and structure modeling platform fastens the development of optimal composite parts. Through micromechanical modeling approaches, DIGMAT accurately predict the nonlinear behavior of complex multi-phase materials such as Carbon Fiber Reinforced Plastics (CFRP), honeycomb sandwich structures, short fiber reinforced thermoplastics or any other multi-phase material used in aerospace applications. The coupling of the material description with commercial CAE codes also allows for a precise modeling of the behavior of composite structures.

Airplane, space craft manufacturers and their suppliers use DIGMAT to study the thermo-mechanical behavior of material lab samples and predict the influence of the material microstructure on the structure end performance. Through partnerships with the aerospace sector, e-Xstreams has developed the appropriate tools and extensive know-how for modeling materials typically involved in lightweight aerospace composite structures.

Euro Heat Pipes (EHP)



Euro Heat Pipes (EHP) develops produces and sells Two-Phase Heat Transfer Systems (Heat pipes and Loop heat pipes) that, thanks to their exceptional thermal performances, are enabling the development of more powerful and consequently more dissipative Power Electronics.

From Space to Earth

Created in 2001, by externalizing the Two Phase Systems department of Sabca, EHP know-how is based on more than 30 years of heritage. Developed for Space, now available on Earth. This 100% European technology is leading the European cooling market for Space applications and is strongly developing on Aeronautical, Defense and Terrestrial markets. EHP proposes its two-phase cooling devices that will enable equipment manufacturers to increase their equipments reliability with the management of high power densities, low temperature excursion, compact packaging and remote cold sources.

Full in-house capabilities

Based on a staff of 38 persons, Euro Heat Pipes organization offers full in-house capabilities: Design and simulation capabilities, Industrial manufacturing, Quality control and Qualification and acceptance tests.

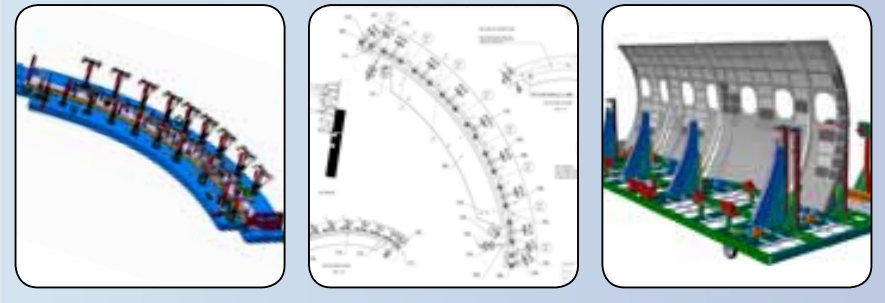
Main customers

Main customers are ESA, CNES, EADS Astrium, Thales Alenia Space, Tesat, IAI and Jaxa for space markets and Alstom, Airbus, Safran and PSA for non-space markets.

High untapped potential

The electronic improved reliability needs combined with the tendency to miniaturization associated to an increase of the dissipated power makes compulsory the use of new technologies as EHP Two-Phase Heat Transfer Systems and opens new high untapped potential markets.

Engiconcept



ENGICONCEPT is an engineering and design company founded in 1993.

Since 2004, it has been certified ISO 9001-2000.

The company has carried out projects in the aerospace and aircraft industry, railways, the automotive industry, industrial equipment and tooling (a speciality), plastics injection, science and laboratory technology, food industry, glass industry, pharmaceutical industry, telecommunications, etc.

ENGICONCEPT works in the field of design and making of tools (templates, injection moulds for plastics, pressing tools, etc) as well as the production of plans, solid parts modelling and surface modelling. It can design any automated system or mechanical solution. It produces mechanical and plastic prototypes, and is increasingly involved in rapid prototyping.

One of the major areas of activity of ENGICONCEPT is technical design studies and consultancy, as well as assistance and consultancy for project managers.

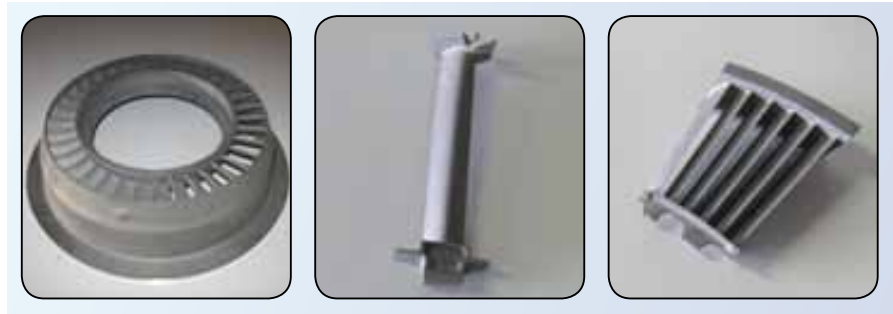
Design studies by one or more of the company's engineers are designers or draughtsmen with or without computer-aided drawing machine is another of the company's strengths.

ENGICONCEPT is specialised in the design study of fabricated structures, precision mechanics, design of new or modified production lines, development and manufacture of specific tools for measurement, control, assembly or handling in various fields. It is particularly involved in high-level computer-aided design and drawing, finite element modelling and process engineering for composite materials.

Our CAD software in our offices are Autocad, Catia V5, Inventor, ProEngineer and Solidworks.

The main existing export markets are in neighbouring France and Luxembourg, and ENGICONCEPT is keen to expand its export activities.

The company has 15 employees at its offices in Charleroi and Liège.



Esco Turbine technologies Belgium (ETT Belgium) is an investment casting facility using vacuum casting techniques to produce structural castings, rotating blades and nozzle guide vanes for aeronautical gas turbines.

ETT Belgium is a major supplier for the aerospace market : helicopter, missile and airplane engines. ETT Belgium has a subsidiary company named AR in Slovakia Republic for low cost manufacturing and is part of Esco Turbine technologies Group including 3 facilities in the USA and one in Mexico.

ESCO Turbine Technologies has the strength and agility to exceed customers' demanding expectations in a continuously changing business environment. ESCO specializes in challenging products that require exotic alloys and complex geometries.

ESCO Turbine Technologies keeps aircraft flying by providing a wide array of critical components to the aerospace and defense industries. ESCO produces the entire line of hot gas path (HGP) components – including directionally solidified (DS), single crystal (SC) and equiaxed blades, nozzles, vanes and structural castings. ESCO also provides and manages such post-cast processes as machining, grinding and stem drilling.

Product quality, technical capability, customer service, delivery response and cost effectiveness are key factors when choosing a casting vendor. With state-of-the-art facilities on two continents – as well as superior expertise and service – ESCO Turbine Technologies is a recognized and major supplier of investment cast products and machining services for the aerospace.



Injection Moulding of technical parts in plastics and composite materials & tools since 1950.

Scope of activities

Injection Moulding of technical parts in plastic.
 Research and design of plastic parts or new applications involving injected parts
 Assembly of sub-systems by gluing, clipping or ultrasonic welding

Certifications:

ISO 9001 : 2000
 EN9100

Highlights :

In-house engineering.
 50 Years of experience in the injection moulding of technical plastics and in the fabrication of injection tools
 Dynamic, flexible and reactive team which enables a mastery of complete projects from A to Z.
 Partnership with research centers or organisations specialised in complementary services(material choice, tests, design, rapid prototyping, painting, surface treatment,...)

We dispose of a wide variety of injection machines between 10 tons and 1300 tons of closing force, which allows us to produce pieces between 0,05 grams and 5500 grams of weight.

Transformed technical materials (possible with glassfibres, carbon-fibres, talc, etc...): PEEK, PEI, PES, PPS, PC, POM, ABS, ASA,

FN Herstal



FN Herstal provides airborne systems with unprecedented and unequalled firing capabilities for multi-role helicopters and subsonic aircraft while maintaining simplicity of use and crew safety.

Taking advantage of its century-long firearms expertise, FN HERSTAL designs, develops and manufactures fully integrated airborne weapon systems equipped with combat-proven, single-barrel automatic machine guns that offer reliability, accuracy, simplicity and safety.

FN's Integrated Airborne Weapon Systems include crew served or axially mounted machine guns, rocket launchers and a complete range of ammunition.

Airborne Pintle Mounted Systems can be window-, door- or ramp- positioned and offer the following:

- A .50 cal M3M / GAU-21 machine gun for outstanding firepower (1,100 rounds per minute)
- A soft mount for reduced recoil forces on the structure
- Outstanding balance among the system for perfect firing accuracy
- Weapons with an open bolt firing mode for full safety and reliability
- Lightweight and fully mechanical system
- Compatibility with the 7.62 cal machine gun.

Airborne Podded Systems are available in three different configurations:

- HMP250: features a .50 cal M3P machine gun and 250-round ammunition box capacity
- HMP400: features a .50 cal M3P machine gun and 400-round ammunition box capacity
- RMP: features a .50 cal M3P machine gun, 250-round ammunition box capacity, and 3 rocket launcher tubes (for 2.75» - 70mm rockets).

To date, FN Airborne Weapon Systems have been selected to equip more than 2,800 helicopters and subsonic aircraft worldwide.

Forges de Zeebrugge



World leader in the field of air-to-ground rocket system.

Forges de Zeebrugge (FZ) is a Belgian registered company who was set up in 1932. Entity of Thales Belgium and subsidiary of TDA Armaments, FZ is a world leader in the field of air-to-ground rocket systems, able to provide to its customers a global service in its field of activity.

FZ rocket system includes rockets, rocket launchers and firing management system (*picture on the right*).

FZ global service includes aircraft integration procedure, integrated logistic support, ballistic calculations, safety analysis, training and technical assistance.

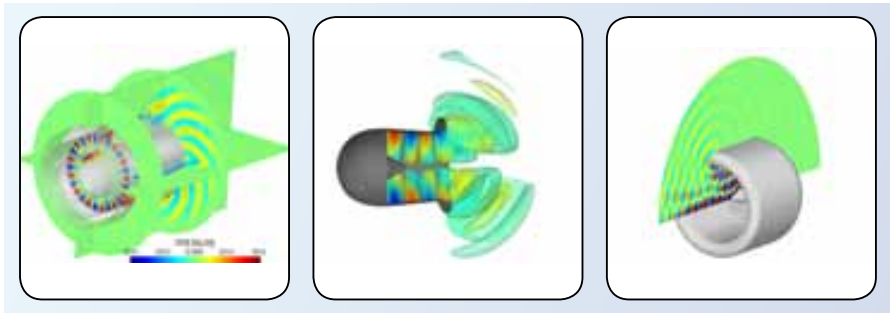
FZ rocket system equips major NATO countries accounting for more than 50% of its turnover. FZ systems are adapted to major aircrafts and helicopters such as Hawk (*picture on the left*), Tiger (*picture in the middle*) ... etc.

A guided version of its 70mm rocket compatible with existing systems is presently under development, with the support of the Walloon Region.

FZ is a customer oriented company with a flexible and responsive structure.

FZ Quality System is certified ISO 9001-2008.

Free Field Technologies



Free Field Technologies develops the ACTRAN acoustic CAE software suite and provides related technical services such as support, training, engineering projects and customization of implementations. FFT has more than 200 customers around the world including leading companies in the Aerospace industry.

ACTRAN is the most complete acoustic, vibro-acoustic and aero-acoustic CAE software suite. Under a common technological umbrella provided by the finite and infinite element method, ACTRAN provides a rich library of elements, material properties, boundary conditions, solution schemes and solvers. ACTRAN is a high productivity, high accuracy modeling environment suiting the needs of the most demanding engineers, researchers and teachers and empowering them with the tool they need for solving the most challenging acoustic problems.

ACTRAN/TM: A powerful acoustic CAE tool for turbo machinery noise prediction

Target applications:

- Aircraft engine noise, including nacelle design;
- Ducted cooling systems (electronic devices);
- Blower systems (air conditioning modules);
- Helicopter turbine noise.

ACTRAN/Aeroacoustics: Predicting the noise generated by turbulent flows

Target applications:

- Air conditioning modules (HVAC);
- Airframe noise (landing gear, trailing edge);
- Air distribution systems.

ACTRAN/VibroAcoustics: The most complete vibro-acoustic simulation software

Target applications:

- Sound transmission through cockpit and fuselage;
- Noise propagation in air distribution system;
- Response to turbulent boundary layer excitation;
- Random dynamic response of rocket payload at take-off.

GDTech



Engineering-Consultancy-Services

Engineering company, GDTech offers its expertise to industrial projects spanning across all necessary stages for Design, Simulation and Industrialisation.

- Design and stress analysis
- Tools design and manufacturing
- Technical documentation
- Project management
- Engineering consulting

At first, GDTech was founded to provide a service in the numerical analysis sector. Its offer has significantly expanded. The GDTech group mission is to build an **integrated service offer covering the entire product development process**. Our knowledge of the state-of-the-art industrial techniques and our extensive experience ensure a **perfect balance between the services we offer and your project needs**. Flexibility, reactivity and thorough skills are our business-enhancing opportunities.

Our consultants are : Designer (mechanics, electricity, boiler making, pipe, frame), Study Engineer, FEA Engineer, Modelisation Engineer, Project Manager, Hydromechanics Engineer, Documentation Engineer, Exploitation Engineer, Material Engineer, Tests Technician, Method Agent, Quality Management, Work Coordinator.

Enthusiasts about new technologies and permanently on the looking after real challenges, our staff will demonstrate their experience legacy and teamwork, enhanced by a never-ending quest for continuous improvement.

Thanks to our knowledge of the most advanced industrial technologies and our expertise, we provide you a **customized solution**.

Our assets ... our expertise, our CAE complete offer and our quality commitment (EN9100 certified).

GILLAM-FEi



Gillam-FEi
FREQUENCY, ELECTRONICS & TELECOMMUNICATIONS

Key partner in telecommunications, SCADA and military equipment.

GILLAM-FEi designs and produces world-class equipment in various fields as follows:

- Precision time and frequency products for ground and space terminals and platforms
- Network synchronization products
- Rubidium Vapor Atomic Oscillator and hydrogen Maser
- Telecontrol and monitoring (SCADA DMS EMS)
- Various military equipment (Man Machine Interface, computers, fire sequencer, ...)

GILLAM – FEi is a world leader in the design, development and manufacture of high precision timing, frequency control and synchronization products for space, military and terrestrial systems, including energy, wireline and wireless communications networks.

As the key partner in the synchronization area, certified ISO 9001:2008, GILLAM-FEi has developed successful and extremely reliable systems for the major telecommunications operators in Europe and in the U.S.A. and for ground satellite stations (GALILEO).

GILLAM-FEi also develops and delivers secure and adaptive turnkey systems for network supervision based on open and standard architectures (SCADA, DMS/EMS, RTU).

From the beginning, GILLAM-FEi has become the reference electronic partner for defense customers, in a EN-9100 context. It has also developed its expertise by creating smart Man-Machine interfaces.

Thanks to its vitality and to the excellent expertise of its teams, GILLAM-FEi is developing new products at the forefront of technology in highly demanding fields, such as hydrogen masers, extremely accurate synchronization systems for lasers...

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Hexcel



Hexcel's plant was established in Welkenraedt in 1967. It is Hexcel's European center of excellence for Engineered Core (HexWeb® EC), the name we give to our processed honeycomb parts that are machined and finished in any number of ways and then supplied as ready to fit «drop-in» parts to customers. Key applications for products made at Hexcel's Welkenraedt plant are aerospace structures - for civil and defense aircraft, helicopters and aero-engines. Our facility is ISO9001, AS/EN9100 Rev. B and NADCAP certified for composites processing.

HexWeb® EC encompasses a wide range of unique processing technologies used to add value to blocks or slices of HexWeb® honeycomb, also known as flat core. With advanced computer-aided design and manufacturing techniques, flat core is formed, shaped, machined and/or bonded to create high quality core details and assemblies to precise customer specifications. With over 60 years of honeycomb manufacturing experience, Hexcel is the leading supplier of Engineered Core used in commercials and military aircraft including engine and nacelle applications. The expertise of our manufacturing and engineering staff, combined with extensive research and unique core processing technologies, results in precise complex shapes and core assemblies that allow our customers to streamline their production process and eliminate capital investment through the purchase of Drop In point of use components.

HexWeb® EC provides the following advantages for your volume production program:

- I. High quality components
- II. Precise dimensional tolerances
- III. Fewer manufacturing stages and processes
- IV. Dedicated technical support from HexWeb® EC experts

Hexcel Corporation is one of the largest US producer of carbon fiber; the world's largest weaver of reinforcement fabrics; the number one producer of composite materials such as honeycomb, prepregs, film adhesives and sandwich panels; and a leading manufacturer of composite parts and structures.

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JDC Innovation



In 2006, « Ateliers Jean Del'Cour » created JDC Innovation to propose manufacturing services in high-technology fields (aeronautic, military, green energy, ...). Being part of JDC group allows JDC Innovation to be very flexible and to have a reactive organisation.

JDC INNOVATION has three core activities : composite materials, multi-material adhesive bonding and industrialization of processes (curing, final assembly with RFID or connectics integration if needed). JDC Innovation is expert at integrating these three competences in one single product.

Competences:

Composite materials: "Hand lay-up" process with various epoxy matrix materials (glass and carbon).

Multi-material adhesive bonding: Different technologies such as ultrasonic and thermo-bonding (hot / cold).

Processes Industrialization: Competences and equipment to integrate high precision electronics elements in products (RFID tags, connectics,...) or to perform the curing of several types of components requiring autoclave cycling.

Equipment: Autoclave (diameter : 2.4m – length : 3m) - Oven (section : 2mx2m – length : 3 m) - Clean room (class 100000) - Gluing room - High precision ultrasonic welding - Multi-material CNC machine. Ultrasonic N.D.T. equipment will be acquired before the end of the year.

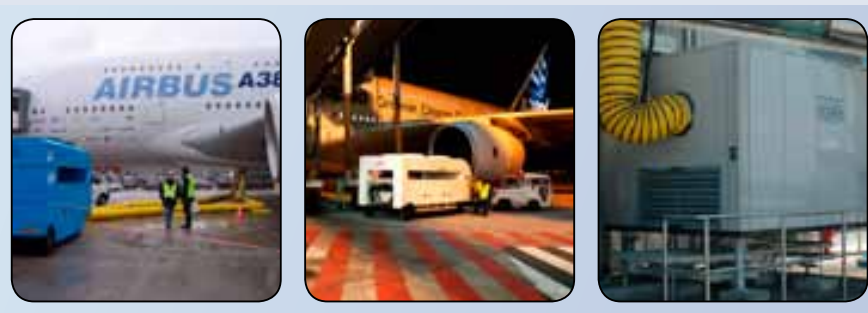
Quality: In 2009, JDC Innovation has been EN9100 certified by B.V.Q.I.

Team: The JDC innovation team has skill and expertise in the technological areas, as well as in operating and manufacturing methods and processes. To day, the team counts 3 engineers and 5 technicians.

Social engagement : Through the development of the activities, the JDC Innovation mission is to give work to disadvantaged people (handicap, small school career ...). JDC Innovation offers them intensive education and training, adapted to their situation and competences.

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cecilegeorge@jean-delcour.be & JDCINNOVATION@jean-delcour.be | www.jean-delcour.be

Lebrun



COOLING INDUSTRY

Air Conditioning units for civil & military aircraft's

LEBRUN Pre-Conditioned Air units for civil application have been specifically developed to meet the requirements of airlines and airports in taking over the functions of the aircraft APU while the aircraft is parked at the gate. This alternative drastically reduces CO₂/NOx emissions and noise level while leading to major savings in fuel and on the maintenance cost to the on-board APU. Available trailer or truck mounted, bridge or ground mounted, the LEBRUN PCA units suit all types of aircraft's and in all climates (AIRBUS, BOEING, MD). LEBRUN Air Conditioning units for military application are dedicated to the ground cooling of military aircraft during servicing and provide satisfactory cooling in extreme temperature environments for fighter aircraft such as F15, F16, F18, Rafale & Mirage 2000.

Regardless severe external conditions, LEBRUN PCA units will safeguard the smooth operation of electronic equipment and the comfort of passengers and crew, by maintaining the appropriate temperature inside the cockpit, the cabin and the electronic compartment of any parked aircraft during pre-flight servicing, loading and maintenance.

Completely self-contained, with compact design and extremely low noise level, LEBRUN Pre-Conditioned Air units can operate at the gate, parked in a remote area, or for maintenance purpose in a hangar.

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Lescav



For more than a decade, Lescav has manufactured high precision tools for such tasks in silicone, epoxy and polyurethane.

Our tools are primarily used in the aerospace industry.

Essential uses include:

- Protection during special treatments, such as metallisation (plasma and H.V.O.F.), sandblasting, shot-blasting.
- Fluid-tight sealing of components prior to chemical bath treatments.
- Silicone injection.
- Component reproduction moulds.
- Impact-protection of components.

We manufacture tools to order, directly onto your components, rapidly and economically. Our experience in the aerospace industry means we can advise you with regard both to the design of your protection equipment as well as to the choice of materials.

We are equally specialized in the application of fire-resistant silicone layers to different surface materials. We can manufacture mouldings and inject the silicone in situ (oil tank).

In addition we can apply silicone by projection directly into a component (aircraft engine cover). We also produce polypropylene containers for the chemical treatment of fragile components. Our strength lies in the research and prompt application of creative technical solutions to the challenges facing our clients.

Mockel



Control of the precision since more than 50 years!
Mockel has been the reliable partner in aeronautics and space.

Mockel is a dynamic company in which each colleague is specialized in manufacturing high-precision mechanical components.

We have the necessary production machines, the technical know-how and the experience to produce high precision parts. No matter if small or large parts, simple or complex components, series of 5 or 10000 parts, we translate your ideas into a perfect technique. All our parts are turned and milled with the highest degree of accuracy on up to date machines with numerical controls. We control your pieces on a plant with total CNC 3D / air-conditioned measurement compartment. Our customers belong to the following sectors: aeronautics, aerospace, defence, the construction of machines and hydraulics, renewable energy...

Realization is supported by ERP HI-PASS and CAO/FAO MASTERCAM X4 systems, we can integrate CATIA V4-V5 and IGES files.

Mockel currently occupies 32 collaborators and is certified in accordance with the standard ISO 9001/2008 and the European aeronautical standard EN 9100/2003.

Here an outline of our services:

- Mechanical Machining of precision
- Machining on center holes 3, 4 & 5 axes, with pallets and in pendular
- Machining on center of turning CN (2 to 5 axes)
- Assembly of mechanical subsets
- Correction, grinding, slotting, slotting
- Thread rolling
- Inject printer, Electronic Engraving
- Surface treatments
- Heat treatments
- End product

Nanocyl



THE CARBON NANOTUBE SPECIALIST

Nanocyl SA is the global leader in carbon nanotube production and offers complete carbon nanotube solutions for high performance composite materials.

Integrating carbon nanotubes (CNTs) inside composite materials can help you produce high performance parts and components that are stronger, lighter and multifunctional.

CNTs confer higher damage tolerance to composite parts, and **improve their overall mechanical properties**, resulting in final materials that have longer life cycles, higher reliability, and lower maintenance cycles. Carbon nanotubes (CNTs) are among the most advanced toughening agents when used in our EPOCYL™ formulations. These technologies help provide enhanced durability and crack propagation resistance—without the drawbacks of conventional solutions. Also, where delamination resistance and crack propagation resistance are dimensioning factors, integrating EPOCYL™ in composite designs can reduce the overall weight and simultaneously increase performance.

CNTs also **impart electrical conductivity** to composite materials, helping to generate multifunctional parts and components that have less weight and unparalleled performance. Dedicated EPOCYL™ products greatly improve the electrical conductivity of epoxy formulations. The adjustable level of conductivity, combined with the preservation of the intrinsic matrix properties without changes in density, make this solution highly versatile and superior to conventional fillers for high conductivity materials.

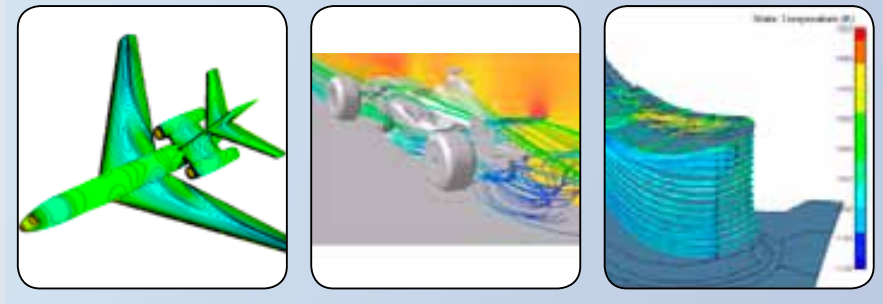
Nanocyl offers three ranges of CNT products that complement industrial process requirements while bringing new performance levels to composite materials :

- EPOCYL™ : Epoxy resin systems for structural conductivity, strength and durability, and weight reduction.
- PREGCYL™ : New range of prepreg formulations for reinforcement materials.
- SIZCYL™ : New generation of patented sizing agents containing carbon nanotubes. Efficient, cost-effective solution for infusion and RTM composite manufacturing.

Nanocyl S.A participates to a project in the frame of the third calls of the pole SkyWin. The project is called ICS that stands for Intelligent Cooling System and 10 partners are working to achieve different goals in heat management, scavenge management and supply management. Nanocyl S.A works especially in this field on the integration of CNT in Aluminum in order to increase the thermal and mechanical properties of an oil-air exchanger used in the airplane motors.

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Numeca International



NUMECA develops and commercializes innovative Computational Fluid Dynamics analysis and optimization software solutions. Throughout the last decade, NUMECA has developed a leading position in the aerospace industry with prestigious references such as Airbus, Boeing, Safran (Snecma), Rolls-Royce or GE.

Leader in the field of flow simulations and optimization for rotating machines (aircraft engines, hydraulic, gas or steam turbines, compressors, pumps, wind turbines, etc.), NUMECA offers today an extended suite of software covering a broad range of applications for both internal and external flows. Based on the most recent technology, NUMECA software systems are largely recognized for their application-driven features and interface, optimal solutions, multi-physics models, high accuracy, speed and general user friendliness.

NUMECA has a worldwide presence, with branch offices in Belgium, USA and Japan as well as a worldwide network of distributors.

NUMECA product-line includes the following software suites:

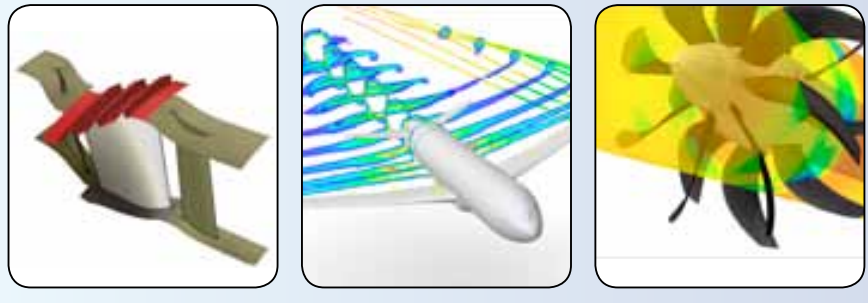
- FINE™/Turbo: Flow Integrated Environment dedicated to rotating machinery.
- FINE™/Hexa: Flow Integrated Environment for external and internal complex geometries, including multi-physics such as combustion, multiphase, FSI, free surface, cavitation...
- FINE™/Design3D: Integrated Environment for blade and channel optimization in rotating machinery.
- FINE™/Marine: Integrated Environment dedicated to marine hydrodynamics applications
- FINE™/Open: Integrated Environment for Academics and Research Centers based on an open environment for in-house models implementation.
- FINE™/Auto; Integrated Environment for Automotive applications

Each suite provides a complete solution, from grid generation to flow visualization. Pre and post-processing tools are available separately and in particular:

- AutoMesh4G (AutoGrid5-IGG-HEXPRESS-HEXPRESS/Hybrid: complete suite of grid generation tools for block structured and unstructured automated meshing, with full hexahedra cells and encapsulated CAD cleaning and repairing tools.

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Numflo



NUMFLO

Reliable simulations rely on the understanding of a large number of physical properties and models and the manipulation of various software tools.

NUMFLO accompanies CAE and CFD workflows, providing high level consulting services and technology to simulate and optimize complex industrial components and processes.

NUMFLO is a leading provider of advance engineering services in fluid mechanics, thermodynamics and multi-physics and is active in Europe, US and Asia. NUMFLO works with most of the prestigious aerospace and power generation companies worldwide such as Snecma, Airbus, EDF, Rolls-Royce, Honeywell, Honda,...

NUMFLO main areas of expertise are:

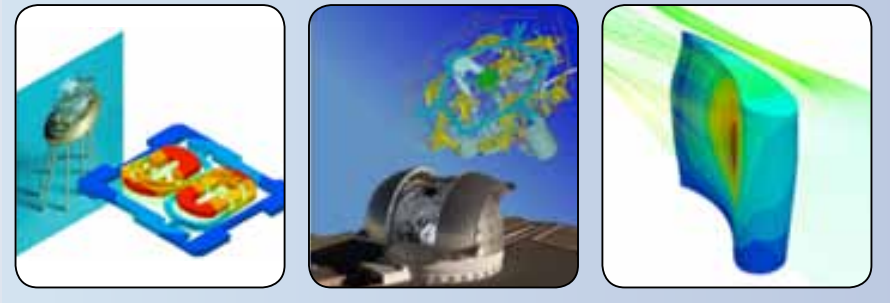
- Simulation of complex fluid and multiphysics environments
- Innovative technology and models in response to specific requirements
- Integration of in-house or new technology in commercial CAE software systems, guarantying maintainability and support.

Some recent projects includes:

- the analysis and optimization of Rocket engines components with cavitation and fluid-structure interaction
- Blade optimization of Jet Engines
- 3D casing treatments
- Performance and optimization of Turbocharger
- Marine Design: hull optimization, propeller simulation
- Urbanism: pedestrian comfort, pressure forces on structure and related stress-fatigue life cycle and resistance

NUMFLO is working in close relation with universities and research centers worldwide and is active in several National R&D funded projects..

Open Engineering



Open Engineering, part of the Samtech group, is a breakthrough supplier of Multiphysics software for the CAE market. Our solutions are based on our Oofelie Multiphysics platform, optimized for large complex industrial 3D design work.

Oofelie Multiphysics provides you with unique capabilities to analyze industrial applications such as: sensors & actuators, MEMS & MOEMS & Fluid Structure Interaction problems.

Large Complex Industrial & Strongly Coupled Multiphysics Design.

Oofelie Multiphysics is integrated in Samcef field, an Engineering standard, intuitive product providing time-saving design flow including scripting parameterization & optimization.

Today's [scaled down] devices involve [multiple physical phenomena], microscopic effects gain importance & their time-constants reach similar magnitudes. [Oofelie beats the classic technology!] Fully & strongly coupled FEM BEM FMM simulations between relevant physical phenomena yield fast convergence, accuracy & efficient handling of supersized problems, in the fields of PiezoVibroAcoustics for sound based applications or thermo-piezo-electrics for accelerometers & gyrometers.

Advanced optics need high dimensional stability, improved accuracy & predictable performances. Oofelie performs a coupled analysis of OptoThermoElectroMechanic interactions linked to Zemax, for novel optics steering mechanisms such as those based on PiezoElectrics & ThermoMechanics.

[FINE/Oofelie FSI, the integrated solution for strongly coupled fluid-structure interaction] developed with Numeca Intl. is of crucial importance in critical fields as nozzle vibration, wing flutter or buffeting & in wind turbines applications. It opens the world of CFD to the entire MultiPhysics domain.

Optimal Aircraft Design



OAD proposes Design Tools that will help you to accelerate the design process of any aircraft and to improve the quality of your products.

OAD Activities:

- Software development
- Subcontracting and consultancy
- Training session organisation

OAD Develops ADS (Aircraft Design Software)

ADS is one of the most user-friendly and accurate software packages dedicated to take the designer through the entire aircraft conceptual design process. ADS can handle light aircraft, UAV and commuter category aircraft of any configuration. ADS can be used either to design a new aircraft from scratch, or to design modifications to existing aircraft. ADS is used all over the world, by leading aerospace companies, Universities and individuals.

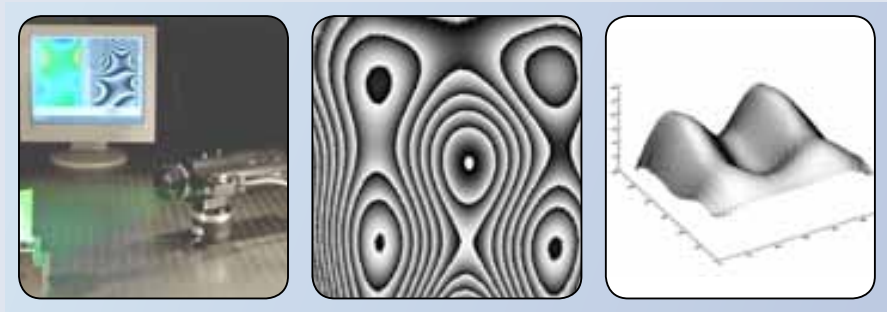
Subcontracting and consultancy play a key role in OAD's activities

We can design all kinds of planes, with any specifications: UAVs, light aircraft, jets, single and twin-engine planes, with electric or internal combustion engines. We can offer comprehensive or specific assistance. We can simply help the designer to define the specifications, or take part in the complete development of the project. We can design a new prototype or help with modifications to an existing design. We use our own calculation models to answer most questions that arise during the pilot study incredibly quickly.

OAD regularly organises training sessions in businesses and academic institutions

We adapt our training solutions to the level of the participants as well as to the teachers' requirements. The courses can last anything from 1 day to 1 week.

Optrion



OPTRION : High resolution interferometric holographic camera for metrology and NDT testing

OPTRION sa is a Belgian SME, specialized in optical metrology and associated optical products (original optical fibre and crystals). The company has a wide experience in providing innovative solutions in:

1. Non destructive testing: detection of defects (delaminating, welding defects, bonding defects, cracks, impacts, etc) in all types of shapes and materials including metals plastics or composite.
2. Vibration analysis: whole field technology, real time analysis, and frequency from 0 to 40 kHz.
3. Micro-displacements metrology: thermo mechanical behaviour, stress analysis, new materials characterization...

OPTRION's technology is based on a high resolution camera combining the principle of holographic interferometry and photorefractive crystals developed by the Centre Spatial de Liege. The research efforts allowed miniaturizing the whole set-up into a user friendly compact portable optical head.

OPTRION's expertises are

- the design and manufacturing of its own products such as a new generation of the photorefractive camera (fast events measurements),
- the manufacture of a monomode fibre (patented by CSL) for delivery of high power laser beam and its dedicated coupling device.
- high precision measurement tools, including third party instruments.

Pratt & Whitney Belgium Engine Center



Pratt & Whitney Belgium Engine Center was established on July 1st, 2008, when Pratt & Whitney acquired 100% ownership of Techspace Aero's Military Aftermarket Division. The Pratt & Whitney Belgium Engine Center joins eight existing Pratt & Whitney Engine Centers worldwide and is a new location for Pratt & Whitney in Europe.

The technical and mechanical experience of the Pratt & Whitney Belgium Engine Center is based on military turbo-engine Maintenance, Repair, and Overhaul (MRO) activity developed by Techspace Aero following in-house production of most fighter engine programs for the Belgian Air Force and other major European Air Forces. In the last 30 years, the MRO activity has grown to include F100 engine support to 13 Air Forces throughout the world, including the U.S. Air Force since 1984.

The acquisition of Techspace Aero's military MRO activity by Pratt & Whitney opens up new perspectives to provide customers locally and regionally with military engine services. The 122 high skilled Pratt & Whitney Belgium Engine Center workforce is customer-focused and dedicated to MRO activity.

Located in Herstal (Liège), at the crossroads of the European Union, the Pratt & Whitney Belgium Engine Center will become a Center of Excellence for Pratt & Whitney services in Europe, the Middle East and Asia.

Pratt & Whitney Military Aftermarket Services offers customers a range of tailored fleet management service solutions for operating their fleets with the optimum mix of organic capability and world class expertise.

Left picture: Eddy Current Inspection
Middle picture: Waterjet Stripping

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Précimétal



Investment casting (lost wax process). Steel and stainless steel technical parts for aeronautics.

Civil and military aeronautics: steel, stainless steel, copper and cobalt alloys technical parts:

- For aircraft structures, door locking systems, landing gears, engines ...
- For embedded electronic and optics, light and heavy weapons.
- Components and complex pipes for fluid transport and control
- Seat fasteners and other level 2 and 3 parts.
- Machined and coated parts ready for the assembly on production line.

Other sectors:

- Besides the aeronautical and defence sector, Precimetal supplies the nuclear and petrochemical markets, general engineering, food production equipments, fluids processing, defence, building, railway and automotive, ...

Rapid prototyping:

- Fast casting of steel prototypes based on 3D files and STL models.

Technical data:

- Investment casting process (lost wax)
- Parts from 1g to 50 kg,
- All steel and stainless steel grades
- Nickel, cobalt and copper alloys.
- Machining and surface treatments on demand; ready-to-use parts
- Non destructive testing facilities (Nadcap accredited)

Certifications:

- EN9100 : 2003
- ISO 9001 2008
- NADCAP accredited (Non Destructive Testing)
- Qualified as test laboratory (Metallography)

References:

- EADS / AIRBUS, Eurocopter, Safran, Sagem, Nexter, ...

Investment casting strengths:

- Dimensional accuracy and surface quality
- Complex shapes, thin walls, design freedom
- Weight reduction
- Reduced machining, welding and assembly
- Very wide choice of alloys

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edward.rabendzki@precimetal.be | www.precimetal.com

RHEA SYSTEMS



RHEA is a Belgian SME providing system engineering solutions and professional engineering services to the international space industry. RHEA has supported over 40 space missions in the last 19 years, including comet chasers, planetary and Moon missions, deep space astronomy experiments to understand the fundamental laws of physics, climate monitoring, meteorology, navigation and communications.

RHEA provides engineering solutions in spacecraft Assembly Integration and Test (AIT), spacecraft and payload operations, ground segment definition, on board software development, system engineering, mission analysis and radiation analysis.

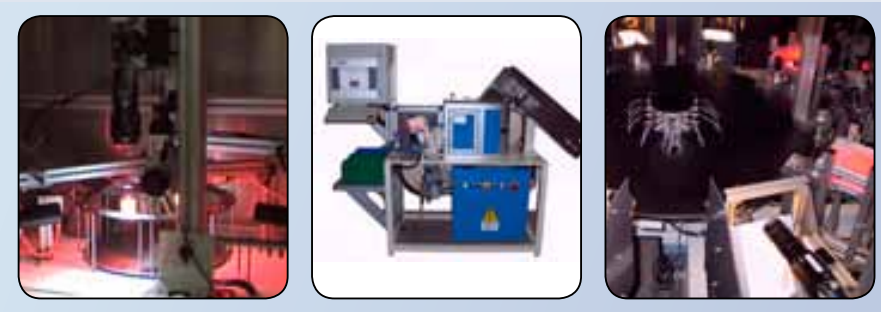
In the Aeronautic domain RHEA was responsible for the development of a model to compute the delay of GNSS electromagnetic signals due to ionosphere fronts for the Anastasia project.

RHEA is the market leader for MOIS solutions and procedure management systems. RHEA offers MOIS solutions for spacecraft operations, spacecraft testing and requirements verification and development of On Board Control Procedures (OBCP).

RHEA's know-how and experience include the following competencies:

- Spacecraft Assembly Integration Testing (AIT) Management and Supervision
- Ground Segment Engineering. Design, develop, accept, manage & maintain ground segments
- Ground Segment Operations in all phases (i.e. LEOP, Commissioning, etc.)
- System Engineering
- System and Operational Software Engineering
- Space Environment and Radiation Studies
- Space Weather Systems and Consultancy
- System Requirements Specification
- Operations Concept Definition
- Space Craft Database Preparation and Production
- Mission Analysis, Feasibility Studies
- Spacecraft Platform, Payload and Ground Segment Operations
- Earth Observation Data Processing and Data Management
- Attitude and Orbit Control System (AOCS) Engineering
- Mission Planning and Management
- Image Pre-processing (radiometric and geometric improvement)
- Level 1, 2 and 3 Processing
- Cal/Val developments
- Project Management

Rovi-Tech



ROVI-TECH

YOUR PARTNER:

- IN QUALITY CONTROL BY VISION
- IN DIAGNOSTICS BY NEURAL TECHNOLOGY

ROVI-TECH is specialised in industrial vision application and builder of "turn key" machines (mechanical part included) in the field of quality control by 2D and 3D technology.

ROVI-TECH has developed its own vision system, the ILB-25N (image learning box) including a metrological software and a **high performance neural core**. The ILB-25N is able after learning to take decision confronted to complex situations never learned before.

In the aeronautic field, ROVI-TECH has realised several machines foreseen for the conformity control of roller bearings (Craft project) and has developed a particularly know-how in the cosmetic control of reflectance products as turbine blades and machined foundry pieces.

ROVI-TECH is presently partner in the TRIADE European Craft project for the military defence sector (leader EADS).

According to its experience in the neural technology, ROVI-TECH has recently conceived a flexible multi purpose neural tool: the **ILB-25N-DT (data base)** able to treat complex situation where it is difficult to establish any correlation by classic method between parameters and observed diagnostics.



SABCA is active since more than 90 years in the fields of civil aircraft, space launchers and defence.

SABCA's competences cover complex large structures, both metallic and composite, advanced thrust vectoring systems, as well as major avionics and structural upgrades.

With three facilities in Belgium, SABCA provides a full range of services, from early studies to after sales support, passing through design, stress justification, testing, qualification, manufacturing, assembly and repairs.

Major OEMs trust SABCA as a Tier One supplier. Examples are Airbus for its complete range of aircraft, including the A400M and the new A350 XWB; also business jets manufacturer like Dassault and Gulfstream rely on SABCA for their products.

*The left picture shows the 12m long Lower Rear Center Shell for the A380
Centre picture : the first Flap Support for the A350 XWB, delivered to Airbus end of May 2011*

SABCA is a major partner in the Ariane 5 and Vega launchers, being responsible for the development and production of large structural elements as well as for the thrust vectoring systems that steer the rocket.

SABCA's Charleroi plant is the place to be for heavy maintenance and major upgrades of military aircraft and helicopters as well as their equipment. The Belgian Armed Forces and several foreign Air Forces regularly send here their F-16, Mirage F1, Alpha-Jets, A10, F5 and Agusta A109 in search of a new youth.

On the right picture, a Belgian F16 is ready to be delivered

If you wish to know more about SABCA and its capabilities, please visit our website : www.sabca.com or contact us at sales@sabca.be.



- Sagita develops the new DDTR helicopter drive system; Direct Drive Turbine Rotor.
- Sagita develops the Sherpa: a kit-built two seater helicopter featuring the DDTR concept.
- Sagita also provides consulting work for innovative solutions in turbomachinery.

Contrarotating Turbines

These turbines are specifically developed to drive a contrarotating helicopter rotor. The DDTR system could fit a large range of helicopter sizes and should be beneficial both in performance and in maintenance costs. On the left picture, the first stage of such a turbine installed on an experimental small scale rotor. Rotational speed 1500 rpm.

Flight testing

Wind tunnel and flight tests on small scale (1/5) models validate the DDTR concept for autorotation, handling and stability, fuselage drag. On the central picture, the 1/5 scale model of the Sherpa in a demonstration flight.

Sherpa

Currently under development and assembly, the Sherpa is expected to perform its first flight in summer 2011. The research and development is supported by the Walloon Region in partnership with Dimma, GDTEch, JDC, ULB, ULg. On the right picture, the 3D virtual model of the Sherpa.

Samtech



SAMTECH is one of the leaders in CAE simulation software based on the Finite Elements method. Major manufacturers of aircraft and aeronautical components all over the World benefit from its know-how and expertise through both software products and engineering services.

With its headquarters located in Liege, Belgium, and offices in 10 countries over 3 continents, SAMTECH has grown from the first spin-off of the University of Liege in 1987 into an international company employing more than 280 people.

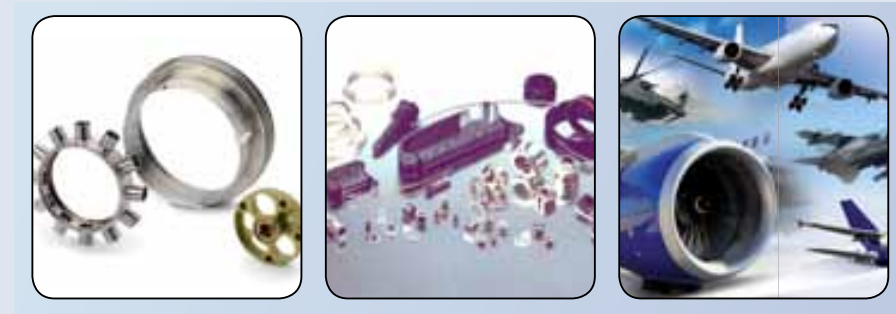
SAMTECH's core product SAMCEF is used for local stress analyses and verification. SAMCEF covers a wide range of applications: airframes, fuselage, wing boxes... for both airplanes and helicopters. Structures made of composites can be easily designed and optimized using SAMCEF and BOSS Quattro, SAMTECH's optimization platform.

SAMCEF Mecano has the unique ability to mix finite elements and multi body simulation features in one single model making it the tool of choice for slat-track mechanisms, landing gears...

Professional solutions have been created based on SAMCEF, such as SAMCEF for Rotors which is dedicated to the dynamics of rotating machines. Aeroengines quite naturally benefit from SAMTECH's vast expertise in that domain.

SAMTECH also offers the integration platform CAESAM. CAESAM encapsulates companies' know-how and design processes into a single tool used by all relevant departments in an extended enterprise context. Thanks to CAESAM, aircraft manufacturers can ensure that all their departments and subcontractors use coherent methods and tools in their engineering tasks.

Shur Lok



Shur-Lok International is a world leader in the design and manufacture of critical performance fasteners which have become industry standards notably for aerospace, defense or racing.

Shur-Lok International has also strong expertise in producing hard metal machined parts for aircraft engine components.

Shur-Lok International is ISO9100 & NADCAP certified and processes all aerospace materials, specifically high-alloyed steels, stainless steels, high-temperature-resistant steels, titanium or aluminium.

SLI is part of SPS Fastener Division, Precision Castparts Corp. a worldwide, diversified manufacturer of complex metal components and products. It serves the aerospace, power generation, and general industrial markets.

PCC is the market leader in manufacturing large complex structural investment castings, airfoil castings, and forged components used in jet aircraft engines and industrial gas turbines.

Simonis Plastic



Simonis Plastic Group has been providing plastic parts for the Aeronautics, Automotive, Industrial Vehicles, Medical, Defence, and Electro-Technics industries for over 40 years.

Simonis Plastic Group offers:

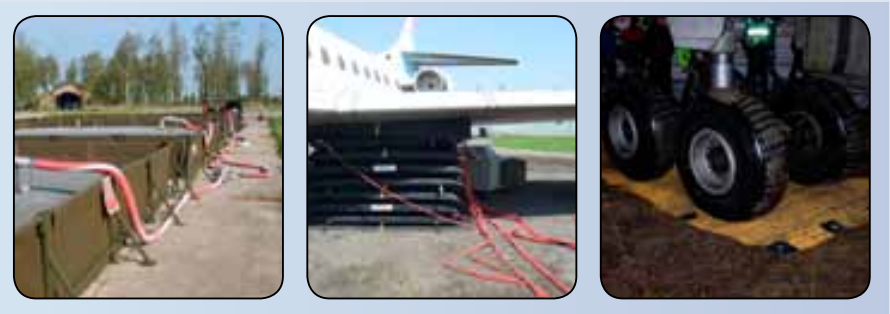
- 1- Total Project Management
- 2- Parts development ,simulation and prototyping
- 3- Mold design, simulation, and production
- 4- Injection molding, final assembling and finishing

Simonis Plastic Group currently owns production facilities in Belgium, China and in Romania through a partnership. The R&D and project management team is located in Belgium.

DETAILED DESCRIPTION AERONAUTICS ACTIVITIES

- Simonis Plastic Group is producing, in Europe and China, high technical plastic injection products for aeronautics customer.
- It offers worldwide support and solutions to customers' technical issues with plastic parts (weight, rigidity, chemical properties,...)
- We support our customers in the development of new projects and define with them the best polymer technology to use, which allows them to reach their quality/cost targets.
- We can geographically produce the part where it's the most relevant, (technically, cost, logistic,...)

Simtech



Simtech

SIMTECH is a Belgian based company specialised in the design & manufacturing of aeronautical fuel supply & aircraft recovery solutions comprising:

"Ground refueling & defueling systems"

AAFARS for aircraft refueling • airplane & helicopter refueling equipment • FARE • fuel farms • airport fuel stations • mobile fuel stations • containerized refueling systems & fuel stations • aircraft defueling systems • aero & helitransportable storage fuel tanks • collapsible tanks • parachute fuel tanks • fuel tanks • fuel bladders • composite tanks • water detectors • particle counters • fuel filtration units • berm & bund liners

"Mobility, emergency & recovery assistance"

• aircraft recovery equipment • aircraft recovery lifting bags • mobility mats & trackways • GSE • turntables • sludge • tethering equipment • helipads • flexible roadways • lifting bags • lifesaving systems • emergency flotation systems • helicopter floatation systems

"On-board fuel storage & dispensing systems"

• Aircraft (airplane, helicopter, UAV, missile, ...) fuel or oil bladders • Liquids storage, distribution & collection tanks • airworthy fuel bladders • crashworthy fuel cells • self-sealing fuel tanks • anti sloshing fuel cells • lightweight flexible tanks • main or additional tanks • ferry tanks • cargo tanks • auxiliary fuel systems • portable aircraft refueling units • aero & helitransportable storage fuel tanks • flexible tanks • parachute fuel tanks • fuel bladders • composite tanks

"Engineering"

• computer assisted design (CATIA...) • prototype or mock-up and simulation test bench • design & implementation • composite & polymer 3D or 2D structures engineering • aircraft manufacturing process tooling (pneumatic thrusters, ...)

"Services & technical assistance"

• project management • training • support • installation • maintenance • MRO • 24/7 service • bladder default detection & repair • fuel contamination detection • aircraft fuel system audit

Sobelcomp



Since its inception, Sobelcomp creates advanced composite products, working for a variety of markets as diverse as aeronautical, defense, and the automotive industry.

Sobelcomp use the differents technologies to produce innovative composite parts on an industrial scale with technical know-how, performance and production efficiency.

Our designers and engineers are engaged in tooling design, engineering for built to print of new or existing composite products and cost optimization.

Our team production are involved in product development of several product types, repair operations, demonstrating our strength and flexibility.

Turn to Sobelcomp is a commitment to a high-quality of composite parts and success of your project within aeronautical and defense fields.

Aeronautical field : Composite parts for bench test.

Since 2008, we have satisfied our customer, Techspace aero, in manufacturing of Air Intake and cowlings in composite materials for engine bench test (engine types CF34-10 / CFM56-5).

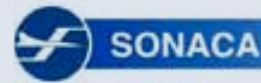
Sobelcomp has demonstrated inventiveness and competitiveness by providing technical solutions with its expertise throughout the project.

Defense field: Composite parts for weapon system and specific containers

FN Herstal company have trusted us in the realization of different types of weapon cowlings. The infusion process used, allow us to make large products of average complexity and cost control.

Our ability to diversify, we were able to obtain new contracts with Forge de Zeebrugge company in the manufacture of containers for air transport of heavy weapons.

Sonaca



Sonaca is an international group and world leader in the design and production of aerospace structures and their associated systems.

SONACA is an international group whose parent company is located in Gosselies, Belgium. The group's subsidiaries are established in Brazil, North America and China. They ensure a constant proximity with our customers as well as numerous possibilities in terms of production flexibility and cost management.

The SONACA Group is the world leader in the development and production of aerospace structures and their associated systems. Thanks to an incomparable heritage, SONACA developed fruitful partnerships over the years with the most important aircraft manufacturers, such as Airbus (all programs), Embraer (E145, E170, E190, etc.), Dassault (Falcon 7X), Bombardier (Learjet, Challenger, Global Express, CRJ, etc.). The Sonaca Group is currently closely involved in five new programs: Airbus Military A400M, Airbus A350XWB, Bombardier CSeries, Bombardier Learjet 85 and Embraer Legacy 450/500.

Through experience and know-how and with a manpower of close to 300 engineers specialized in their own fields, SONACA's Engineering can meet our customers and partners' industrial requirements, both effectively and with a high level of professionalism.

In 2011, the SONACA Group is celebrating its 80th anniversary, which shows its durability in the aircraft industry as well as its experience with its customers.

Sonaca also applies its engineering and composites skills to space vehicles and satellites, like International Space Station, complete satellite platforms and specialized instrument structures.

Soudospace



Since 1980 Soudospace is involved in sub-contracting and engineering support in many high welding technologies in sub contracting as:

From prototype to industrial series

I. Electrons beam welding (EBW)with more than 300 different applications -cooling plates (Al) for electronic devices -waves guide for satellites -cyclic guide for helicopter rotor -fan repairs -radar antennas.

II. micro welding (plasma , micro plasma, TIG) -our main application is the production of thin wall tubes (0.4 mm) from diam 3/4 « to 3»1/4.for wing de-icing system-fittings (machined and welded).

III. Injection powder metal Parts in 17.4 Ph from 30 gr to 500 gr.

Tech Welding



High Precision Welding Works (Tig-Microplasma-Microlaser)

The company tech-welding

- Company member of the "Groupe Mendes S.A. CH-1475 Forel" since November 2010
- Subcontractor with references in in the sectors requiring high precision welding on all noble metals
- Member of Cluster EWA (Walloon aeronautical companies) & of cluster MITECH (Micro technologies for intelligent manufacturing & products)

Certifications

- EN 9110 - ISO 9001
- Welders certified according to the new European norm ISO24394
- Clients demands.

Engagement

- Continuous improvement of a know-how based on many years of experience
- The customer focuses our priorities : listening, flexibility, support
- Permanent self-critical sense : clear and regular rating of satisfaction

References

- Aeronautics, space, pharmaceuticals, precision engineering, industry of technological sectors

Equipment

- Recent and performing machines
- Oven VÖTSCH/HERAEUS, Incubator JACOMEX, TIG, MICROPLASMA, MICROLASER Welding, Setting up of ultrasonic cleaning FINNSONIC,...
- Laser ROFIN YAG 4 axes XYZO
- Microscope - video measurement
- In project : EWB stations, FSW

Team

- 4 people with 2 high-tech specialized welders

Technical Airborne Components



Technical Airborne Components Industries also known as TAC, established in 1981 in Milmort, Belgium, produces high quality custom engineered mechanical controls and structural assemblies for the aeronautical and space industries.

With a complete range of mechanical products TAC designs, certifies, and manufactures at its site and is present in all the segments of the industry: commercial, regional, general aviation, helicopter, military and space.

Modern Aircrafts are using rod systems in a variety of application. TAC offers the complete range, whether these are structural rods for the life of the aircraft, actuating rods for landing gear or flaps, system door rods for main and cargo doors, and flight control rods for flight surfaces or cockpit controls. Based on the stringent requirements of weight, strength, and operating cost, those products will be made of metallic or composite technology.

Our engineering and manufacturing expertise of rods is complemented by related machined parts (e.g. cranks, brackets) by special tubular links, telescopic rods, hold open rods, torque shafts and special rod ends.

Over 160 employees are working at TAC offering the complete scope of competence under one roof, from developing solutions to performing qualification testing and hence rapid prototyping and production; TAC supports its customers with an experienced team of engineers to meet the most demanding aerospace requirements and is EN9100 as well as NADCAP certified.

TAC is part of TransDigm Aerospace made of 25 operating units.

Techspace Aero



A Safran group company, Techspace Aero designs, develops and produces modules, equipment and test cells for aerospace engines.

Through its high-tech products, Techspace Aero contributes to the successful performance records of numerous Airbus (A320, A330, A340, A380 and A400M), Boeing (B737, B747, B767, B777 and B787), Embraer (190 and 195) flights as well as the Ariane 5 launcher.

Based on its technological maturity, the company plays an important role in aerospace propulsion evolution and is a leader in its three areas of expertise:

1. Commercial and military aeronautics propulsion

- World position in design, development and production of low pressure compressors and front bearing supports for commercial applications, in partnership with Snecma, General Electric and Pratt & Whitney (CF34-10, CFM56, GP7200, GE90, GENx engines)
- production of complex disks and casings for compressors and turbines

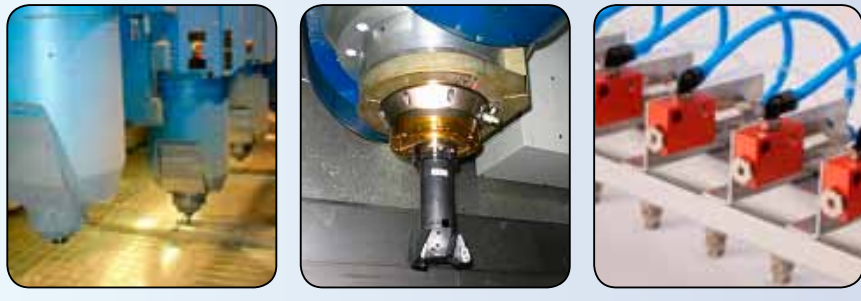
2. Equipment

- Design, development, production and maintenance of oil system equipment for aircraft engines (CFM56, GE90, CF34-10, V2500, SaM 146, TP400, Kaveri, etc.)
- Design, development and manufacture of control valves and equipment for liquid propulsion of space launchers

3. Test facilities

- Design, creation, upgrading and maintenance of turnkey test facilities marketed under the Cenco International™ brand (Techspace Aero and its Cenco US subsidiary)
- Design and manufacture of specific equipment for engine testing (cowlings, bellmouths, nozzles & plugs, etc.) under the EoLines™ brand

Tecnolub



The right picture shows a lubrication crown for a 5 axis UGC gantry.
The central picture shows a spindle equipped with a Tecnolub crown and coolant thru.
The right picture shows the adapted Tecnolub for layer deposition.

The company Tecnolub has been created in 1988 merging his initial lubrication expertise with the aeronautical industry needs of lubricants pulverization and has grown up by developing a global concept for the mechanical industry.

Tecnolub was immediately interested by the Microlubrication and has developed systems that can provide flexible and adapted solutions to its client's requirements.

Micro-lubrication advantages:

- Controlling the volume of lubricant, and reducing consumption by 50 to 90%.
- Reducing the volume of products to be recycled, less storage, less handling.
- Reducing costs for metalworking (tools, products).
- Better working conditions: improved health and safety. Greater respect for the environment.
- Use of a lubricant that is always fresh, and thus always has optimal characteristics.
- Increased machining performance, possibility of increased speeds.
- Improved surface condition of machined components.
- Reduction of temperature rise due to friction.
- Increased tool life, since the lubricant is consumed during operations and is always fresh.
- Dry swarf: no spinning required and has added value.
- Possibility of using a soluble lubricant (better tool cooling).
- Perfect visibility during machining.
- No formation of oil mist in the workplace.
- Elimination of problems of bacterial and fungal.
- Particularly adapted and interesting for machining in open table.

Recently, Tecnolub expanded his activity to food, concrete and plastic industry for deposition off thin layers of liquids (alcoholic aromas, alcoholic gum, alcoholic coolant, release agents, ...) Located in the centre of Europe, we deliver our products all over Europe and the North of America. Since June 2004, Tecnolub has started a new branch in Montréal.

Thales Belgium



THALES

Thales Belgium SA is the Belgian competence center of Thales Group internationally recognized for its capacity to design, develop, produce, supply and maintain critical communication and information systems to benefit of Defense, Transport and Security sectors and, in particular, Aeronautic communications.

Aeronautic Communication competences and products

- Intercommunications system for surveillance special mission aircrafts/helicopters or maritime patrol aircrafts, designed for cockpit or cabin integration in military or civil version
- Modernisation of communication systems in NATO's AWACS aircraft, acting as First tier Supplier for Boeing
- VHF Data Radio Modem for civil aviation using dedicated aeronautic waveforms
- Coordinator of a industrial/academic consortium for several Research programs related to the "Smarter Aircraft" axe of the Walloon competitiveness pole Skywin

Security and Transport Domains

- InfoSec product family with certified crypto IP capability
- Information Systems for Security Forces (including simulation in crisis management phase)
- Smart and flexible Information Systems for Public Transportation

Defense Domain

- HF and VHF radio communications, Antenna Tuning Units and Power Amplifiers from 20W to 400W, including NVIS (Near Vertical Incidence System) capability, a technology that is unique with an international patent
- Definition and Integration for tactical vehicles of Vetronic, Battlefield Management System and complete Communication Suite including "Satcom on the Move" capabilities
- Definition and Integration for Future Soldier of a complete optronic/communication/situation awareness System with Mounted/Dismounted continuity



V2i provides a full range of services in the field of mechanical vibrations:
V2i answers industrial desire to have one single qualified partner addressing vibration problems, from initial CAD design to product certification. This includes F.E. simulation, definition of testing specifications, experimental testing, modal analysis, instrumentation

V2i knowledge is

- based on the researches of international repute of the University of Liège in the field of structural dynamics;
- continuously improved and updated in close collaboration with the Department of Aerospace and Mechanical Engineering (LTAS-VIS); one of the pioneering research team of the development of the Finite Element method and more than twenty years of expertise in the field of experimental techniques.

Numerical Modelling & Experimental Testing

Thanks to those complementary expertises – numerical modelling & experimental testing – and thanks to innovative tools, V2i offers the necessary integration of simulation and testing to customers.

List of services

- Finite Elements modelling and simulation (special knowledge in dynamic, life time prediction and random excitation)
- F.E. based analysis of composite
- F.E. model updating
- Experimental Modal Analysis
- Shaker testing with complete assistance
- High Cycle Fatigue testing
- Health Monitoring of Equipments & Structures
- Tools conception (hard & soft) for vibrations monitoring
- R&D programs
- Design or analysis of mechanical structures
- Instrumentation and Measurements
- Definition of accelerated fatigue testing from real measurements
- All V2i activities are covered by an ISO 9001:2008 certification



Compression Springs. Traction Springs. Form Springs. Torsion Springs.
Double Torsion Springs. Induction Coils. Locking Rings.

Stamping of items in single or combined toolings, by electroerosion, laser and chemical components for prototype building and small series.

Assembling of mechanical, plastic or electronic parts in using conventional or specific processes (tig and ion-beam welding, ...).

The quality of the VANHULEN products is officially certified by standards such as ISO 9001:2008, EN 9100 P2 (First in Europe) and ISO/TS16949:2009.

	SKILLS	R&D	Engineering	Airframes & systems	Engines, propulsion systems, valves	Weapon systems	M.R.O.	Mechanical components & metallurgy	Electrical & electronic components	Optical components	Composites and plastic components	Paintings and coatings	Industrial processes & factory equipment	IT, software and related services	Training, education	Ground systems - ATM	Test & control benches
1	ADVANCED COATING		x					x				x					
2	AEROFLEET										x						
3	AKKA BENELUX	x	x											x			
4	BARCO SILEX	x							x								
5	BASF BELGIUM	x	x	x							x	x					
6	BODAIR	x									x						
7	BRITTE		x					x					x				
8	CAPPAUL		x					x					x				
9	CEGELEC													x			x
10	CISSOID								x								
11	CITIUS	x	x														
12	COEXPAIR	x	x								x						
13	DARDENNE							x									
14	DELTATEC		x						x								x
15	DUMOULIN HERSTAL							x									
16	E-XSTREAM	x	x											x			
17	EHP	x															
18	ENGICONCEPT		x										x				
19	ESCO TURBINE TECH.		x					x									
20	F.N. HERSTAL	x	x			x		x		x	x						
21	FERONYL		x								x		x				
22	FORGES DE ZEEBRUGGE	x	x			x											
23	FREE FIELD TECHNOLOGIES													x			
24	GDTECH		x											x			
25	GILLAM								x								
26	HEXCEL COMPOSITES		x								x						
27	JDC INNOVATION										x						
28	LEBRUN															x	

	SKILLS	R&D	Engineering	Airframes & systems	Engines, propulsion systems, valves	Weapon systems	M.R.O.	Mechanical components & metallurgy	Electrical & electronic components	Optical components	Composites and plastic components	Paintings and coatings	Industrial processes & factory equipment	IT, software and related services	Training, education	Ground systems - ATM	Test & control benches
29	LESCAV											X					
30	MOCKEL		X					X									
31	NANOCYL	X									X						
32	NUMECA	X	X											X			
33	NUMFLO	X	X											X			
34	O.A.D.		X											X			
35	OPEN-ENGINEERING	X	X											X			
36	OPTRION												X	X			
37	PRATT&WITHNEY						X										
38	PRECIMETAL							X									
39	RHEA SYSTEMS													X			
40	ROVI-TECH												X				
41	SABCA	X	X	X			X		X								
42	SAGITA	X	X	X													
43	SAMTECH	X	X											X	X		
44	SHUR-LOK INTERNATIONAL		X					X					X				
45	SIMONIS PLASTIC		X								X		X				
46	SIMTECH	X									X						
47	SOBELCOMP										X						
48	SONACA	X	X	X			X	X			X						X
49	SODOSPACE							X									
50	TECH WELDING						X	X									
51	TECHNICAL AIRBORNE COMPONENTS	X	X					X			X		X				
52	TECHSPACE AERO	X	X		X		X						X				X
53	TECNOLUB		X										X				
54	THALES COMM. BELGIUM	X							X								
55	V2i	X	X										X				
56	VANHULEN							X									

SKYWIN Academies & Research Centers

Aeroelasticity and Experimental Aerodynamics Research Group



The aim of the Aeroelasticity and Experimental Aerodynamics Research Group of the University of Liège is to carry out internationally recognized research in the fields of aeroelasticity, experimental aerodynamics and fluid-structure interaction. Applications include air vehicles, civil engineering structures and land vehicles.

The research group is in charge of the University of Liège wind tunnel facility. This facility features a modern large, closed return, multidisciplinary low speed wind tunnel. It has two working sections, with a maximum cross-sectional area of 2.5x1.8m (width x height) and a maximum airspeed of 65m/s.

The research group has been expanding steadily since 2007. It now includes six research engineers, while a seventh engineer and a dedicated technician will soon be appointed. The group participates in a number of European, national and Regional projects. These include the FP6 NICETRIP project, the European Regional Development Fund/Walloon Region SIMBA project and three Walloon Region industrial/academic partnerships (Skywin and Energywall initiatives).

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Aerospace & Mechanical Department Turbomachinery Group



Current research activities of the group are applied thermodynamics, simulation of flows in turbomachines and aircraft engine health monitoring.

Health Monitoring and condition-based maintenance of aircraft engines

The degradations - gradual or brutal - are detected, located and quantified during both steady and transient operation of the engine.

With National Technical University of Athens, Chalmers University of Technology, Snecma

Development of throughflow tools for turbomachines

Applications : aerodynamic design and analysis, simulation of bleeds and cooling flows, simulation of stall and surge in compressors, coupling with cycle calculations

With Ecole Centrale de Lyon, ONERA, EDF, Snecma

Development of stationary and transient models of lubrication systems for aircraft engines

Applications : evaluation of new architectures / new components
With Techspace Aero, ULB

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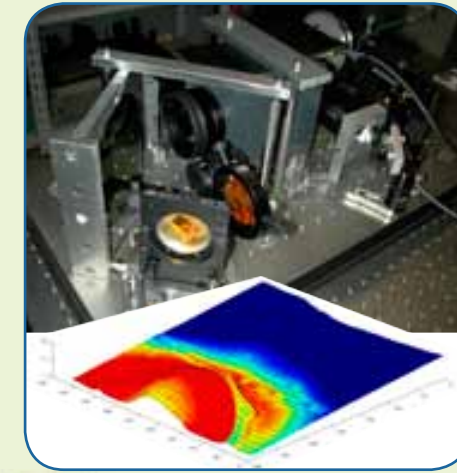
Student UAV project

Students in the Aerospace Engineering Master's course are applying the knowledge they acquired in classes to the development of their own Unmanned Aerial Vehicle (UAV). The only design requirement was that the craft should be able to carry 3D cameras and shoot 3D movies.

- Conceptual design: Starting from a blank sheet, the students completed the conceptual design procedure, with extensive recourse to CAD.
- Wind tunnel testing: The students carried out wind tunnel tests in order to validate their estimates for the UAV's aerodynamic properties (drag, lift etc). Virtual prototyping was used to build the wing and tail of the half-scale wind tunnel model.
- Upcoming work: The students are now designing and realizing the first full-scale prototype.



Applied and Computational Electromagnetics (ACE) group: Electromagnetic Compatibility (EMC) tests according to MIL STD 461 (D/E/F) and RTCA DO 160 in reverberating and semi-anechoic rooms.



The Centre Spatial de Liège is specialized in optical qualification of space payloads. Besides this main activity, CSL offers R&D support and Technology Transfer in the following fields for aeronautics sector.

Non contact metrology and NDT for aeronautical composites structures

Development of innovative high resolution holographic measurement instrument. (Application to detection of internal or impact defects on composite structures with high resolution, deformation measurement of composite structures under thermo-mechanical solicitation.

Development of innovative NDT technique combining simultaneous deformation and thermal measurements in a single sensor based on Long Wave InfraRed holography. Application in structural testing at Airbus premises.

Investigation of new NDT techniques for detecting defects in composite structures with complex shapes, mainly by shearography, thermography and laser ultrasonics.

Assessment of dilatation and deformation measurement of engine composite components. Dimensional measurement by image correlation and fringe projection, deformation measurement by holography techniques.

CSL is involved in Aeronautics Health Monitoring projects, in partnerships with industrial teams. CSL R&D services in this domain are: Sensors development, Electronic design support Downscaling, Breadboard, Analysis and test of severe environmental constraints.

Computer Aided Geometrical Design



Department of Aerospace and Mechanical Engineering

The Computer Aided Geometrical Design group is part of the Aerospace and Mechanical Engineering department (LTAS) of Liège University. It is active in research in CAD/CAM/CAE and the link with novel numerical simulation techniques.

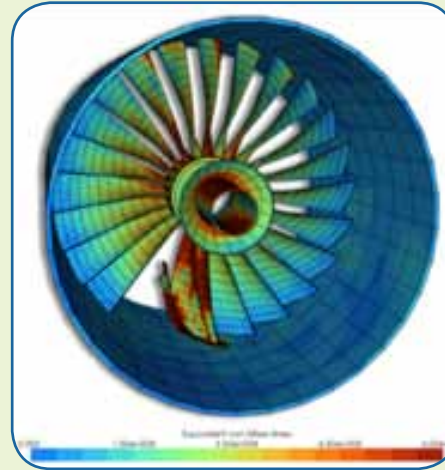
Among our research topics, the following have applications in aeronautics:

- Novel simulation techniques like the Extended Finite Element Method (X-FEM)
- Application of the X-FEM to the simulation of composite structures (structural analysis or manufacturing techniques)
- Structural analysis-driven automatic model simplification
- Mesh Generation for numerical simulations

We have a computer room equipped with 3DS's product CATIA ñ the leader in the aerospace industry ñ for CAD laboratories and student's final year projects, among those many have topics in aerospace.

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LTAS Computational Mechanics



Aerospace & Mechanical
LTAS-MN2L

LTAS - Computational Mechanics specializes in tailored software developments and numerical simulation of problems involving large deformations, complex contact situations and multi-physics couplings.

Our finite element based software METAFOR can deal with complex material behaviors including damage and fracture for both metallic and composite materials.

Specific domains of application are:

- Impact simulation and crashworthiness of aerospace components (Fan Blade Out see figure, bird strike, blade buckling & fracture, shock absorbers, blade/casing interactions, impact on composite panels).
- Hot and cold metal forming processes (superplastic forming, creep forming, deep-drawing & springback, hydroforming, cold roll forming, thixoforming, tension leveling, strip rolling and lubrication).
- Tire mechanics & rubber.
- Biomechanics (brain models, orthodontics, remodeling, impact).

These numerical models result from many collaborative projects with industry and funded by the European Community, the Walloon Region and the Marshall Plan.

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LTAS - Structural Dynamics Research Group



Aerospace & Mechanical
Engineering Department

The field of expertise of the «Vibrations et Identification des Structures» (LTAS-VIS) research group relies in the theoretical and experimental dynamic analysis of jet engine mechanical components.

The main topics on which LTAS-VIS has developed a strong research as well as teaching expertise are the following:

- structural design of aircraft engines;
- turbomachinery rotordynamics;
- vibration testing and modal analysis (e.g. compressor blades and bladed disks).

Research developments are performed most of the time with the aim of implementation in industrial finite element programs such as Samcef and/or Oofelie. Experimental activities are closely related to the setting-up of vibration testing facilities within the LTAS-VIS research group which led to the creation of the V2i company in 2004.

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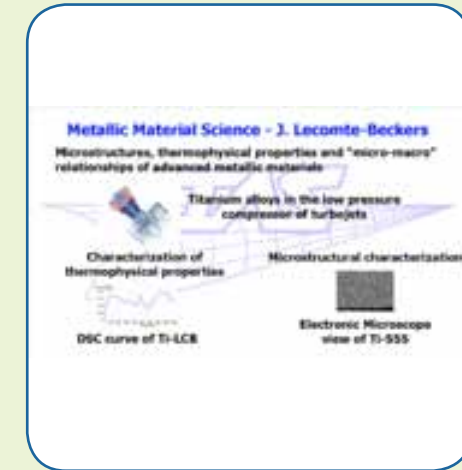
ArGenCO (Architectural, Geological, Environmental and Civil Engineering) Department

MSM team (Materials and Solid Mechanics) belongs to Structures, Fluids and Scg processes, specific static or fatigue loading cases. Since 1984 MSM team has developed its own non linear finite element code Lagamine. Actual developments concern new elements such as solid-shell ones, coupling with fluid code and specific behaviour law for coating, TA6V sheet or bulk material, Ti5553 alloy...



ArGenCO (Architectural, Geological, Environmental and Civil Engineering) Department
Laboratory of Materials and Structures Mechanics

The Laboratory of Materials and Structures Mechanics (M&S) depends on the Applied Sciences Faculty (ArGenCo department) of the University of Liège (Belgium). It offers possibilities for aeronautical firms to carry out tests on different types of aircrafts components like rods, lubrication groups, bearing supports, flaps actuator parts, engines composite or metallic carter. Among the regular clients, Techspace-Aéro, SABCA, Technical Airborne Components and BODAIR for example are firms from the aeronautical field and for which tests are realised in the Laboratory of Materials and Structures Mechanics. The available equipments enables static, cyclic and dynamic tests on tension-compression machines or, for bigger structures, on a concrete test slab (11 x 21 m ñ 800 mm thickness) with anchoring points every 500 mm used to fix supports for the necessary test actuators. Characteristics such as load, displacements, torque, strains, deformations, angles, oil pressure can be measured en recorded. The machines can be regulated in load or in displacement. The park includes hydraulic and electro-mechanic machines with a load capacity from 10 kN for the smallest to 2500 kN for the biggest. On the test floor movable static hydraulic jacks (50 to 1000 kN load capacity) and movable dynamic hydraulic jacks (100 to 1000 kN load capacity) can be used.



The Metallic Material Science Unit (MMS) studies the physical, chemical and physico-chemical phenomenons that governs forming and optimisation of metallic materials (and metallic matrix composite) and determines their properties.

The main focus is concerning thermal treatments, phase transformations at liquid and solid state for aeronautical materials and alloys (Al, Ni, Ti, special steels).

The MMS researches concerns also microstructure obtained through particular processes such as : thixoforming, vacuum coating and deposition of thin foils, laser cladding, laser melting, electron beam melting, powder metallurgy.

The MMS Unit possesses specific equipments for microstructural analysis, for high temperature thermophysical properties characterisation (dilatometry, thermal capacity DSC, diffusivity laser flash, thermal conductivity) and for high temperature tribological properties.

Mycrosys



Mycrosys is a laboratory of the University of Liege, its main research fields are the exploratory R&D in the field of microsystem and the energy harvesting or scavenging systems.

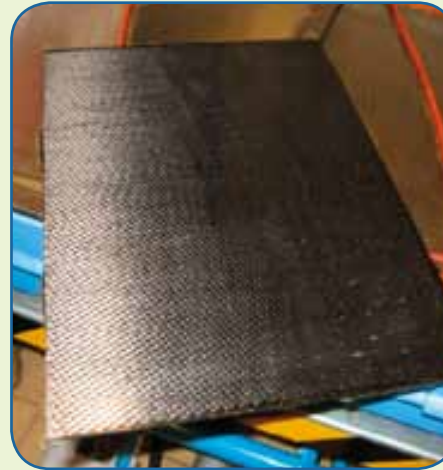
Mycrosys conducts inter-disciplinary and cross-disciplinary innovative research in edge-cut fields:

- Exploratory R&D in the field of microsystem (multiphysics and thermo-mechanical simulation, design in all aspects)
- R&D in the field of micro-assembly, packaging and interconnect technology
- Microsystem design using off-the-shelf sensors and components, including packaged and bare die
- Pathfinding research on Energy harvesting and scavenging

Mycrosys is involved in aeronautic project as HM+ (health monitoring) on the integration of used oil sensor and slat positioning detection system, with Techspace aero and Sonaca.

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ARCOMAT



Research center on ARChitected and COmposite MATerials
Université catholique de Louvain (UCL)

The ARCOMAT research center federates the activities of several teams working at UCL in the field of architected, hybrids and composite materials. ARCOMAT gathers expertises on organic and inorganic materials, on experimental characterization and multiscale-multiphysics modelling, and on mechanical and functional properties. Both fundamental and applied researches are articulated around the development of innovative composite or architected material solutions through processing, testing and modelling. ARCOMAT aims also at offering an integrated support to the industries working in the field of composites, in particular in aeronautics, directly connected to the UCL research platforms.

ARCOMAT is the UCL partner into the «+Composites INTERREG IVB project

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CEREM



Center for Research in Mechatronics (CEREM). Institute of Mechanics, Materials and Civil engineering (iMMC).
Université catholique de Louvain (UCL)

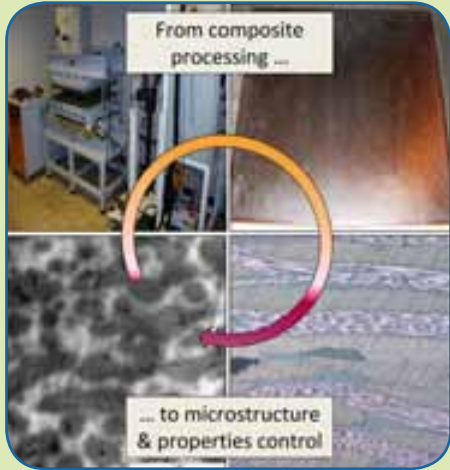
The Center for Research in Mechatronics of UCL focuses on the design, modeling, simulation, optimization and prototyping of mechatronic systems, i.e. systems optimally integrating sensors, actuators and control strategies within mechanical devices.

More specifically, the CEREM develops five axes of research and expertise:

- Multibody and multiphysic modeling
- Optimal design of mechatronic devices
- High Performance Actuators
- Power electronics
- Innovative joining process

Through European, national and regional research programs, particularly in the areas of automotive and aerospace.

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Institute on Condensed Matter and Nanosciences (IMCN). Engineering and Rheology of Composites and Macromolecules (ERC&M). Université catholique de Louvain (UCL)

The ERC&M research group is active on processing, characterization and structure/properties control of high performance composites, with the overall objective to develop innovative material solutions.

Major research activities and technical capabilities focus on:

- Characterization of polymer composite systems, especially : thermo-mechanical properties, morphology and physico-chemical aspects.
- Thermoset and thermoplastic processing, including RTM.
- Understand and control microstructure of thermoset-thermoplastic composites.
- The link between structure and mechanical or physical properties.
- The influence of nano- and microfillers on composite properties.

The ERC&M group works in close collaboration with IMAP-iMMC on aspects of mechanical testing and modeling. This collaboration is structured in the frame of the new ARCOMAT research center.



Institute of Information and Communication Technologies, Electronics and Applied Mathematics of UCL (ICTEAM) Université catholique de Louvain (UCL)

ICTEAM carries both basic and applied world-class research in various sub domains with direct applications in the aeronautical sector:

- Communication systems and networks (positioning, propagation, channel modeling, modem design, navigation systems, radio-localization)
- Cryptography and Information Security (design and analysis of strong security protocols)
- Dynamical Systems, Control and Optimization (control of Nonlinear and Infinite Dimensional Systems)
- Electronic Circuits and Systems (embedded systems, ultra low power for harsh environments, radiation hardness, sensors)
- Micro and Nano Technologies and Systems (MEMS/NEMS for characterization of material properties at the nano scale, composite materials for EM shielding)
- Microwave Engineering and Applied Electromagnetism (numerical electromagnetics, RF & microwave circuits, antenna design, satellite communications)
- Signal and Image Processing



Division of materials and process engineering (IMAP) Institute of mechanics, materials and civil engineering (iMMC) Université catholique de Louvain (UCL)

The research at IMAP (iMMC/UCL) in the field of aeronautics concerns the processing, characterization, testing, assembling, modeling and selection of engineering materials, with a focus on structural applications:

- thermal/thermomechanical control of microstructures of Ti, Al and steels; processing of thin coatings and new architected materials
- chemical and physical analysis of inorganic materials (X-ray, EBSD, SEM, TEM)
- mechanical testing of metals and composites under certified procedures; testing of thin coatings
- characterization and constitutive modeling of hardening, damage, creep, fracture and wear mechanisms
- bonding and welding (e.g. FSW)
- materials-by-design approach

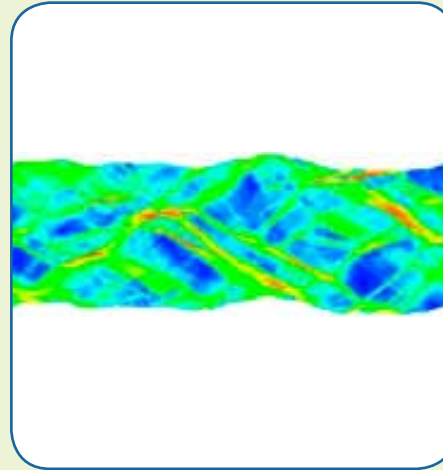
Fundamental and applied researches are carried out by 5 Profs, 25 Ph. D. and post docs, and 10 engineers/doctors who provide support to industry oriented problems. The division benefits from the technical support of the 5 labs of iMMC.



Laboratory of mechanical testing, structures and civil engineering (LEMSC)
Institute of mechanics, materials and civil engineering (iMMC). Université catholique de Louvain (UCL)

The laboratory LEMSC (iMMC/UCL) provides, in the field of aeronautics, an integrated research platform for mechanical testing of materials, especially composites, and structures, under ISO 17025 certification:

- 5 servo-hydraulic machines (50, 100, 500 and 1000 kN, one allowing combined axial 250 kN/torsion 2 kNm), 4 mechanical testing machines (50, 3 x 250 kN), some of them with humidity and temperature control,
- 200 m² test floor for testing structures in a real scale, with frames, hydraulic actuators (from 5 to 1000 kN), measurement devices, softwares,
- Composite testing following international aeronautics standards : tensile (plain, open and filled hole), compression (plain, open and filled hole), flexural tests, interlaminar shear strength, bearing, V-notch beam shear, impact and compression after impact, fatigue, fracture mechanics tests,
- Materials aging in temperature, humidity and various fluids.

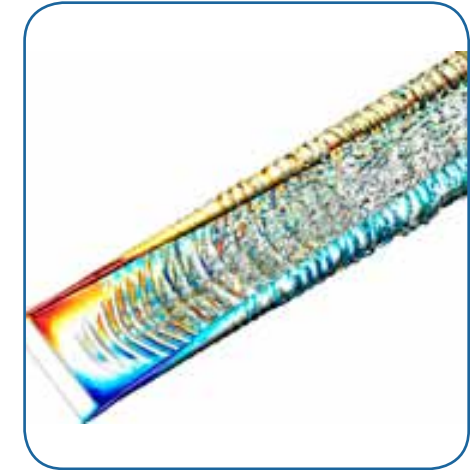


Division of applied mechanics and mathematics (MEMA)
Institute of mechanics, materials and civil engineering (iMMC). Université catholique de Louvain (UCL)

The MEMA division has two main activities in the field of aeronautics:

- Based on multiscale modeling schemes, we develop original constitutive laws for advanced materials used in aeronautics. Nonlinear mean-field approaches accounting for different types of reinforcements (particles, short and long fibers or foams) as encountered in polymer-based composites and in metal-matrix composites. Novel crystal plasticity models are developed in order to investigate forming of multiphase metallic alloys.
- Based on home-made numerical codes, we perform intensive finite element simulations of multi-physics processes. Our expertise is in adaptive meshing, parallel computing, unit cell calculation of materials with intricate microstructures, and robust integration algorithms in fluid mechanics.

The MEMA division gathers 7 professors and 34 scientists who are active in fundamental and applied research.



Division of thermodynamics and fluid mechanics (TFL)
Institute of Mechanics, Materials and Civil engineering (iMMC)
Université catholique de Louvain (UCL)

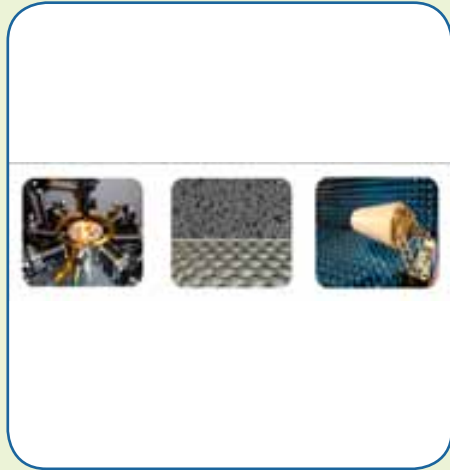
The research at TFL (iMMC/UCL) in the field of aeronautics covers three main topics:

- fluid mechanics, aerodynamics and hydrodynamics : external flows past streamlined and bluff bodies, aircraft wake vortex flows, shear flows, internal flows, reacting flows, advanced numerical methods (Lagrangian particle methods, Eulerian methods, hybrid methods), advanced turbulence modeling (LES and hybrid RANS-LES approaches).
- energy systems and combustion: thermodynamics, thermal cycles, heat transfer, analysis of processes, combustion equipments, thermal engines
- two-phase flows : particle-laden flows, critical flows, ejector flows, atomization, nucleation.

Fundamental and applied researches in aeronautics are carried out by the research teams of 4 professors, who also provide support to industry oriented problems. The research is carried through simulations (also developing and using large-scale parallel computing) and/or experiments. It also benefits from the technical support of the experimental laboratories of iMMC and from the HPC facilities of UCL.

WELCOME platform

UCL



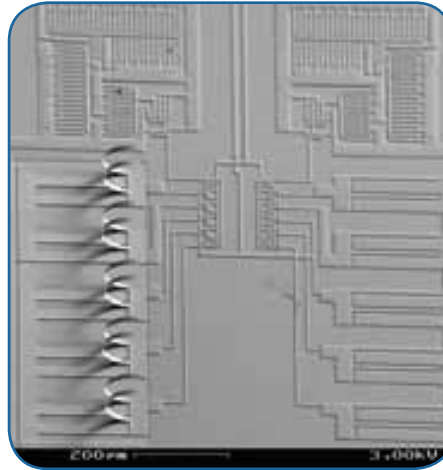
Université catholique de Louvain (UCL)

From the physical behavior of materials and electron devices, to systems architectures and ultra-wideband communications protocols, Welcome proposes a wide panel of characterization techniques under various electromagnetic, mechanical and temperature conditions that are of prime interest for automotive, space, aeronautics and radar applications. Tools and expertise available in WELCOME result from key research axes including micro- and nanotechnology (materials, devices and sensors), Silicon-on-Insulator technology, RF circuits and antennas, digital systems and VLSI architectures, cryptography, Micro-Electro-Mechanical Systems, ultra low-power circuits, extreme-environment components (radiations, temperature) and wireless communications.

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WINFAB platform

UCL



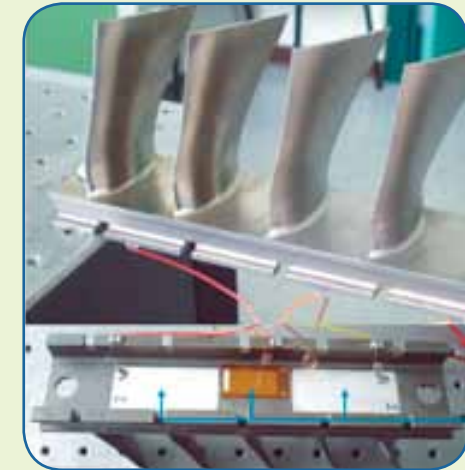
Université catholique de Louvain (UCL)

WINFAB (Wallonia Infrastructure Nano Fabrication) facility is a shared resource of UCL serving academic and industrial researcher. Main research activities include SOI (Silicon-on-Insulator)-CMOS integrated circuit processing, Micro(Nano) Electromechanical Systems (MEMS/NEMS), nanoelectronics, organic electronics, photovoltaics and sensors. We support a broad line of lithography, thin-film deposition, reactive ion etching, and characterization tools in support of device fabrication for a variety of materials. We welcome researchers from any discipline who wish to explore uses of micro- and nano- manufacturing.

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Active Structure Laboratory

ULB



The Active Structures Laboratory (ASL) is specialized in Random Vibration and Active Vibration Control (damping and isolation). Applications include: multi-axial random fatigue, vibro-acoustic control of aircraft panels, adaptive optics and shunt damping of lightly damped structures with piezoelectric transducers.

The activities combine theoretical studies, numerical analysis and experiments. ASL is equipped with state-of-the-art equipments for vibration measurements and control. A small workshop allows building in-house demonstrators. The methods for the computation of random fatigue von Mises stresses and for the analysis of piezoelectric composite plates have been implemented in the structural analysis software SAMCEF.

Past activities in random fatigue include the analysis of the Vulcain engine for Ariane 5. Ongoing research work in vibration control includes the application of piezoelectric transducers to the damping of turbomachinery.

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Aero-Thermo-Mechanics Department

ULB



The research activities of the ATM department cover a wide range of fluid mechanics applications mainly focused on aeronautics: lubrication systems for aero-engines, air-oil heat exchangers (compact and surface coolers), CFD of reactive flows (combustion), propulsion systems for UAVs and helicopters among others.

The department has a strong expertise in experimental investigations of aeronautical devices with test benches developed in collaboration with major companies of the aeronautic sector for gas turbine engine lubrication equipments, heat exchangers and two-phase flow separation systems. The department has also other small test benches for Fuel Cell propulsion for example.

Most of the know-how has been built through participation to Belgian and European research projects (FP6, FP7, JTI Clean Sky, Walloon Marshall Plan) with strong national and international collaborations (academic and industrial).

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BATir - SMC

ULB



BATir (Building, Architecture & Town planning)
SMC (Structural and Material Computational mechanics)

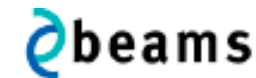
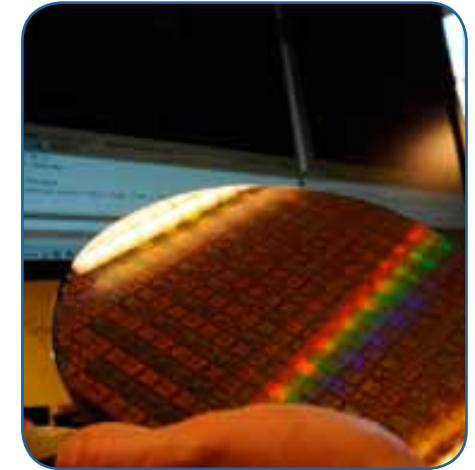
The research group in numerical methods at the ULB-BATir department is devoted to advanced computational mechanics, including structural dynamics and vibroacoustics, nonlinear mechanics, and multidisciplinary design optimization.

In particular, to answer the growing challenges met in aeronautics in terms of cost, engine performances, and environmental impact, original strategies are proposed to optimize the design of aircraft components. In collaboration with Cenaero research centre, a specific emphasis is put on the development of reliable reduced-order models to predict the aerodynamical and structural behaviour of turbomachinery blades, thereby exploiting efficiently today's High Performance Computing (HPC) resources.

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Bio, Electro And Mechanical Systems (BEAMS)

ULB



BEAMS (Bio, Electro and Mechanical System) & Embedded Electronics

Embedded systems - Digital electronics - Power Electronics - FPGA

- Digital electronics based on micro-controllers, DSP and FPGA
- Complex embedded processors (SoC: System on Chip; MPSoC: Multi Processor System on Chip) in deep sub-micron technology and coarse-grain architecture, including an interconnection network (NoC: Network on Chip)
- Real-time networks (field busses) for industrial monitoring and control
- Multi-FPGA and multi-core/multi-processor platforms for simulation and digital design

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Laboratory of Neurophysiology & Movement Biomechanics (LNMB)

Led by Professor Guy Cheron, the LNMB has performed groundbreaking research and developed expertise in the fields of Human Space Science, Brain Computer Interfaces and fundamental Neuroscience. He is supported by a highly qualified international research team.

Main study areas:

- EEG and evoked potential studies during virtual navigation (Neurocog) and docking (Neurospat) in space missions and in microgravity on board the ISS (International Space Station)- Dynamic Recurrent Neural Networks exploring the relationship between EMG (Electromyogram) and Kinematics of motion
- Movement research in adults and children involving EEG, EMG and Kinematics to better understand locomotor development

Industrial application fields:

- Brain Computer Interfaces
- Rehabilitation therapy
- Pilot performance monitoring and assistance



Microgravity Research Center (MRC)

Headed by Professor Frank Dubois, the MRC (Microgravity Research Centre) involves 5 research topics involving an international researcher staff. His over 20 years experience in fluid physics and optical metrology enabled to develop theoretical and experimental researches from the fundamental up to the applied levels.

Two types of activities are significant for the aeronautic applications:

The optical metrology axis aims to develop generic digital holography technologies with applications in non-destructive testing, microscopy as well as 3D velocimetry. Those researches give rise to several patents exploited by the SPIN-OFF OVIZIO.

Evaporation, condensation and boiling axis studies those phenomena that come in industrial processes to optimize several heat transfer applications as the heat-pipes for space and aeronautic applications. In this field, MRC is at the origin of the SPIN-OFF EURO HEAT PIPE.



Non Linear Optics Department (ONT)

Asymptotic methods - Delay-differential equations - Dynamical systems

The main research areas concern nonlinear optics, solar cells, laser dynamics, delay-differential equations with applications to industry and solid mechanics.

The industrial application fields aim at any areas where mathematical modeling is needed, such as chemical reactors, machining, or buckling problems. We can also provide expertise for qualitative/approximative resolution of mathematical equations resulting from such a modeling.

The team has a strong experience in setting up equations for problems in industries such as: control of chemical reactors (with or without delays), transport problems (flows, heat, radiation), instabilities... We provide analytical solution, including asymptotic methods, which reduce the complexity of anticipated problems.

SAAS

ULB



Department of System Analysis and Control Engineering (SAAS)

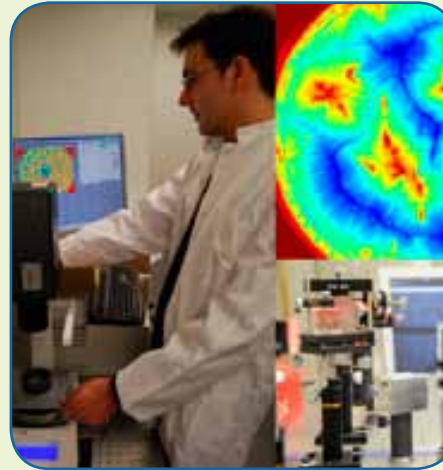
The team of SAAS studies and develops model-based condition monitoring systems. Such systems process in real time the measurements available on the supervised device in order to detect and localize small degradations, and hence to plan maintenance operations in due time, before a failure occurs.

In particular a condition monitoring system able to detect leaks and fouling in the lubrication system of an aircraft engine has been developed. The monitoring system includes sensor supervision in order to distinguish between sensor faults and leaks or fouling. The emphasis is on the development of systematic methodologies that allow to automatically adjust the tuning parameters of the algorithms for health monitoring on the basis of test bench and flight data.

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TIPs

ULB



TIPs

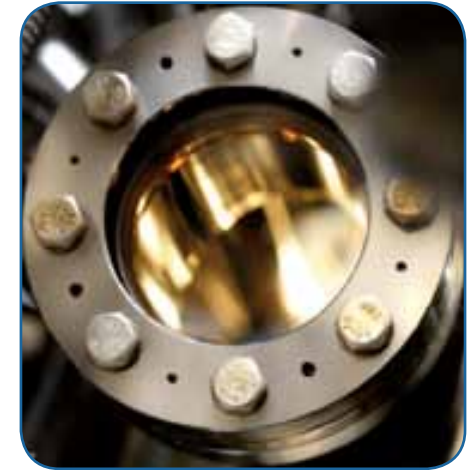
Transfers, Interfaces and Processes (TIPs)

At TIPs, the main goal of the ongoing research is to develop new theoretical, numerical and experimental methods allowing to understand and predict the behavior of multiphase systems, and to design or optimize industrial processes dedicated to the transformation of matter (mineral, organic or biological) and energy.

In particular, the Fluid Physics unit studies heat transfer technologies for ground and space applications, and is involved in several research networks and space experiments funded by the European Space Agency. Some examples of projects are the modeling of heat pipes (used onboard satellites for cooling electronic devices), the multi-scale analysis of nucleate boiling, and the enhancement of heat transfer by surface-tension-driven turbulence in evaporating fluids (picture).

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CIRMAP

UMONS
Université de Mons

CIRMAP & Center of Innovation and Research in Materials and Polymers

The research activities of the group are in synthesis, characterization, transformation, processing, and applications of polymeric and composite material.

The center is also specialized in the study of surfaces and interfaces : with the structural, electronic, and optical properties (OLEDs and organic solar cells), thin film deposit (plasma technology) and surface analysis (depth profiling and elemental composition).

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CRMM & Center for Research in Molecular Modelling

The Centre for Research in Molecular Modelling (CRMM) is a multidisciplinary team. They specialize in the study of interfaces and solid surfaces.

Functional characteristics of materials are to a large degree determined by the properties of their surfaces and the interactions of these surfaces with surrounding media.

As a result, the performance of a material in terms of its function in coating, wetting, adsorption, friction and wear, optics, etc. can be manipulated by introducing surface layers of molecular thickness.

Department of Mechanical Engineering



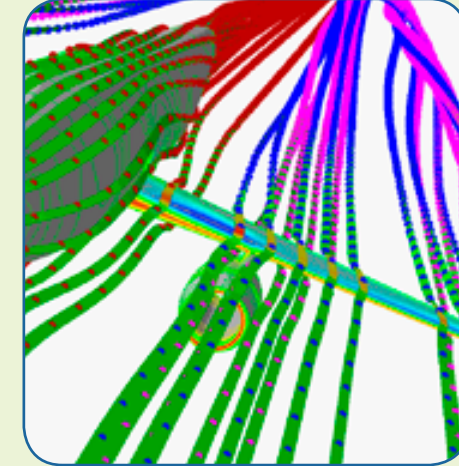
The laboratory develops an expertise in the field of manufacturing processes. Specific research projects address design of closed mold composite parts for aircrafts or simulation of high-speed machining.

Another topic to be mentioned is the design of piezoelectric motors to provide a gain in weight and control in space applications.

Laboratory research activities aim also at developing techniques to improve the safety of mechanical equipments and optimize their maintenance strategies.

The Department of Mechanical Engineering has some projects related to the manufacturing of composites parts for aircraft applications by a specific process, Resin Transfer Molding, which consists in injecting some resin in a closed mold filled by a fibrous reinforcement.

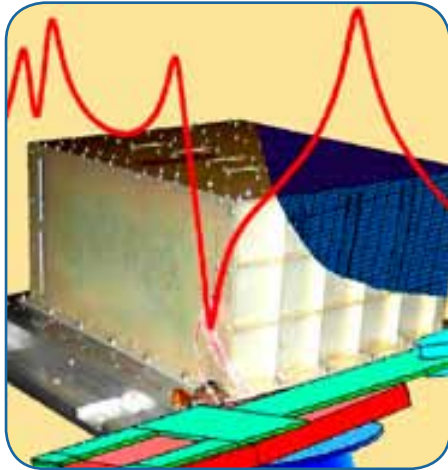
Fluids-Machines Department



The Fluids-Machines Department has the mission to provide an advanced research in fundamental fluid dynamics and applications dealing with interactions of fluids with structure, machine, human and/or its environment.

The department performs research activities in:

- Modeling, development and simulation in Computation Fluid Dynamics (CFD) for aeronautical, turbomachinery and multiphysical applications. The main development themes concern fluid-structure interactions, advanced preconditioning methods and turbulent transition modeling. Applied study are focused on design and optimization for flow problems in facilities or engines (optimization of fans, compressors and turbines, design of separator and cyclone chambers, ...)
- Dispersion of air pollutants and their impact on air quality. This area is focused in the development of a simulation chain for air pollutants dispersion allowin Dispersion of air pollutants and their impact on air quality. This area is focused in the development of a simulation chain for air pollutants dispersion allowing **to analyze the effect of industrial plant rejection in the atmosphere.**



In a general way, the department develops research related to the exploitation of vibration measurements performed on mechanical or electronic systems.

Past and current research activities include: experimental modal analysis and finite element model updating, identification of input forces by inverse methods, vibration testing and finite element modeling of electronic boards embarked on spatial vehicles, equivalence criteria between vibration tests, analysis and modeling of pyroshocks, prediction of ground vibrations induced by railway vehicles.

The laboratory is endowed with the sensors, exciters, signal conditioning devices, acquisition boards, and software's, necessary to perform the usual vibration measurements.

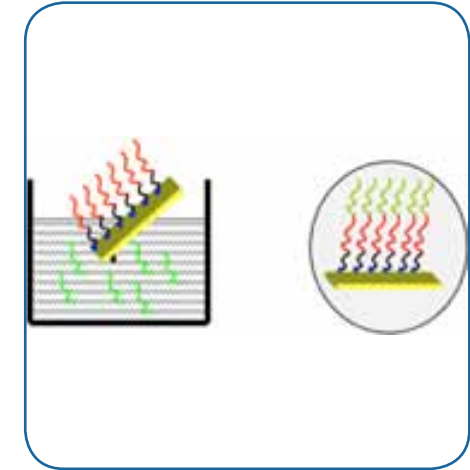


The laboratory develops its expertise in research fields related with energy use: from energy consumption in buildings to rational use of energy in industry.

Research is mainly carried out with advanced CFD (Computational Fluid Dynamics) software. Numerical simulation methods for radiative transfer in absorbing media are also developed in the laboratory as well as combustion gases spectral properties modeling.

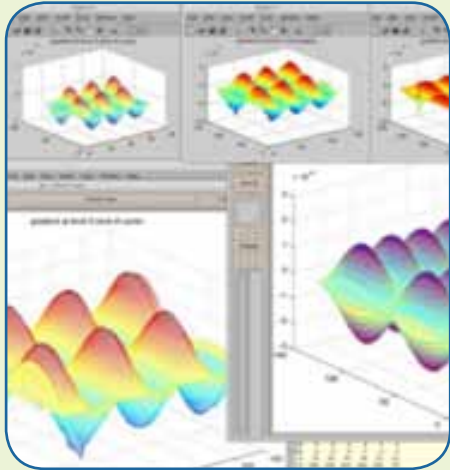
Main study areas :

- Radiative heat transfer : simulation methods, spectral behavior.
- Flameless combustion \bar{n} low NO_x burners \bar{n} Pilot furnaces for testing of gas burners.
- Modelling \bar{n} simulation of industrial furnaces.



Research at CES deals with design of surface and interface innovative materials and their synthesis by (electro-) chemistry and self-assembling to tailor surface properties, maximize performance, chemical selectivity towards targets and structural control at a molecular level of (electro-) chemically synthesized compounds.

Those surface materials correspond to organic and/or inorganic films assembly, thin or ultra-thin, on metallic, oxides or polymers substrates. The research opens doors to the study of new interfacial phenomena and applications in different fields. Among the applications developed, the self-assembled monolayers as new generation of corrosion inhibitors, molecular lubricants, molecular connectors for adhesion of polymers or metals, among others.



In many industrial and research projects, one attempts to improve a system by modifying its decision variables subject to constraints: this is optimization.

The research group focusses on the numerical solution of such problems, that is the effective calculation of the best values for the decision variables. We focus in particular on nonconvex and large-scale instances. Both theoretical questions, such as design and convergence properties of the algorithms, and associated software issues are studied.



Laboratories from PMR draw on powerful and modern instrumentation to develop materials, processes, devices and modeling thereof.

It includes the development and applications of many spectroscopic techniques, the quest for new materials, the study of thin films, nanostructures and hybrid (nano)-systems. A selection of examples includes research on self-cleaning surfaces, photovoltaic cells, organic light emitting diodes, and new transparent conducting oxide layers.

The research is focused on the study of materials, radiations and their interactions. LISE and LARN laboratories investigate surface modification of materials by ion implantation or physical deposition, and surfaces and interfaces of solid materials. Quantum chemical calculations are also performed.



Centre for Technological Support for Aeronautical Industry

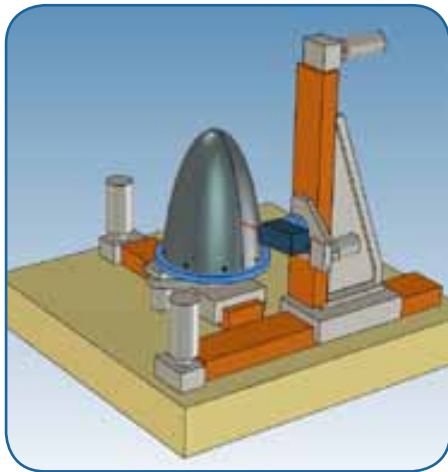
Quality and Measurement

As an engineering discipline, information systems engineering is the application of systematic, disciplined and quantifiable approaches to the specification, development, operation, and maintenance of information systems. This implies a systematic control of the quality for all the products and processes being involved.

The software process is to be considered as part of a global view involving all the enterprise's processes.

At the software product level, we are investigating topics related to our view of information systems as a complex product involving interrelated models at different abstraction levels.

Royal Military Academy



At the Royal Military Academy aeronautical applications are addressed in the following departments: Communication, Information Systems and Sensors, Construction and Materials, Mechanics, Weapon Systems and Ballistics.

Modern aircraft structures have to comply with severe requirements. To support the high standards of composite part construction and repair, new non-destructive techniques (NDT) are necessary to improve the efficacy of composite part inspection. DOTNAC (THz NDT on Aeronautics Composite multi-layered structures) proposes to develop a NDT using THz waves. The picture represents the overall system architecture of a high resolution and non contact inspection system under development.

Drawing on their scientific knowledge the members of the Laboratory of Materials Engineering do failure analysis of aeronautical components for the Belgian Air Force and the Belgian Government.

Research and development in aeronautics have led us to implement a pyrotechnical launcher in order to impart bird surrogates with a mass of 1,8 kg and a velocity of up to 180 m/s. The impact of the surrogate on samples enables assessment of the resistance of these samples.

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Cenaero



Cenaero is an applied research center providing to companies involved in a technology innovation process high fidelity numerical simulation methods and tools to invent and design more competitive products.

Cenaero provides state-of-the-art expertise in numerical simulation and modeling and its ambition is to be internationally recognized as a technology leader, to be a strategic partner of large industries as well as a real support to regional companies, including innovative SME.

Mainly active in Aeronautics, Cenaero offers advanced consulting services & engineering software in several fields: manufacturing processes, structural integrity analysis, composite structure design and optimization, complex multi-physics CFD, turbomachinery aerodynamics & design optimization and high performance computing.

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Cetic



Your Connection to
ICT Research

CETIC brings a strong expertise in certification for software embedded used in aeronautic and requiring insurance on their safety behaviour. In particular, in the product side, CETIC helps companies to improve reusability for the certification of critical and aeronautical embedded systems, following the embedded software (RTCA DO-178B) and hardware (RTCA DO-254) standards from the US FAA (Federal Aviation Administration) and EUROCAE (European Organisation for Civil Aviation Equipment).

In the certification process side, CETIC helps to improve the certification process in order to reduce the cost of multi-standard certification following well-known standard like RTCA DO-178B and IEC 61508.

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CEWAC is a technical services and R&D centre intended to assist companies: testing, studies, expertises and controls (ISO 17025 accreditation). Its 2 departments offer various services:

Welding and Testing Department

- Welding processes : Arc (MIG, TIG, (μ)-plasma), Laser, Friction, Friction Stir, Electron Beam and Resistance welding.
- Non-destructive testing: PT, MT, RT (2D and 3D), UT, VT and IT.
- Destructive testing : metallography, (micro-)hardness, tensile & bend testing.
- Calculations (FEM), conception & design in the fields of welding.

Hydraulic Department

- Free flows studies: valves, pumps, separators, water treatment plants, filters, ...
- Development and design of tests in extreme conditions: fire, high and low temperature, cryogenic, high and low pressure, helium leak tests, ...
- Assistance to research and product design in vacuum, industrial & medical hydromechanics.

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Multitel is a private & non-profit young research center created in 2000 with the support of the FEDER European initiative. Leading applied research and development activities for industry leaders, SMEs and spin-off companies, Multitel is a distinguished multidisciplinary Centre of Excellence, employing around 55 researchers.

Today the activity of the Centre is articulated around five areas:

- Photonics with an activities in embedding optical fiber in carbon wing structure,
- Wireless Network for Specific wireless network deployment with strong competencies on Zigbee protocol,
- Signal Processing with a strong position in the development of speech-centric human-machine multimodal interfaces and electronic embedded systems,
- image processing: for image and video content analysis,
- Certification activities in Railways signalization with a ISO-17025 accreditation.

Specifically on Aeronautic activities, Multitel has participated to a large European Integrated project, WearIT@Work, with EADS as direct partner, as Speech driven human-machine interface specialist for the development of a wearable system to help worker in maintenance applications.

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SIRRIS, the Collective Center for the Belgian technological industry.

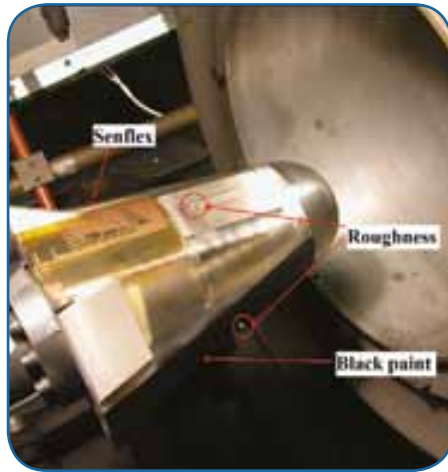
Sirris, is the technology center of the Belgian manufacturing industry. It promotes and supports innovation in products, materials and processes for a very broad range of industrial activities.

Sirris is :

- A technology transfer partner of advanced and breakthrough manufacturing technologies.
- A competence integrator in innovative projects, helping set up and management of multi-competence R&D consortia with its network of 2500 Belgian industrial and academic partners.
- An R&D partner providing expertise and up to date equipment in additive manufacturing for complex metal or ceramic parts (Ti, CrCo, SiC,...), in nanoparticles production/integration, in nanocomposites and in Micromanufacturing (circuit on foil, μMim, µreplication...), in smart products concept and development.

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Aeronautics and aerospace department

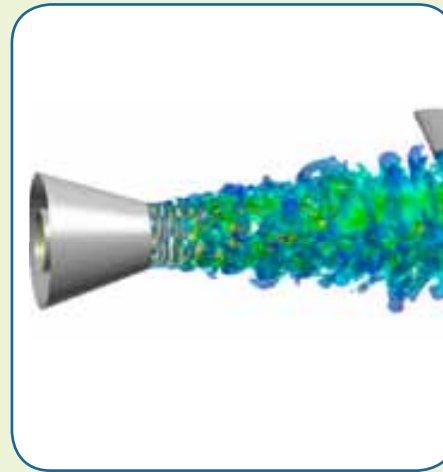


VKI - Von Karman Institute for Fluid Dynamics

A wide spectrum of facilities and computational tools covers the flow range from the low-speed regime of commercial aircrafts to the supersonic and hypersonic regime of atmospheric space entry. The department focuses in particular on the modeling, simulation and experimental validation of atmospheric entry flows and thermal protection systems (TPS), including transition to turbulence and stability. The experimental studies are carried out in its top level Mach 14, Mach 6 and Induction Coupled Plasma windtunnels, for which dedicated measurement techniques have been developed e.g. involving spectroscopic laser technique. Recently the department initiated a strong activity on small satellite developments and launching (CubeSat Programme QB50). On the computational side the department has developed an extendable software platform (COOLFluid) for which high performance computational flow simulation which incorporates the research on numerical algorithms, advanced physico-chemical and plasma models as well as fluid-structure interaction and conjugate heat transfer.

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Environmental and Applied Fluid Dynamics Department



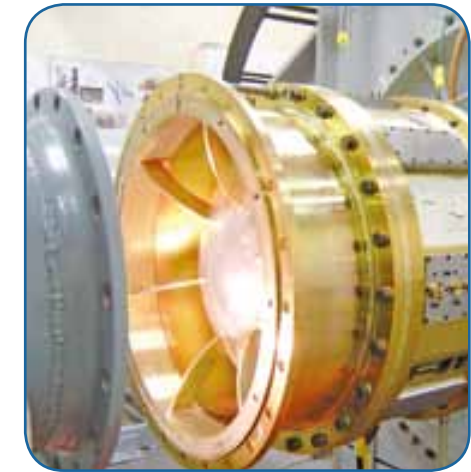
VKI - Von Karman Institute for Fluid Dynamics

The Turbomachinery and Propulsion department specializes in the aero-thermal aspects of turbomachinery components for aero-engines and industrial gas turbines, space propulsion units, steam turbines and process industry compressors and pumps. It has accumulated wide skills in wind tunnel testing over a wide range of Mach and Reynolds numbers and related measurement techniques development and application. The department has acquired a world recognised expertise on steady/unsteady aerodynamic and aero/thermal aspects of high pressure, including cooling, and low pressure turbomachinery components through the design, development and use of a number of unique wind tunnels.

The department finally has over 20 years of experience in the computational analysis of flow in turbomachines, and in the design techniques and multi-disciplinary optimization methods of their components.

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Turbomachinery and propulsion department



VKI - Von Karman Institute for Fluid Dynamics

The Environmental and Applied Fluid Dynamics department studies and teaches fluid dynamic aspects of environmental and industrial processes. Research themes are aeroacoustics, multiphase flows, wind technology, and bluff-body aerodynamics. The department has 40 years of expertise in experimental fluid dynamics at full-scale and model-scale, including the design, construction and testing of dedicated experimental facilities, and the development of traditional and advanced, laser-based and acoustic measurement techniques. Since 20 years, numerical modeling is performed using CFD (Computational Fluid Dynamics), and includes the development of turbulence models. Current research activities are nano-particle flows, pollutant dispersion, wind energy, pedestrian wind comfort, wind loading on structures, acoustics of turbines, heat and mass transfer of industrial processes, and bubble and spray dynamics.

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Attached to the Haute Ecole de la Province de Liège, CECOTEPE, Centre of Technical and Educational Cooperation, undertakes several state-of-the-art research activities among which aeronautical supervision (automated surface condition and binding analysis) and aeronautics (infrared thermography analysis).

Main skills of the Research Center:

- Automated aerospace surface control, aeronautical collages control, control by infrared thermography
- Various CND techniques

Extraordinary engineering equipment:

- Sony digital camera support, HF lighting, software toolboxes Matlab with Image Processing and Neural Networks
- Infrared thermography camera

Keywords:

surface states, collages, visual controls, digital images, neural networks, infrared thermography

Projects:

AUCONPA (Techspace), COQUANE (SONACA), InfraredThermography (Belgian Army)



Attached to the Haute Ecole Libre Mosane, the Combined Institutes Research Centre (CRIG) is highly qualified in Applied Mathematics (maximising the effective and efficient use of processes: metaheuristics, continuous and discrete variables, multi-criteria, statistics applied to manufacturing) and Physiques (engineering computation: liquid or gas flows, structure calculations, etc.).

The Centre offers to industrialists access to the key computation programs as well as a wind tunnel

The CRIG recently participated alongside the CENAERO (Centre of Excellence in Aeronautical Research) in a project for maximising the effectiveness of heat pipes.

Main skills of the Research Center:

Heat transfer, CFD, Thermal, Modeling, Aerothermodynamics

Extraordinary engineering equipment:

Soft fluid simulation, Optimizer ...

Keywords:

Modeling - Aerothermodynamics - HEAT EXCHANGE - Human Machine Interface - Telecom

Projects: OUFTI-1



Based in Mons, Belgium, and attached to the Haute Ecole Louvain en Hainaut, the CERISIC (Research and Study Centre) specialises in particular in electronics and automation (wireless networks, home automation, power electronics applied to space, power electronics, Ultra Wideband system in wireless transmission, sensors and optical logic, vibration analyses, thermal imaging).

Main skills of the Research Center:

Electricity, electronics and telecommunications (wireless networks air and water, power electronics applied to the space field, electromagnetic compatibility of power electronics, transmission not wired broadband (UWB) sensors and optical logic, sensor networks)

Extraordinary engineering equipment:

- Bench vibration analysis and signal processing using FPGA platform Embedded Linux Platform
- Prototyping and testing electronic circuits

Keywords:

Non-wired telecommunications - sensor network - power electronic converters



IRISib

Attached to the Haute Ecole Paul Henri Spaak, IRISIB (Research Institute of Brussels Higher Industrial Institute) is a showcase in particular for cutting edge expertise in mechanics (design, modelling and calculating structures or mechanical equipment; hydraulic and thermodynamic calculations, aerodynamic research, industrial processes simulation, CAM and CAD).

Main skills of the Research Center:

- Design, modeling and calculation of structures or mechanical equipment
- Hydraulic and thermodynamic calculations.
- Material characterization
- Aerodynamic Studies
- Flight mechanics

Extraordinary engineering equipment:

- Versatile test beds (bellows, hydraulic channel, bench motors, pumps, compressors, fan boxes), CNC milling machine CAD, CAD, CAM, CFD, chartplotter, nonlinear behavior, finite element programming (Python, Visual Basic, Fortran)

Keywords: 3D materials - numerical models - wind tunnel - technical thermodynamics - fluid mechanics - aerodynamics - CAD - CAM - CAD - finite elements - HVAC - thermal

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Wallonia Training Centers



Technifutur



Training, awareness enhancement, advising, R&D assistance, e-learning, e-business, technology intelligence and pre-production support are our assignments. They cover various fields, such as aeronautics, assembly, automation, design, measurement and inspection, machining, image and multimedia, etc. They meet the requirements of the regional, national and international industrial environment.

We target company staff, job seekers, teachers and students (for more information, go to our website www.technifutur.be).

More particularly and for more than 10 years now, Technifutur has been providing training to aircraft maintenance mechanics in the aviation sector. In 2007, the "Service Public Fédéral de la Mobilité et du Transport Aéronautique" granted the PART 147 approval, officially acknowledging Technifutur's competency and their right to conduct training and examination and to issue certificates for aircraft maintenance mechanics in accordance with the requirements of PART 66 levels A1, A2, A3 and A4.

On the basis of this recognition, of the acquired experience and the needs expressed by the aircraft industry, Technifutur now aims at expanding their skills and achieving the approval to provide levels B1 and B2 training and examination.

Technifutur is also recognized worldwide for its welding and non destructive testing training courses.

Wallonie Aerotraining Network (WAN)



The WAN is an « assembly ground » of training. The WAN relies on different partners, such as centres of competency, aeronautical schools, Belgian Air Force and major players of industry (SONACA, SABCA, ...). The WAN covers all the needs of the aerotechnical sector.

PRODUCTION. All technologies and methodologies linked to design, manufacture, repair and inspect cells, engines, avionics. Such as : CAD/CAM (CATIA v5), analysis and functional dimensioning, operating gamuts, process understanding and assembly techniques (metallic/composite), non destructive testing, finite element analysis and resolution methods (SAMCEF/NASTRAN), quality (EN9100/EN4179), Lean Manufacturing, SPC methodologies,...

MAINTENANCE. Trainings for jobs in airports or industrial aeroplane workshops, propulsion mechanisms, onboard equipment. Approved as official training centre (EASA BE.147.002), the WAN provides recognised (meets EASA Part-147 requirements) basic training for Part-66 Aircraft Maintenance License A1, A2, B1.1, B1.2, B2 and aircraft type training for Airbus or Boeing ranges for B1.1, B2 and C. Many others tailored courses and exams are possible in French or English. For its training, lectured by highly qualified senior instructors, the WAN owns a functional Boeing 727 and various aircraft parts, engines, avionics.

AUTOMATED FIBER PLACEMENT. An AFP machine manufactures complex shapes using composite material. An Ingersoll AFP is installed at SONACA facilities. The centre is able to conduct research for advanced aerospace applications and industrial process development. The WAN's main target is to train specialised people using AFP technology.

Networks



Technological and scientific intermediation network

Are you looking for a solution to a technological problem? Do you want to launch out further into research and technological innovation? Do you want to enhance your technologies? The technological and scientific intermediation network is at your service!



DG06

The operational Directorate General for the Economy, Employment and Research (Research Department) offers a range of incentives and forms of assistance to increase the technological potential of researchers based in the Walloon Region.

<http://recherche-technologie.wallonie.be>



PICARRÉ asbl

Decision-making assistance for developing a management policy for your intellectual assets.

www.picarre.be



INNOVATECH

InnovaTech

The coach for your technological innovations which helps you to structure your technological innovation projects from the emergence of the idea until its commercial exploitation.

www.innovatech.be



NCP-Wallonie

Free professional assistance at every stage of your European research project.

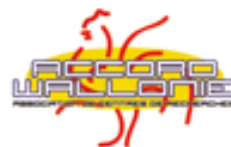
www.ncpwallonie.be



LIEU Network

provides access to the resources and competences of universities and higher education institutions.

www.reseaulieu.be



Accord Wallonie

federates the Walloon research centres, promotes its technological resources and strengthens the synergies between them.

www.accord-wallonie.be



EEN network

Assistance to your SME to develop and exploit your technological expertise by setting up European partnerships

www.wallonieeurope.be



SPoW

Science Parcs of Wallonia: Places where your innovative business is a priority

www.spow.be



CEQUAL

Helps you to integrate Quality, Safety and Environmental Management Systems to improve your competitiveness

www.cequal.be

Find, Collaborate, Innovate!

You're a Walloon company wishing to innovate?

The portal www.innovons.be is there to help you overcome the obstacles you encounter and give worldwide visibility to your skills and core competencies.

You'll find key information to boost your projects. And also all the partners of the Intermediation Network, waiting for you with their skills in innovation management, their scientific expertise and their state-of-the-art equipment.

In addition, the portal is your gateway to the Technology Vouchers, a fast and easy way to boost your innovation.

So, join www.innovons.be, the innovation community in Wallonia.



WALLONIA FOREIGN TRADE AND INVESTMENT AGENCY (AWEX)

The Wallonia Foreign Trade and Investment Agency (AWEX) is the governmental agency in charge of foreign trade promotion and foreign direct investment attraction in the Region of Wallonia, Belgium.

The agency has a worldwide network of 107 Economic and Trade Commissioners. AWEX has been certified ISO 9001 since April 2002.

As a foreign trade agency, AWEX carries out a mission of promotion and information for the benefit of both Wallonia and the foreign business community.

Upon request, AWEX assists buyers, decision-makers, importers and foreign prospects by:

- Providing economic data on Wallonia and its export potential
- Disseminating information on products and services from companies located in Wallonia
- Identifying companies in Wallonia for international partnerships
- Distributing lists of exporters from Wallonia

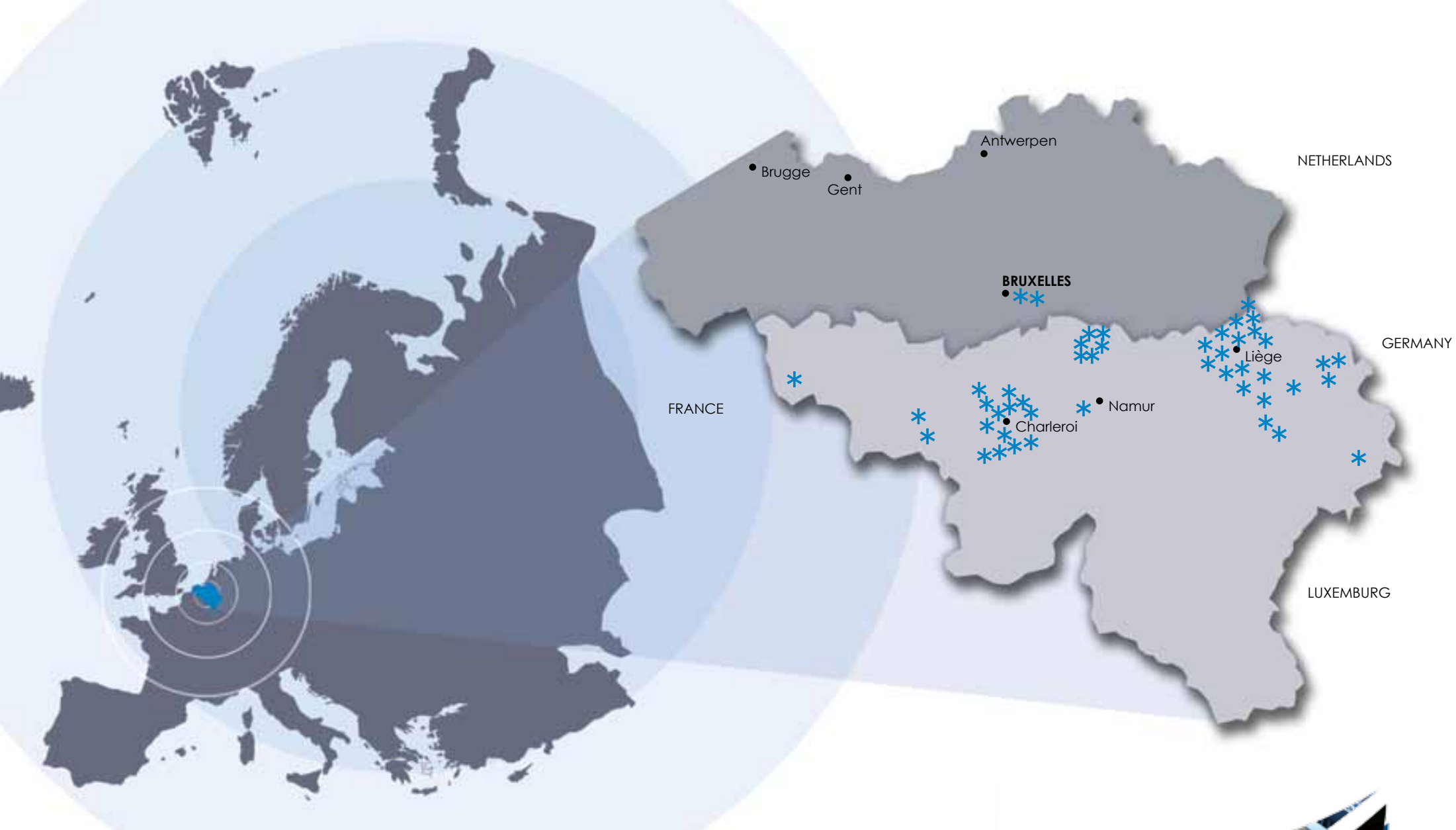
As an export partner for Wallonia-based companies, Awex offers a wide range of export-oriented services and activities:

- General and commercial information on foreign markets
- Market studies tailored to specific areas upon request
- Organization and planning of marketing activities (international trade shows, economic missions, sector-based contact days...)
- Establishing contacts with international organizations
- Promoting Wallonia's export potential abroad
- Financial support and export financing
- Training in international careers

As a Foreign Direct Investment agency, AWEX – via its Office for Foreign Investors (OFI) – has an overall responsibility for the attraction of foreign investment in Wallonia. This includes seeking out and providing information to potential foreign investors. The Agency also offers a pro-active follow-up service to investors already established in Wallonia. In addition, it is in charge of identifying new foreign investors for the acquisition of industrial sites under restructuring process.

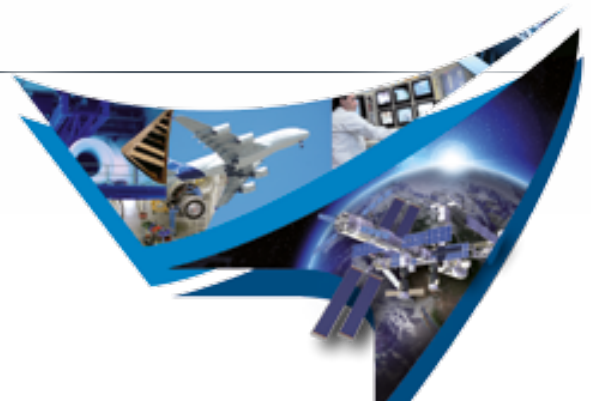


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Skywin
Wallonie
Aerospace cluster of Wallonia

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www.image-cie



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In association with:

