ITS (UK) Members'

Connected and Autonomous Vehicles

Capability 2015

Organisation name: Transport Research Laboratory

Website: www.trl.co.uk

Contact name and email address: Nick Reed nreed@trl.co.uk

Capabilities offered:

Many automated vehicle presentations begin with a Black & White photo of TRL automated vehicles from the 1950s-1970s. Since then TRL has undertaken development projects, feasibility studies, trials and evaluation of many types of automated road vehicles for governments and private clients.

Their capabilities include:

- High fidelity driving simulator (DigiCar) and portable simulator (MiniDigiSim) ï to evaluate driver behaviour, new vehicle control systems and human interface concepts. DigiCar now has full automation capability.
- Traffic modelling ï development and adaptation of software to include automated vehicles to provide evidence and support decision making around traffic management.
- Test track/on-road studies ï safe and effective use of test track facilities and careful design of on-road studies for live testing of new vehicle capabilities.
- Automated vehicles ï experience in testing a range of issues related to vehicle automation including system performance and driver acceptance/behaviour.

As well as vehicle automation, TRL is active in V2X cooperative systems development, which may be crucial in realising the potential of automated vehicles. This is one of the areas in which TRL provides advice to the European Commission, the DfT, Highways England, other National Governments and private organisations. Such clients rely on TRL to provide independent evidence-based research including product evaluation, cost-benefit studies, impact analysis and business case development.

Key projects in the vehicle automation area include:

- Sentience (UK Government) ï practical evaluation of vehicle automation (powertrain and climate control) to minimise energy based on topological maps using on-road, test-track and driving simulator techniques
- ADAPTATION (EC funded Marie-Curie Initial Training Network) ï Simulator research into behaviour of ñon-equippedò drivers when driving in mixed traffic including vehicle platoons
- Heavy Vehicle platooning feasibility study (DfT) ï Working with Ricardo to explore the feasibility of heavy truck platoons on UK inter-urban roads
- Value chain disruption by robotics and autonomous systems in road and rail (Robotics and Autonomous Systems Special Interest Group) ï review of how and where automation will affect road and rail businesses

- Automation community of interest (RSSB/TRL) ï joint programme to review the development of automation applications in the rail domain
- VRA (EC Support Action) - partner in the Vehicle and Road Automation project
- GATEway ï Leader of the £8m InnovateUK automation project in Greenwich (www.gateway-project.org.uk @GATEway_TRL)
- iMobility Automation in Road Transport Working Group ï active member focusing on human factors issues
- DAVI ï TRL are Charter Partners of the Dutch Automated Vehicle Initiative

TRL disseminates its work in the scientific literature and through conferences, websites and social media.


Organisation name: TRW Conekt

Website: www.conekt.co.uk

Contact name and email address: Peter Frere, peter.frere@trw.com

Capabilities offered:

TRW Conekt provides a wide range of high-value engineering services to TRW Automotive and other world-leading companies who are undertaking intelligent-vehicle development projects. Conektôs experience in this area has been established through working on collaborative and customer-funded projects in both commercial and military domains.

Conektôs engineering capabilities include:

- Automotive systems engineering
- Control engineering
- Data fusion
- Embedded electronic systems
- Image processing
- Safety analysis and management
- Systems engineering
- Radar and vision-based perception technologies
- Vehicle systems integration and test
- Product validation testing for EMC, climatic and vibration specification compliance

By applying its knowledge in these areas, Conekt can support organisations that are seeking to develop advanced control systems for connected and autonomous vehicles.

Conekt also provides low volume vehicle manufacturers and prototype vehicle developers with access to TRW's range of sensor, steering and braking products with supporting applications engineering.

Organisation name: TSS – Transport Simulation Systems

Website: www.aimsun.com

Contact name and email address: Jordi Casas, casas@aimsun.com

Capabilities offered:

TSS-Transport Simulation Systems Ltd develops, market and supports Aimsun transport modelling software. The company introduced traffic microsimulation on standard computers in the late 1980s and went on to develop Aimsun. TSS's latest release, Aimsun 8, stands out for the exceptionally high speed of its simulations and for integrating travel demand modelling, hybrid microscopic-mesoscopic traffic simulation and dynamic traffic assignment - all within a single software application. TSS also develops and markets Aimsun Online, the real-time decision support system for traffic management. Its dynamic, high-speed simulation of large areas allows traffic operators to accurately forecast the future network flow patterns that will result from a particular traffic management or information provision strategy.

TSS is currently working with a number of users on the development and application of Aimsun to the assessment of autonomous and connected vehicles. The Aimsun API Extension and MicroSDK package allows users to replace default behaviours and settings with bespoke control algorithms to run connected vehicle communications either V2V or V2I. Additionally Python scripting means you can automate repetitive tasks and obtain specific outputs such as indicators of traffic performance (capacity maximization), safety (collision reductions), economic efficiency (fuel consumption) and environmental impact (emission reductions), among others.

TSS provides a mature tool in terms of evaluating connected vehicle technologies, response plan evaluation and, in Aimsun Online, a Decision Support System in a TMC for providing simulation-based prediction.

Additional outcomes of Aimsun-based modelling, in its live (or quasi-live) application in the connected vehicle framework might include co-operative centralised route choice calculation and also evaluation (pre-evaluation and testing or real time) of tailored response plans enabled by connected vehicles.

Aimsun's flexibility means these investigations of impacts, such as capacity and emissions, will not just apply to motorway/platooning/road train implementations, but also to far more complex systems that may ultimately be applicable to urban areas.

Organisation name: Arup

Website: www.arup.com

Contact name and email address: Tim Armitage, tim.armitage@arup.com

Capabilities offered:

Using our specialist knowledge of the low carbon transport domain, emerging technologies and urban infrastructure, we have led the way on the management, trialling and implementation of a variety of transport systems.

We have demonstrated the trialling of driverless technologies, effective introduction of ultra-low carbon vehicles and their infrastructure, and high-speed transit systems. We have experience in implementing communication systems, incorporating V2V, V2I and V2X vehicle interaction into trials.

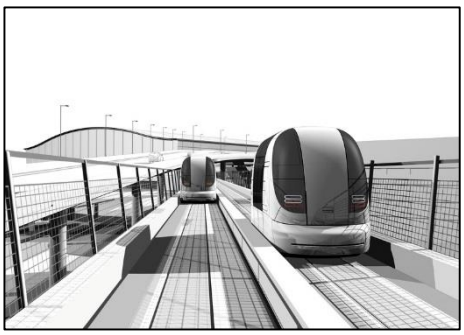
Our transportation and infrastructure experts offer project management as well as commercial and procurement services, integrated into a co-ordinated approach for all scales of mobility system. This, combined with our previous experience with autonomous and connected vehicles, has positioned us to take the lead on a variety of automated vehicle and mobility system projects.

Our project experience in this field includes:

- UK Autodrive - project management of autonomous vehicle trials in Milton Keynes and Coventry including the implementation of vehicle communication systems, incorporating V2V, V2I and V2X interaction as part of the vehicle trials.
- MASP, UK - in partnership with Mitsui we launched an all-electric bus route in Milton Keynes in January 2014.
- CABLED, UK - leading a programme of large scale user trials of electric vehicles.
- Heathrow Personal Rapid Transit system, Terminal 5, UK - designed crashworthy tracks for this world first passenger transport system.
- Plugged-in Places, Milton Keynes, UK - our knowledge was applied to secure funding for an infrastructure of charging posts.
- Translink, Vancouver, Canada - mapping of low carbon vehicle introduction and integration.

© Arup ï Plugged-in places, Milton Keynes

© CABLED - electric vehicles



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