



## Press Information

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# Institute for Automotive & Manufacturing Advanced Practice (AMAP) invests in the latest Drive Simulator and VR software for Low Carbon Vehicle Research

**AMAP**, the specialist research and consultancy arm of the **University of Sunderland** in the UK has announced the ordering of a state of the art Drive Simulator system from leading 3D virtual reality visualisation specialists Forum8.

AMAP is part of the Faculty of Applied Sciences within the University of Sunderland and evolved from two previous University groups across the automotive and manufacturing sectors.

Their expertise covers a broad range of industrial applications with particular strengths in the automotive sector. AMAP stress that they are able to provide a range of valuable services to manufacturers whilst also combining expertise as a leading group in niche international research.

The purchase of the Forum8 Drive Simulator was achieved through AMAP's partnership with local regional funding organisation One North East.

The AMAP General Manager Adrian Morris explained; "There is already a vast range of Low Carbon Vehicles (LCVs) available in prototype and commercial forms. They include many different technological solutions – mild hybrid, full hybrid, petrol-electric, diesel-electric, plug-in electric, range-extender electric etc. Also, they include most vehicle applications – commuter cars, passenger cars, vans, light trucks, buses, and small utility vehicles.

"The key performance incentives behind these vehicles are reduced energy usage and reduced carbon-based emissions. And the main method used to assess vehicle performance and compare it with current IC engine based vehicles is to 'drive' the vehicle over one of the globally agreed driving cycles. In fact, these tests actually take place under controlled laboratory conditions on a rolling road dynamometer.

"Although such tests inevitably arouse considerable controversy, they are nevertheless accepted by the industry as a fair, controlled method of comparison. Nevertheless, the results bear little resemblance to real world practical driving.

"Therefore this research project has the overall aim of comparing the real world performance of LCVs using a state of the art driving simulator from Forum8. What we aim to do is:

1. Develop mathematical models of different LCVs
2. Integrate these models into the Forum8 driving simulator software **UC-win/Road**
3. Conduct simulator-based studies using typical driver groups to compare the performance of competing vehicles in terms of economy and emissions
4. Develop a unique simulator-based test bed for the LCV industry to conduct laboratory testing on prototype LCV designs

"The research challenge is to include sufficient detail of the components – engines, motors, batteries, power electronics, gearboxes etc – to capture realistic predictions of the overall energy usage characteristics, but without excessive mathematical complexity.

“The outputs from these models which will run in real time will then be integrated with the simulator software UC-win/Road. A verification exercise of the modelling approach will be conducted using a well-known vehicle example such as the Toyota Prius, whose performance properties are well understood and accepted.

“Laboratory based experiments using cohorts of typical drivers will then be designed with the aim of comparing different LCV designs with equivalent IC based engine vehicles over the same driving scenarios. The simulator offers a unique facility for doing this under carefully controlled conditions but still using inputs from real drivers – in contrast to the nominal optimal operating points selected for the current standard driving cycle tests.”

### **The Forum8 System**

AMAP ordered the Forum8 iDrive Car Simulator hardware system along with a licence for the company’s interactive 3D visual simulation software UC-win/Road. In addition AMAP ordered the Eco-Drive software plug-in which enables the calculation of fuel consumption and CO<sub>2</sub> emissions, plus the CarSim vehicle dynamics plug-in and under the Forum8 Academic Partner Programme they will receive comprehensive telephone and email support.

### **For more information:**

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