



Accelerating product design and development at Jaguar Land Rover

Collaborative expertise and access to supercomputing facilities enabled the Virtual Engineering Centre (VEC) to create new virtual engineering processes for Jaguar Land Rover, accelerating vehicle product design.

The VEC team developed Computer Aided Engineering (CAE) process templates and optimisation methods to support future designs for Jaguar Land Rover, which has reduced the time taken for these processes from several weeks to a timescale of several days.

THE CHALLENGE

World-class automotive company Jaguar Land Rover's approach was to seek opportunities in technological developments and expertise to continually improve their development process and product performance.

The VEC combined their expertise with the team at Jaguar Land Rover to develop scientific workflows which optimised Jaguar Land Rover's modelling and simulation processes, incorporating multiple disciplines and regression methods.

THE SOLUTION

The VEC developed an integrated CAE process for maximising vehicle performance in pedestrian safety according to the EuroNCAP standards subject to structural stiffness constraints connected to high-performance computing resources.

Hundreds of design variants were created, invoking powerful modelling tools through automation procedures, allowing the extensive exploration of the design space and vehicle's performance.

Regression techniques were used in optimisation workflows, leading to an optimal design. A key enabler was the seamless access to the UK's largest supercomputing facilities provided by the VEC's partnership with the Hartree Centre, Science and Technology Facilities Council (STFC), based at the Daresbury Laboratory.

THE BENEFITS

Virtual engineering allows organisations to investigate the performance of products in the early stages of their design process, minimising the use of physical prototypes, resulting in considerable reductions in time-to-market and manufacturing costs. The VEC provided fast interpretation and manipulation of thousands of results, as well as improved designs, using accurate numerical methods. Elements of the developed workflows have already been adopted by Jaguar Land Rover into their modelling process and they have been able to achieve a tenfold increase of the investigated complex scenarios.