O M N I C A V

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OmniCAV: Simulated road users in new testing framework for connected and autonomous vehicles

A consortium of 11 organisations is embarking on a UK government funded project to create a high-fidelity simulation environment, including artificial intelligence (AI) trained models of road users, to test connected and autonomous vehicles (CAVs).

OmniCAV, which was awarded funding as part of a competition run by the Centre for Connected and Autonomous Vehicles (CCAV) and Innovate UK, will be fed by highly detailed geospatial data, traffic camera data, accident data and near-miss analyses. These inputs will be used to create a high-fidelity model of the physical environment, realistic AI road users, and an extensive open-access scenario library.

The simulator technology will offer market-leading coverage of a diverse range of road networks including rural, peri-urban and urban roads.

OmniCAV will lay the foundations for the development of a comprehensive, robust and secure simulator, aimed at providing a certification tool for CAVs that can be used by regulatory and accreditation bodies, insurers and manufacturers to accelerate the safe development of CAVs.

The project will validate the realism of the simulator by comparing its outputs with data measured for the equivalent locations and scenarios in the real world. This will include tests on proving grounds and open roads.

The project will culminate in a CAV being put through the entire end-to-end OmniCAV testing programme, from simulator-only, to controlled environment, to on-road testing.

Through representation on international standard committees, OmniCAV's results will influence, or lead to the creation of, new international standards to ensure safe deployment and certification of CAVs.

Kirsty Lloyd-Jukes, CEO of project lead Latent Logic, said "OmniCAV's vision is 'CAVs for All': bringing safer, smarter, self-driving mobility to urban and rural areas. But first we need to know that driverless cars really can handle our challenging road conditions, on country lanes as much as crowded city streets. Virtual reality "driving tests" are the only way of doing this, which is why we've brought together these 11 leading organisations to build a world-first, AI-based simulation of real Oxfordshire roads to securely and reliably test autonomous car safety."

The partners in the project are: Latent Logic (lead), Admiral, Aimsun, Arcadis, Arrival, Ordnance Survey, Oxfordshire County Council, UK Atomic Energy Authority, WMG (at the University of Warwick), and XPI Simulation. Thatcham Research is providing advice as a non-funded partner

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Notes for editors

Latent Logic (project lead)

Latent Logic, formally Morpheus Labs, is a spin-out of the award-winning Computer Science department at the University of Oxford. The company uses state-of-the-art computer vision and a machine learning algorithm called Imitation Learning to develop high-fidelity behaviour models for motorists, cyclists, and pedestrians. These "smart actor" models are used to create more accurate and challenging virtual environments for autonomous car testing. In 2018, Latent Logic was selected as one of Nvidia's "top 4 global Autonomous Systems start-ups" due to its innovative A.I. solutions.

Admiral

Admiral is a FTSE 100 insurance company with 25 years history in delivering motor insurance direct to the UK market. Admiral has now grown to today serving over 4 million motor customers. In more recent years, Admiral has expanded its motor insurance operations to include operations in Italy, Spain, France and the US. Admiral was also first pioneer price comparison in the UK with the launch of Confused.com in 2002 and now offer a number of comparison sites across the globe. Admiral's success has been built upon delivering fantastic customer service coupled with a strong underwriting performance.

Aimsun

Aimsun is an international software and services company with a singular focus on algorithms, modelling, and operational know-how for strategic transport planning, traffic engineering and mobility management. Aimsun develops, markets and supports Aimsun Next transport modelling software, which will provide the traffic simulation underpinning the project and developing its interfaces to allow seamless compatibility with XPI and Latent Logic.

Gav Jackman, Aimsun's UK Managing Director, said: "Our success in the CAVSim competition is an important strategic development for us, allowing us to work with partners in new fields that add to our value chain and bring us closer to OEMs and Tier 1 suppliers as well as forward-thinking authorities such as Oxfordshire. Extending the off-road testbed environment of RACE to a realistic twinned environment of simulation and simulators is an incredible value chain to be involved in."

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Arcadis

Arcadis, one of the world's leading providers of Design and Consultancy services, has a strong focus on driving innovation in the design, delivery and operation of built and natural assets, including modelling the impact of CAV and new mobility on city and regional policy. Working with the consortium, Arcadis will be developing and implementing the traffic model at the heart of OmniCAV, designed to enable acceleration of testing the reliability and safety of CAV technology.

Tim Strong, Arcadis' Transport Innovation Director and Arcadis' OmniCAV Project Director said: "We are excited to be part of this compelling project, working in collaboration with a best-in-class team and drawing on our extensive experience in traffic modelling to generate and demonstrate the value of the OmniCAV innovative solution to help realise the societal and economic benefits from CAV adoption."

Arrival

ARRIVAL is a technology company making vehicles the way they should be – smart and electric. We believe that everyone benefits from a world without combustion engine vehicles. We are currently focused on commercial vehicles, with a van, bus and taxi in development, and plans for more. We are working with some of the world's leading businesses and governments, and are currently running a series of trials with companies like the Royal Mail. We also supply the electrical components to the first fully electric and driverless racing series, Roborace, which is our sister company.

Ordnance Survey (OS)

OS is Britain's national mapping agency, providing the geospatial framework relied upon by government, industry and the general public. Its role within OmniCAV is to specify, capture and maintain the high-resolution spatial data required within a robust autonomous vehicle simulation environment. OS will work alongside the other members of the OmniCAV consortium to establish a specification and standard for a geospatial dataset to act as the underpinning reference, or digital twin, for CAV simulation. Based on this specification, OS will capture and process data within the OmniCAV test area, using a variety of terrestrial and airborne sensors. OS will encourage as many other parties as possible to utilise and build on this reference dataset, with the aim of developing a scalable UK exemplar built around the Oxfordshire test area. OS's involvement will also extend into other key work packages to provide geospatial support through the full scope of the project.

Oxfordshire County Council

Oxfordshire County Council (OCC) is the highways, public health and emergency services authority located at the geographical centre of current connected and autonomous vehicle R&D projects. As the first UK authority to include connected and autonomous vehicles (CAVs) in local strategy and development plans, as well as to have a dedicated team, OCC is keen to support the safe growth and deployment of CAVs, and promote an equitable change to smart mobility.

In OmniCAV, OCC will be providing data crucial to construct and evaluate the simulation environment, local knowledge and facilitate the road trials. Moreover, OCC will be leading on the citizen engagement during the project.

UKAEA

UKAEAs centre for Remote Applications for Challenging Environments (RACE) has teamed with Millbrook, the leading independent vehicle test and validation services provider, to offer a unique, controlled test bed representative of an urban environment for the development of connected and autonomous vehicle (CAV) technologies. The road and test track networks of the two sites will operate as a single facility offering all-weather, multi-user access and seamless transfers between environments, cost-effectively addressing all functional requirements, both current and future, of real-world urban scenarios. Development of this facility is being supported by CCAV as part of its investment in a coordinated national platform of CAV testing infrastructure.

WMG

WMG was established by Professor Lord Kumar Bhattacharyya in 1980 in order to reinvigorate UK manufacturing through the application of cutting edge research and effective knowledge transfer. WMG is a world leading research and education group and an academic department of the University of Warwick.

WMG has pioneered an international model for working with industry, commerce and public sectors and holds a unique position between academia and industry. The Group's strength is to provide companies with the opportunity to gain a competitive edge by understanding a company's strategy and working in partnership with them to create, through multidisciplinary research, ground-breaking products, processes and services.

XPI Simulation Ltd.

XPI Simulation, a wholly-owned subsidary of Thales UK, designs and manufactures a range of world-leading, cost-effective simulator systems for driver training and research applications. XPI offers a range of solutions that are fully scalable and flexible according to different budget and performance requirements. XPI's core capability lies in the development of a flexible and modular software architecture that

accommodates the different functions related to driving simulation - including physical hardware interfaces, image generation, database generation, modelling, vehicle dynamics and scenario creation.

For OmniCAV, XPI will be leading the design and development of the core simulation software that will be used to test autonomous vehicles. This activity will draw upon the CAV3 feasibility study, Certification of Autonomous Vehicles in Synthetic Environments (CAVinSE), which XPI is leading.

XPI will draw upon the resources of its parent company in order to deliver a design that ensures a root of trust within the simulator, providing a secure environment for OEMs, regulators and certification bodies alike. XPI will also leverage Thales's experience and expertise in complex, mission-critical domains across defence, aerospace, transport and security.