



Next-generation hub motors aim to improve mobility for US military vehicles

Our plan for change

The development of new intellectual property through both contract-funded research and development and targeted internal funding will provide the potential for new revenue streams.

The US Defense Advanced Research Projects Agency (DARPA) has awarded QinetiQ a contract worth \$2m (with an option for a further \$3m) to develop a new electric hub motor that aims to revolutionise the mobility and performance of military vehicles. This R&D project, part of the Ground X-Vehicle Technologies (GXV-T) program, reflects DARPA's mission to develop breakthrough technologies that could enable fundamental change – radical improvements – in military capability.

Breaking the mould

"We want to stretch the limits of performance and enable a fundamentally new approach to vehicle design, that breaks the cycle of vehicles becoming heavier and less mobile, due to the increasing armour and weaponry required to meet the demands of modern warfare," says Steven Goldsack, Programme manager. Until now, no design team has succeeded in packing such a



leading-edge capability into a standard wheel size: "The goal is to achieve a high-power unit at an acceptable weight and cost, making it viable for in-service deployment." QinetiQ was the only non-US partner selected in an open tender; our novel approach builds on highly integrated motor and gearbox technologies pioneered in previous research.

Striking a unique balance

This new approach is specifically designed to deliver unparalleled performance and durability for a unit of this size and mass. "The hub is the key to unlocking vehicle system benefits," explains Steven Goldsack. "DARPA has given us a huge amount of freedom to innovate, drawing on our deep technical expertise in electromechanical transmissions and the design of high-mobility vehicles." The QinetiQ team, he says, is striking a remarkable balance between mechanical and electrical engineering, creating designs that "combine a high-performance motor with an integral multi-speed gearbox and friction brake. We are meeting the customer brief and more, through an entirely new approach" – an approach that could provide major benefits for future armoured fighting vehicles. "The hub drive also offers huge potential for significantly improved suspension travel and better protecting vehicles and personnel by removing conventional drive systems."

