



Future Mobility: Opportunities and Challenges

Professor Paul Jennings

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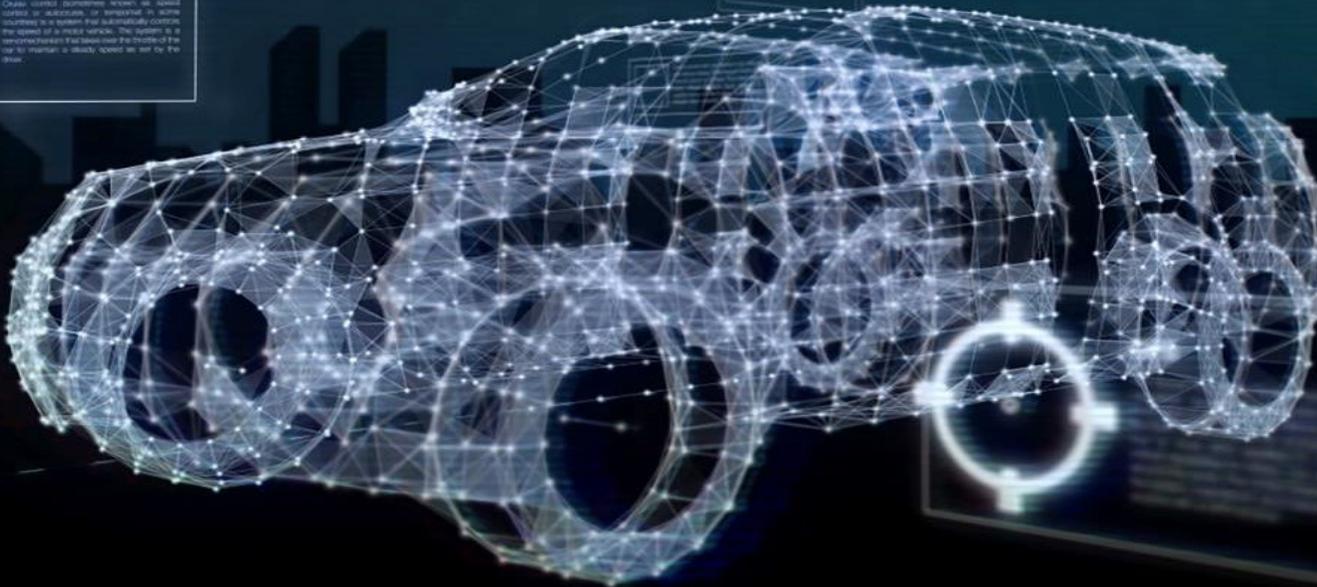
Self-Driving Vehicles: A Good Idea?



CRUISE CONTROL
Cruise control automatically keeps a steady speed on highways or roads with little to no traffic. The system is designed to maintain a steady speed as set by the driver.



START
STOP



BLUETOOTH
Bluetooth is a wireless technology standard for exchanging data over short distances from fixed and mobile devices, and building personal area networks. It is based on the IEEE 802.15.1 specification, which is a subset of the IEEE 802.15.2 specification. Bluetooth is a short-range wireless technology standard that uses radio waves in the ISM band to connect devices. It is widely used in mobile phones, laptops, and other devices for data exchange and network connections.

Importance of 'CAV industry' to UK

- Overall economic and social benefit of connected and autonomous vehicles could be in the region of £62 billion per year for the UK by 2030
- Connected and autonomous vehicles could create an additional 320,000 jobs in the UK by 2030, 25,000 of which would be in automotive manufacturing*



- **Therefore highlighted within both Industrial Strategy and HVM Catapult Strategy**

Challenges



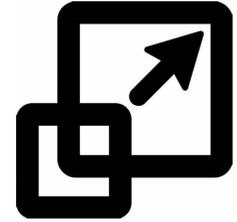
Technical



New Partnerships



New Data Streams



Scale



Perception & Trust



Robust V&V



Skills



Speed to Market

How WMG is supporting industry

- **New Education and Skills Offerings**
 - Masterclasses for Industry
 - MSc programme, with industry projects
 - Centre for Doctoral Training (to Advance the Deployment of Future Mobility Technologies)
 - ...
- **Collaborative Research across TRLs**
 - WMG centre High Value Manufacturing Catapult
 - Innovate UK, EPSRC, H2020 and industry programmes (>£12M external funding at start of 2019)
 - Our Focus:
 - Opportunities from Connectivity (including 5G, Cooperative Autonomy)
 - Addressing Human Factors
 - Achieving Dependability
 - Midlands Future Mobility (part of Zenic Testbed UK)



Accelerating Technology & Service Development

*To make future vehicles, technologies and services **dependable**, **desirable** and **viable**, we need to learn from a continuum of simulation, testing, trials and early deployment*

Public Environments



Controlled Environments



Modelling and Simulation



Approaches should work together across the continuum

- Selection of suitable test cases and scenarios
- Input into relevant standards and new certification processes
- Inputs & validation data for models

Our Vision: To test or evaluate any new technology (infrastructure, communications or on-vehicle) in representative real world conditions with a “driver” in the loop



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MIDLANDS
FUTURE
MOBILITY

Accelerating future
mobility solutions

ZENZIC⁴



REQUIREMENTS

- Access to a comprehensive mix of road environments
- Wireless infrastructure (4G and 5G ready network) open to all operators
 - Contiguous connectivity with high capacity and low latency across all routes
- Smart monitoring of vehicles and roads
- Back office for data collection and analysis (collating multiple data feeds)
- Digital models available for key zones to support simulation
- Regular upgrades over lifetime
- Vehicle/user support infrastructure readily available
- Strong engagement with local public
- Engagement with a broader and supportive CAV eco-system

MIDLANDS FUTURE MOBILITY

www.midlandsfuturemobility.co.uk

ZENZIC⁴

 **WMG**
THE UNIVERSITY OF WARWICK

amey**consulting**

AVL 

COSTAIN

 **highways
england**

TfWM


 **MIRA**
A HORIBA COMPANY

 Wireless
Infrastructure
Group

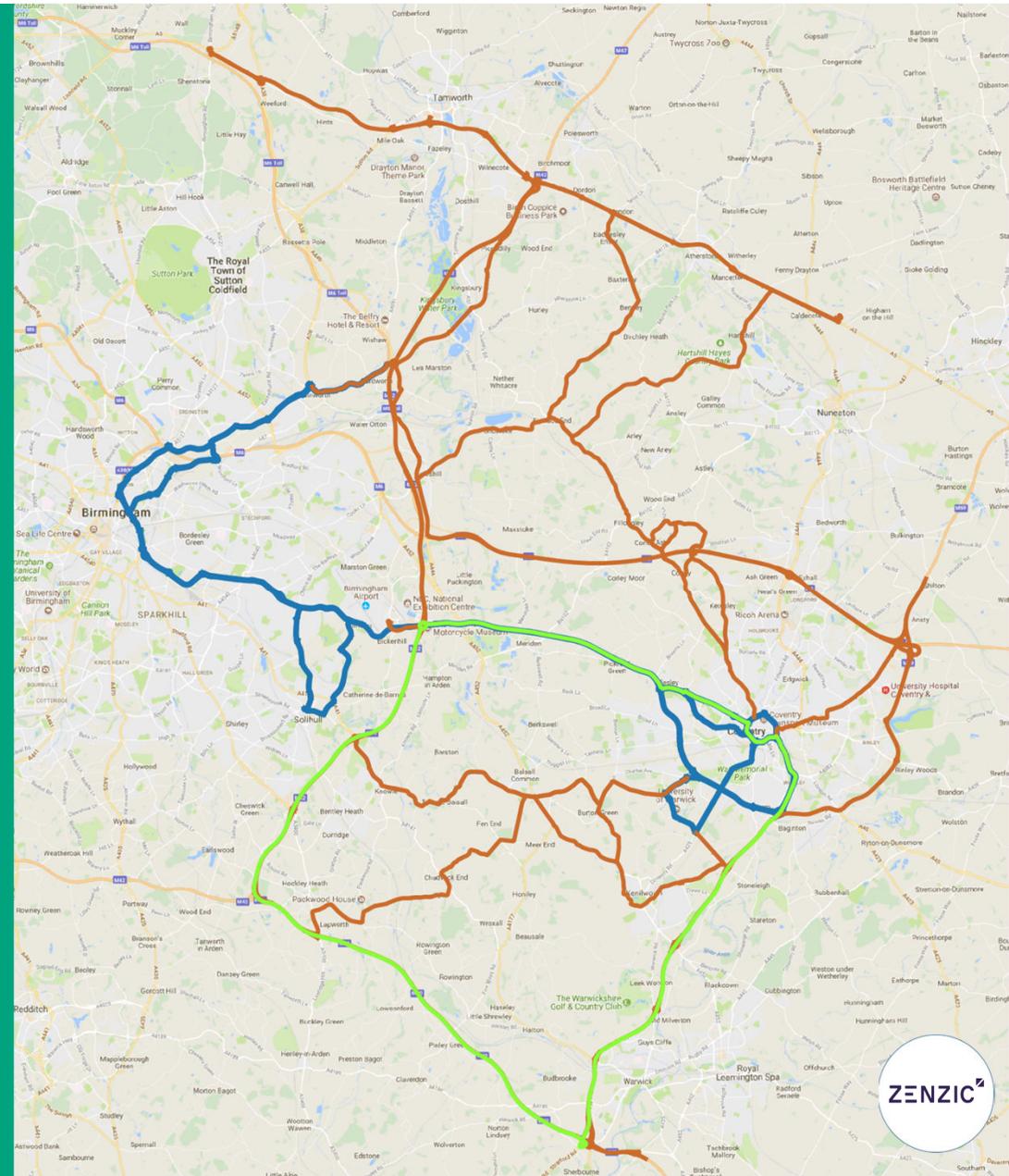
**Coventry
University** 



Midlands Future Mobility: Routes

- Urban Testbed (MFM)
- UK CITE
- Rural & Highway Extension

New routes, split between motorway, A and B/C roads, link key features such as proposed West Midlands rail exchange (M42/M6 Toll), HS2 interchange, JLR sites and HORIBA MIRA

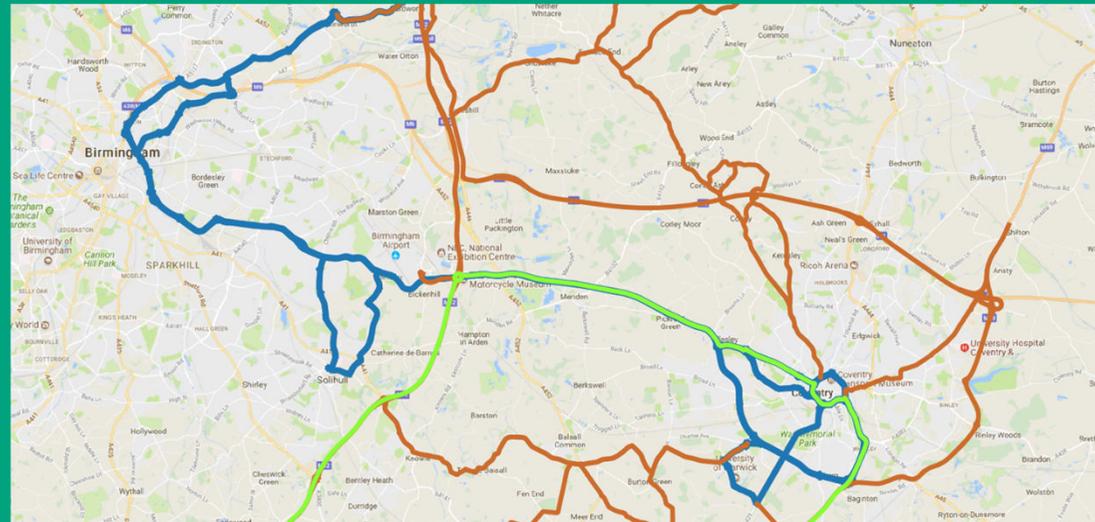




SERVICES

We will deliver added value from any real-world test, trial or early deployment of CAM technologies or services. We will also provide support for the process.

- Physical Environment
- Digital Services
- People and Skills





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e.g.

- Searchable features/zones
- CCTV, configurable infrastructure
- Access to transport and environment data
- Planning and design of 'tests'
- Vehicle support and preparation
- On campus LSAT environment
- Liaison with local authorities and emergency services
- Participant database and trial design
- Control room and collaborative space
- Data hub access
- Trials with latest wireless technology including 5G
- Access to training, skills and education
- At the heart of an emerging mobility eco-system in the West Midlands



Midlands Ecosystem

To support UK companies and attract overseas investment to the UK/Midlands

- Midlands Future Mobility programme
- Broader Zenzic offerings at HORIBA MIRA
- 5G UCC Testbed & other 5G offerings
- Mobility Data Initiatives e.g. ConVEx

- Future Mobility Zones & Transforming Cities Fund
- Electrification Activity (e.g. EIC and BIC)

- Skills and Education Offerings
- WMG centre HVM Catapult



SUMMARY

New vehicles, technologies and services are coming sooner than we might think, bringing societal benefits, and commercial opportunities

But we need to ensure they are dependable in complex real world environments. They must also be desirable and commercially viable.

To achieve this, we will need real world trials/deployment & new methods too.

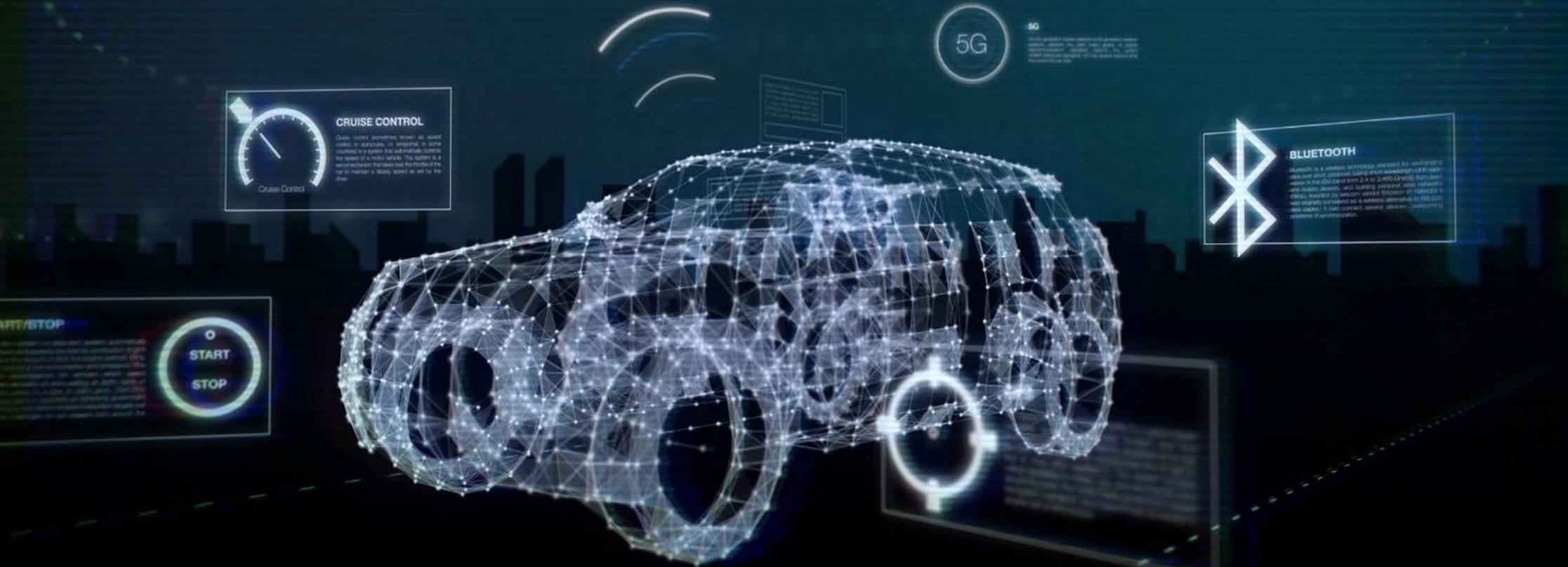
With greater integration of technologies, and the advent of new services, uncertainty will remain.

Collaboration will be essential.

WMG is developing a unique capability and eco-system to accelerate commercialisation.



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