



HUNGARIAN  
INVESTMENT AND  
TRADE AGENCY

# AEROSPACE INDUSTRY IN HUNGARY

# 2012



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# Welcome

## Dear Partners,

**All things change.** So does the Hungarian Aerospace Industry which is in the phase of rebirth and reemergence. The last decade brought remarkable changes to our industry, new high-tech products, solutions were emerging every year.

Hungarian Aviation Industry Foundation **HAIF** was founded in 2003 with the mission to be the industry catalyst and promoter that brings together organizations, companies in order to speed up the development and growth of our industry.



HAIF initiated and organized the establishment of the Hungarian Aerospace Cluster **HAC** in 2006 and the Hungarian Aerospace Technology Platform **HATP** in 2007. By 2009 Hungary had an aerospace industry which employs more than 2500 employees and incorporates more than 40 high-tech organizations.

Our industry is a mix of foreign and local companies and capable to develop and manufacture small aircraft for General Aviation, manufacture metal and composite components for large aircraft and able to develop and manufacture electronic systems and components for space applications. Since 2008 more than 30 Hungarian companies implemented the AS9100 aerospace quality system.

In 2009 our companies debuted in the Aero 2009 Friedrichshafen Expo for the first time as an industry, exhibiting seven aircraft models including two new composite amphibians and a small UAV.

In 2010 we celebrated the **100<sup>th</sup> anniversary of the birth of Hungarian Aviation** with two remarkable events, the debut of our new Corvus Racer 540 aircraft in Canada at the Red Bull Air Race and the grand opening of our greenfield EL-TEC Center in Budapest which focuses on developing electronic systems for aerospace applications.

We completed our strategy document last year, which defines the future directions and stages of our development for the next 10 years with the focus on General Aviation aircraft, UAV systems, composite- and turbine part manufacturing and space system development. It also emphasises the need to enhance our participation in EU Framework and the Clean Sky JTI research programmes.

**HAIF** commitment to collaboration and our diversification strategy will help to bring new products and services to the global market and will help our industry to be successful internationally.

**Mihaly Hideg MBA, MSc.**

*Chairman of the Hungarian Aviation Industry Foundation*

*Cluster manager of the Hungarian Aerospace Cluster*

*President of the Hungarian Aerospace Technology Platform (Aviation)*

**[www.haif.org](http://www.haif.org)**



# The Hungarian Aerospace Industry History In a Nutshell

Hungary's aerospace industry can look back on rich traditions. There have been several outstanding Hungarian aircraft designers and builders who have left their mark on the early history of aviation.

Following World War II, and the Hungarian revolution of 1956 (against the government and its Soviet-imposed policies) in particular, Hungarian aerospace development was restricted to prototypes of training aeroplanes and gliders.

Before 1992, little was made public about the latest developments in the industry, although Hungarian engineers played a significant role in the research and development of Soviet-made aircraft and supplementary equipment. Nevertheless, Hungarian instruments and communications equipment have always been used extensively in space research and space flight.

During the 1990s, with the help of Lockheed Martin managers Hungarian engineers and technicians grew increasingly familiar with advanced methods of aircraft operation, maintenance and refurbishment. By the end of the decade, a new group of aerospace experts had emerged that was proficient in English and knowledgeable of Western practices in the aerospace business.

The re-emergence of Hungarian aerospace began in 2000 with the construction of the first greenfield aerospace plant by GE Engine Services in Veresegyház. This was soon followed by Lufthansa Technik, Eldim, Alcoa, Elektrometall GmbH and Flamespray. Together, these companies laid the foundations for a modern aerospace sector in Hungary. In the early years of the millennium, three new small aircraft design companies also commenced operations. Using all-composite technologies, Corvus Aircraft Ltd., Composite One Ltd. and Waterfly Ltd. opened a new "composite era" in the history of the Hungarian aerospace industry. Today there are six SMEs active in the design, development and manufacturing of general aviation aircraft and unmanned aviation vehicles.

The Hungarian Aerospace industry (including MRO organisations) is almost 100% privately owned and currently comprises more than 130 registered organisations employing some 2,500 people. The Hungarian Aviation Industry Foundation (HAIF - [www.haif.org](http://www.haif.org)) was established in 2003 to accelerate the development of the sector. By organising workshops, lobbying and bringing together aerospace-related companies, HAIF initiated and oversaw the creation of the Hungarian Aerospace Cluster (HAC) in 2006, the first aerospace industrial group in Hungary focusing on development and manufacturing. HAC currently has 26 members.

In 2007, HAIF launched the AS9100 aerospace quality management project for its members in tandem with the Ministry of Transport. More than 30 companies participated in the project and were certified by the end of 2011.

In September 2007, HAIF founded the Hungarian Aerospace Technology Platform (HATP), a third key body designed to help research and development organisations participate in FP7 Framework programmes and bring together space and aeronautical companies in Hungary. HATP currently lists 29 organisations as members, including three major universities. Since the late 1960s, academic and university research groups have participated in the development and manufacturing of space-born payloads, such as on-board energy management subsystems, computer systems, telemetry systems and scientific instruments for space missions. After 1990, several privately owned companies joined this group and became successful members of the international space community.

Established in 1993, the Defence Industry Association of Hungary ([www.vedelmiipar.hu](http://www.vedelmiipar.hu)) also lists several aerospace suppliers among its members.

# Milestones of Hungarian Aeronautical Research

**Emil Némethy (1867-1943)** was the first engineer in the world to use steel tubes for aeroplanes and work with aileron areas. The "Némethy-equation" was one of the first mathematical solutions to calculate with great precision the lifting ability of early aircraft.

**Sándor Svachulay (1875-1955)** built an aeroplane with welded steel tubes in 1909, which proved to be a forerunner of modern skeleton-structured aeroplanes. For the famous Albatros, Svachulay designed a retractable landing gear, later adapted by several international designers. His other inventions included the adjustable metal propeller and a device to control landing speed.

**János Adorján (1882-1964)** was the designer and constructor of Hungary's first working aeroplane. His twin-cylinder "Libelle" plane completed several successful flights in 1909 and 1910.

**Aladár Zsélyi (1883-1914)** was the first in Hungary to design and construct an aeroplane based entirely on structural engineering fundamentals. His creation included several new concepts, including a new control mechanism and a spring-mounted landing gear.

**Tódor Kármán (1881-1949)** is considered a leading theoretician of aerodynamics. Kármán analysed the flow of fluids past a cylindrical obstacle at right angles and determined that the wake separated into two rows creating turbulence around them. This is manifested in aircraft wing flutter and the oscillation of a bridge in high wind. The concept, presented in several papers in 1911 and 1912, came to be known as the "Kármán vortex street" or "Kármán vortices". His work led to the redesign of many structures to withstand vibration, including modifications to the design of ships and aircraft to adopt more streamlined forms. Kármán's theory on aerodynamic bumps served as a basis for the development of supersonic aircraft.

**Pál Vágó (1889-?)** invented and developed the gyroscopic stabiliser, a forerunner of modern gyro horizons.

In the early decades of modern aviation history, engineers seeking new flying methods probed a variety of diverse concepts. In addition to the rigidwing "dragon" and the ornithopter, they also experimented with propellers rotating around a vertical shaft. During World War I, Lieutenant-colonel István Petróczy, professor Tódor Kármán and Vilmos Zurovetz jointly conducted hovering experiments with a "windmill plane", the PKZ.



Emil Némethy



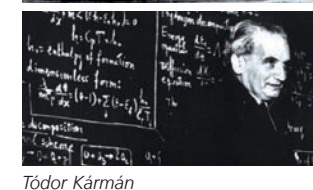
Sándor Svachulay



Adorján János (balról a harmadik) segítőivel és a Libelle



Aladár Zsélyi



Tódor Kármán



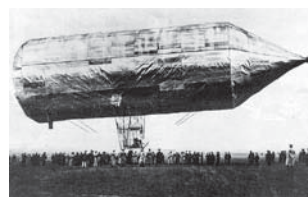
# The Hungarian Aerospace Industry History In a Nutshell

**Oszkár Asbóth (1891-1960)** performed military service at an aircraft factory near Vienna after the outbreak of World War I, where he was in charge of propeller manufacturing. He constructed and tested some 1,500 propellers in the factory's wind tunnel. Ten years later, Asbóth built his first helicopter. Powered by a 120-horsepower, nine-cylinder engine and propelled by two 4.35 meter propellers assembled in parallel one above the other and rotating in opposite directions, the "AH 1" took off vertically on September 9, 1928.



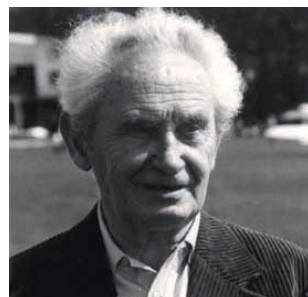
Oszkár Asbóth

**Dávid Schwartz (1845-1897)**, the Hungarian inventor of the dirigible airship, used ultra-thin aluminium to insulate the balloon, the aluminium skeleton and the propellers at the sides of the basket. Commissioned by the German army, he constructed the first dirigible airship in 1896, tested with partial success at Tempelhof near Berlin, Germany, on November 3, 1897. The propeller belts broke, causing the pilot to lose control and crash the airship. Schwarz died shortly afterwards and his widow sold all patent rights to Graf Zeppelin in 1898. Zeppelin went on to develop a successful line of dirigible airships which bore his name, while that of Schwartz disappeared into oblivion.



Dávid Schwartz

**Ernő Rubik (1910-1997)** was a member of a group of aircraft designers who were instrumental in rebuilding the Hungarian aircraft industry after World War I and II. As head of the Central Experimental Plant, he started to develop all-metal gliders with simple structures suitable for mass production in 1956. A family of gliders emerged, the most successful of which was the R-26 Góbé two-seater glider still in use for training purposes. In 1963, Ernő Rubik was awarded the Kossuth Prize, the highest Hungarian state award for science, for his lifetime achievement.



Ernő Rubik



# Milestones of Hungarian Space Research

The Space Technology Department of the Central Research Institute of Physics (KFKI RMKI) played an active role in the Soviet-led Intercosmos international research programme. The Vega 1 and 2 spacecraft were launched from Baikonur in December 1984 carrying KFKI's plasma particle detector, as well as its tracking and imaging systems. It approached Halley's Comet in March 1986, sending the first ever close-up pictures of a comet nucleus. KFKI instruments were also used in several other Russian and NASA and ESA co-ordinated projects. Recent Hungarian involvement in space research includes the Rosetta, MarsExpress and VenusExpress projects. KFKI RMKI will supply a data acquisition and control system to the ISS Plasma Wave Complex due to be launched at the end of 2008, while another Hungarian supplier, SGF Kft., is involved in developing the project's electronic ground support equipment.

The Hungarian space industry has developed in parallel with space science in recent decades, propelled by the efforts of the country's great academic research institutes and universities to conceptualise devices for interplanetary missions and manned space flight. However, these projects are yet to make the transition to actual production. This situation has led to the establishment of several private firms. Some of these companies have grown into established suppliers of the international space segment, providing both on-board and ground equipment. BL Electronics supplies various space missions involving small astronomy satellites and other instruments, while BHE Bonn Hungary supplies a number of microwave subsystems for missile programmes, including the KSLV launcher and microwave ground checkout subsystems for the Chandrayaan-1 moon mission.

The competence and scope of the Hungarian space industry is extremely broad. Hungarian companies can be found in 20 of 26 categories of the ESTMP (European Science Technology Master Plan), covering a total of 60 topics. Of these, 29 are classed as "Competences" and 31 are "Interests". Hungary has top specialists in every field, many of whom have already made a variety of technical achievements related to space technology. Their professional knowledge is a base on which the industry can build.

**MASAT-1** is a Cube-sat project to be built by university students to demonstrate the capabilities of pico-satellites. It is an educational project designed to provide students with genuine experiences of space technology in action. The fruits of their work may be helpful to the development of more sophisticated spacecraft. MASAT-1 was launched and functioning successfully since February 2012.

In February 2010 a successful materials science experiment was conducted on board the International Space Station under the aegis of the FOCUS project. Both the experiment and the hardware were designed, built and qualified by Admatis Kft. This was the first perfectly functioning Hungarian payload classified according to ESA standards.

Under the MSI-MMTH project the team assembled by Admatis Kft designed, built and tested several hundred components for the European satellite Sentinel-2, thus becoming an EADS Astrium supplier.

The Hungarian Space Industry Cluster was set up in 2007, and its over 30 members include the majority of firms which are able to take part in fulfilling space industry orders. Most of these companies are playing a role in the success of the MSI-MMTH project as their products and service will be put into space.

The Hungarian Space Industry Cluster represents Hungary in the international organisation SME4Space, which holds ESA level advisory licences.

## SECTOR OVERVIEW

Several Hungarian automotive and electronic suppliers have been manufacturing high-quality products for international aerospace customers since the 1990s. Aerospace component manufacturing activity in Hungary was initiated by foreign subsidiaries of Western aerospace companies, such as Sulzer Hungaerotech, Elektrometall Paks, Alcoa-Köfém and Flamespray. These companies were soon joined by local enterprises and, thanks in part to the rapidly growing automotive industry in Hungary, there are now more than 400 part suppliers covering a wide range of technologies and products (with an increasing number also targeting the aerospace industry) throughout the country. In the early years of the new millennium, several sport and GA aircraft developers joined the sector to offer new composite aircraft, including two amphibians and a UAV. Today more than 2500 people are employed in the industry. EL-TEC Centre and Diehl Aircabin Hungary Kft are the two latest greenfield organizations that joined this rapidly developing sector.

## UNIVERSITIES, RESEARCH INSTITUTIONS

Several universities and research institutes joined the sector with the establishment of the Hungarian Aerospace Technology Platform (HATP), dedicating research capacity both to European FP7 projects and to the development of sport aeroplanes and their systems.

### Bay Zoltan Foundation for Applied Research

Department of New Generation Materials and Technologies

1116 Budapest, Fehérvári út 130 • Tel.: +36 1 463 0500 • [www.bayati.hu](http://www.bayati.hu)



The Bay Zoltán institute for Materials Science and Technology opened in Budapest in 1995. BAYATI's mission is to play a dominant role in the innovation chain of materials science and technology, primarily in the fields of laser technology, metallurgy and simulation, polymer technology, environmental technologies, and nanotechnology. BAYATI achieves this by consolidating Hungarian and international R&D resources.

#### Competence fields

- Development of thermoplastic and thermosetting composites
- Development of other complex systems
- Development of production and application technique of polymer composites
- Testing of polymer composites
- Application of particle (nano and macro sized) and fibre (natural, glass, carbon, aramide, etc. fibres and self-) reinforcement
- Application of 2K technologies (injection moulding, extrusion), product and technology development
- Welding of polymers by laser beam

### Budapest University of Technology and Economics, Department of Aircraft and Ships



1111 Budapest, Stoczek utca 4, building "J" • Tel.: +36 1 463 1922 • <http://rht.bme.hu/>

BUTE is a large education, research and service centre working in close cooperation with international companies and organisations to promote the innovative application of the latest research in science and technology. Its activities include task-oriented analysis of markets, technology and design. Technology and product development span design methods, measurement, analysis, testing, engineering, prototyping, materials and production technologies.

#### Main fields of development:

- Thermal and fluid micro-machines
- Vehicle thermal processes
- Gas turbines and combustion engines
- Aeronautical sciences
- Special aircraft
- Air traffic management

### Budapest University of Technology and Economics Space Research Group

1111 Budapest, V2 building, VI. floor 658 • Goldman György tér 3 • Tel.: +36 1 463 3288 • <http://vac.mht.bme.hu/srg/>

The Space Research Group has a long track record in space-related hardware and software development. Over the past 35 years, the group has built more than 50 devices in close co-operation with Intercosmos, AMSAT, ESA and NASA. These projects were mainly concerned with major satellite subsystems. On the basis of its considerable experience in on-board electronics, the group has developed a series of outstanding solutions for power systems, high-frequency communications equipment and remote sensing systems, as well as data collection, transmission and telemetry systems.

### Budapest University of Technology and Economics Department of Control and Transport Automation

1111 Budapest, Bertalan Lajos utca 2 • Tel.: +36 1 463 1013 • [www.kka.bme.hu](http://www.kka.bme.hu)

#### Research activities:

- Aircraft modelling and flight control systems (mainly for UAVs)
- Detection filter design algorithm, and its application in safety critical vehicle systems (trains, aircrafts, road vehicle, nuclear power plant)
- Road traffic system modelling and control
- Heavy vehicles rollover stabilization
- GPS/INS navigation
- Battery fed and hybrid electric cars.



**Budapest University of Technology and Economics**  
**Faculty of Mechanical Engineering Department of Polymer Engineering**

1111 Budapest, Műegyetem rakpart 3, T. building III. • Tel: +36 1 463 2003 • [www.pt.bme.hu](http://www.pt.bme.hu)

The history of the Department of Polymer Engineering Technology dates back to 1871, when the Mechanical Engineering Department of the Budapest Technical University was founded. Today, its main fields of activity are development of polymer composites, injection moulding and fibrous materials.



**Hungarian Academy of Sciences (MTA EK)**  
**Centre for Energy Research,**  
**Fuel and Reactor Materials Department**

H-1121 Budapest, Konkoly Thege út 29-33. • Telephone: +36 1 392-2222 • <http://energia.mta.hu/>



The Fuel and Reactor Materials Department has extensive experience in the research of corrosion at high temperatures, the electrochemical properties of metal-liquid interfaces, radiation, and thermal aging of structural materials. The research centre operates Europe's only neutron, gamma and X-ray radiography station, which is suitable for imaging a variety of objects, such as propeller blades of length up to 10m, width of up to 70cm and weight of up to 200kg.

**Hungarian Academy of Sciences**  
**(MTA SZTAKI DSD) Department**  
**of Distributed Systems**



1111 Budapest, Lágymányosi utca 11 • Tel.: +36 1 279 6212 • <http://dsd.sztaki.hu>

MTA SZTAKI DSD Established in 1994, MTA SZTAKI Department of Distributed Systems (MTA SZTAKI DSD) was one of the very first organizations to introduce and apply WWW technologies in Hungary, and since 2002 has run the W3C Hungarian Office. Since the mid-90s MTA SZTAKI DSD has specialized in the research and development of distributed systems, applications and middleware, including Web-based software systems, cloud computing, social computing, groupware applications and services, digital archive systems, and mobile development. MTA SZTAKI DSD has participated in numerous European and national joint research projects, and worked for large multinational companies such as RICOH, Nuance, RIM, EADS Space Transportation, INRIA, Telefonica I+D, Atos Origin.

Current activities of MTA SZTAKI DSD involve the development of virtualization tools, middleware systems, including Grid and P2P-based systems, semantic web-service architectures, platforms, methods and tools that create context-

aware smart spaces, and make the personalization and dynamic composition of services possible. They support flexible business models, notably, collaboration in networked enterprises, as they provide platform independent access and sharing of knowledge, processing, communication, storage and content. Furthermore, they enable the definition and execution of tasks and workflows for collaboration and operation.

Facing today's challenges regarding the load and diversity of information and content, MTA SZTAKI DSD is also actively involved in the research and development (methods, technologies, applications) of digital archives, which aim at ensuring usability, accessibility, scalability and long-term preservation of digital data. Building upon the usage of OAI (Open Archives Initiative) protocols, the department has significantly contributed to the promotion of sophisticated digital archive solutions in Hungary and has participated in the EU funded DELOS NoE projects (European Network of Excellence on Digital Libraries). MTA SZTAKI DSD has also implemented and conducted research in the architectural, functional and user interface aspects, group-based project management systems, workflow systems, meeting support systems, distributed whiteboards, discussion forums, group calendar, agenda applications, voting, rating, annotation and collaborative filtering facilities.

MTA SZTAKI DSD is an active community member of S-Cube for Software Services and Systems Network in Europe with professional experience in JAVA, XML, RDF, OWL, SPARQL and {L,W,M} AMP technologies.



**Hungarian Academy of Sciences (MFA KFKI)**  
**Research Institute for Technical Physics**  
**and Materials Science**

1121 Budapest, Konkoly Thege út 29-33 • Tel.: +36 1 392 2222 • [www.mfa.kfki.hu](http://www.mfa.kfki.hu)

The Research Institute for Technical Physics and Materials Science (MFA) was established in 1998 by the Hungarian Academy of Sciences, merging the former Research Institute for Technical Physics (MFKI) and the KFKI Research Institute for Materials Science (ATKI). The Institute operates at the KFKI Campus in Budapest.

The primary mission of MFA is basic research on the properties of complex, functional materials (semiconductors, thin films, ceramic and polymer-based composite structures) and exploring their relationships within the multi-disciplinary framework of physics, chemistry, biology, engineering and informatics. Due to the small scale now common to each of the above topics, these activities are categorised under nanotechnology research.

A unique, nationwide pool of sample and prototype production resources, as well as a variety of analytical devices, allows intensive research in the following strategic fields: nanostructured materials and composites; special thin-film coatings; integrated optics and photonic devices; biomolecular surface functionalisation; microtechnology device development; photovoltaic R&D; integrated sensor applications; and industrial and biocompatible ceramics.

MFA also stresses the application of its research results, primarily in integrated micro- and nano-devices and photovoltaic energy conversion. IPR and practical utilisation strategies have been reaffirmed by industrial clients and partners for several decades. The recent success and continuing development of its spin-off companies (ANTE Innovative Technologies Ltd., TactoLogic Ltd.) further strengthen the Institute's position.

MFA builds extensive national and international partnerships focusing on higher education institutions in particular. Joint laboratories are operated with the Technical University of Budapest (chemical nanostructures, electron-lithography), Pannon University (nano-sensorics) and Budapest Tech (Molecular Beam Epitaxy), thus ensuring a steady flow of young researchers and engineers.

### **Hungarian Academy of Sciences (MTA SZTAKI SCL) Systems and Control Laboratory, Computer and Automation Research Institute**

1111 Budapest, Kende utca 13-17 • Tel.: +36 1 279 6117 • [www.sztaki.hu/department/SCL](http://www.sztaki.hu/department/SCL)

System theory, in general terminology, considers the formal description of specific behaviours in a large variety of systems. This discipline is the research topic adopted by SZTAKI since its foundation and is at the heart of the work conducted by its Systems and Control Laboratory. The laboratory carries out research projects in the following areas:

- System identification
- Simultaneous identification and control
- Robust control
- Uncertainty and performance in continuous-time stochastic adaptive control
- Recursive estimation
- Use of information theory in identification
- Randomisation methods for direct adaptive control
- Estimation of Hidden-Markov processes
- Fault-tolerant and reconfigurable control
- Integrated vehicle control systems
- Advanced signal processing methods
- Model-based diagnosis and control of process systems
- Discrete methods in process control

The main application fields are aerial vehicles, road vehicles, road traffic systems, Paks nuclear power plant.



## **RAW MATERIALS**

Hungary's aluminium industry supplies lightweight structures for vehicle manufacturing. Alcoa Hungary recently established a new airfoil casting plant, while US-based Zoltek makes Panex carbon-fibre products in its plant in Nyergesújfalu. A variety of artificial-fibre-reinforced thermoplastic and thermosetting matrix composites have also been developed by the Pannon University.



### **Alcoa Fastening Systems**

8248 Nemesvámos, Dózsa György utca 2/a • Tel.: +36 88 515 560 • [www.alcoa.com/hungary/hu/home.asp](http://www.alcoa.com/hungary/hu/home.asp)

Alcoa purchased a majority stake in this Székesfehérvár light metals plant in 1993, before acquiring the company in full in 1996. The company now has five manufacturing divisions: a foundry (primary/ingot); a rolling mill (EMP); automotive parts (AATS); wheel products (AWPE); aircraft fastening systems (AFS); automotive electronic cable bundles (AEES); and finally processing of metal components cast for industrial gas turbines and aircraft engines (Power & Propulsion - Howmet).

#### **Main products and services**

Machined parts, turbine airfoils and fasteners for the aerospace industry

### **Zoltek Zrt**



2537 Nyergesújfalu, Varga József tér 1 • Tel.: +36 33 536 000 • [www.zoltek.hu](http://www.zoltek.hu)



Zoltek Zrt. is a wholly owned subsidiary of Zoltek Companies, Inc., headquartered in St. Louis, Missouri, USA. The Hungarian company was established in 1941 and became a leading manufacturer in Hungary. Since 1995, Zoltek Zrt. has grown into a major manufacturer of carbon fibre, a material expected to become the 21st century's most important construction material.

#### **Main products and services**

Carbon fibre, flame-resistant PAN fiber, fabrics

## COMPOSITES

Due to the growing popularity of composite structures in the aerospace industry, several Hungarian private companies have evolved into suppliers to local, Austrian, German, Italian and US small aircraft and helicopter manufacturers. This is a rapidly growing sector where organisations are active in the research, development and manufacturing of composite parts and complete structures up to 9m in length. Corvus Aircraft Kft., Avana Industries and Idea-Aircraft Kft. are also developing and manufacturing GA aircraft for the global market.

## Avana Industries Kft.



8698 Somogyvár, pf. 33 • Tel.: +36 70 378 5266 • [jdosa@avanaind.eu](mailto:jdosa@avanaind.eu)



Avana Industries Kft. is among Central Europe's leading developers of automotive components and manufacturers of composite tools. In recent years, the company has participated primarily in the development of custom and small-series vehicles and their components. It has also created the Avana Larus seven-seater 1,000-horsepower turboprop amphibian aircraft.



## Corvus Hungary Kft.

6035 Ballószög, II. körzet 35 • Tel.: +36 20 508 3080 • [www.corvus-hungary.com](http://www.corvus-hungary.com)



Corvus Hungary is relatively young company with very impressive background in high-tech composite, ultralight, sport and aerobatic aircraft production. Our well trained staff and the given infrastructure allows us to produce up to 40-50 aircraft a year and also to produce aircraft parts, made of composite which even fits the highest manufacturing standards of the aeronautic industry.

## Flytech Kft

9400 Sopron, Elősor u. 9 • Tel.: +36 94 505 112 • [flytech@t-online.hu](mailto:flytech@t-online.hu)



Flytech Kft. has been traditionally a composite part supplier of the Austrian Diamond Aircraft company. It also supplies composite parts to other GA aircraft manufacturer and for the automotive industry.

## ENGINEERING AND DESIGN

Hungarian independent engineering companies started to emerge in the late 90s due to the rapid development of the automotive industry. They later diversified into other industry sectors and become members of HAC and HATP, participating in a wide variety of projects. Thanks to highly sophisticated software implementations, these companies are now able to provide design, simulation and other CAE services to both local and international companies.

## Admatis Kft



3535 Miskolc, Partos utca 16 • Tel.: +36 46 898-154 • [www.admatis.com](http://www.admatis.com)

ADMATIS is a small company specialized in three topics: space engineering, material development and heat management. The team is experienced in payload development for microgravity conditions, satellite thermal and mechanical part development, special equipment for single crystals R&D.

**References:** R&D cooperation with NASA Space Flight Center, foaming experimental hardware operating on the board of ISS, Sentinel-2 satellite equipments design, manufacture and test.

**Partners:** NASA, ESA, EADS Astrium, Hungarian Space Cluster, University of Miskolc.

ADMATIS mission is to become Hungarian subprime that able to satisfy international requirement.

## ArraboCAD Kft



9023 Győr, Körkemence utca 8 • Tel.: +36 96 769 104 • [www.arrabocad.hu](http://www.arrabocad.hu)

ArraboCAD was founded in December 2002 from 100% Hungarian private capital. The company employs young, energetic engineers with German automotive industry experience in manufacturing preparation and engineering responsibilities. The company undertakes design and development of products, production units, production lines and bespoke equipment, as well as workshop diagrams and documents. It offers solutions from mechanical planning through electric, pneumatic development and assembly to installation. ArraboCAD is also able to participate in design planning, rapid prototype production, manufacturing process optimisation and ergonomic examinations.

## C3D Engineering Kft



1191 Budapest, Üllői út 178 • Tel.: +36 1 348 0509 • <http://c3d.eu>

C3D Engineering Consultants was founded in November 1999 to establish an engineering company specialised in:

- solving complex tasks in the field of mechanical engineering



- deploying the latest engineering devices (3D CAD systems)
- providing quick, professional and cost-effective service
- supporting its partners with advice on the systems in operation, in addition to performing engineering and simulation tasks

In the course of its operations, C3D has achieved outstanding results in a number of fields, particularly in simulations aided by computer engineering (static and kinematic simulations). Furthermore, C3D has helped its partners complete not only mechanical engineering projects but also carry out related tasks, such as visualisation and photo-realistic representation:

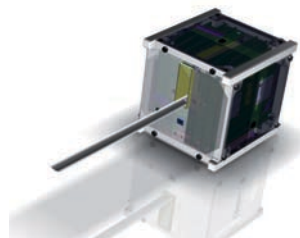
- computer animations
- product brochures
- product descriptions and manuals in several languages

C3D maintains close cooperation with the Budapest University of Technology and Economics and assists its educational activities.



### CAD-Terv Kft

1087 Budapest, Könyves K. krt. 76 • Tel.: +36 1 461 9000 • [www.cadterv.hu](http://www.cadterv.hu)



CAD-Terv Kft. has been offering engineering services in a variety of fields since 1997, including mechanical engineering, product development and complete product management. Its team of experts supports clients by resolving company-specific problems and providing product demonstrations to help clients choose program packages and hardware best suited to their needs. New users can acquire the knowledge necessary for the effective use of CATIA systems and DS/PLM solutions by attending customised courses run by experienced engineers.

The company also played an important part in the planning, development and construction of MASAT-1, Hungary's first satellite. CAD-Terv was tasked with designing the frame of the satellite and developing the process for opening the aerial in space in accordance with complex specifications and guidelines.



### CAE Engineering Kft

H-1122 Budapest, Ráth György utca 28 • Tel.: +36 1 225 0134 • [www.cae-engineering.hu](http://www.cae-engineering.hu)

CAE is a world leader in providing simulation and modelling technologies and integrated training solutions for the civil aviation industry and defence forces around the globe. With clients in more than 100 countries, CAE has the broadest global reach of any simulation and training equipment and services company on the market. CAE Engineering Kft, a subsidiary of CAE Germany, specializes in designing software solutions for flight and tactical simulation. Beside full mission trainers, we also design lightweight, scalable, low-cost training systems that are affordable for a wider audience, including commercial airlines or air rescue service operators. Currently we employ about 40 highly skilled engineers and aviation experts, some of them with a vast military background.

### CFD Engineering Kft

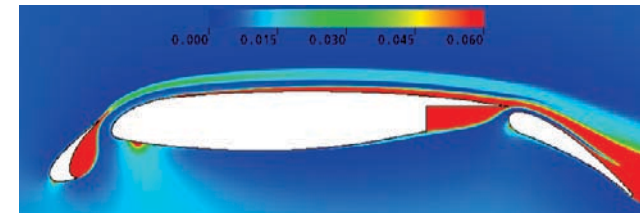
2100 Gödöllő, Rét u. 41/A • Tel.: +36 28 510 261 • [www.cfdengineering.hu](http://www.cfdengineering.hu)

A Hungarian-owned engineering company with a main profile of fluid flow and heat transfer simulation and CF design.



### eCon Engineering Kft

1089 Budapest, Korányi utca 3/b • Tel.: +36 1 279 0320 • [www.econengineering.com](http://www.econengineering.com)



The eCon Engineering Kft. have been working in the engineering market since more than ten years (established in 2002). The company provides cost effective, practicable, efficient solutions for its customers, and the eCon Engineering Kft. is a stable, competent, innovative partner.

The company delivers sophisticated engineering services based on a strong finite-element background and a wealth of experience in automated assembly. Fields of activity include CAE analysis and design engineering. Based on the broad angle of experience of its expert teams and extensive network of vendor contacts, eCon is able to provide a highly competitive range of services. To build close relationship with our customers we are able to integrate directly into our partners design, develop and manufacturing process, to ensure the optimal cooperation for our partners.

Using the state of the arts tools and services we are able to ensure our customers' products and process quality on the highest standard. Our quality assurance systems like AS 9100/ ISO 9001 help the company maintain high quality level. We are working hard to continuously train our colleagues and develop our tools.

**Our strategy:** Concurrent engineering consulting on different areas of design, implementation, and analysis.



### Gamma Technical Corporation Kft

1097 Budapest, Illatos út 9 • Tel.: +36 1 205 5771 • [www.gammatech.hu](http://www.gammatech.hu)



Gamma Technical Corporation was founded in 1920 for the manufacture of precision mechanical and optical products. The company has been developing and manufacturing radiation measurement devices since 1960, while the production of meteorological instruments and monitoring systems began in the 1980s. Throughout this period, Gamma has been supplying the Hungarian Armed Forces and other government organisations with the instruments of NBC defence.

In the course of the company's 90-year history, Gamma engineers have made significant contributions to innovative products of Hungarian origin, including numerous patents on unique products and specialised machinery. Gamma has an established track record in the design, development and manufacture of reliable products to meet the specific requirements of its customers. In line with its ISO 9001:2009 and NATO AQAP 2110 quality assurance certifications, its primary product lines continue to focus on devices for civil and military protection. Main fields of application for Gamma products include reconnaissance, disaster management, incident evaluation, accident stabilisation and early warning systems.

### Meshining Engineering Kft



H-9026 Győr, Ady E. u. 39. • Telephone: +36 96 326 474 • [www.meshining.com](http://www.meshining.com)

MESHINING Engineering is a Hungarian engineering company originally providing services in the field of CAD/CAE, BIW design and simulation. The company is dedicated as a supplier partner to support engineering activities in development of vehicles. The MESHINING Engineering Ltd. is ready to be a supplier partner in the field of wide range of engineering design and product development (CAD/CAE) from the early phase of development steps up to the serial production. According to the demands of clients and the requirements of product, our company permanently consults with customer during development process in order to prepare the most optimized final design which can be integrated into actual system without any problems.

We can offer to our customers a very ambitious engineering team with many years experiences in design and development. Our engineers worked many years at vehicle producers and international engineering offices.

### Rea-Tech Kft

1115 Budapest, Somogyi u. 28-30/a • Tel.: +36 30 581 937 • [www.rea-tech.eu](http://www.rea-tech.eu)

Rea-Tech Kft. is a privately owned Hungarian company in air transportation and aeronautics. Rea-Tech's activities are focused on R & D, specialist consulting, engineering, training and innovation process management.

The company's mission is to contribute to national and international projects for the improvement of air transport systems. Rea-Tech continues to actively participate in a variety of EC projects under different Framework Programmes and collaborates with a number of research institutions, organisations, private companies and universities.

### Slot Consulting Kft



1185 Budapest, Nagyszőlős u. 12 • Telephone: +36 1 290 3498 • [www.slotconsulting.hu](http://www.slotconsulting.hu)

Slot Consulting is a leading Hungarian SME in the participation of aeronautics and air transport related research projects. The company has an exclusive focus on aviation related activities. Slot Consulting actively participates in aeronautical projects co-financed by the European Commission and also by EUROCONTROL, we have contributed in a

number of EU FP7 funded R&D projects like Airport2050 investigating the future airport model, SANDRA researching novel solutions of aircraft on board – ground communications or ATOM which designs an innovative detection and surveillance system able to enhance the security level of the terminal area of the airport.

Besides EU funded projects Slot Consulting have its own research projects like GreenFlight developing methodology for estimating future aircraft emissions in airport vicinities, develops ITC systems like Nomogram which provides web based aircraft performance calculation services for aircraft pilots.

Slot Consulting also participates in programs and initiatives serving the integration of the international aeronautics industry in the field of R&D. These projects usually help the R&D resources of one specific country or a region by developing international connections for it, thus helping the international integration of R&D resources such as CEARES for Central European research institutions or Aero-Ukraine to foster integration of Ukrainian R&D institutions into European R&D area. Furthermore Slot Consulting provides services like CDM course provision for IATA, consulting on business solutions and provides handling support for airlines operating to or from Hungary.

### Main fields of development:

- Aeronautical research
  - Airport infrastructure
  - Airport processes
  - Airport safety
- On board communication
- ICT solutions
- SOA systems
- Web based services
- Greening of air transport

### Willisits Engineering Kft



9028 Győr, Koppány utca 19 • Tel: +36 20 940 9353 • [www.willisits.com](http://www.willisits.com)

Willisits Engineering was established in 2009 to develop highly engineered, world-class engines for electronic vehicles. Founded on the know-how of Intermotor Kft., itself formed in 1990, the company has more than 20 years' of specialist experience allied to small-series production capacity. Willisits Engineering is capable of designing electrical engines of varying performance in small or large batches for a wide range of purposes, as well as developing and manufacturing integrated electronic control systems to meet individual needs. In planning electrical engines, the company's engineers aim primarily to achieve maximum performance and first-class quality, while also prioritising cost-effective production and optimising the power-to-weight ratio.

### Capabilities of the engineering and design division

- End-to-end services from mechanical planning to installation
- Product development
- Production equipment and tool design
- Fluid-flow and heat-transfer simulations
- CF design
- Reconnaissance systems



- CAE analysis
- CAE calculations
- FEM analysis
- NVH
- Dynamic analysis
- Structure optimisation and analysis (composites)
- Simulation projects
- Analysis of composite structures
- Explicit simulations (crash, drop, airbag, etc.)
- Multi-body dynamic analysis
- Lifetime estimation
- Design and development of electro motors and regulators, assembly of prototypes
- In co-operation with partners: physical tests, part production.

## RAPID PROTOTYPING

Several rapid prototyping companies have emerged due to growing demand from Hungary's automotive sector. In recent years, these companies have diversified into aerospace and other areas.

### Technoplast Prototyping Kft

3540 Miskolc, Street Vasgyári utca 43 • Tel.: + 36 46 533 363 • [www.technoplast.hu](http://www.technoplast.hu)



**TECHNOPLAST**

Technoplast is a 100% privately owned company. Its management and 85 employees are fully committed to providing a variety of highly specialised services, including design, engineering, rapid prototyping, toolmaking, low-volume trial production and mass production. The company complies with the ISO 9001-2000 and AS 9100B quality assurance systems and deploys four distinct rapid prototyping processes:

SLA (stereolithography), vacuum and gravitational vacuum casting, RIM low-pressure injection moulding and low-volume injection moulding.



### Varinex Informatics Zrt

1141 Budapest, Kőszeg utca 4 • Tel.: +36 1 273 3400 • [www.varinex.hu](http://www.varinex.hu)

Varinex Zrt. was the first organisation in Hungary to introduce rapid prototyping and tooling engineering services in 1998. The RPT business division offers customers three different layer-to-layer procedures. Paper-based LOM and plaster-powder-based 3D printers have been the underlying technologies employed over the past 10 years, but Varinex now uses the PolyJet and PolyJet/Matrix 3D printing procedures developed by Objet Geometries Ltd. These allow the production of rich and accurate models from a polymer material. The CONNEX500 3D printer uses PolyJet/Matrix technology to enable printing of two different materials in the same layer, a unique solution worldwide. Moreover, it is also possible to use a wide range of combinations of the two materials to print complex models. Varinex's latest R&D achievement is a technology using differential pressure to cast light metals. This allows the production of pressure-cast part prototypes in a matter of days.

## MACHINING PARTS

Hungary traditionally has large machining capability serving several industries, including the automotive, energy and machine tools sectors. Several companies in this segment are members of the Hungarian Aerospace Cluster and participate in the AS9100 project.

### Anton Kft

8900 Zalaegerszeg, Sport utca 16 • Tel.: +36 92 550 010 • [www.anton.hu](http://www.anton.hu)

**ANTON**



Established in 1990, Anton Kft. has played a pioneering role in bringing modern tooling and component manufacturing techniques to Hungary. The company currently has three divisions:

- Toolmaking
- Plastics manufacturing
- Specialised metals processing (SMD = Special Machining Division) – the division with aerospace manufacturing capability

Anton Kft. holds certification for several customer and standard quality assurance systems, including ISO9001:2001, ISO14001:1997, ISO/TS 16949:2002 and AS9100. Its workforce is expanding steadily in line with growth and currently stands at 310. Production takes place on an area exceeding 10,000 m<sup>2</sup>.

#### Core competences

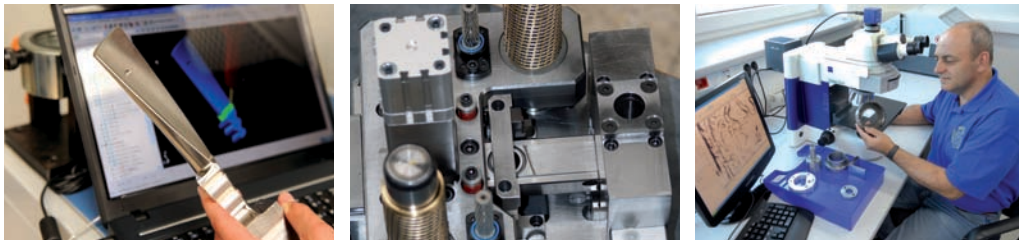
Parts for gas turbine combustors (complete machining), toolsets for machining the above components



#### Borsodi Műhely Kft.

9027 Győr, Juharfa utca 8 • Tel.: +36 96 529 071 • [www.borsodimuhely.hu](http://www.borsodimuhely.hu)

Borsodi Műhely, a family-owned company established in 1981, now employs more than 115 people in two production sites and an integrated onsite office. This is supplemented with the 22 employees of our associated company in Szombathely, and thereby increasing the numbers to 137. The company complies with all major automotive quality assurance certificates, as well as the AS 9100 Aerospace standard.



#### Core competences

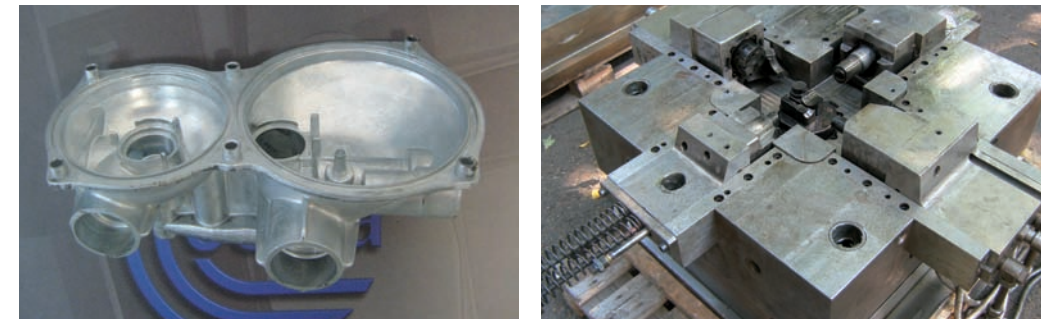
Production of unique precision parts includes 3D milling, 5D milling, lathe-tooling, drilling, spark tooling, grinding and etchwork.



#### Certa Kft

3980 Sátoraljaújhely, Berecki út 18-28 • Tel.: +36 47 525 210 • [www.certa.hu](http://www.certa.hu)

Certa Kft., established in 2000 and employing around 260 people, operates one of the largest industrial plants in the town of Sátoraljaújhely. The site's total production area is 14,300m<sup>2</sup> and comprises the following facilities: a zinc warm chamber die-casting, aluminium cold chamber die-casting, hand-powered grinding, vibrator-powered grinding and electro plating.



#### Core competences

Die-casting of zinc and aluminium, surfacing and pressing



#### Cooptim Ipari Kft

2030 Érd, Budafoki út 10 • Tel.: +36 23 521 410 • [www.cooptim.hu](http://www.cooptim.hu)

Cooptim Ipari Kft. was established in 1982 and specialises in the production of wire feed systems used in welding equipment ranging from small machines to large industrial units. The company is continuously developing new products to address the latest requirements of the market.

The first Hungarian satellite was put in orbit on 13<sup>th</sup> February, 2012 was made of Cooptim components, the skeleton, the casing and the inner mechanic elements of MASAT-1 were made on Cooptim's CNC machines. Our company owns AS9100 certification – thus, we are eligible to produce aircraft and aerospace industrial components.

#### Core competences

Machine-cut parts, assembly of components and modules



#### Dendrit Kft

1135 Budapest, Reitter Ferenc utca 42 • Tel.: + 36 1 350 8474 • [www.dendrit.hu](http://www.dendrit.hu)

In the two decades since the foundation of Dendrit Kft. in 1990, the company has developed the resources, skills and inventory to satisfy the process industry's demanding needs from the first step of engineering right through to serial





production. Its range of activity is widening continuously in accordance with new market demands. Dendrit's customers are consistently satisfied with both the company's production quality and service levels thanks to the state-of-the-art technology the company employs and the exceptional experience of the Dendrit team. In 1997, the company's quality systems earned the Certificate of Registration for ISO 9001:2001 compliance and have benefited from EN 9100 compliance since 2009.

Dendrit currently employs 40 people but is planning to expand its workforce as it develops into new areas. Production takes place on an area of 1,200m<sup>2</sup> in Budapest and 400m<sup>2</sup> in Veregyház. The company has extensive experience in manufacturing tools for general production using pressing, milling, cutting and crimping technologies. A highly qualified and experienced technical team, modern machinery and equipment and a certified quality assurance system guarantee customer satisfaction both at home and abroad.

#### Core competences

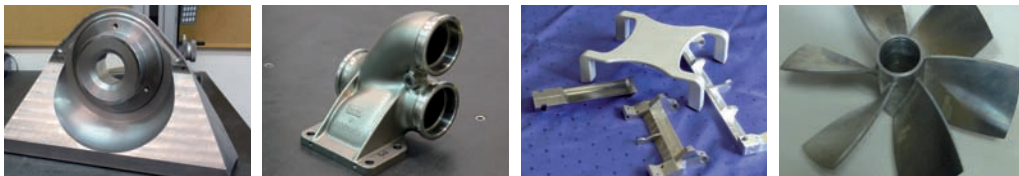
Pressing - hydraulic presses; machining - machining centres, machining - CNC lathe-turning; machining - CNC milling; machining - CNC grinding, cutting - plasma; engineering design - product design; welding - MIG, MAG, WIG (TIG); cutting and bending - sheet-metal bending, tools - for machining; tools - for pressing and cutting sheet metal



#### Gravitás 2000 Kft

1139 Budapest, Lomb utca 31/C • Tel.: +36 1 350 8851 • [www.gravitas.hu](http://www.gravitas.hu)

The Gravitás 2000 Ltd. is a 100% Hungarian owned limited company, which is working on the field of the machine element and tool production. The business strategies of the company are the high quality in the design and manufacturing and the precise fulfilment in the delivery. The highly educated and experienced engineers and skilled workers guarantee the perfect realizations of the manufacturing tasks. The CAD/CAM systems, installed in our engineering office and the PPS system are in close connection and ensure the precise realization of the projects. The complicated manufacturing tasks are supported by the computer aided part design, multi-axis machining, HSC and hard milling, high precision CNC turning, spark erosion and grinding. The production process is controlled by a computer system, and supported by ISO 9001:2008, ISO 14001: 2005, ISO 13485:2003 and the AS9100 Revision B integrated quality assurance systems. The manufacturing environment is developing continuously, new procedures, more efficient tooling and machining equipment, and up-to-date CNC machine tools help the business success of the company.



**Main products and services:** Precision parts and sub-assemblies for medical, automobile and aerospace industry; tool and tool insert machining; special machinery design and manufacturing.

#### Core competences

CAD/CAM application, multi-axis machining, mil-turn, turn-mill machining, wire EDMing, EDM drilling, micro milling, exotic material machining, assembling.

#### Capabilities of the machining part segment

- Quality control
- Innovation
- Casting
- Pressing
- Stamping
- Welding
- Toolmaking
- Assembling
- Surface treatment
- CAD/CAM application
- Multi-axis machining
- Mil-turn, turn-mill machining
- Wire EDMing
- EDM drilling
- Micro milling
- Exotic material machining
- Machining of awkward components using spark and CNC lathes
- Custom-developed production lines and specialised machining of products using bespoke technologies
- Manufacturing and handling technology for components with complex geometry and unusual material composition
- Dynamic development and flexible expansion strategy

#### WIRE HARNESSES, CONFECTIONING, ENGINEERING

**Wire harness manufacturers have emerged from the automotive sector and diversified into aerospace by adopting AS9100 certification.**



#### Eltec Holding Kft

1106 Budapest, Tündérfűt utca 3-5 • Tel.: + 36 1 335-8330 • [www.eltec.net](http://www.eltec.net)



Eltec was founded in 1994 in Budapest. The company's strategic location in Central Europe offers easy access to continental Europe. In 1999, Eltec restructured its operations by creating five entities to form the Eltec Group. Eltec's growing reputation and excellent quality of service prompted it to obtain ISO TS 16949 certification and become a competitive global player in the automotive industry. Eltec's area of expertise includes customised service solutions for difficult manufacturing tasks and small to mid-sized order volumes.

**EMP Elektro-Metall Paks Kft**

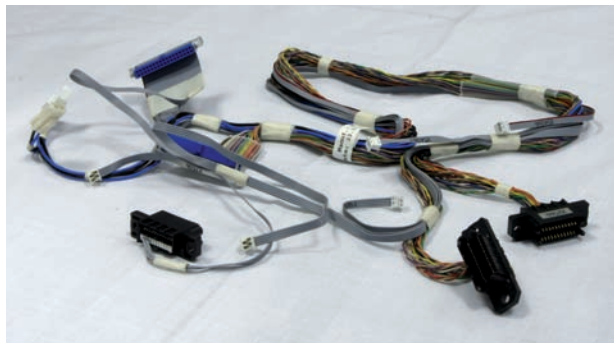
7030 Paks Ipari Park, Pf. 30 • Tel.: +36 75 519 110 • [www.eme-in.de](http://www.eme-in.de)

Elektro-Metall's actuator center of excellence, prototyping of wiring harnesses, and research and development operations are based at the company headquarters in Ingolstadt, Germany. The modern branch facility of EMP, dedicated primarily to the series production of wiring harnesses, is based in Paks, Hungary. Elektro-Metall Export GmbH. (EME) was founded in 1952. Since then, the company has been active in the development and manufacturing of electromechanical aircraft components for the international commercial and military aerospace industry.

In 2009 we began manufacturing optional wiring harnesses for Eurocopter, and full wiring harnesses for the Swiss Pilatus PC 12 aircraft are also produced in our plant. It is a great achievement that, after the project phase, the series production process and the full management of modifications plus the final function tests of certain products are also done by our company.

**Macher Gépészeti és Elektronikai Kft**

8000 Székesfehérvár, Sóstói út 1 • Tel.: +36 22 507 450 • [www.macher.hu](http://www.macher.hu)



Macher was established in 1991 in the most dynamically developing region of Hungary, in Székesfehérvár. Main profile: cable confectioning (custom-made cables) and production of cable harnesses, electromechanical assembling, electronic development

According to its long term strategy, the company aims to provide services to its customers which cover all areas, such as full-scale system approach, design, product development,

preparing documentations, prototype and series production. In case of specific demands, it designs and produces the required tools, further, it prepares self-developed testing and control equipment.

As regards its strengths, the company records knowledge and its continuous development, first rate customer service enhanced by the Integrated Management System, which also incorporates the AS9100 certification, and the investments aimed at developing new technologies and having been realized thanks to the achievements of its management and to procurement resources. Competitiveness has been improved through the acquisition of state-of art, automated machinery, by increasing the level of mounting, and the continuous product and production development.

As a result of continuous investments and improvements, meeting the newest challenges of the economic environment non-stop, the continuous development of the quality management system, Macher Ltd. is well-known and acclaimed in the field of special industrial electronics both in Hungary and Western Europe, and it has grown to be a two-time National Quality Award winning company.

**ICT**

Information and communications technology is a large and rapidly growing sector in Hungary. The combined number of companies in the sector has reached more than 600 and spans a number of associations and clusters. A handful of firms have diversified into the aerospace sector with the objective of obtaining AS 9100 certification in 2010.

**Ental Kft**

9024 Győr, Babits Mihály utca 34 • Tel.: +36 96 415 616 • [www.ental.hu](http://www.ental.hu)

Ental Research, Development and Consulting Kft. was founded in 2005 as a spin-off from the István Széchenyi University. The company's main aim is foster rapid commercial adaptation and utilisation of applied research knowledge and development experiences accumulated at the university in previous years. This includes promotion and updating of innovative ideas that may lead to the evolution of new and marketable products and services. Ental employees are all highly educated and talented as qualified physicists, mathematicians, electrical engineers, mechanical engineers and IT specialists.

The company's successful industrial projects include a quality control system based on digital image processing, development of noise measuring and testing equipment, optimisation of production chains and development of CD player simulators.

**IT Ware Kft**

1117 Budapest, Budafoki út 209 • Tel.: +36 1 463 0620 • [www.itware.hu](http://www.itware.hu)

IT Ware was founded in 2001 by the IT staff of Hungary's first mobile operator. The aim of the project was to continue IT and development projects in other industries by preserving the unity of development and operating experiences gained in the course of several years in the telecommunications sector. A significant proportion of IT Ware's resources are directed towards software development and IT projects as an outsourcing partner of T-Mobile. In addition to these high-priority engagements, IT Ware has also launched several independent R&D projects.

**OptXware Kft**

1117 Budapest, Budafoki út 187-189 • Tel.: +36 1 3711420 • [www.optxware.com](http://www.optxware.com)

OptXware Kft. was established in 2005 by a team of specialists from the Budapest University of Technology and Economics (BUTE). The members of the company arrived from the Fault-tolerant Systems Research Group (FTSRG). All



senior staff members hold PhDs and junior staff members belong to the top 10% of students educated by members of FTSRG. In addition, all of them began their individual research activities during their studies. OptXware has 15 years of experience in model-based design and analysis of resilient IT systems.

OptXware offers its customers professional services that include business systems dependability consulting, IT systems dependability assessment and customised training on dependability. Through these services, customers are able to evaluate, test and upgrade their business systems and technology infrastructure.



**simpleSoft**

### simpleSoft Kft.

3529 Miskolc, Szentpáli utca 1 • Tel.: +36 20 777-3088 • [www.simplesoft.hu](http://www.simplesoft.hu)



simpleSoft Kft. was established in 2007, when its founders joined forces from a number of multinational software houses. The company has more than 8 years of experience in software development with a focus on high added-value projects. Project success is supported by a solid knowledge base founded on constant education.

Areas of specialization: Secure data and information handling, automation and MES systems, intranet portals and custom web applications. simpleSoft also provides custom client applications built with Java SE/.net and enterprise systems built with Java EE/.net. The company has profound knowledge of a variety of Web technologies, including Java Server Pages, Java Server Faces and Portlets, wide variety of .net based and mobile technologies. simpleSoft Kft. has AS/EN 9100 certification and a number of references for space applications.



### Sky Soft Kft

1121 Budapest, Konkoly-Thege út 29-33 • Tel.: +36 1 392 2275 • [www.sky-soft.hu](http://www.sky-soft.hu)

Sky-Soft Kft. was established on March 1, 1993 by a group of physicists who are members of the KFKI Research Institute for Particle and Nuclear Physics (RMKI), an arm of the Hungarian Academy of Sciences.

#### Core competences

- Software development
- Software and hardware consulting
- Military research and development
- Computer systems virtualisation
- Development of mission-critical systems for 24/7 operation (based on bulletproof hardware and software)

- Product support services
- Rugged, military computer design and manufacturing
- Server/thin-client systems
- Virtualisation of DEC computer systems using CHARON emulation software
- Support for special VAX hardware emulation for CHARON-VAX emulated systems



### Slot Consulting Kft

1185 Budapest, Nagyszőlős u. 12 • Telephone: +36 1 290 3498 • [www.slotconsulting.hu](http://www.slotconsulting.hu)

Slot Consulting is a leading Hungarian SME in the participation of aeronautics and air transport related research projects. The company has an exclusive focus on aviation related activities. Slot Consulting actively participates in aeronautical projects co-financed by the European Commission and also by EUROCONTROL, we have contributed in a number of EU FP7 funded R&D projects like Airport2050 investigating the future airport model, SANDRA researching novel solutions of aircraft on board – ground communications or ATOM which designs an innovative detection and surveillance system able to enhance the security level of the terminal area of the airport.

Besides EU funded projects Slot Consulting have its own research projects like GreenFlight developing methodology for estimating future aircraft emissions in airport vicinities, develops ITC systems like Nomogram which provides web based aircraft performance calculation services for aircraft pilots.

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#### Main fields of development:

- On board communication
- ICT solutions
- SOA systems
- Web based services
- Greening of air transport

#### Capabilities of the ICT segment

- Secure data and information handling
- Automation
- Software development
- VAX hardware emulation
- IT solutions
- Digital image processing
- Flight simulation

## AVIONICS

Avionics companies have traditionally served the space and military sector, but the rapidly emerging Hungarian Aerospace Industry has prompted some companies to diversify into the sector and join the AS 9100 project.

### Aviatronic Kft



1121 Budapest, Konkoly Thege út 29-33 • Tel.: +36 1 392 0784 • [www.avia.kfkipark.hu](http://www.avia.kfkipark.hu)



Aviatronic Kft. is a well known Hungarian systems house for customised hardware and software solutions, development of avionics and other high-tech electronics systems, and small-series manufacturing of electronic products. Its team comprises 20 staff, engineers and physicists with experience in flight data recorders, evaluation systems for aircraft and helicopters and GPS applications for small aircraft and helicopter Visual Flight Rules navigation, as well as simulators.

#### Main products and services

Design and manufacturing of high-tech electronic systems; small-series production of electronic products

### BHE Bonn Hungary Kft



1044 Budapest, Ipari Park utca 10 • Tel.: +36 1 233 2138 • [www.bhe-mw.eu](http://www.bhe-mw.eu)

BHE Bonn Hungary is a leading company in the Hungarian aerospace industry and its avionics-related products are sold to more than 15 countries worldwide. BHE develops novel airborne applications, such as vibration-proof radar subsystems, IFF, telemetry and telecommand systems, electronic surveillance subsystems, satellite communications and intelligence solutions.



#### Main products and services

##### On-board RF and microwave subsystems, such as

- IFF transmitters
- Digital microwave altimeters
- Telemetry transmitters
- Digital command receivers
- Autopilot systems
- Navigation systems
- Synthetic Aperture Radar (SAR) subsystems
- On-board computers
- Digital high-speed data transmitters
- Encrypted microwave communications equipment

### BL-Electronics Kft



2083, Solymár, Sport 5 • Tel.: +36 26 363 620 • [www.bl-electronics.hu](http://www.bl-electronics.hu)

BL-Electronics was established in 1991 and maintains technological and development support for scientific institutes and laboratories developing equipment and instrumentation for their research. The company's activity is focused mainly on space research, but it is also involved in projects in other fields.

#### Main products and services

- Data collection systems
- Radio telemetry systems
- Design and manufacture of high-reliability electronics
- Space technology
- GPS-aided fleet management (public transport)
- Software development

### Gamma Technical Corporation Kft



1097 Budapest, Illatos utca 9 • Tel: +36 1 205 5771 • [www.gammattech.hu](http://www.gammattech.hu)



The Gamma Technical Corporation was founded in 1920. During its 85 years of existence, it has become established as one of the largest manufacturers of NBC defence instruments in Eastern Europe. The reputation of the company is founded on the expertise of its engineers, who have contributed many inventions and registered patents to the region's technical development. G.T.C. was the first company in Hungary to develop and produce nuclear and chemical defence instruments in 1963 and continues to design protective instruments for the Hungarian Army, Hungarian Civil Defence and environmental protection.



In addition to the production, maintenance and authentication of existing instrumentation designs, Gamma is now developing and launching several instruments and devices for environmental protection, civil defence and military use in particular. These include radiation measuring devices, scintillation crystal monitoring systems and meteorological stations.

A common characteristic of Gamma devices is that their microcomputers are programmed with algorithms implementing new measuring methods. The simple operation and construction of these devices makes them suitable both for military purposes and civilian applications, setting them apart from similar equipment developed elsewhere in the world.

#### Main products and services

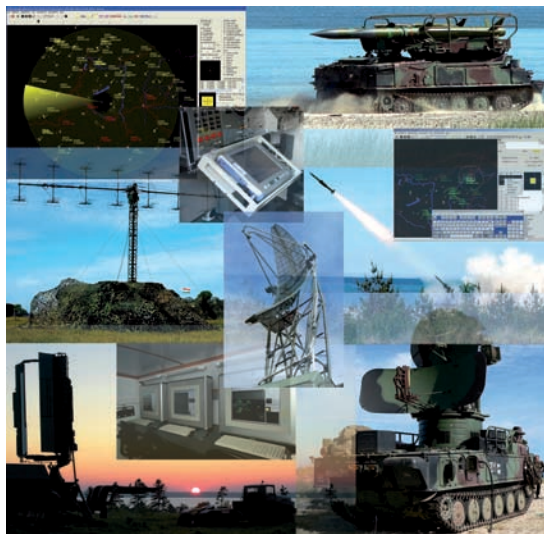
- Radiation-measurement devices, meteorological devices, gas detectors, monitoring systems, data loggers
- LABV airborne nuclear reconnaissance system
- RABV nuclear reconnaissance system for UAVs
- GTI-R on-board CO monitor and alarm unit



#### HM Arzenál Elektromechanikai Zrt

4461 Nyírtelek, Dózsa György út 121 • Tel.: +36 42 210 801 • [www.hmarzenal.hu](http://www.hmarzenal.hu)

The company's predecessor was founded in 1964. HM Arzenál has been operating in its present form as a stock company since 1992. The company is located at the east part of Hungary. HM ARZENAL applies the following quality management systems: ISO 9004:2000, ISO 14001:2004, NATO AQUAP 2110:2003, ISO 17025:2001.



#### Main products and services

- Overhaul and modernization of radars (P-18, P-37, ST-68U, MPR etc.)
- Life cycle extension of guided and non guided missiles (9M131 Metisz, Sz-5 MO/KO/KP, 9M31M Sz-trela 1, 9M313 Igla, 9M111 Fagot etc.)
- K-1P and K-2PC fire control systems
- Development, manufacturing and installation of security engineering systems (Perimeter security systems, burglar alarm systems, intrusion detection systems)
- Calibration activities
- Maintenance, testing, repair and inspection of MAVERICK AGM-65G and AGM-65H missiles. Logistical depot on the premises.
- Ammunition case refurbishment line (dying, drying etc.)
- Metal working, aluminium and acid-proof steel structures



#### SGF Technology Associates Kft

1525 Budapest, pf. 49 • Tel.: +36 20 344 2537 • [www.sgf.hu](http://www.sgf.hu)

SGF Kft. was established in 1996 as a spin-off of the Research Institute for Particle and Nuclear Physics. Its activity covers software development and circuit design for aerospace-related embedded systems, but the company is specifically focused on development of fault-tolerant control and data acquisition systems, as well as electrical ground-support equipment.

SGF's Command and Data Management System is a dual-processor, warm-redundant and fault-tolerant control and data processing unit of the ESA's Rosetta spacecraft lander. The company has developed embedded processor-based electrical ground-support equipment (EGSE) with a quick-look option for various on-board experiments run by the Rosetta, MarsExpress, VenusExpress and BepiColombo ESA missions. SGF has also developed EGSE solutions for the International Space Station's Plasma Wave Complex experiment. The EGSE consists of two units: a signal-level simulator and a commercially available PC. Embedded processors are used in signal-level simulators and work under a real-time multitasking operating system. The PC runs the Graphical User Interface to visualise telemetry data flow and generate telecommands.

The Rosetta Lander Software Simulator (LSS) was commissioned by DLR (Cologne). The LSS comprises five PCs and eight embedded processor units simulating all payloads. The simulation software uses a universal solution that defines experiment activity in XML format. The system is used to test the lander's commands, its off-nominal situations and as a training tool for new operators.

The Data Archiving Box and Analyzing System for small aeroplanes is capable of storing flight data for the entire lifetime of the aircraft. Main parameters to be archived include load on wings, load on several points of the body, load on landing gears during take-off and landing, engine management data, on-board video recording of flight manoeuvres and pilot activity in high-pressure situations, measurement of acceleration on three axes, GPS position, absolute speed, altitude, date and time, and aircraft-air relative speed.

#### Main products and services

- Hardware-close software development
- Dedicated real-time multitasking systems
- Testing software development
- Embedded systems development based on diverse microprocessors (Intel processors, Inmos transporter, Rabbit microprocessors, Microchip microcontrollers, AMD digital signal processors, Harris processors, etc.)
- FPGA development (Xilinx, Actel, Altera, etc.)

#### Capabilities of the Avionics segment

- High-tech electronics systems
- Small-series electronic products
- Embedded systems development
- Space technology



## RF COMMUNICATION

RF communication has always been very important to aviation. In modern aviation and space systems, it has evolved into a key technology that none of today's aviation services could exist without. Hungary has very good traditions in this field and Hungarian companies have been highly successful in establishing strong R&D and manufacturing capabilities. These enterprises make extensive use of the latest CAD/CAM software in their design, development and manufacturing processes. Their work is supported by state-of-the-art test facilities that meet the most rigorous demands of the defence, aeronautics and space industries.



### BHE Bonn Hungary Electronics Kft

1044 Budapest, Ipari Park utca 10 • Tel.: +36 1 233 2138 • [www.bhe-mw.eu](http://www.bhe-mw.eu)



BHE was established in 1991 for the development and manufacture of RF and microwave components, subsystems and equipment for applications in telecommunications, defence, aeronautics and space. BHE is equipped with state-of-the-art EDA simulation software and uses modern electronic testing and measuring equipment. Its sensitive, high-reliability products are assembled in fully anti-static cleanrooms. BHE has its own machine shop equipped with the latest CNC milling centres. Its environmental tests are supported by computer-controlled shock and vibration test systems, an EMC anechoic chamber, a G-Tem cell and climate chambers. BHE's new facility ([www.elteccenter.eu](http://www.elteccenter.eu)) contains all the necessary electronic testing instruments up to 40GHz, including chip bonding, BGA soldering, vacuum sealing and thermal vacuum testing equipment.

The company currently employs 65 highly skilled and motivated people, half of which are qualified engineers and some of which hold academic degrees. BHE products are represented in 18 countries on four continents and the company holds ISO9001 and AS9100 certification.

#### Main products and services

- Low-phase noise RF and microwave synthesisers
- Low-noise microwave amplifiers
- High-power solid-state amplifiers
- Microwave up/down converters
- Microwave subsystems for radar, SAR and Doppler frequencies
- T/R modules and microwave front-ends
- Microwave adaptive antennas
- Phased array subsystems

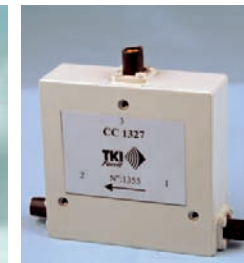
- Digital signal processing
- Switching matrices
- Small UAVs and related subsystems
- Digital command receivers
- Telemetry and telecommand subsystems
- Satellite communications equipments
- Satellite video receivers
- Digital demultiplexers and demodulators
- Satellite monitoring systems



### TKI-Ferrit Kft

1142 Budapest, Ungvár utca 64-66 • Tel.: +36 1 422 0029 • [www.tki-ferrit.hu](http://www.tki-ferrit.hu)

TKI-Ferrit Manufacturing and Development was established in 2000. Its main fields of activity include development and manufacturing of diverse passive microwave components (primarily ferrite devices with frequency ranges from 70 MHz to 40 GHz), R&D activity, consulting and education. The development and production of microwave ferrite materials and devices began in the Research Institute for Telecommunication in Hungary in the mid 1950s. The only institute in Hungary at the time was the Innovation Company for Telecommunications, which continued this specialised activity after the reorganization of the Research Institute for Telecommunications. TKI-Ferrit was formed from the Special Technologies Department of the Innovation Company for Telecommunications to continue this activity. The staff of TKI-Ferrit have several decades of knowledge, experience and contacts on the field of microwave ferrite materials and devices. This is reflected in a variety of products that has been growing continuously to meet client requests and align with telecommunications trends. The company has been successful in a variety of domestic and international R&D projects, such as OTKA, NKFP, NATO Science for Peace, EU 5 and Bilateral Cooperations. These projects have played a crucial role in the development of advanced components and materials.



#### Main products and services

Passive microwave parts

#### Capabilities of the RF communications segment

- Complete, tailored solutions; systems rather than subsystems
- Strong R&D background and engineering support
- Aerospace subsystems and modules



## TESTING AND VALIDATION

Most companies involved in testing and validation activities have a sound academic background and long-standing experience in aerospace R&D. Others have diversified into aerospace from other industries, predominantly the automotive industry.

### BHE Bonn Hungary Kft



1044 Budapest, Ipari Fásor utca 10 • Tel.: + 36 1 233 2138 • [www.bhe-mw.eu](http://www.bhe-mw.eu)



BHE Bonn Hungary has the most complete environmental testing facility in Hungary and is capable of meeting all requirements of the defence (MIL) and aerospace industry. The company holds ISO-9001 and AS-9100 certification, and supports the following testing capabilities:

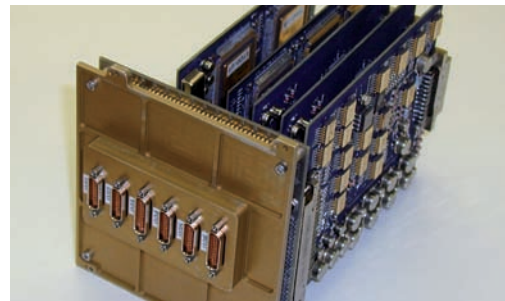
- Electronic lab tests up to 40 GHz
- Climate test chambers (-70 to +180 °C, including humidity, thermal shock and thermal cycling)
- Shock and vibration tests (40 KN peak force, any test pattern)
- EMC anechoic chamber (26.5 GHz, emission)
- EMC G-Tem cell (26.5 GHz immunity)
- Vibration-induced phase noise



### SGF Technology Associates Kft

1525 Budapest, pf. 49 • Tel.: +36 20 344 2537 • [www.sgf.hu](http://www.sgf.hu)

SGF was established in 1996 as a spin-off of the Research Institute for Particle and Nuclear Physics. Its activity covers software development and circuit design for aerospace-related embedded systems.



#### Main products and services:

High-reliability, fault-tolerant data acquisition and control systems

## LASER TECHNOLOGY

There are a handful of small companies specialising in laser technology in Hungary that are qualified to serve the aerospace sector. HAC invited the three most advanced to join the AS9100 project.

### Hilase Kft



6720 Szeged, Dóm tér 9 • Tel.: +36 62 544 518 • [www.hilase.eu](http://www.hilase.eu)

Hilase Ltd., a spin-off of the University of Szeged, was founded in 2004 and belongs to the Videoton Group (the largest and most significant local privately owned EMS company in Central and Eastern Europe). Hilase develops and manufactures laser-based gas detection instruments for the natural gas and biogas industry, as well as for environmental monitoring. It also offers a service for measuring the gas permeability parameters of polymer membranes, sheets and tubes.

#### Main products and services:

- WaSul-Hygro instrument for simultaneous measurement of water vapour and total water concentration in the atmosphere (airborne H<sub>2</sub>O detector)
- Diode-laser-based photoacoustic gas detection

### Lasram Engineering Kft



1044 Budapest, Ezred utca 2, B/2/ • Tel.: +36 1 688 1910 • [www.lasram.hu](http://www.lasram.hu)

Lasram designs and manufactures industrial and medical laser systems and provides material processing services. The founders of Lasram worked together at the Research Laboratory of Tungsram. Lasram has sold over 550 laser systems through its worldwide distribution network over the past 15 years.

#### Main products and services:

Development and production of laser equipment and technologies

#### Capabilities of the Laser Technology segment

- General solutions for broadband dispersion control and feedback in femtosecond laser systems
- Design and construction of compact and reliable laser sources
- Laser-based instruments

## OTHER

Several companies who do not fall into any of the above categories but can provide important services to the industry and are included in the AS9100 project.

## ABF Bowdentechnika Kft



2120 Dunakeszi, Rákóczi út 127. • Tel.: +36 27 346 542 • [www.abfbowden.hu](http://www.abfbowden.hu)

ABF Bowdentechnika Kft. is a Hungarian company manufacturing mechanical control cables. The company was established in 1990 as a private company wholly-owned by the Bencze family. Its control cables for automotive applications include handbrake cables, clutch cables, accelerator cables (throttle cables), hood latch release cables.

ABF is a cable supplier to the Magyar Suzuki Corporation and GM and uses Japanese technology and several Japanese machines.

## Main products and services:

Mechanical Bowden cables to operate handbrake, accelerator and other functions

## Admatis Kft



3535 Miskolc, Partos utca 16 • Tel.: +36 46 898-154 • [www.admatis.com](http://www.admatis.com)



A new metal foaming technology has been developed by ADMATIS that resemble the structure of a human bone: solid shell filled with light but strong porous material, the metal foam. The shell protects the structure, determines the shape, creates opportunities of assembling; alternatively by screwing, riveting or adhesive bonding. The metal foam inside ensures the advanced mechanical properties.

Equipment and prototypes are ready but end user and potential investors are seeking from aerospace industry. See details: [www.alubone.com](http://www.alubone.com)

## Main products and services:

Metal foam

## Magyarmet Finomöntöde Bt



2060 Bicske, Kanizsai utca 12 • Tel.: +36 22 566 310 • [www.magyarmet.com](http://www.magyarmet.com)

Magyarmet, situated not far from Budapest, is a precision investment foundry employing the lost-wax process. The company casts some 250 tonnes of investment castings per year, generating turnover of €6.6 million and employing 140 people. Magyarmet casts parts in high-alloy steel, corrosion-, acid-, wear- and heat-resistant steels, as well as bronze, Ni- and Co-based alloys. The company's technology enables the production of castings weighing up to 30kg, while the maximum dimensions of castings are around 300mm x 400mm x 400mm. As a result of continuous technology improvements and investments in machines and equipment, Magyarmet is able to produce parts of ever increasing complexity employing undercut casting using water-soluble wax cores, for instance.



Magyarmet attained AS9100 certification in 2009 and responds to the demands of targeted markets by offering an ever-increasing range of services to its clients. These include in-house heat treatment, as well as mechanical machining and surface treatment (painting, zinc-plating, pickling, electrolytic and mechanical polishing) in close collaboration with subcontractors.

## Main products and services

Lost-wax casting

## Ostorházi Bevonattechnikai Kft.



2030 Érd, Duna út 27/c Iparterület • Tel.: +36 23 521 100 • [www.ostorhazi.hu](http://www.ostorhazi.hu)

Ostorházi Kft. was incorporated in 1991 as a family enterprise, the pillars of which were the three Ostorházi brothers. Their permanent staff currently comprises 40 persons and the company's core activities are corrosion prevention and surface finishing.

## Main products and services

Special coatings



## SMALL AIRCRAFT DEVELOPMENT AND MANUFACTURING

At the end of the 1990s, Eger-based Halley Kft. was the first company to market a powered Trike alongside the Apollo series ultralight aircraft. Soon, three new private companies followed suit with new small aircraft designs using composite technology: Avana Industries., Corvus Hungary Kft. and Idea Aircraft Kft. These four aircraft developers, with the support of HAIF, established the Hungarian Aerospace Cluster in 2006.

### Avana Industries Kft.



8698 Somogyvár, pf. 33 • Tel.: +36 70 378 5266 • [jdosa@avanaind.eu](mailto:jdosa@avanaind.eu)



Avana Industries Kft. is among Central Europe's leading developers and manufacturers of composite tools for automotive components. In recent years, the company has participated primarily in the development of custom and small-series vehicles and their components. It has also created the prototype of Avana Larus seven-seater 1,000-horsepower turboprop amphibian aircraft.

### BHE Bonn Hungary Electronics Kft.



1044 Budapest, Ipari Park utca 10 • Tel.: +36 1 233 2138 • [www.bhe-mw.eu](http://www.bhe-mw.eu)



BHE's Unmanned Aerial Vehicle (UAV) system is a highly intelligent reconnaissance system that can follow a pre-programmed route while sending real-time, high-resolution video signals and position data back to the ground control station. The BX UAV system can be effectively used by companies to patrol remote premises or networks such as electric wires, oil pipelines and towers. Due to its compact size (length: 1.5m; wingspan: 3.15m) and intelligent software, this new innovation is also suited to government authorities and emergency services.

### Main application areas:

- Security and maintenance control for companies
- Natural disaster monitoring for earthquakes, floods and forest fires
- Precision agriculture
- Wildlife monitoring
- Border control
- Geodesy

BX UAV models are made using the latest carbon-fibre composite technology and equipped with failsafe on-board electronics. Several features, such as flexible route planning, adaptive communications and control mechanisms, are also built-in. The aircraft has been designed to allow easy installation and operation at minimal cost.

### Corvus Hungary Kft.



6035 Ballószög, II. körzet 35 • Tel.: +36 20 508 3080 • [www.corvus-hungary.com](http://www.corvus-hungary.com)

Corvus Hungary is relatively young company with very impressive background in high-tech composite, ultralight, sport and aerobatic aircraft production. Our well trained staff and the given infrastructure allows us to produce up to 40-50 aircraft a year and also to produce aircraft parts, made of composite which even fits the highest manufacturing standards of the aeronautic industry.



The company has been founded in 2011 with the goal to develop a completely new ultralight category aircraft, called the Corvus Fusion LSA. The small, but highly motivated team, led by Mr. Andras Voloscuk, who was also the designer and chief engineer of the Corvus Racer 540 aerobatic aircraft, the Corvus Phantom, Corvus Corone MK I-IV models, started the developments in 2011 and just after 6 months the Corvus Fusion's prototype has been introduced to the public in Italy in January 2012.

The company has achieved in a very short term to have dealers in several countries, like Germany, Italy, Poland, Slovakia, France, USA, Australia, Brazil, in Egypt, Spain and many more. Our goal is to have partners in at least 20 different countries and to set up also assembly plants in at least 3 continents. Excellent relations to the Red Bull Air Race GmbH in Austria give the advantage to promote our aircraft at the most popular Air race championships worldwide. As Corvus Hungary is still a very young startup company, we can only give an estimation on 2012's turnover of round 2million USD. In the coming business years our goal is to produce and sell 40-100 aircraft yearly, which will make a turnover of around 4-6 million USD.

**Dióferr Kft.**

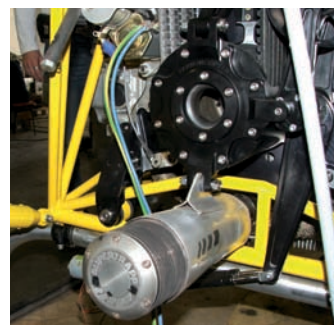
2676 Dabas, Lindmajer utca 16 • Tel.: +36 29 367 476 • [www.diora.hu](http://www.diora.hu)



The basic idea for the Diora KX 165 (Icepick) coaxial rotor 2 seat small helicopter was drafted in 2005. The coaxial rotor system has been known since the earliest helicopter experiments when the Petróczy-Kármán-Zurovetz PKZ-1, the world's first usable tethered helicopter, took its maiden flight in 1918. After the 30's, this design was ignored, with only the Russian company Kamov building a very successful line of helicopters for more than 60 years. At present, no coaxial helicopter is commercially available in this category. Following six months of design work, production of the rotors and engine is close to getting underway and testing of a custom-designed blade frame has also begun. The Diora helicopter is powered by a 165-horsepower Subaru EJ25I boxer engine.

**Hungaro Copter Kft**

3351, Verpelét, Kossúth út 64 • Tel: +36 36 494 183 • [www.hungarocopter.hu](http://www.hungarocopter.hu)



Our company started dealing with helicopter construction and development at the level of enthusiasts in 2008. As the development progressed the solutions used, and the construction of the components and sub-assembly units we devised became more and more sophisticated until the final concept was successfully developed. In parallel with designing, we began manufacturing components and assembling larger units, so the option also arose to test them before installation. Later the demand arose for us to make sub-assembly units for self-build helicopter enthusiasts. As a result of the vast amount of experience gained in the course of development, today a design and production system has been created that is able to fulfil orders for larger quantities. We are also able to meet orders for the design, manufacture and development of helicopter sub-assembly units.

**Halley Kft.**

3300 Eger, Mester utca 3 • Tel.: +36 36 517 830 • [www.halley.hu](http://www.halley.hu)



Halley Kft. is a Hungarian-owned company manufacturing and developing ultralight aircraft and trikes. Founded in 1980, it employs 19 people and operates on a site occupying 2,500m<sup>2</sup> and comprising six manufacturing halls. To date, more than 2,000 Apollo motorised hanggliders and 100 Apollo Fox ultralight aircraft have rolled off the production line. Its trikes are known by the Jet Star, Racer GT, Delta Jet, Delta Jet 2 and Monsoon brand names.

**Idea Aircraft Ltd.**

3534 Miskolc, Industrial Park • Tel.: +36 30 206 5953 • [www.ideaaircraft.eu](http://www.ideaaircraft.eu)



The concept for an amphibian plane was born as the brainchild of Varga Zoltán in 2004. The Hungarian engineer was already very well known as a designer of boats, pedelos and other water transportation. The Hydropter, a newly developed amphibian plane, is constructed from state-of-the-art composite epoxy-carbon. This material combines durability with the minimal weight required for take-off and landing on water. The two- or three-seater VLA sport plane is highly suitable for touring and is likely to be popular among fisherman and hunters. The aircraft is equipped with a parachute and its propeller can be adjusted in-flight to allow highly efficient travel at high speeds, steep ascents and even reversing out of the berth. The size of the wings has been deliberately increased to allow the plane to glide to safety on ground and water in the event of mechanical failure.

**Strength of the Small Aircraft production segment**

- Innovation in design and materials
- Fully computerised (CAD) design processes using CATIA, Solid Edge ST and SolidWorks
- FEA (Finite Element Analyses) inspection using Femap and Cosmos systems
- Every component checked on multiple occasions before installation
- Testing to extremes using dynamic and strategic strain modeling equipment
- Strong R&D support from universities
- Hungarian-designed avionics subsystems



## MAINTENANCE, REPAIR AND OVERHAUL

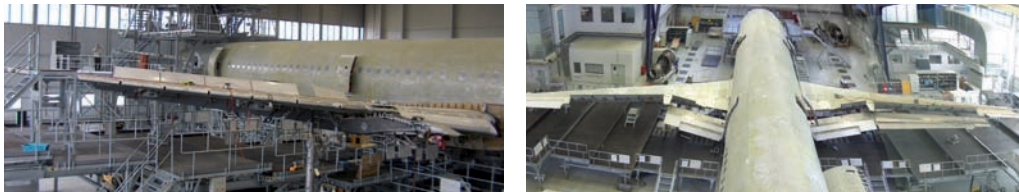
The MRO sector employs the largest number of employees in the Hungarian aerospace sector. Authorised to service mainly Airbus and Boeing planes, both Aeroplex and Lufthansa-Technik Budapest provide line maintenance, repair and overhaul at Budapest Ferihegy Airport. The GE Aviation division at Veresegyház repairs and maintains turbine engine parts.

- Aeroplex Kft. - [www.aeroplex.com](http://www.aeroplex.com)
- Base Kft. - [www.baseairlines.hu](http://www.baseairlines.hu)
- Farnair Hungary Kft. - [www.farnair.com](http://www.farnair.com)
- GE Engine Services, Aviation - [www.ge.com/hu/en](http://www.ge.com/hu/en)
- Hat&S Kft., Gyor - [www.hats.hu](http://www.hats.hu)
- Lufthansa Technik Budapest Kft. - [www.lht-budapest.com](http://www.lht-budapest.com)

### Multiprojekt Development, Contracting, Executing Kft.



1222 Budapest, Gyár u. 15. • Tel.: +36 1 424 0213 • [www.multiprojekt-kft.com](http://www.multiprojekt-kft.com)



The company's main profile is contracting, designing and executing of complete waste water treatment plants. During the last decades we gained lots of experiences and knowledge in development and executing of individual, special equipments (e.g VARIDOCK® docking systems for the maintenance and painting of aircraft). VARIDOCK® is applicable for maintenance of different types of aircraft families (BOEING, AIRBUS).

### Produktum Kft.



1182 Budapest, Olt utca 12 • Tel.: +36 1 291 0460 • [www.produktum.hu](http://www.produktum.hu)



Aluminium repair workstations for the aviation industry.

## AEROSPACE ORGANISATIONS

### Hungarian Aerospace Technology Platform (HATP)



[www.haif.org/HATP.html](http://www.haif.org/HATP.html)

HATP was established in 2007 and represents more than 50 SMEs in the fields of design, R&D, testing and manufacturing. It brings together aeronautical and space organisations to serve both local and international clients. The main aim of HATP is to assist product development based on new and novel technologies. It is particularly focused on promoting the development, production and marketing of new models of small aircraft for general and special applications, strengthening the competencies of the space industry, and becoming a leading player in Hungarian space programmes and satellite manufacturing technologies. As part of this strategy, it is involved in a project to build the first Hungarian Remote Sensing Satellite. HATP is also dedicated to supporting the realisation of a Space Technology and Test Center. As of May 2010, HATP has a new R&D base inside the Eltec Center ([www.elteccenter.eu](http://www.elteccenter.eu)) in Budapest. The building has been fitted with the latest equipment to meet the requirements of the global aerospace industry.



### The Hungarian Aerospace Cluster (HAC)

[www.haif.org](http://www.haif.org)

HAC was established in 2006 on the bottom-up principle. A non-profit, private, non-legal entity with formal membership, it is led by three managers – two founders and the HAIF chairman. Its members, 22 Hungarian SMEs and four foreign subsidiaries, are 100% privately owned and generally have workforces exceeding 1,000 people. The cluster is focused on product development based on a solid engineering background, modern software (Catia, SolidWorks, Ansys) and young, dynamic management.

HAC has cooperation agreements with the Aviation Valley of Poland and Hanse Aerospace of Germany and is a member of the European Aerospace Cluster Partnership (EACP).

#### HAC has the following objectives:

1. Accelerate the development of the Hungarian Aerospace Industry
2. Diversify the best parts manufacturers into aerospace
3. Create a network of aerospace and related industries
4. Develop new Hungarian-designed small aerospace vehicles
5. Oversee production of these vehicles internationally
6. Organise and develop complementary capabilities among Hungarian firms for the manufacture of assemblies for large aircraft
7. Achieve synergies and economies of scale through networking in the fields of design, development, training, logistics, quality (AS 9100), IT, marketing and certification
8. Introduce modern management methods and principles to the SME sector – six sigma, lean manufacturing
9. Develop new supplier relationships with other countries
10. Increase Hungarian participation in EU-funded aerospace projects

## The Hungarian Space Cluster (HSC)

[www.hunspace.org](http://www.hunspace.org)



The Hungarian Space Cluster was founded in 2007 by a group of enterprises and research centres, as well as the University of Miskolc, the City of Miskolc and by the Borsod-Abaúj-Zemplén County Chamber of Commerce and Industry. The Hungarian Space Industry Cluster aims to help its members penetrate foreign markets primarily to win European space industry tenders and become suppliers to international companies in the industry. As its members understand the necessity of co-operation and rational division of labour, they also appreciate the benefits of a management organisation that can help relieve them of the long and intensive learning process of becoming an effective tenderer. The Hungarian Space Cluster employs Matmod Kft. to provide members of the cluster with relevant information on tenders and applications, as well as organising working teams and consortia.

### The strategy of the cluster can be defined in the following terms:

- Improvement of the market potential of members, expansion of their profiles and increasing the complexity of projects they are able to participate in.
- Targeting the Hungarian space industry to help it become industrially and commercially successful, rather than just scientifically based.
- Creation of competence centres with suitable standards and infrastructures.
- A long-term goal to construct a domestically assembled Hungarian satellite (HUNMOON). The satellite would provide data specifically for domestic customers and would participate in the ESA GMES earth and atmosphere monitoring programme.

## AEROSPACE TESTING COMPETENCE CENTRE

### Electronics Technology Centre Research, Development, Manufacturing, Testing

[www.eltech-center.eu](http://www.eltech-center.eu)

Investors in the Electronics Technology Centre wished to create a research, development and production centre in which companies can utilise the latest technologies in planning, production, assembling and testing. Facilities include vibration, climate and EMC testing laboratories, anti-static assembly rooms, cleanlabs with chip-bonding technology, and CNC workrooms.

The centre's high technological standards allow the building to participate in international R&D projects and tenders. The five-storey, net 6000m<sup>2</sup> Eltec Centre is equipped with a high-tech infrastructure to suit today's demands in electronics production. Elements of this infrastructure are available as professional services primarily to tenants of the centre – firms and groups working in the fields of electronic development and short-run production.

The Eltec Center is the location of several aerospace companies and organisations including BHE Bonn Hungary, BL-Electronics, HATP and the Hungarian Astronautical Society (MANT).

## EU-FUNDED INTERNATIONAL PARTNERSHIP AND R&D PROJECTS

Hungarian involvement in EC-funded R&D projects has intensified since Hungary's accession to the European Union in 2004. Since then, a handful of Hungarian companies have taken the opportunity to participate in EU partnership projects under the aegis of the 6th and 7th Framework Programmes. The following tables provide a short overview of the involvement of Hungarian institutions and companies in aerospace R&D and partnership projects funded by the European Commission:

### FP7, Clean Sky and other International Projects

Project acronym, start year	Project name	Hungarian partner involved
<b>COSMA, 2009</b>	Community Oriented Solutions to Minimise aircraft noise Annoyance	Budapest University of Technology and Economics
<b>TITAN, 2009</b>	Turnaround Integration in Trajectory and Network	Slot Consulting Ltd.
<b>ADDSAFE, 2009</b>	Advanced Fault Diagnosis for Safer Flight Guidance and Control	HAS Computer and Automation Research Institute
<b>SANDRA, 2009</b>	Seamless Aeronautical Networking through integration of Data links, Radios and Antennas	Slot Consulting Ltd.
<b>ATOM, 2009</b>	Airport detection and Tracking Of dangerous Materials by passive and active sensors arrays	Slot Consulting Ltd.
<b>PPlane, 2009</b>	Personal Plane: Assessment and Validation of Pioneering Concepts for Personal Air Transport Systems	REA-TECH Engineering and Architecture Kft.
<b>AEROPORTAL, 2007</b>	Support for European aeronautical SMEs	Slot Consulting Ltd.
<b>CEARES, 2008</b>	The concept of the CEARES and CEARES-NET projects were to establish a well coordinated network among the aeronautical research organisations of the Central-European states.	Slot Consulting Ltd. (coordinator) Eurocontrol - Central European Research, Development and Simulation Centre
<b>CEARES-NET</b>		Slot Consulting Ltd.
<b>AERO-UKRAINE, 2009</b>	Stimulating Ukraine–EU Aeronautics Research Co-operation	Slot Consulting Ltd. (coordinator)
<b>AirTN-FP7, 2010</b>	Air Transport Net (AirTN) as one of the key enablers for the prosperous development of Aeronautics in Europe	NIH - National Innovation Office
<b>MONITOR, 2009</b>	Monitoring System of the Development of Global Aviation	Slot Consulting Ltd.
<b>The 2050+ Airport</b>	New airport concepts	Slot Consulting Ltd.
<b>CANNAPE</b>	CANNAPE is an FP7-funded programme which aims to improve engagement between the aeronautics R&D communities within the EU and Canada.	Slot Consulting Ltd.
<b>CARGOMAP</b>	The CargoMap project intends to address objectives such as understanding of the future role of air freight within the SESAR operational concept	Slot Consulting Ltd.
<b>GABRIEL</b>	Adaptation of magnetic levitation technology to aircrafts	REA-TECH Engineering and Architecture Kft (coordinator) Slot Consulting Ltd.
<b>GREENFLIGHT</b>	An own research project of Slot Consulting. The goal of it is to elaborate a forecast model that estimates the like-ly amount of air pollution in 2030.	Slot Consulting Ltd.
<b>NOMOGRAM</b>	The project aim is to create and efficiently operate a web-based pre-flight performance analysis solution.	Slot Consulting Ltd.
<b>BME Clean Sky 32</b>	Resin, Laminate and Industrial Nanoparticles Concept and Application. Industrialization	BUTE Department of Polymer Engineering (coordinator)
<b>BME Clean Sky 027</b>	Development of an innovative bio-based resin for aeronautical applications	BUTE Department of Polymer Engineering (coordinator)
<b>SAT-Rdmp</b>	Small Air Transport - Roadmap	BUTE, Department of Aircraft and Ships
<b>ESPOSA</b>	Development and integration of novel design and manufacture technologies for a range of small gas turbine engines	BUTE, Department of Aircraft and Ships
<b>SINBAD</b>	Aims to improve ATM Security through the use of new airport surveillance sensors and multilateration systems	REA-TECH Engineering and Architecture Kft



## PARTNERSHIP OPPORTUNITIES IN THE FIELD OF AERONAUTICS

Foreign companies are invited to be part of the revival of the Hungarian aerospace and aeronautics industry in the following areas in particular:

### Training and consulting

- HAC members need regular updates and assistance for the implementation of the AS 9100 quality assurance programme and the Design Organisation Approval programme.
- New prototypes recently developed need type certifications from around the globe. This procedure also needs advisory assistance from experienced international consultants.
- Demand for small aeroplanes will generate a market for UL and LSA aircraft. International co-operation will be needed for their maintenance and pilot training.

### Research & Development

- With the establishment of the Hungarian Aerospace Technology Platform, a new opportunity is offered for R&D co-operation with Hungarian institutions and enterprises in the FP7 Framework programme and the Clean Sky JTI programme.
- The Hungarian Government provides cash subsidies and other incentives for the establishment of research and development centres in Hungary.

### Subcontracting

- Machining, wire harness and composite manufacturing offer the highest potential for outsourcing products from Hungary.
- Several aerospace engineering companies have launched initiatives in Hungary in recent years. These diversified companies are active in both the aerospace and automotive sectors. With Hungarian labour costs far below the EU average, these companies represent good opportunities for Western companies to outsource products and services in Hungary.

### Outsourced maintenance

- Aeroplex provides third-party maintenance services for several charter airlines. It has A320, B737, B767, Bombardier CRJ/Q400 and Fokker 70 'C' check capability and plans to build new hangar capacity to cope with growing demand for low-cost MRO services.
- Dozens of small maintenance service providers throughout the country will need foreign capital and technological assistance to upgrade capacities and improve service levels.

### Outsourced services

- Hungarian engineering companies are rapidly expanding into the western market. For instance, EDAG Hungary outplaced 30 engineers to Hamburg to support Airbus projects in cabin interior work. The professional organisations of the Hungarian aerospace industry are seeking partnerships with western universities to establish joint ventures for postgraduate aerospace engineering training. Foreign universities are invited to establish a CEE affiliate programme in Hungary to provide cost-effective training to the industry.
- Hundreds of highly skilled Hungarian companies in the ICT sector are available for contract programming, software integration and other communications and information technology services.

### Airport development

- There are more than 70 airports in Hungary, but only a handful are currently suitable for international traffic. Foreign airport operators are invited to help develop secondary and regional airports for freight and civilian use.
- In the coming years, major investments will transform Budapest Airport into Central Europe's leading air transport hub. More than €250 million has been earmarked to boost passenger and freight traffic and upgrade related airport services, logistics and tourist facilities by 2011. In terms of freight transport, the airports at Sármellék, Taszár, Debrecen and Mezőkövesd have been singled out for further expansion and development.

## PARTNERSHIP OPPORTUNITIES IN THE SPACE INDUSTRY

- Develop competitive space technology and micro satellite integration and testing capabilities
- As subcontractors, participate in Galileo and Kopernikus (GMES) programmes
- Joint participation in ESA and FP7 Space programmes
- Promote co-operation with the European space industry
- Acquire the capability to design and build micro-satellites mostly for remote sensing applications

## SYSTEM DEVELOPMENT PERFORMED BY THE HUNGARIAN AEROSPACE SECTOR

- Aircraft equipped with Hungarian electronics systems
- UAV systems
- Flight data recorders, data collection systems
- Autopilot systems
- Navigation systems
- On-board computers
- Data transmitters
- Microwave communications equipment
- Airborne reconnaissance systems and subsystems
- Radar subsystems
- IFF, telemetry and telecommand systems
- Satellite communications systems
- Security systems
- Radio telemetry systems
- Dedicated real-time multitasking systems



	Certification	Other	Aircraft Manufacturing	Composites	Space - Aerospace Subsystems/ Components	Airports / Airport Infrastructure	Auxiliary Systems/ Tooling	Avionics / Simulators/ Control Systems	Manufacturing of precision parts	Interiors	ICT	Production / Processing / Assembly	Laser Technology	Wire Harnesses	Satellite Communications	On-board instruments	Assembling / Integration	Consultancy / People Management	R&D / Engineering / Testing	Education / Training	Prototyping / Rapid prototyping	Raw materials / Special Materials
ABF Bowdentechnika Kft	AS 9100 certified in 2010	Mechanic cables (Bowden cables)																				
Admatis Kft	AS 9100 certified in 2011	payload development for ISS and satellites; satellite thermal and mechanical parts; metal foam																				
Alcoa Fastening Systems	AS 9100																					
Anton Kft																						
AiraboCad Kft.	AS 9100 certified in 2011																					
Avana Industries Kft.		Composite parts																				
Aviatic Kft.	AS 9100 certified in 2010																					
Bay Zoltán Foundation for Applied Research																						
BL Electronics Kft.	AS 9100 certified in 2011																					
Bonn Hungary Electronics Kft.	AS 9100 certified in 2011																					
Borsodi Műhely Kft.	AS 9100 certified in 2011																					
BUTE, Department of Aircraft and Ships																						
BUTE, Department of Control and Transport operation																						
BUTE, Department of Polymer Engineering		End-of-life recycling																				
BUTE, Space Research Group																						
C3D Engineering Kft.																						
CAD-Terv Kft.																						
CAE Engineering Kft	AS 9100 certified in 2011	Flight simulators																				
Certa Kft.	AS 9100 certified in 2011																					
CFD Engineering Kft.																						
Cooptim Kft.	AS 9100 certified in 2011																					
Corvus Hungary Kft.																						
Dendrit Kft.	AS 9100 certified in 2010																					
Dióferr Kft.																						
eCon Engineering Kft	AS 9100 certified in 2011																					
Eltec Holding	EN 9100-2003 (AS 9100)																					
EMP Elektro-Metall Paks Kft	AS 9100 certified in 2011																					
Ental Kft																						
Flytech Kft.	AS 9100 certified in 2011																					
Gamma Technical Corporation Kft.	NATO AQAP 2110																					
GE Engine Services	AS 9100	MRO																				
Graviász 2000 Kft.	AS 9100 certified in 2011 NATO AQAP 2110																					
Halley Kft.																						
Hilase Kft.	AS 9100 certified in 2011																					
HM Azenal Kft.	NATO AQAP 2110:2006																					
MTA EK																						
MTA SZTAKI DSD																						
MFA KFKI																						
MTA SZTAKI SCL																						
Idea Aircraft Kft.																						
ITWare Kft.																						
Lasram Engineering Kft.	AS 9100 certified in 2011																					
Macher Kft.	AS 9100 certified in 2011																					
Magyarmet Bt.	AS 9100 certified in 2011																					
Meshing Engineering Kft	AS 9100 certified in 2011	Lost-wax casting																				
Multiproject Kft.		docking systems for aircraft maintenance																				
Optixware Kft.	AS 9100 certified in 2011																					
Ostoriázi Kft.		Special coatings																				
Produktum Kft.		Aluminium repair workstations																				
Rea-Tech Kft.	AS 9100 certified in 2011																					
SGF Kft.																						
Simplesoft Kft	AS 9100 certified in 2011																					
Sky Soft Kft.																						
Slot Consulting Kft																						
Technoplast Prototyping	AS 9100 certified in 2010	Gravitational vacuum casting																				
TKI-Ferrit Kft.	AS 9100 certified in 2010																					
Varnex Zrt.																						
Willisits Engineering Kft.	AS 9100 certified in 2011																					
Zoltek Zrt.	AS 9100 certified in 2011																					



# Hungarian Investment and Trade Agency

Nonprofit agency of the Hungarian Government, established in January 1, 2011, for assistance in achieving its foreign economic policy goals.

## Main profile, promotion of:

- Hungarian exports
- Inward (and outward) investments

Contacts:

## Hungarian Investment and Trade Agency

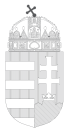
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HUNGARIAN  
INVESTMENT AND  
TRADE AGENCY

The Agency's activities are supported by an extensive network of domestic and foreign offices, this latter operating usually within the administrative structure of Hungary's diplomatic missions.

## Business development marketing tools:

- Organising sectorial and multi-sectorial programmes (exhibitions, forums, b2b meetings)
- Basic services (tender observation, EU business database, newsletter, partner list)
- Premium services (checked partner list, targeted partner search, special company promotion)
- Supplier programmes

