

Introducing Driverless Cars to UK roads' Demonstrator Projects

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July 2016



Outline of presentation

- Overview of the demonstration projects in the UK
- Regulatory issues identified as part of LUTZ project
- Contacts for further information

Project Location



UK AutoDrive

Milton Keynes Transport Systems Catapult in partnership with the motor industry in Coventry.

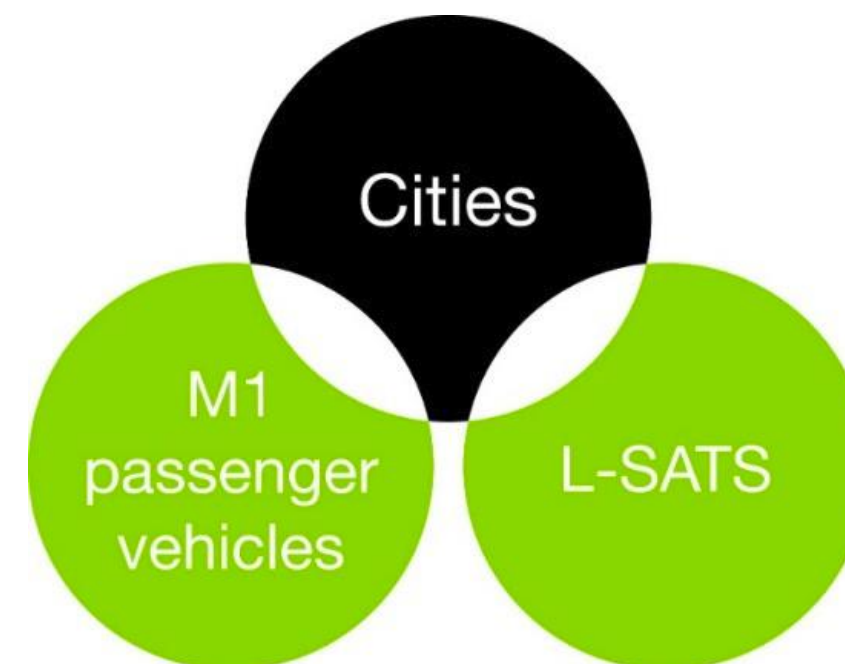
Consortium trials now progressing to more complex scenarios, and trying out various communications technologies, such as 4G and mesh networks.

TSC is planning to test two vehicle configurations: the LUTZ Pathfinder two seater and a 4 to 6 seater.

The Project Objectives

- Validate driverless Technology
- Demonstrate interoperability
- Demonstrate scalability
- Identify new business models
- Position the UK as a leading test bed
- Increase public awareness and Acceptance

The project will focus around these 3 main areas;



UK AutoDrive



- The project will focus on researching and building a deep understanding of the impact of driverless Vehicles on road users and wider society.
- Evaluation of public awareness and acceptance
- Public demonstrations will include interaction between passenger vehicles and L-SATS system

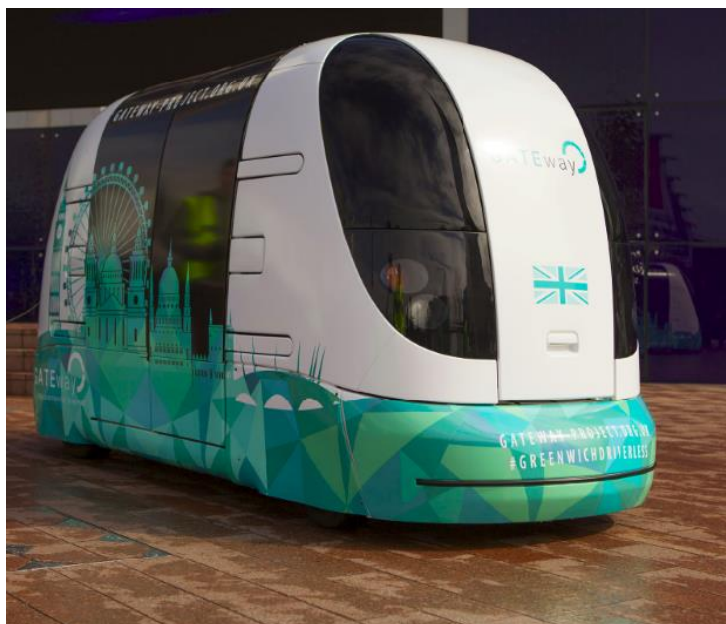


GATEway - Greenwich Automated Transport Environment

Project, now operating around O2 Arena precincts, although not yet in autonomous mode.

[GATEway](#) is taking place in the [UK Smart Mobility Living Lab](#) @ Greenwich and led by [TRL](#).

• Project Overview



Trial #1
Micro Transit



Trial #2
Autonomous
Valet parking



Trial #1
Urban deliveries



- Test and evaluate several use cases for autonomy
- Human factors and technology focus
- Shuttles ready for validation and testing July 2016
- Live trials with participants in August 2016
- £2.3m deployment includes, command and control, visualization, mapping, demand control and monitoring
- software and shuttle development (× 7)

Consortium
TRL

RSA

GOBOTIX LTD

Heathrow

Royal
Academy
of Arts



ROYAL borough of
GREENWICH

Telefonica

O₂



UNIVERSITY
of
GREENWICH

**Imperial College
London**

COMMONPLACE

OXBOTICA

VENTURER

Objectives:

VENTURER is focusing on people's responses
Researchers at the University of West of England will explore the social context to understand barriers.

Bristol-focussed acceptance/ expectations research

- Stakeholder interviews, Online survey and debates
- 'Pod' perception experiments

Interactions studies

- Focus groups
- Passenger and non-user acceptance of AV decisions

Deriving requirements for the acceptance of the technology.



VENTURER

Testing

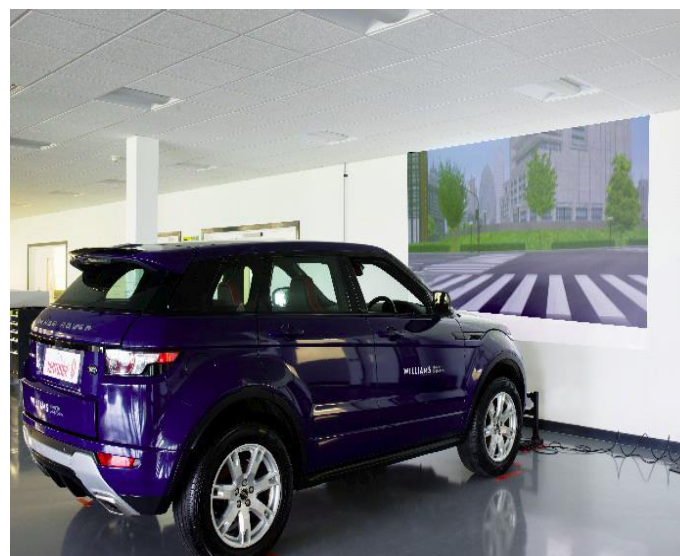
Wildcat and simulator trials:

- Trial 1, Summer 2016 – Planned handover of control
- between a vehicle and a person
- Trial 2, Spring 2017 – more detailed and complex
- scenarios likely to include other road users.
- Trial 3, Winter 2017 – increasingly complex scenarios.



POD & Bus experiments

Ongoing user behaviour testing.



LUTZ Pathfinder Pods

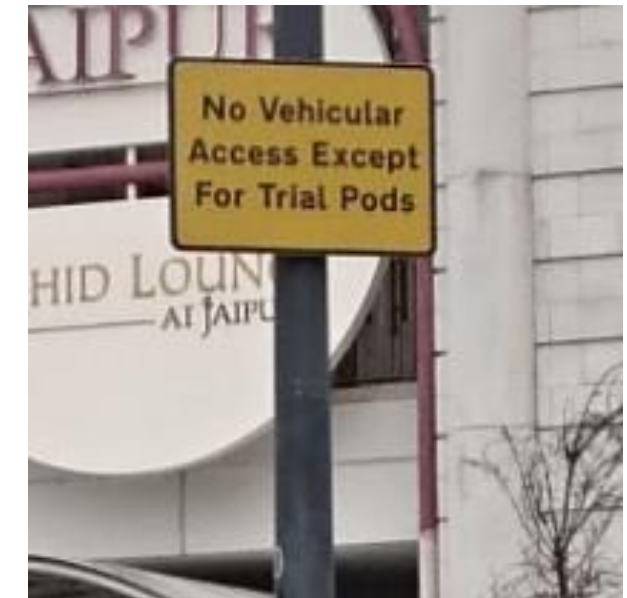
Public shared space testing in the UK



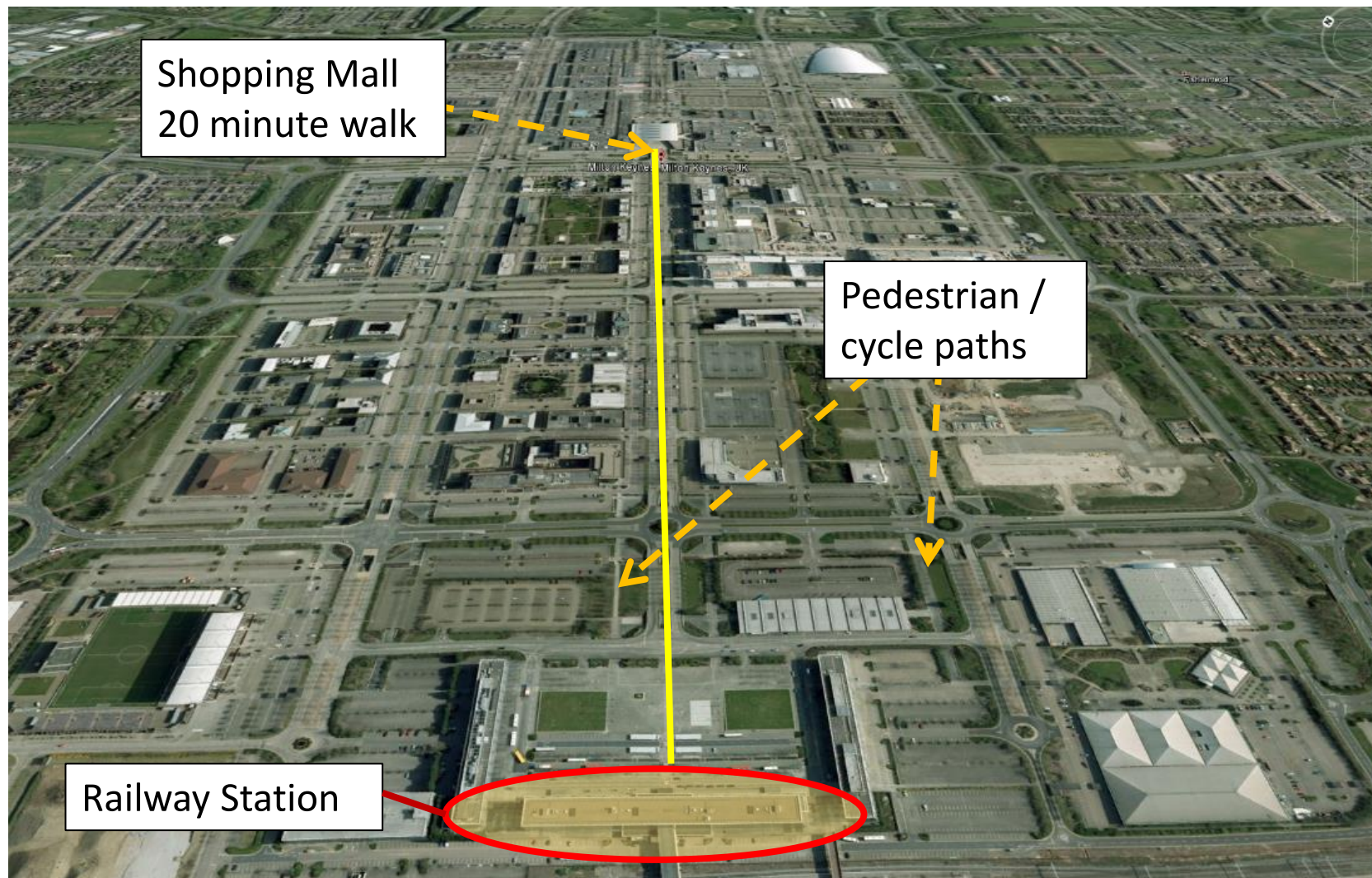
Lessons learnt so far.....

UK: Great place for trials

- UK Department for Transport *Code of Practice* published in 2015
- Motorized vehicles not generally permitted on “footway”
- Experimental Road Traffic Order and bespoke signage required
- Private areas require separate permissions



Pods on pavements



Bollards get in the way

- Bollard removal required for autonomous driving
- Pedestrian crossings not included in route
- Milton Keynes' underpasses therefore an important feature



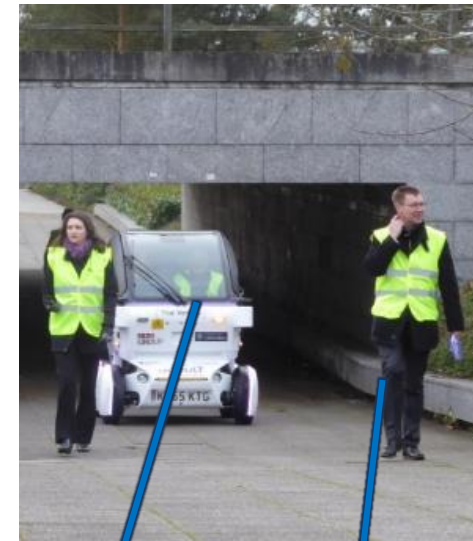
Nobody expects a pod

- Pod characteristics
 - Max speed 24kph (15mph), average ~10kph (6mph)
 - Mass: 525kg
- Environment
 - Small spaces
 - Many vulnerable “road” users, not expecting vehicle
- Pod awareness
 - Sound emitted from vehicle when moving
 - LEDs – potential to communicate intent
 - Horn (if required)
 - Team is in contact with local disability groups
 - Working closely with MK Council – duty of care



Bespoke safety case needed

- Based on ISO 26262 and layers of protection
- Key learning points to date:
 - Steering reliability critical to reducing risk
 - Requirement to record distance travelled and time in both automated and manual mode
 - “Negative” obstacles need particular management
- Always trained Safety Driver able to take control



Automated
Control
System

Safety
Curtain

Base
Pod

Safety
Driver

Marshalls
+ Trials
Manager



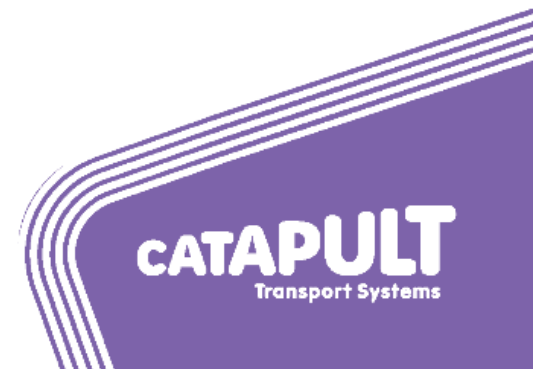
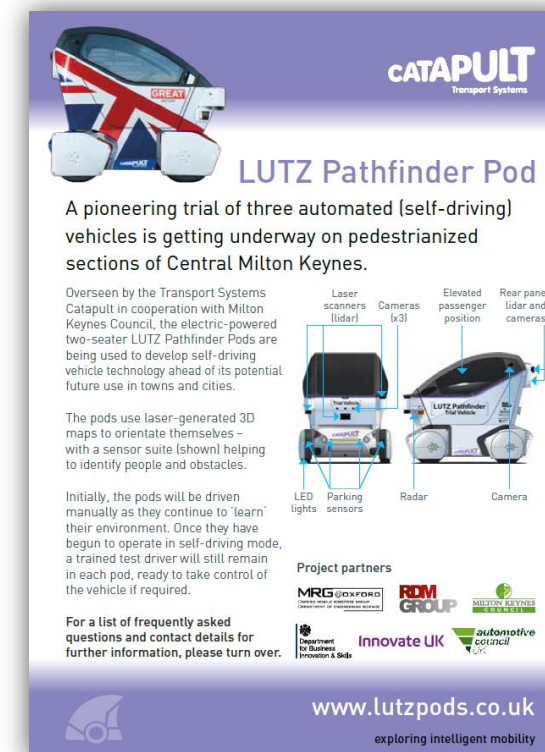
Safe trials are a team effort

- Roles identified for trials
 - Safety Driver, Trials Manager, Marshalls, Communications Manager
 - Log of who is fulfilling each role for each trial
 - Contingency plan lists responsibilities of each role in case of different types of emergency
- Emergency services
 - Informed local police of operations
 - Invited local fire service to view pod and ask questions
 - First responder information sheet circulated
- Recovery company engaged with ability to retrieve pod from underpasses



Local public onboard

- Project has started manual driving with marshalls
 - Generally positive (or no) reaction
 - Hand out leaflets about project to those interested
- Local stakeholder event held
- Representative survey of UK and Milton Keynes residents:
 - 78% of adults in Milton Keynes had heard about the project
 - 23% nationally
 - 61% of adults in Milton Keynes would be interested in using pods
 - 39% nationally



Learnings still to come

- No “rules of the road” in shared spaces
- Wide variety of users
- Foliage and other objects can obstruct path
- Underpasses produce high contrast in lighting conditions





THANK YOU

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Any Questions

Project Contact details

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VENTURER

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The consortium for UK Autodrive

ARUP



CATAPULT
Transport Systems



OXBOTICA
robotics & autonomous systems

RDM
GROUP



THALES



VENTURER Consortium

