

GKN Aerospace Services



One Company - One Team

GKN Aerospace Services

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GKN plc

GKN is a global engineering company focussed on automotive and aerospace. It provides highly engineered products requiring complex manufacturing to virtually all of the world's producers of automotive vehicles, aircraft and aero engines. Operating in more than 30 countries, GKN employs 35,700 people in its subsidiaries. Its joint ventures, the largest being AgustaWestland, employ a further 12,900 people.

In 2002, GKN achieved sales of £4.5 billion and a profit before tax and exceptional items of £267 million. The global nature of the business is demonstrated by the geographical split of these sales, with 60% from Continental Europe, 32% from the Americas and 8% from the rest of the world. The aerospace activity accounted for 34% of total sales.



Drive Shafts



EH101 Helicopter

Automotive

GKN is a global supplier of automotive components and systems. Its Driveline Division is No. 1 supplier of constant velocity jointed halfshafts, operating in 21 countries and with a 42% global market share. Growth in the business is being achieved from outsourcing of driveline manufacture by vehicle manufacturers, growth in emerging markets and increasing demand for four-wheel drive and all-wheel drive sports utility vehicles. In 2002 these accounted for 25% of the 16.4 million light vehicles produced in North America. More recently a specialised Torque Systems Group has been established within GKN Driveline to expand its presence in this emerging market.

GKN is the No. 1 supplier of powder metal parts with a 16% global market share and with operations in 11 countries. It is the No. 1 producer of powder metal in the US. GKN's capability in the technology and production of powder metal parts and their raw material is unique among major companies.

GKN is a major European and North American supplier of components and systems for agricultural and off-highway equipment. It is also a leading supplier of automotive structural presswork and cylinder liners for automotive, industrial and marine applications. Emitec, a 50:50 joint venture with Siemens, is the world leader in metal substrates for catalytic converters.

Aerospace

GKN operates as a first tier supplier through GKN Aerospace Services and as a prime contractor through AgustaWestland.

GKN Aerospace Services supplies structures, components and design services to aircraft and aero engine manufacturers. The business has achieved sales growth of more than 300% in five years. This growth has come principally from acquisitions targeted at key technologies and programmes.

AgustaWestland is a 50:50 joint venture created by GKN and Finmeccanica when both companies merged their helicopter subsidiaries to create the world's No. 2 helicopter company. The new company has one of the broadest and most balanced military and civil product portfolios in the industry. It has strong relationships with Boeing, Lockheed Martin and Bell Textron and is a partner in the European NH90 helicopter with EADS and Fokker.

Contact: information@gknplc.com

GKN Aerospace Services

GKN Aerospace Services is the aerospace division of GKN plc. It is a global independent first tier supplier of complex composite and metallic integrated structures for airframe and engine applications, transparencies and other equipment and systems, and engineering and outsourcing services to virtually all of the world's leading aircraft and aero engine manufacturers.

The Company possesses expertise in all specialist aerospace manufacturing and design processes, in addition to a comprehensive supply chain and logistics capability. This unparalleled expertise makes GKN Aerospace Services a preferred partner to the major primes.

Over the last five years, the company has achieved a compound

annual growth rate of 32%, principally from acquisitions targeted at key technologies and investment in major new military and civil aerospace programmes.

GKN Aerospace Services now has thirteen centres of manufacturing excellence in Europe, North America, and Australasia together with specialist repair and overhaul facilities in Tulsa and Fort Worth in the USA

The manufacturing operations of GKN Aerospace Services are supported by the Group's integrated engineering arm with 1000 engineers in 12 design offices located across the USA, the United Kingdom and Australia. The total workforce of GKN Aerospace Services is in the order of 6,300.



GKN Aerospace Services offers:

- Comprehensive design, certification and build capability
- Trans-Atlantic footprint
- Focus on high-technology structures and associated systems
- Innovation and creativity
- Operational best practice (incl. automotive learning)
- Part of Blue Chip FTSE 100 company with global posture
- Deep understanding of and willingness to enter partnerships



Facilities

The combined manufacturing facilities of GKN Aerospace Services covers an area in excess of 4 million square feet.

THE AMERICAS

St. Louis, Missouri - complex machined components, military composites and nacelles.

San Diego, California - specialist engine and airframe fabrications.

Tallassee, Alabama - composite components and assemblies.

Garden Grove, California - military transparencies and civil aircraft windows.

Santa Ana, California - all-resistance-welded honeycomb sandwich structures.

Kent, Washington - electron beam welding of specialist structures.

São José dos Campos, Brazil - passenger cabin windows and Bullet Resistant Glass.

Mexicali, Mexico - machine support centre.

EUROPE

Cowes, UK - composite structures and nacelles.

Yeovil, UK - metallic components and structures.

Portsmouth, UK - fuel cells and systems and helicopter flotation equipment.

Luton, UK - aircraft transparencies and electrothermal ice protection systems.

Kings Norton, UK - glass products for aerospace, automotive and rail industries.

Munich, Germany - large commercial composite structures and long bed machining.

ASIA

Patumthanee, Thailand - military transparencies.

The Company's integrated engineering activities provides support to both these facilities and to the OEMs and second tier suppliers:

- GKN Aerospace Engineering Services provides specialised engineering services to the aerospace industry and to the design teams within the individual GKN Aerospace Services companies. It has offices in Weston-super-Mare, Aldershot, Avonmouth, Blackburn, Chester, Yeovil, Kirkham and Derby, UK and Port Melbourne, Victoria, Australia.
- Advanced design teams located at each site provide internal engineering expertise. The largest of these teams being at Cowes, UK and San Diego, North America. These are supported by Engineering Development Centres in Meriden, Connecticut and Nashville, Tennessee, North America and Munich, Germany.



Sputtering Chamber - Luton



Long Bed Machine - Munich



Resin Transfer Moulding Facility - St. Louis



Vacuum Furnace - Santa Ana



NC Machining Station - San Diego



CMM Room - Cowes

Programmes

GKN Aerospace Services supports the world's major prime aircraft and aero engine manufacturers:

Airbus A380

Engineering services

(Joint partner with Airbus UK on main wing box design)

Composites

- Flap Track Beams
- Landing Flap Upper Skin
- Shroud Box
- Overwing and Underwing Panels
- Main Landing Gear Doors and Fairings
- Trailing Edge Panels
- Tip and Outer Falsework
- Vertical Tailplane - Fairings and Brackets

Metallics

- Fuselage and Stringers

Boeing C-17

Supply Chain Management services

Composites

- Wing Flaps and Fixed Leading Edges
- Doors
- Cockpit Floors
- Pylon Skins
- Landing Gear Pod Skins

Metallics

- Landing Gear Frames
- Fuselage Bulkheads, Longerons and Stringers
- Cargo Ramp, Door and Floor Components
- Engine Pylons
- Wing Slats, Slat Tracks and Flap Trailing Edges
- Nose Barrel Skins

Equipment

- Metallic Nacelle components
- Cockpit windshields

Lockheed Martin F-22

Engineering services

Composites

- Sine Wave Wing Spars
- Fuselage Frames
- Stabiliser Kick Ribs
- Engine Air Inlet Lips
- Aileron Inboard Spar

Metallics

- Titanium Sine Wave Wing Spars
- Titanium Keelsons
- Titanium A-Frames
- Gun Trough
- Aft Boom
- Engine Transition Duct
- Fan and Augmenter Duct
- External Flaps

Equipments

- Cockpit Canopy

AgustaWestland EH101

Engineering services

Composites

- Engine Cowls Suite
- Sponsons
- Cockpit Glazing Structure
- Rotor Blades
- Roof Panels

Metallics

- Roof Assembly
- Lower Forward Fuselage
- Underfloor Structure

Equipments

- Fuel Tanks
- Emergency Flotation Systems
- Sea Floors
- Main Rotor Ice Protection System
- Cockpit windows



Boeing C-17 Globemaster III



A380



Lockheed Martin F-22 Raptor



EH101 Helicopter

Other notable programmes include:

AgustaWestland Lynx - Engineering and supply chain management services, a major element of the metallic fuselage structure, composite components, fuel tanks, flotation system, cockpit windows and other minor structures.

Airbus A319/320/321 - Composite wing and tail components and cockpit windshields.

Airbus A340 500/600 - Design services, manufacturing contracts for a number of wing components together with contracts for Trent 500 engine components.

BAES Eurofighter - Responsible for the design of the conformal fuel tanks, manufacture of the cockpit canopy and front screen and engine bypass duct and jet pipe.

Boeing Commercial Aircraft range - Cockpit and cabin windows.

Boeing F-18 E/F - Major supplier of composite and metallic wing and fuselage structures and canopy.

Lockheed Martin C-130J and C-27J - Design, test, certification and manufacture of the nacelle systems.

Lockheed Martin F-35 (JSF) - Partnership agreement with BAE SYSTEMS on design and production of high technology fuselage components together with manufacture of composite and metallic engine components and canopy.

Sikorsky Black Hawk - Significant elements of the cabin structure, rotor blades and other composite components, and emergency flotation equipment.

Sikorsky Comanche - A range of components in Resin Transfer Moulding (RTM) technology are supplied for this programme.

GKN Aerospace Services provides a range of composite and metallic engine components to the world's major aero engine manufacturers, including Rolls-Royce, Pratt & Whitney, GE, Allison and Eurojet. Products include fan and containment cases, ducts and rings and exhaust nozzles and systems.

Engineering

GKN Aerospace Engineering Services is the integrated engineering service provider within the Group. It offers a comprehensive range of engineering support services to the aerospace and defence industries. It also supports the rail and automotive industries.

Its position as a prime supplier of engineering services to OEM's such as EADS Airbus, BAE SYSTEMS and Lockheed Martin, together with its support to first and second tier suppliers, is based upon a broad range of capabilities backed with a highly developed IT infrastructure. With offices across the UK, North America and Australia, it is able to work around the clock on programmes, offering its customers the unique opportunity to compress turnaround time on programmes. Its extensive expertise and experience has been deployed in a wide range of tasks including major aerostructures design through to engineering support of in-service products.

GKN Aerospace Engineering Services has its own large pool of dedicated engineering resources with skills ranging from project management, analysis and modelling through to CATIA and CADD5 CAD design and manufacture support.



Supply Chain Management

GKN Aerospace Services is a leader in the management of extended supply chains, focussing on the total cost of ownership to the end customer. Unlike traditional approaches to supply chain management, GKN Aerospace Services aims to manage the extended supply chain from raw material supply through to the end customer.

Utilising a comprehensive set of innovative tools to re-structure the supply chain and eliminate waste at all stages of the design, development and manufacture lifecycle, GKN Aerospace Services has constantly demonstrated significant cost reductions and improvements in quality and delivery performance to its end customers. The philosophy embraced in its supply chain approach gives the customer the ability to have GKN Aerospace Services manage and participate in the supply chain at all stages of the programme, from design concepts to logistical support.

By expanding its involvement on the Lynx helicopter programme, GKN Aerospace Services was able to reduce the original part number count of 40,000 from suppliers throughout the industry to down to 2 deliverables from a single supplier. With its unparalleled range of products and services, GKN Aerospace Services, provides significant cost reductions and efficiency improvements in the supply of aerostructure assemblies and equipment.

BELOW Lynx airframe

Capabilities

Problem Identification

- Analyse needs
- Define problems
- Requirements capture

Concept Engineering

- Compare and contrast options
- Select appropriate technology
- Evaluate cost
- Work breakdown structure
- Engineer systems

Product Design

- Produce detailed designs on CAD
- Assess strength using FEA
- Systems designs/wiring diagrams
- Hardware and software

Design Appraisal

- Analyse safety and reliability
- Check compliance with specification
- Study ergonomics assembly and usage
- Define training requirements
- Certify/test

Life Cycle Management

- Study and minimise risk
- Plan projects
- Management of time/cost
- Integrated logistics support
- IS definition
- Vendor contracting

Manufacture

- Production engineering studies
- Select method of manufacture
- Design jigs, tools, fixtures and test rigs
- Production planning

In Service Support

- Produce required technical publications
- Establish procedures for repair and overhaul



Advanced Composites

GKN Aerospace Services is recognised as one of the world leaders in primary composite structures for the civil and military aircraft markets, helicopters and space vehicles.

With over 40 years experience in composites, its market position is maintained through its four composite manufacturing facilities in Europe and North America and the Company's continuing commitment to development work in manufacturing processes, materials and tooling methods.

Components produced range from simple detail components through to large structures featuring integrated stiffening, manufactured by one-shot autoclave processing. All facilities undertake assembly and sub-assembly work. Examples of products include doors and covers, wing surfaces and components and fuselage sub-assemblies.

GKN Aerospace Services companies possess all the key composite fabrication processes. Through its commitment to developing technology, the Company now has a leading market position in RTM and continues to develop technologies for advancing the business. Resin Film Infusion (RFI) is one such technology.



LEFT ESSS Beam for Black Hawk helicopter
RIGHT A340 500/600 outer flap skin
BELOW Assembly of A380 tip falsework

ABOVE Ingersol 7-axis CNC Fibre placement machine
LEFT Filament winding of a Black Hawk refuelling probe
CENTRE A340 500/600 overwing panels
RIGHT Automated trim and drill
BELOW Lay up of a Trent 500 fan cowl door



Composite Facilities

The composite facilities of GKN Aerospace Services are equipped with advanced equipment and processes supported by state-of-the-art non-destructive testing capabilities. With over 40 years experience in composites, substantial investments in all facilities has ensured that GKN Aerospace Services remains at the forefront of composite technology.

A range of manufacturing processes is employed across the composite facilities of GKN Aerospace Services. These include hand lay-up, automatic tape laying, fibre placement, filament winding, and autoclave and oven curing.

High precision NC trimming and drilling equipment and techniques are used to finish the components. Quality assurance is supported with a range of equipment including CMM, automated ultrasonic and scanning systems, x-ray, and other developed testing systems.





Resin Transfer Moulding (RTM)

The Resin Transfer Moulding (RTM) process augments the extensive composite processes currently undertaken across the GKN Aerospace Services composite facilities. Through major investment in the technology, the Company has established a strong position in RTM which enables production of a new range of applications in airframe and engine components.

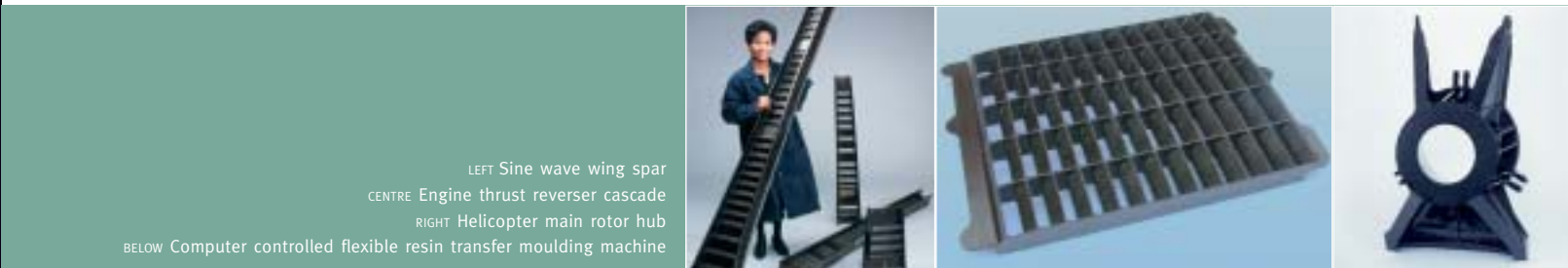
In the RTM process, advanced polymer resins are injected into a matched mould encapsulating a continuous fibre, preformed reinforcement. The results are high performance precision moulded parts controlling both contour and laminate thickness. The quality of the laminate is the inherent advantage of RTM. Porosity, fibre distortion and wrinkling problems are eliminated. Repeatability and delivery of first pieces from new tools are routine.

RTM also enables multi parts to be moulded into one single component thus reducing part counts and weight.

All of these result in cost benefits, which are enhanced by the manufacture of close tolerance components, improving final assembly through-put by the elimination of pre-fitting and shimming.



ABOVE Lay up of an F-18 horizontal stabiliser
LEFT C-17 flap vane assembly
CENTRE Composite clean area
RIGHT Automated ultrasonic scanning system



LEFT Sine wave wing spar
CENTRE Engine thrust reverser cascade
RIGHT Helicopter main rotor hub
BELOW Computer controlled flexible resin transfer moulding machine

Composite Processes

The combined facilities offer a total of 25 autoclaves, ranging from 15 feet working diameter to 45 feet working length. Metal-to-metal and metal-to-composite bonding processes are also performed in a number of the facilities. To enable this work to be undertaken these centres have comprehensive metal cleaning and priming processes plants.

All types of high-grade composite materials are utilised in the manufacture of the Company's range of components and sub-assemblies. These include carbon fibre, fibreglass, Kevlar, Nomex honeycomb, thermoset resins (bismaleimide, polyamide, epoxy, phenolic) and thermoplastic resins (nylons, polycarbonates).

Resin Film Infusion (RFI)

The composite manufacturing activities are supported by the Company's composite research and development activities including participation in international co-operative programmes with industry and universities. Resin Film Infusion (RFI) is the latest process developed by the Company. This involves laying-up of dry multi-axial fabric interleaved with resin film, which can be cured using an oven or heated tools, thereby removing the size limitations of an autoclave. Benefits include improved cycle times, lower weight and cost together with improved quality. RFI is being used on the A380 trailing edge components and has further applications on a range of new programmes.



Metallic

GKN Aerospace Services has a full range of capabilities in metal fabrication and assembly. Its operations in North America and Europe offer capabilities unmatched by their competitors.

The machining centres in St. Louis and Munich have the capability to machine large complex monolithic parts from a range of materials. Key processes include milling, reaming and boring with high speed machining being its core competency.

A range of technologies is employed to fabricate complex sheet metal and extruded products in titanium and other exotic hard to form metals. Processes include forming, superplastic forming (SPF) and diffusion bonding.

Metal fabrication using chemical milling techniques is used by GKN Aerospace Chem-tronics to produce airframe components including doors, bulkheads and keels. This technique offers weight and parts count reductions and cost benefits over alternative fabrication methods.

GKN Aerospace Services companies produce metallic structures and sub-assemblies for a range of aircraft and helicopters, including the completed forward fuselage for the AgustaWestland Lynx helicopter. Other structures and components include engine pylon fairings, fuselage tailcones, together with doors, panels and fairings.

Machining

The machining centres located in St. Louis and Munich have the capability to machine large - up to 100 ft long - complex monolithic parts from both hard and soft metals to within exacting aerospace tolerances.

The key processes are milling, reaming and boring. High speed machining (HSM) of aluminium is also a strong competency with significant recent investments in new machines.

The facilities also have on-site environmentally compliant chemical processing and paint capabilities and Co-ordinate Measuring Machines (CMMs) for part inspection. These enable delivery of parts to the customer ready for assembly.



Cincinnati Magnum 1000 HVC flexible manufacturing system



Henri Liné high velocity Powermill

Machined ribs for the C-17

LEFT F/A-22 welded titanium boom
CENTRE A340 Shroud box
RIGHT A340 500/600 aft pylon fairing
BELOW Assembly of Bombardier CRJ700 tailcone



Combined, the machining centres have 200 major machine tools - 124 N/C controlled machines. The St. Louis facility has the largest number of multi-spindle profilers under one roof. Key processes are:-

- Multi-axis Complex Milling
- High Speed Long Bed Milling
- Grit Blast/Deburr
- Paint Shop
- Process Cell
- Jig Bore
- Prep Area
- Chemical Processing/Paint to 22' Long
- Aluminium Heat Treat to 24' Long

Maximum part size is an impressive 1194in by 164in by 33in (30.3m by 4.2m by 0.8m).



Droop and Rein 3-axis CNC long bed milling machine



N/C coordinate measuring machine



Sheet Metal Fabrication

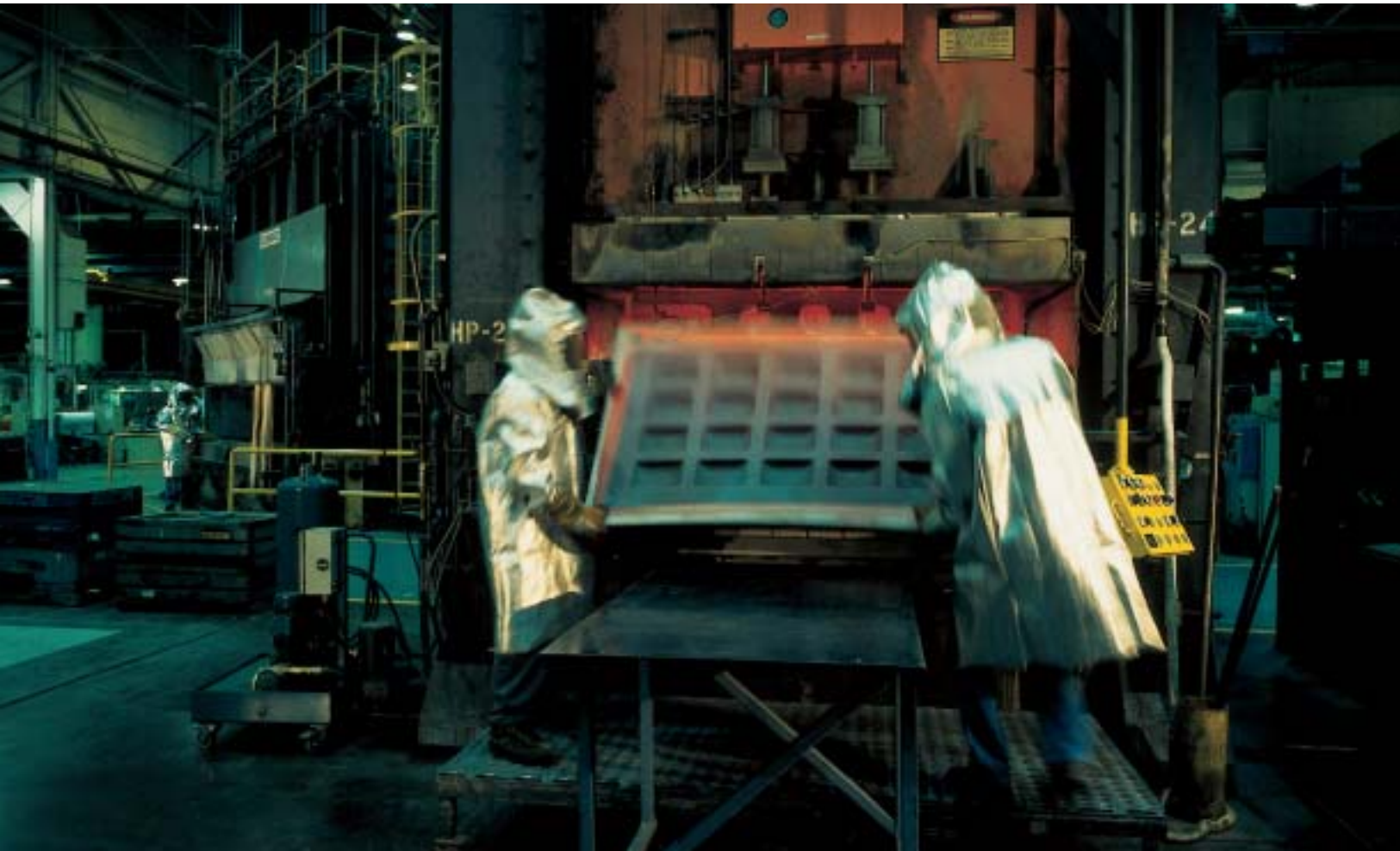
With capabilities acknowledged throughout the industry, GKN Aerospace Services specialises in advanced technologies to produce a range of lightweight sheet metal components and assemblies. These include:

- Electron Beam Welding
- Hot Forming Titanium
- Superplastic Forming/Diffusion Bonding
- Fluid Forming
- Stretch Forming and Stretch Wrap Forming
- Welding expertise ranging from Tungsten Inert Gas ("TIG") welding to electron-beam welding
- State-of-the-art glycol quench for heat treatment



ABOVE Sciaky electron beam welder
RIGHT ABB Fluid forming press
LEFT Inspection of longeron profiling

Superplastic forming process



Engine Components

GKN Aerospace Services produces a range of engine components using advanced metallic materials and processes, including fan and containment cases, ducts and rings, and exhaust nozzles and systems.

GKN Aerospace Chem-tronics has pioneered the use of roll-formed and welded aluminium extrusions to reduce the cost of cases for large commercial aircraft. For its latest generation of fan and containment cases it has obtained further weight savings through the application of its Unistructure™ chemical milling process. The fan containment system for the Trent 800 engine is one example of a component manufactured by this process.

Unistructure™ is also used in the manufacture of jet engine bypass fan and augments ducts for military aircraft that operate in a high vibration environment with high internal pressure loads. Here, this advanced process enables greater reliability through the reduction of the parts count. Benefits offered are 25-40% less weight than skin/stringer equivalents, with cost benefits of 10-20%.



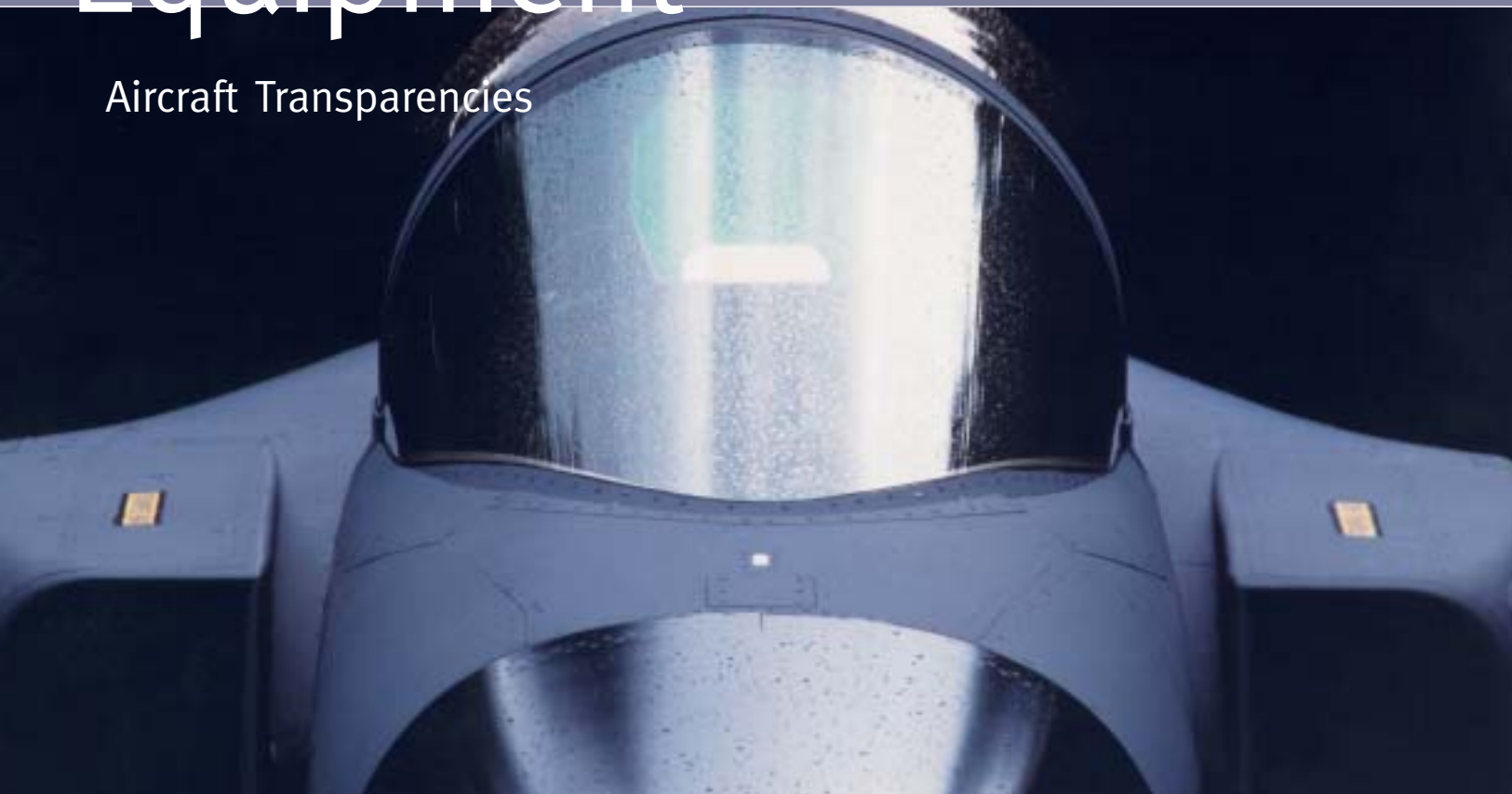
LEFT Acoustic nozzle for Boeing 757
MIDDLE Coating of a high pressure compressor case
RIGHT Trent Fan Case Assembly

ASTECH Engineered Products Inc. is the world's largest producer of resistance welded honeycomb sandwich structures, which are formed into three dimensional structures using proprietary manufacturing processes. Soundwich™ and Stresskin™ produce noise reduction structures for civil aircraft and lightweight, robust structures for high stress, high temperature areas of military airframes and engines. Examples being the lightweight titanium exhaust system for the Airbus A330 and the exhaust nozzles for F-117A fighter.



Panel forming of a welded honeycomb structure

Aircraft Transparencies



ABOVE Canopy for the Saab Gripen
LEFT Cockpit and cabin windows for 747
CENTRE Bombardier Learjet 31A
cockpit windows
RIGHT Electrothermal Ice protection systems



Flexible Structures

GKN Aerospace Services company, FPT Industries designs, manufactures and qualifies a wide range of flexible structures and associated systems for a host of applications.

Fuel bladders are produced for civil and military platforms including aircraft, helicopters, missiles and UAVs, with further capabilities in the design and manufacture of range extender or auxiliary fuel tanks. Fully integrated 'turnkey' fuel systems for fighting vehicles, comprising flexible and rotationally moulded tanks and associated equipment and pipework, are also produced by FPT Industries.

FPT Industries designs, manufactures and installs emergency flotation systems for both civil and military helicopters. This systems technology has also been applied to other products such as the automated inflatable recovery systems for training torpedos.

An extensive range of rubber fabrications and mouldings for the aerospace and defence industries is produced, these include 'wet floors', or sea trays, used to reduce corrosion in helicopter floors, and flexible canopies on airport boarding ramps.

LEFT Lynx extended range fuel tank
CENTRE EH101 emergency flotation system
RIGHT EH101 sea tray
BELOW Hawk tank manufacture



GKN Aerospace Transparency Systems designs, develops, tests and manufactures transparencies for aerospace and landbased applications. It is the world's No 1 supplier of transparencies to the military market and No 2 in the civil market.

Transparencies are produced in glass or plastic laminate materials, heated or unheated and can be coated for a range of applications.

Cockpit windshields, side windows and passenger windows are supplied by Transparency Systems for a wide range of aircraft in the commercial, regional and business aviation markets. For the military market, canopies and cockpit windows have been supplied by Transparency Systems for over 60 years and are currently supplied for fighter/attack, military transport, special mission aircraft, trainers and helicopters.

Transparency Systems also supplies locomotive windows and Bullet Resistance Glazing (BRG) for automotive and defence applications.

Electrothermal Ice Protection

The electrothermal ice protection system comprises a sprayed metal matrix element encapsulated by polymer composite materials, which may be attached or embedded within the aircraft surface requiring ice protection. The system has applications on flight control surfaces, engine and equipment inlets, helicopter blades and propeller spinners and is in operation on the EH101 helicopter and the Bell Boeing V-22 Osprey.



Nacelles

GKN Aerospace Services undertakes the design, engineering and manufacture of complete engine nacelles and components for both turboprop and turbofan engines.

With over twenty years experience in the design and manufacture of nacelles, GKN Aerospace Services has now established strong positions in military turboprop nacelles and at the lower thrust end of the turbofan market. It combines innovative design with advanced composite and metallic materials and the application of advanced manufacturing technology to provide lightweight nacelles with fewer components and lower life cycle costs. Nacelles have been designed and manufactured for a range of aircraft programmes, including the Lockheed Martin C-27J Spartan and the Honeywell AS907 engines for the Bombardier Continental.

GKN Aerospace Services also designs and manufactures nacelle and thrust reverser components in a diverse range of materials for military and civil aircraft applications. Components include the inner fixed structure for the CFM56-5C2 engine from bonded aluminium and honeycomb, a range of thrust reverser components with improved acoustic properties from resistance welded honeycomb sandwich structure, the inner cowl door for the C-17 nacelle using Superplastic Formed (SPF) techniques and blocker doors using Resin Transfer Moulding (RTM).



LEFT C-27J nacelle

RIGHT Inner fixed structure for A340 nacelle

BELOW Assembly of AS907 nacelle used on the Bombardier Challenger 300



Customer Support

GKN Aerospace Services provides a full aftermarket service worldwide for both GKN and third party products.

Comprehensive aftermarket support is provided for composite structures and nacelle components for all types of aircraft. The services encompass repair and overhaul, field service, spares, documentation and training.

Contact: Europe - info@aerospace.gknplc.com

North America - sales@tsfw.aero.gknplc.com

Fan blade and engine case repair is carried out by GKN Aerospace Chem-tronics for many jet engines in service with airlines worldwide. It can also apply protective carbide coatings to improve their durability and increase their lifespan.

Contact: mrc@chem-tronics.com



Repair of composite wing component



Fan blade repair

ASTECH Engineered Products is a fully licensed FAA Repair Station for the repair and overhaul of aircraft exhaust systems. In addition to this business, ASTECH holds a number of Supplemental Type Certificates (STCs) for replacement exhaust ducts and engine components offering enhanced performance.

Contact: sales@astechmfg.com

Transparency Systems operates a worldwide service and support activity through its facilities in the USA, Europe and Asia, including a comprehensive network of spares stock distributors. For specific products, Transparency Systems offers a 24hour AOG service.

Contact: Europe - sales@ts.aero.gknplc.com

North America - sales@tsus.aero.gknplc.com

With its specialist knowledge of materials and adhesives, FPT Industries undertakes repair, overhaul and re-certification of fuel tanks, flotation equipment and other flexible products. In addition, repairs of drop tanks are undertaken in a purpose built facility.

Contact: info@fptind.com



MD-80 replacement nozzle



Repair and overhaul of Tornado drop tanks