Overview of the Hungarian Aerospace Industry
Product development, diversification, collaboration

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Chairman
HAIF
1. Introducing the Hungarian Aerospace Industry
Major milestones of industry development

- **2009**: Corvus, Idea-Aircraft, Avana Industries, BHE Ltd., Dioferr Ltd., introduced new aircraft
- **2007**: Creation of HATP Hungarian Aerospace Technology Platform
- **2006**: Creation of HAC and HARP by Hungarian Aviation Industry Foundation
- **2005**: Corvus Aircraft Ltd. introduced its first composite aircraft
- **2004**: HAIF launches the Aerospace Supplier Initiative
- **2003**: Six aeronautical managers establish HAIF
- **2002**: Greenfield sites by Hungaerotech Ltd. and Flamespray Ltd.
- **2001**: Establishment of LH Technik Budapest Ltd. and Elektrometall Ltd.
- **1999**: Halley Ltd. introduces its first Apollo ultralight aircraft
- **1999**: GE Engine Services launches its greenfield sites

The initial development was driven by part manufacturers and small aircraft developers.
<table>
<thead>
<tr>
<th><strong>GEES Veresegyház</strong></th>
<th><strong>Lufthansa Techn. Budapest</strong></th>
<th><strong>Elektro-metall Paks Ltd.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Greenfield site – 100% GE</td>
<td>Greenfield JV site-15% Malév</td>
<td>Greenfield site-100% German</td>
</tr>
<tr>
<td>Repair activity</td>
<td>Overhaul activity</td>
<td>Component manufacture</td>
</tr>
<tr>
<td>15M$ middle size investm.</td>
<td>17 M$ middle size investm.</td>
<td>Small size investment &lt;10M$</td>
</tr>
<tr>
<td>SME/Supplier category</td>
<td>Integrator category</td>
<td>SME/Supplier category</td>
</tr>
<tr>
<td>Not airport dependent</td>
<td>Airport location</td>
<td>Not airport dependent</td>
</tr>
<tr>
<td>Established in 2000</td>
<td>Established in 2001 as a JV</td>
<td>Established in 2001</td>
</tr>
<tr>
<td>Empl. 240 people</td>
<td>Empl. 340 people</td>
<td>Empl. 200 people</td>
</tr>
<tr>
<td>Engine component repair</td>
<td>Airbus320/Boeing737overhaul</td>
<td>Airbus wire harness manufact.</td>
</tr>
<tr>
<td>FAA/JAA/AS9100 certified</td>
<td>JAR-145 certified</td>
<td>AS 9100 certified</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th><strong>Hungaerotech Debrecen</strong></th>
<th><strong>Alcoa-Kőfém Nemesvámos</strong></th>
<th><strong>Flame Spray Ltd. Gödöllő</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Greenfield site-100% Dutch</td>
<td>Privatiz./Acquis.-100% US</td>
<td>Greenfield site - 100% Italian</td>
</tr>
<tr>
<td>Component manufacture</td>
<td>Component manufacture</td>
<td>Thermal spray (APS, HVOF), slurry diffusion, honeycomb brazing</td>
</tr>
<tr>
<td>Small investment &lt;10M$</td>
<td>Middle size investment ?M$</td>
<td>SME / Supplier category</td>
</tr>
<tr>
<td>SME/Supplier category</td>
<td>SME/Supplier category</td>
<td>Not airport dependent</td>
</tr>
<tr>
<td>Not airport dependent</td>
<td>Not airport dependent</td>
<td>Established in 2002</td>
</tr>
<tr>
<td>Empl. 40 people</td>
<td>Empl. 110 people</td>
<td>Employs 57 people</td>
</tr>
<tr>
<td>Turbine parts manufacture</td>
<td>Aerospace fastener manufact.</td>
<td>AS 9100/NADCAP certified</td>
</tr>
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</tbody>
</table>

4 out of 6 foreign investments (FDI) entered to the turbine technology business
The small aircraft manufacturing sector is growing across the country...
In order to increase the number of component manufacturers HAIF launched the Aerospace Supplier Initiative Programme in December 2004. Mainly automotive component manufacturers are involved in the programme.

In March 2006 HAIF initiated and organized the establishment of the Hungarian Aerospace Cluster. Now it has 4 founders and 18 members.

In 2008/09 HAIF launched AS9100 Quality Assurance programs for 26 SMEs, mainly members of HAC.

**The Present**

- Design/Development: 10
- Component manufacturing: 11
- Small a/c manufacturing: 5
- Parachute manufacturing: 1
- Air Ballon manufacturing: 1
- Maintenance/Overhaul: 80
- Training: 4
- Consulting: 2
- Parts sale: 1
- Tools manufacturing: 3
- Calibration: 1
- Engineering: 3
- HR services: 2
- Modification: 1
- Marketing: 2
- Industrial organizations: 3

Total 131 organizations, 2300 people with a few component manufacturers.
2. Introducing the Hungarian Aerospace Cluster
2.1. **Creation of the Hungarian Aerospace Cluster**

Organized by HAIF, founded in March 2006 by four small aircraft developer:

1. **Corvus Aircraft Ltd.** – UL & LSA manufacturer
2. **Halley Ltd.** – UL manufacturer
3. **Composite One Ltd.** - small aircraft design & prototype developer
4. **Hungarocopter Ltd.** – small helicopter developer

**Joined members:**

1. **Design & Engineering companies (7)**
   - **Waterfly Ltd.** – Small aircraft design&prototype developer
   - **eCon Engineering Ltd.** – Computer Aided (CAE) solutions
   - **CAD -Terv Engineering Ltd.** – Engineering services, Catia
   - **Delta -Tech Engineering Ltd.** – Special tool&machine design
   - **H4 Aerospace Ltd.** – Design of systems, upgrades, modifications
   - **Calaluna Plc.** – Development of lighting systems
   - **Meshining Engineering Ltd.** – CAE solutions

HAC was established to provide an organizational framework for faster growth.

2. Prototyping companies (2)
   Varinex Informatics Plc. – rapid prototyping
   Technoplast Ltd. – rapid prototyping

3. Part manufacturing companies (7)
   Hungaerotech Ltd. - machining
   Dendrit Ltd. - machining
   Borsodi Műhely Ltd. - machining
   High Tech Composite Ltd. – composite parts
   Produktum Ltd. – aluminium stands
   Ostorhazi Ltd. – special coatings
   Elektro-Metall Paks Ltd. – wire harnesses
   ELTEC Hungary Ltd. – wire harnesses

4. System integration and testing (1)
   Naturen Ltd.- Virtual design and testing, embedded control

5. Software development (1)
   Allied-Visions Ltd. – simulator training softwares
2.2. Objectives of the Cluster

1. Speed up the development of the Hungarian Aerospace Industry
2. Diversification of the best part manufacturers to aerospace
3. Creation of a network of aerospace and related industries
4. Development of new Hungarian designed small aerospace vehicles
5. Organize the production of these vehicles internationally
6. Organize and develop complementary capabilities among Hungarian firms to be able to manufacture higher assemblies for large aircraft
7. Achieve synergies and economies of scale using networking in the fields of design, development, training, logistics, quality (AS 9100), IT, marketing and certification
8. Introduction of modern management methods and principles to the SME sector – six sigma, lean manufacturing
9. Develop new supplier relationships with other countries
10. Replace expensive foreign suppliers with low cost ones
11. Increase the Hungarian participation in EU founded aerospace projects
2.3. Main Characteristics of the Cluster

- Organized on **bottom up** principle
- Non-profit, **not a legal entity** but with **formal membership**
- Led by **3 managers** - 2 founders and HAIF chairman
- Barter-type financing
- **100 % privately owned** - **16 Hungarian SMEs and 5 foreign subsidiaries**
- **100 % SMEs** - nearly 1000 employees
- **Focusing on product development**
- Good engineering background
- Equipped with modern softwares – **Catia, Solidworks, Ansys**
- Competences: **composites, machining turbine parts, space avionics**
- Young, dynamic management
- Supported by **HAIF, NORT and ITD Hungary**
- Collaboration agreement with Pannon Automotive Cluster, Aviation Valley Poland and Hanse-Aerospace

Collaboration started with local automotive industry, space industry and Poland
2.4. Main Partners

In January HAC joined ECARE+ the European aerospace SME organization
3. Creation of the Hungarian Aeronautical Research Platform

**Created:**
September 2006

**Founders:**
- 1 University (BUTE)
- 1 Research organization (KFKI vibration lab)
- 2 Companies (Bonn Hungary, Slot Consulting)
- Hungarian Aviation Industry Foundation

**Objectives:**
- To provide organizational framework for Aerospace research in Hungary
- To help the best research organizations to diversify into aerospace
- To support HAC in product development
- To launch complex research projects with integrating members’ capabilities
- To participate in FP7 and other EU research programmes
- To establish new R&D relationships with EU countries
Hungarian Aeronautical Research Platform – cont.

**Network members:**
- BUTE Department of Fluid Mechanics
- BUTE Department of Mechatronics, Optics and Instrumentation Technology
- BUTE Department of Transportation Automatics
- BUTE Department of Energy Engineering
- BUTE Department of Control Engineering and Information Technology
- Miskolc University Department of Chemistry
- Research Institute of Technical Physics and Materials Science – (MTA-MFA)
- Humic 2000 Ltd.
- Admatis Ltd.
- Enviro-Pharm Ltd.
- Aviatronic Ltd.
- ODIN Budapest Ltd.
- Naturen Ltd.
4. Creation of the Hungarian Aerospace Technology Platform

Created:
November 2007

Founders:
• 2 Universities (BUTE, ELTE)
• 1 Research organization (KFKI AEKI,)
• 4 Companies
  Bonn Hungary Ltd.
  SGF Ltd.
  BL Electronics Ltd.
  Slot Consulting Ltd.
• Hungarian Aviation Industry Foundation

Objectives:

To provide organizational framework for Aerospace research in Hungary
To close the gap between the EU and Hungary in Aerospace technology
To help the best research organizations to diversify into Aerospace
To devise a national strategy for aerospace research
To develop and test small aerospace vehicles
To launch integrated research projects
To participate in space missions and FP7 research programmes
To establish new R&D relationships with EU countries

Rosetta incorporates several Hungarian ICT components…
5. **Main focus areas of the industry in the future:**

- Development and manufacture of aircraft for **general aviation**
- Development of **Unmanned Aerial Vehicles (UAV)**
- Development of **systems and equipment** for general aviation and UAVs
- Development of **space systems**
- Engineering services – design and simulation
- Development of passenger cabin systems – collaboration with Hanse Aerospace
- Manufacture of special tooling and equipment
- Testing of components and systems for aerospace applications
- Manufacture of **composite parts**
- Manufacture of **turbine parts** – collaboration with Aviation Valley Poland
- Software development and testing – **embedded systems**
- Establish and ramp up collaboration between local and international Clusters and Platforms – **HARP**, **HATP**, **Artemis Hungary ‘08**, **MMP‘08**, and **EU Clusters**
6. Latest Development

In Dec. 2009 an Aerospace electronic R&D center will open with an Incubation House.
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Attachments
The evolution of our industry led to the emergence of new modern vehicles
Apollo Fox was the first ultralight aircraft manufactured in Hungary - 1999
The award winning Corvus Corone 2-seat composite aircraft debuted in 2005
Hungarian Aviation Industry Foundation

Corvus Phantom ultralight certified in Germany, Italy and Spain in 2008
Prototype of Corvus Racer 540 acrobatic aircraft designed for Red Bull race
Prototype of the “Hydropteron” composite amphibian by Idea-Aircraft Ltd.
Prototype of the „Avana Larus” composite amphibian by AVANA Industries
Prototype of the „Diora” coaxial-rotor 1 seat helicopter by Dioferr Ltd.
Prototype of the BHX-03 electric powered UAV by Bonn Hungary Electronics