



PRESS RELEASE

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Research targets next-generation electric motors for luxury automobiles

Cobham, Jaguar Land Rover and Ricardo will carry out research into the design of economic electric motors that avoid expensive magnet materials

Next-generation electric motors for low carbon emission vehicles are the target of a new collaborative research programme to be led by Cobham Technical Services. The project, 'Rapid Design and Development of a Switched Reluctance Traction Motor', will also involve partners Jaguar Land-Rover and engineering consultancy Ricardo UK, and is co-funded by the Technology Strategy Board.

As part of its work in the project, Cobham will develop multi-physics software and capture the other partners' methodology in order to design, simulate and analyze the performance of high efficiency, lightweight electric traction motors that eliminate the use of expensive magnetic materials. Using these new software tools JLR and Ricardo will design and manufacture a prototype switched reluctance motor that addresses the requirements of luxury hybrid vehicles.

The project is one of 16 collaborative R&D programmes to have won funding from the UK government-backed Technology Strategy Board and the Department for Business, Innovation and Skills (BIS), which have agreed to invest £10 million aimed at achieving significant cuts in CO₂ emissions for vehicle-centric technologies. The total value of this particular motor project is £1.5 million, with half the amount funded by the Technology Strategy Board/BIS, and the rest by the project partners.

According to Kevin Ward, Director of Cobham Technical Services - Vector Fields Software, "Design software for switched reluctance motors is at about the same level as diesel engine design software when it was first introduced. Cobham will develop its existing SRM capabilities to provide the consortium with enhanced tools based on the widely used Opera suite for design, finite element simulation and analysis. In addition to expanding various facets of Opera's electromagnetic capabilities, we will investigate advanced integration with our other multi-physics software, to obtain more accurate evaluation of model related performance parameters such as vibration. Design throughput will also be

PRESS RELEASE

enhanced via more extensive parallelization of code and developing an environment which captures the workflow of the design process.”

Tony Harper, Jaguar Land Rover Head of Research: “It is important to understand the capability of switched reluctance motors in the context of the vehicle as a whole so that we can set component targets that will deliver the overall vehicle experience. Jaguar Land Rover will apply its expertise in designing and producing world class vehicles to this project, with the aim of developing the tools and technology for the next generation of electric motors.”

Dr Andrew Atkins, chief engineer – innovation, at Ricardo UK, said: “The development of technologies enabling the design of electric vehicle motors that avoid the use of expensive and potentially carbon-intensive rare-earth metals, is a major focus for the auto industry. Ricardo is pleased to be involved in this innovative programme and we look forward to working with Cobham and Jaguar Land Rover to develop this important new technology. This will further build upon our growth plans for electric drives capability and capacity.”

The project has a three year timetable, at the end of which improved design tools and processes will be in place to support rapid design, helping to accelerate the uptake of this technology into production. Aside from the need to further reduce CO₂ emissions from hybrid vehicles by moving to more efficient and lower weight electric motors, there is an urgent requirement to eliminate the use of rare earth elements, which are in increasingly short supply and have risen ten-fold in cost in recent years. Virtually all electric traction motors currently used in such applications employ permanent magnets made from materials such as neodymium-iron-boron and samarium-cobalt. Since switched reluctance motors do not use permanent magnets, they are likely to provide the ideal replacement technology. However, one of the main challenges of the project will be to produce a torque-dense motor that is also quiet enough for use in luxury vehicles.

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NOTES TO EDITORS:

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Cobham Technical Services produces the world's most advanced software for modelling and analyzing electromagnetic equipment and effects. Its virtual prototyping tools speed the design process - helping to achieve a user's goal, whether that is lowest cost, optimum performance, ease of manufacture, or the best combination.

Jaguar Land Rover is a business built around two iconic British car brands that designs, engineers and manufactures in the UK. With ambitious plans for growth and investment in product creation topping £1.5 billion a year over the next five years, Jaguar Land Rover is at the centre of the UK automotive industry's drive to deliver technical innovation in all areas of vehicle development including ultra-low carbon mobility. Jaguar Land Rover is a major provider of high-skilled jobs in the UK and is one of the UK's largest exporters by value.

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The Technology Strategy Board is the UK's innovation agency. Its goal is to accelerate economic growth by stimulating and supporting business-led innovation. Sponsored by the Department for Business, Innovation and Skills (BIS), the Technology Strategy Board brings together business, research and the public sector, supporting and accelerating the development of innovative products and services to meet market needs, tackle major societal challenges and help build the future economy. For more information please visit www.innovateuk.org

**This press release was originally issued by Cobham Technical Services on behalf of the project.
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