Knowledge Transfer Partnerships working within the Aerospace & Defence industry

**GKN Aerospace Ltd on The Isle of Wight** is able to produce lower cost, large composite components, having adopted a manufacturing process called Resin Film Infusion (RFI). The new RFI process and related technologies is a potential replacement for pre-preg/autoclave composites on major programmes including the Airbus A380 wing.

Three graduates were employed at GKN on Knowledge Transfer Partnerships, supported by expertise from the University of Plymouth’s Advanced Composite Manufacturing Centre (ACMC). Using RFI, two 12m long demonstrator wing spars were produced for mechanical testing, visual inspection and dimensional compliance to design parameters. These demonstrator spars proved to GKN the feasibility of adopting the RFI manufacturing process for the manufacture of large composite components. RFI can remove the need for costly autoclaves (heated pressure ovens), allowing larger components to be manufactured, at shorter cycle times and reduced material costs.

Other benefits include:
- Reduced operating costs
- 10% new markets
- 10% new sales
- Increased profits

The University of Plymouth has gained valuable experience through this collaboration with GKN directly feeding back into the teaching and course content. Through the University’s unique BEng (Hons) in Composite Materials Engineering, a long established relationship exists between the University and GKN, with several of its graduates currently working within the GKN Group. The company has also written letters of support for research applications within the field of Composite Engineering, and the company and academics are also in the process of identifying suitable topics to progress through undergraduate final year and post graduate research projects.

"Collaboration with experts from the University of Plymouth has enabled GKN Aerospace, in conjunction with its own resources, to make significant technological strides and secure market share that would otherwise not have been possible”

*Phil Grainger, Technical Director and Chief Technologist, GKN*  
[www.aerospace.gknplc.com](http://www.aerospace.gknplc.com)

**Dowty Propellers Plc** is maintaining its competitive advantage thanks to a Knowledge Transfer Partnership with the University of Plymouth, which is helping the company to expand its manufacturing processes and implement best practice in composites manufacturing.

Part of Smiths Aerospace, Dowty Propellers manufactures aircraft propellers in thermoset fibre/polymer advanced composite by Resin Transfer Moulding (RTM). The KTP Associate has joined a multi-functional team at the company, tasked with the development of a low-cost, high-performance propeller blade for the general aviation market. Supported by experts from the University’s Advanced Composites Manufacturing Centre (ACMC), this partnership has helped the company to reduce production costs and broaden its current use of RTM manufacture of components through the introduction of new RTM manufacturing techniques.

**Benefits to Dowty will include:**
- Enhanced offering in composites manufacturing techniques
- A competitive edge, able to react swiftly to market requirements and customer enquiries
- Increased range of composite components

*Rob Witik, KTP Associate, Dowty Propellers*  
[www.smith-group.com](http://www.smith-group.com)
Plastech Thermoset Tectonics Ltd is a highly specialised company based in Gunnislake, Cornwall providing machinery, tools and moulds for the manufacture of composite components. Through Knowledge Transfer Partnerships supported by the University of Plymouth’s Advanced Composite Manufacturing Centre (ACMC), Plastech has established an unrivalled reputation for their expertise in Resin Transfer Moulding (RTM) and their 'state of the art' equipment designed to handle specific types of resin systems, predominantly for use in the Aerospace industry.

Offering leading edge equipment and tooling technology to all manufacturers wanting to use fibre reinforced plastics, from simple general mouldings to large high value components, Plastech’s equipment is used for the processing of many different resin systems, including polyester, epoxy, phenolic and hybrids.

Plastech’s most recent KTP is enabling the company to design, develop and produce a novel automated preforming machine which will have a dramatic impact on the composite market and will significantly enhance Plastech’s reputation, market share, turnover and profitability. The company will also benefit from increased demand for training and consultancy to support and optimise efficiency of the new machine.

“Our collaboration with the University of Plymouth has consistently proved extremely valuable to our company. The natural tendency for most is to think of a University as being too academic and not sufficiently in touch with industry. In the case of Plymouth this is far from the truth. Our partnership in many projects continues to be of great importance to us, giving us the opportunity to examine systems in detail and to test various materials on a level that would have been impractical in most instances. On-going dialogue with the University’s teaching and research personnel and use of its laboratory facilities and research database has proved to be of great benefit to our company’s strong market position” – Alan Harper, Managing Director, Plastech Tectonics

Centrax Turbine Components Division in Devon manufacture quality machined components and supply assemblies to gas turbine engine manufacturers world-wide, including many in the aerospace industry such as Rolls-Royce and Pratt & Whitney.

Centrax’ Knowledge Transfer Partnership with the University of Plymouth has drawn on University expertise in intelligent control systems, product design, production automation, manufacturing systems engineering, system mathematical modelling and simulation, neural networks and materials selection. These successful collaborations have enabled Centrax to:

- Gain a valuable insight into new automation technologies
- Evaluate the benefits of implementing robotics within manufacturing operations
- Improve their turbine design capability
- Automate gas turbine manufacturing systems and turbine blade polishing
- Increase understanding of system mathematical modeling and its commercial application

Centrax consider that future increases in production automation will result in considerable benefits to the company including:

- Greater manufacturing flexibility and production capability
- Improvements in product quality and more competitively priced products
- Further improvements in operating costs
- Greater market share with a real competitive edge
- Increased profitability
- Improved employee skills levels

“Working with experts at the University of Plymouth has been highly beneficial to Centrax and given us a greater insight into the whole automation scenario. We are still evaluating the specific benefits that this work has brought to our company, but anticipate considerable increases in profitability resulting from a more flexible approach to manufacturing. Reduced costs will allow us to compete more effectively against the growing competition from low-cost economies” – Simon Harris, Production Engineering Team Leader, Centrax

For further information on Knowledge Transfer Partnerships and other University services contact:

Research and Innovation, University of Plymouth, Drake Circus, Plymouth, Devon PL4 8AA, UK

Business Enquiry Service t +44(0) 800 052 5600 f +44(0) 1752 233505

Businessservices@plymouth.ac.uk www.plymouth.ac.uk/businessservices