GKN – What We Are

GKN is a Tier 1, strategic partner to large Global OEM’s in Automotive & Aerospace providing highly engineered systems and solutions to technically demanding standards.

GKN Aerospace  

GKN Land Systems  

GKN Driveline  

GKN Powder Metallurgy
# GKN Aerospace - Military Aircraft Applications

<table>
<thead>
<tr>
<th>Customer</th>
<th>Military Transport, Fighter and Rotary Aircraft - GKN Aerospace Platform Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Military Transport</strong></td>
<td></td>
</tr>
<tr>
<td>A400M, MRTT, C-27J,</td>
<td><img src="image1.jpg" alt="Military Transport Aircraft 1" /> <img src="image2.jpg" alt="Military Transport Aircraft 2" /></td>
</tr>
<tr>
<td>C-130, C-17</td>
<td><img src="image3.jpg" alt="Military Transport Aircraft 3" /> <img src="image4.jpg" alt="Military Transport Aircraft 4" /></td>
</tr>
<tr>
<td><strong>Fighter / Unmanned</strong></td>
<td></td>
</tr>
<tr>
<td>F-15, F/A-18, F-22,</td>
<td><img src="image5.jpg" alt="Fighter Aircraft 1" /> <img src="image6.jpg" alt="Fighter Aircraft 2" /></td>
</tr>
<tr>
<td>F-35 JSF, Tornado,</td>
<td><img src="image7.jpg" alt="Fighter Aircraft 3" /> <img src="image8.jpg" alt="Fighter Aircraft 4" /></td>
</tr>
<tr>
<td>Gripen, Eurofighter,</td>
<td><img src="image9.jpg" alt="Fighter Aircraft 5" /> <img src="image10.jpg" alt="Fighter Aircraft 6" /></td>
</tr>
<tr>
<td>X-47B N-UCAS</td>
<td><img src="image11.jpg" alt="Fighter Aircraft 7" /> <img src="image12.jpg" alt="Fighter Aircraft 8" /></td>
</tr>
<tr>
<td><strong>Rotary</strong></td>
<td></td>
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<tr>
<td>AW159, V-22, WH101,</td>
<td><img src="image13.jpg" alt="Rotary Aircraft 1" /> <img src="image14.jpg" alt="Rotary Aircraft 2" /></td>
</tr>
<tr>
<td>S-92, CH-47, CH-53K,</td>
<td><img src="image15.jpg" alt="Rotary Aircraft 3" /> <img src="image16.jpg" alt="Rotary Aircraft 4" /></td>
</tr>
<tr>
<td>UH-60</td>
<td><img src="image17.jpg" alt="Rotary Aircraft 5" /> <img src="image18.jpg" alt="Rotary Aircraft 6" /></td>
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</tbody>
</table>
# GKN Aerospace - Commercial Aircraft Applications

<table>
<thead>
<tr>
<th>Customer</th>
<th>Commercial, Regional &amp; Business Jet - GKN Aerospace Platform Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airbus</td>
<td>![Images](A320, A330/340, A350, A380)</td>
</tr>
<tr>
<td>Boeing</td>
<td>![Images](B737, B747, B767, B777, B787)</td>
</tr>
<tr>
<td>Bombardier</td>
<td>![Images](C-Series, Q-400, CRJ, Global 7000/8000)</td>
</tr>
<tr>
<td>Embraer</td>
<td>![Images](E170/175/190/195, 135, 140, 145, Phenom, Legacy, Lineage)</td>
</tr>
<tr>
<td>Other</td>
<td>![Images](HondaJet, Falcon SMS, MRJ, G5, C919)</td>
</tr>
</tbody>
</table>

GKN Proprietary Data – Competitive Sensitive
GKN Aerospace - Space Applications

Ariane 5
- LH2 and LOX Turbines
- Vulcain 2 Engine Nozzle

Taurus
- Welded Honeycomb Payload Fairing

Delta II
- Niobium (Columbium) Fabricated Nozzle

Satellite Solar Panels
- Filament Wound Astrium Satellite Solar Panels

Space Shuttle
- Inconel Fabricated Nozzle

Satellite Bus Structures
- Composite Panels for Iridium Satellite Bus Structure
Aerospace is About Technology

- Always Pushing the Limits of Performance
  - Faster, Lighter, Stronger, More Efficient
  - Application of New Materials & Processes

- Challenging & Innovative Engineering
  - High Expected Rate of Change
  - Making Cutting Edge Technology Robust, Reliable & Safe

- Creating New Opportunities that Benefit All of Aerospace & Other Industries
  - Ability to Leverage Technology Across Space, Military & Commercial Applications
  - Cooperation Across Government, Industry & Academia
Leveraging Technology: Space, Military & Commercial

Titanium Additive Layer Technology

Robotic Laser Welded Primary Engine Structures

Automated Composite Engine Structures

GKN Proprietary Data – Competitive Sensitive
Research → Innovation

Technology readiness

Product on the market
Development
Demonstration
Basic research

Time

GKN Proprietary Data – Competitive Sensitive
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R&T Projects

GKN Managed >300MSEK in 2013 R&T Projects in Sweden Across Space, Military & Commercial Applications

Other European Partnerships
- NTNU
- SINTEF
- Darmstadt (Aero)
- TU Graz (Aero)
- Oxford (Aero thermal)
- Nottingham (Manufacturing)
- Aachen (Manufacturing)
- Delft (Design)
- Cambridge (Design)
- Bath University (Composite)
- Bristol University (Composite)
- Sheffield University (Manufacturing)
- Coventry University (Automation)

More than 60 PhD Projects in Current Portfolio
Increased cooperation between GKN and LTU.

2 Successful Projects:

Virtual manufacturing of Rocket Engine Nozzle:

- Development of process simulation tools for Welding and Metal Deposition (MD) at LTU. Graduate Magnus Söderberg
- Co-funded by GKN, Graduate School of Space Technology and NRFP (Swedish National Space Board).

Addition of different materials and impact on Titanium alloys

- Investigation of what impact different materials (H, O, N, B, Si) have on properties of Ti-64 (casting, fabrication welded and MD). Graduates Pia Åkerfeldt and Raghuveer Gaddam.
- Co-funded by GKN, Graduate School of Space Technology and NFFP (Vinnova/Armed Forces)
GKN’s ambition is to strengthen its cooperation with LTU.

Possibilities to synergies through coordination and co-funding with other national institutions.

- National Space Research Program (NRFP3) planned to start 2015

Proposal for areas of interesting research projects:

- **Simulation of Welding and Metal Deposition** with physically based material models for Ti-64. Possibility to continue ongoing cooperation with NASA.
- **Simulation of sheet metal forming**, possibilities to increased cooperation with industry, academy and SME
- **Materials Technology** – development of Titanium alloys with enhanced properties
- **Design methods** and tools
- **Aerodynamic** analysis