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ROLLS-ROYCE VISION FOR THE FUTURE

With a century of innovation behind it, Rolls-Royce is now focusing on the technology it needs for the future – with a technology acquisition programme which will target the engineering challenges the company faces for the next 20 years.

Technologies for products in its main markets – civil and defence aerospace, marine and energy – are being developed and will be applied in 5, 10 and 20-year timescales in the Vision programme.

Vision5 technologies are those that exist ‘off-the-shelf’ to use in new and existing products, while Vision10 encompasses a variety of technologies currently in the validation stage. With emphasis on affordability, the technologies are likely to be commercially available for application in around ten years time.

Vision20 programmes embrace a broad range of emerging, or as yet unproven, technologies that are aimed at products in the 20-year timeframe and beyond.

To deliver these programmes the company has an extensive research base and undertakes collaborative programmes with external industry and academic institutions through our international network of Rolls-Royce University Technology Centres (UTCs) of which there are currently 20 in the UK and four overseas.

The integrated Vision strategies are targeting many innovative advances, including developments in fuel cells; ‘more-electric’ propulsion and power systems; alternative fuels and intelligent monitoring systems capable of real time ‘diagnostics’ for the condition of engines.

In civil aerospace, targets set by the Advisory Council on Aeronautic Research in Europe (ACARE) include halving perceived aircraft noise levels and reducing the emissions of carbon dioxide by 50 per cent, and oxides of nitrogen – thought to contribute to global warming – by 80 per cent. Aircraft and engine technologies aim to jointly meet these goals and many of the Rolls-Royce Vision20 targets are in line with the global industry’s goals.

The marine industry has the potential to halve carbon dioxide and eliminate NOx emissions altogether by 2025, while the energy business is looking at water injection to further reduce emissions as well as lower cost and improve power output.

Dr Mike Howse, Director of Engineering and Technology, says: "Rolls-Royce is looking to maximise the benefits of these medium and long-term Vision programmes by developing key technologies that can be applied to more than one product and more than one market."

The hollow, lightweight wide-chord fan blade, for example, was developed by Rolls-Royce for civil engine products – allowing potentially large and heavy fan blades to become much lighter, more efficient and tolerant to impact damage.

Since pioneering this technology, Rolls-Royce has taken it through several stages of improvement and has extended its use into other products such as the fans employed in the propulsion system for the Joint Strike Fighter (JSF).

The JSF is the cornerstone of the USA's future combat aircraft requirement and its unique Rolls-Royce LiftSystem® technology maintains the company at the forefront of Short Take-Off Vertical Landing propulsion pioneered with the Harrier jump jet.

In this way, the benefits provided by a world-leading technical advance have been multiplied. It is not only the hardware itself that benefits from sharing technology: design tools, materials and manufacturing technology and production processes can all be applied more widely than the specific purpose for which they were developed.

The use of electric systems – to replace bulky and inefficient mechanical systems – is another area set to grow in all of the prime markets for Rolls-Royce. 'More-electric' systems offer benefits not just for propulsion efficiency but also in linking and distributing power for all sub-systems employed in aircraft and marine vessels. Such systems will be required where space is at a premium, and for applications such as unmanned aerial vehicles.

On land, distributed power systems are also predicted to grow to reduce transmission losses and bring electricity closer to customers. Such systems will allow the use of local renewable energy sources integrated with fossil fuel generation to manage capacity and frequency stability.

The company is also looking at fuel cells that make electrical energy from a chemical reaction and at advanced cycle gas turbines with improved efficiency rates.

In the defence sector, 'high-Mach' propulsion is viewed as a vital property of future systems and Rolls-Royce is undertaking a joint study in this area with the Purdue University UTC in the US.

Collaboration has become a growing facet of aerospace developments in recent years and current collaborative efforts that fall into the Vision10 programme include the ANTLE (Advanced Near-Term Low Emissions) demonstrator. This is a European programme led by Rolls-Royce that will seek to validate a range of technologies aimed at reducing emissions available commercially from around 2008. Noise reduction engineering programmes are also well underway with collaborations between Rolls-Royce and other European companies.

New techniques and technology are also being developed for the provision of aftermarket support for customers. Data and knowledge management have enabled us to develop predictive maintenance tools and are at the heart of aftermarket services. Data Systems and Solutions, a joint venture between Rolls-Royce and Science Applications International Corporation was established in 1999 to develop tools, processes and services.

The joint venture has developed the software for Service Data Manager, which captures civil aero engine data in real time, and for aeromanager.com, which is our web portal with 268 airlines and overhaul shops, monitoring 3,000 engines. As with product development, advances within the civil aero engine aftermarket are applicable to other sectors, enabling Rolls-Royce to share best practice across the group.

Rolls-Royce will stay at the forefront of new technology development so that it remains a force in the competitive markets in which it operates. The company's philosophy of inventing once and using many times in its four businesses will remain at the core of its strategy to leverage its superior technology in four global markets.

Note to editors

Rolls-Royce Group plc operates in four global markets - civil aerospace, defence aerospace, marine and energy. It is investing in technology and capability that can be exploited in each of these sectors to create a competitive range of products.

The success of these products is demonstrated by the company's rapid and substantial gains in market share over recent years. The company now has a total of 54,000 gas turbines in service worldwide. The investments in product, capability and infrastructure to gain this market position create high barriers to entry.

Rolls-Royce has a broad customer base comprising more than 500 airlines, 4,000 corporate and utility aircraft and helicopter operators, 160 armed forces and more than 2,000 marine customers, including 50 navies. The company has energy customers in nearly 120 countries. Rolls-Royce employs around 35,000 people, of which 21,000 are in the UK. Forty per cent of its employees are based outside the UK - including 5,000 in the rest of Europe and 8,000 in North America.

The large number of engines in service will generate an assured aftermarket demand for the provision of spare parts and services. The company's strategy is to maximise aftermarket revenues, which have increased by 60 per cent over the past five years due to the development of a comprehensive services capability.

Annual sales total nearly £6 billion, of which 50 per cent currently comes from aftermarket services. The order book stands at more than £18 billion, which, together with aftermarket demand, provides visibility as to future activity levels.

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