6th Annual Electric Vehicle Online Event –
The TASCC- HIDAVe Project
Human Interaction: Designing Autonomy in Vehicles (2015-2020)

TOWARDS AUTONOMY
SMART AND CONNECTED CONTROL

Edinburgh Napier UNIVERSITY

Professor Pat Langdon
Acting Head of TRI

Thursday 8th October 2020 - online

University of Southampton

Jaguar Land Rover

University of Cambridge

HI:DAVe
Human Interaction: Designing Autonomy in Vehicles

Transport Research Institute
Part of Edinburgh Napier University

TASCC

EPSRC Engineering and Physical Sciences Research Council

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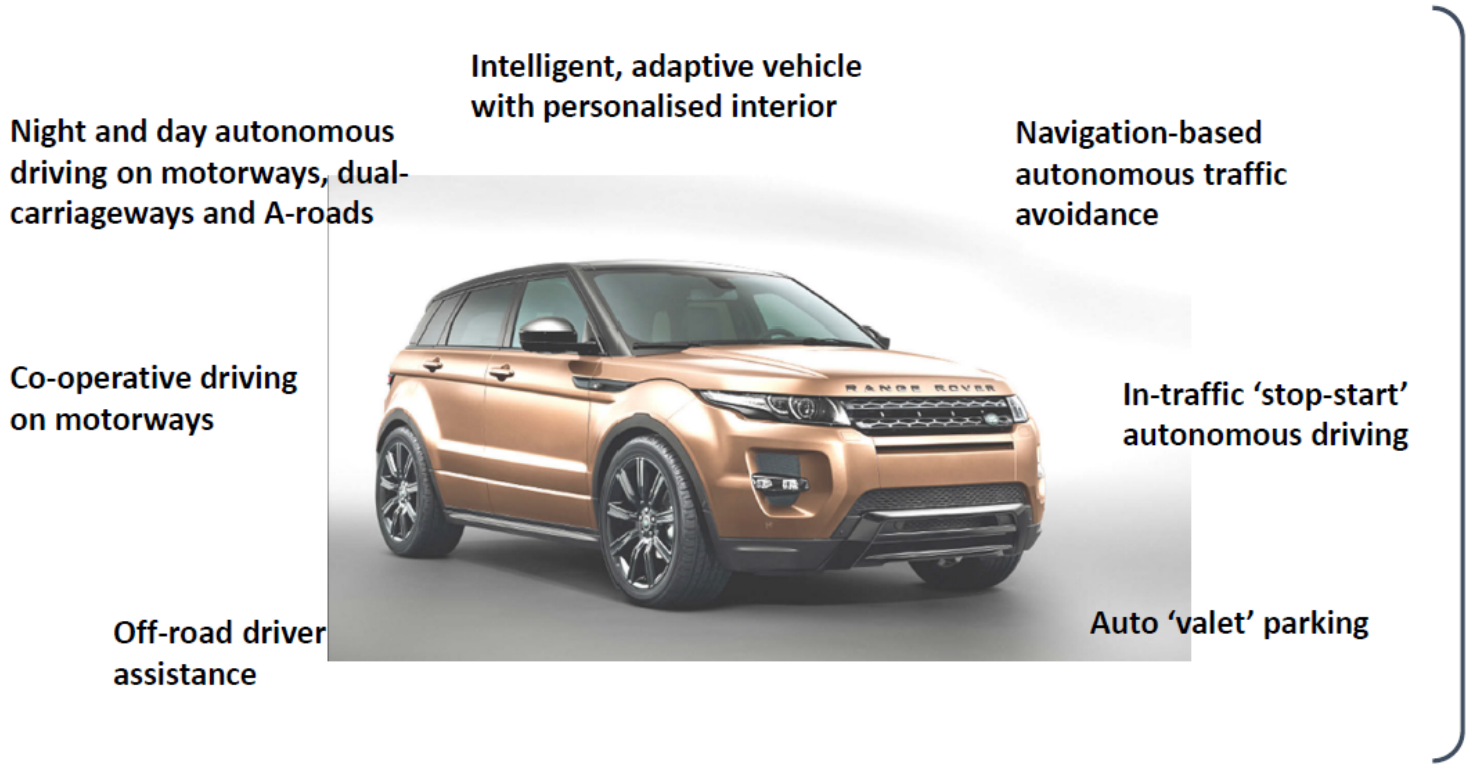
Autonomous Features of a Commercially-Viable Vehicle



EVs are part of integrating domain of Transport (.GOV)

- Safety on road - Decongestion
- Productivity -user
- Inclusion and Disability
- Communication – CAR2CAR and CAR2ROAD - 5G
- Navigation and Traffic management
- Parking and decongestion
- Infrastructure is key part of this
- EV and Autonomy go hand in Hand

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EPSRC Pioneering research and skills

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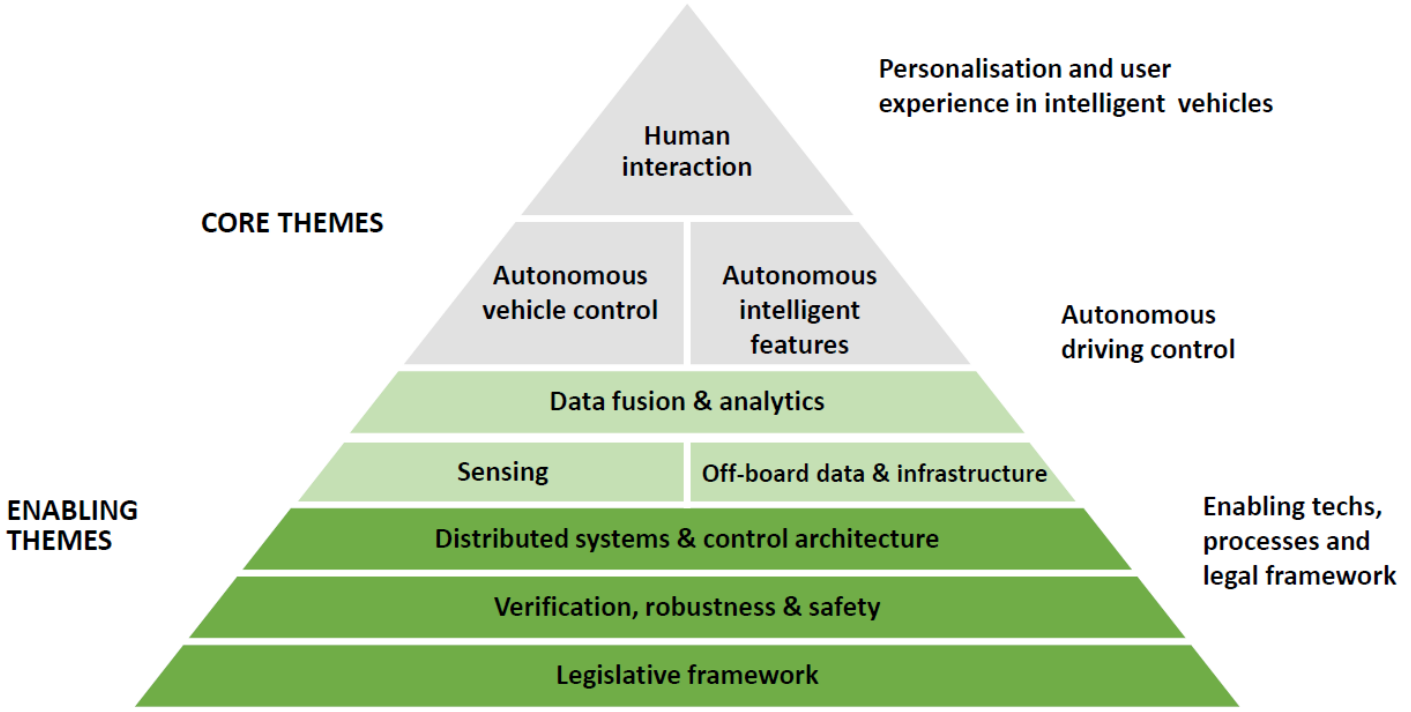
TASCC Theme Coverage



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HIDAVE Team

Human Interaction: Designing Autonomy in Vehicles (HI:DAVe)

HI:DAVe
Human Interaction: Designing Autonomy in Vehicles
JLR #6703

Project Description

- Design intuitive, learnable, friendly, inclusive, multi-modal, adaptive concept **interfaces for interacting** with automated vehicles;
- **Design** the driver-vehicle and vehicle-driver **handover tasks**;
- Predict and validate the **performance of drivers** with automated vehicles;
- **Monitor** the driver and interpreting driver states in a range of scenarios; and
- **Evaluate** the effectiveness of different automation strategies, together with the associated interaction and interfaces with a range of automation use cases.

University of Southampton

University of Cambridge

Project Dates	**01/12/2015 – 30/11/2019**
JLR Prog. Director	Aram Kradjian
JLR Prog. Tech Lead	Dr. Alex Mouzakitis
JLR Tech Lead	Lee Skrypchuk
JLR Tech Support	Simon Thompson
Uni Res Lead	**Prof. Neville Stanton (Southampton)**
Uni Res Lead 2	Dr. Pat Langdon (Cambridge)
Uni Res Lead 3	Prof John Clarkson
Uni Proj. Manager	**Prof. Neville Stanton**
JLR funded PhD's	3 x PhD's
Project Cost:	£1.98m Total

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Project overview

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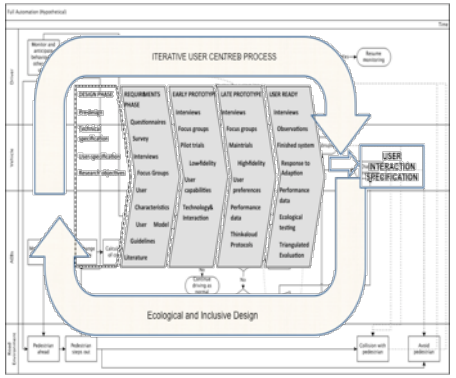
1: Modelling and Design



2: Driving Simulation

3: Test Track Studies

4: On-Road Studies

Year 1 → **Year 2** → **Year 3** → **Year 4**

- How should we interface drivers with automated vehicles?
- What are the benefits of a combined Ecological and Inclusive Design approach?

UCEID method

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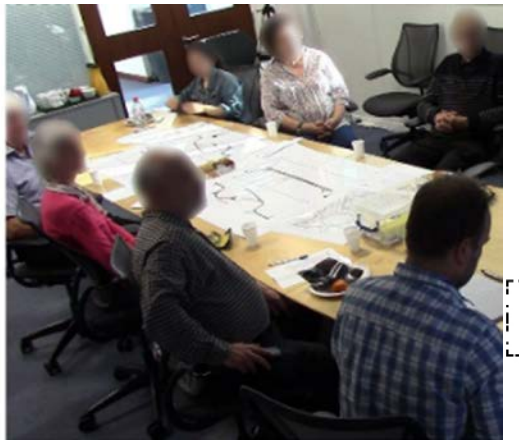
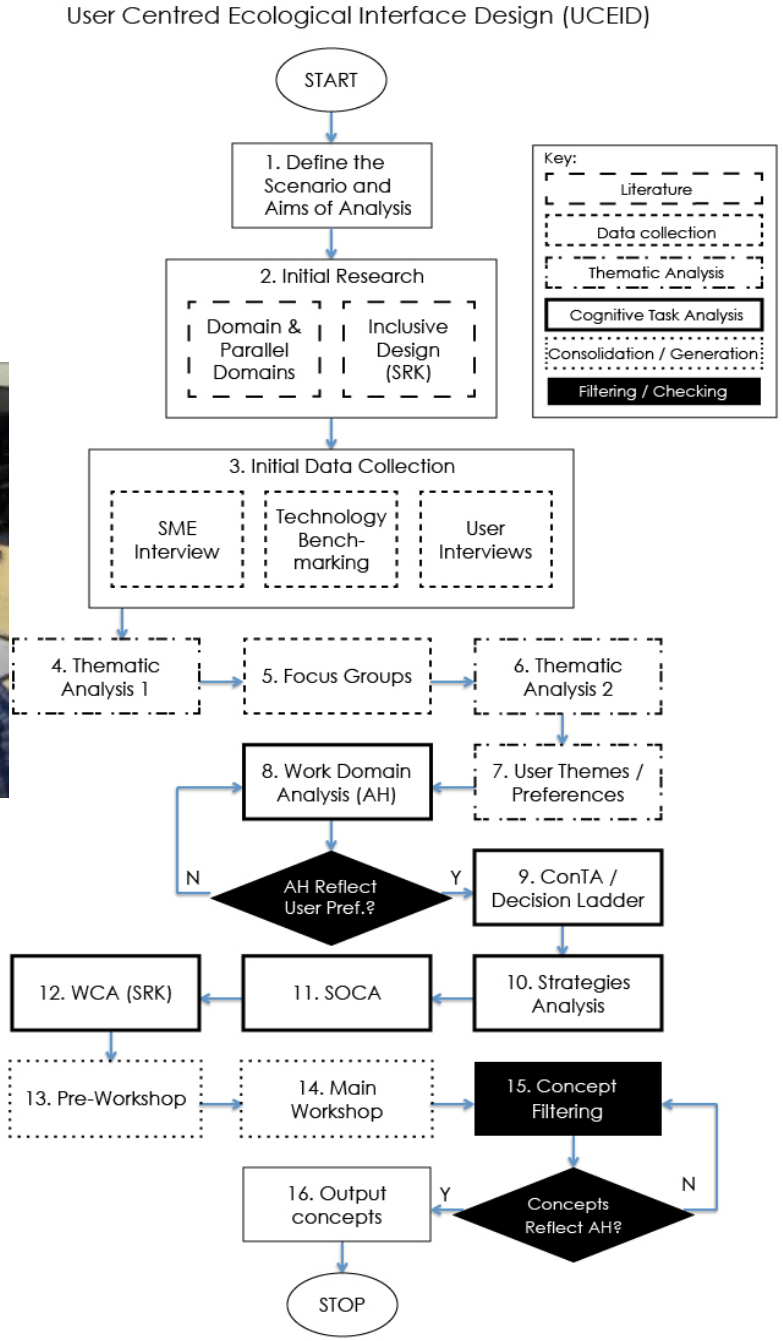
- 1: Define scenario and aims
- 2: Initial research
- 3: Initial data collection
- 4: Thematic analysis 1
- 5: Focus groups
- 6: Thematic analysis 2
- 7: User preferences
- 8-12: Cognitive Work Analysis
- 13-14: Workshops
- 15: Concept filtering
- 16: Output concepts





Concepts

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HIDAVE – MID FIDELITY Experiments

Lab setup

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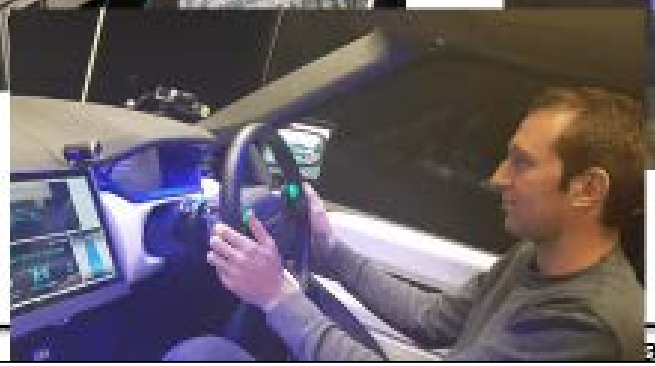

and Rover 2018

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Console, cluster and HUD

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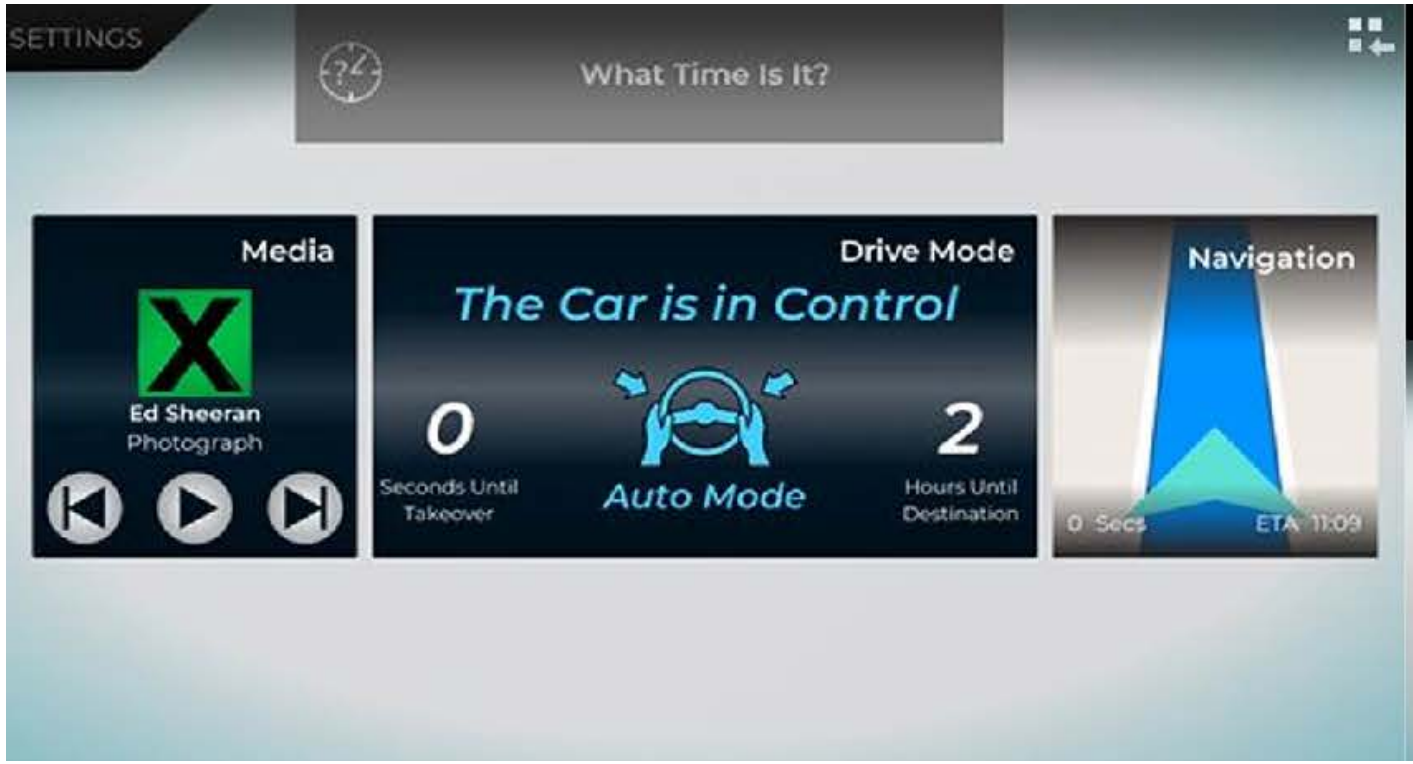

On-road study

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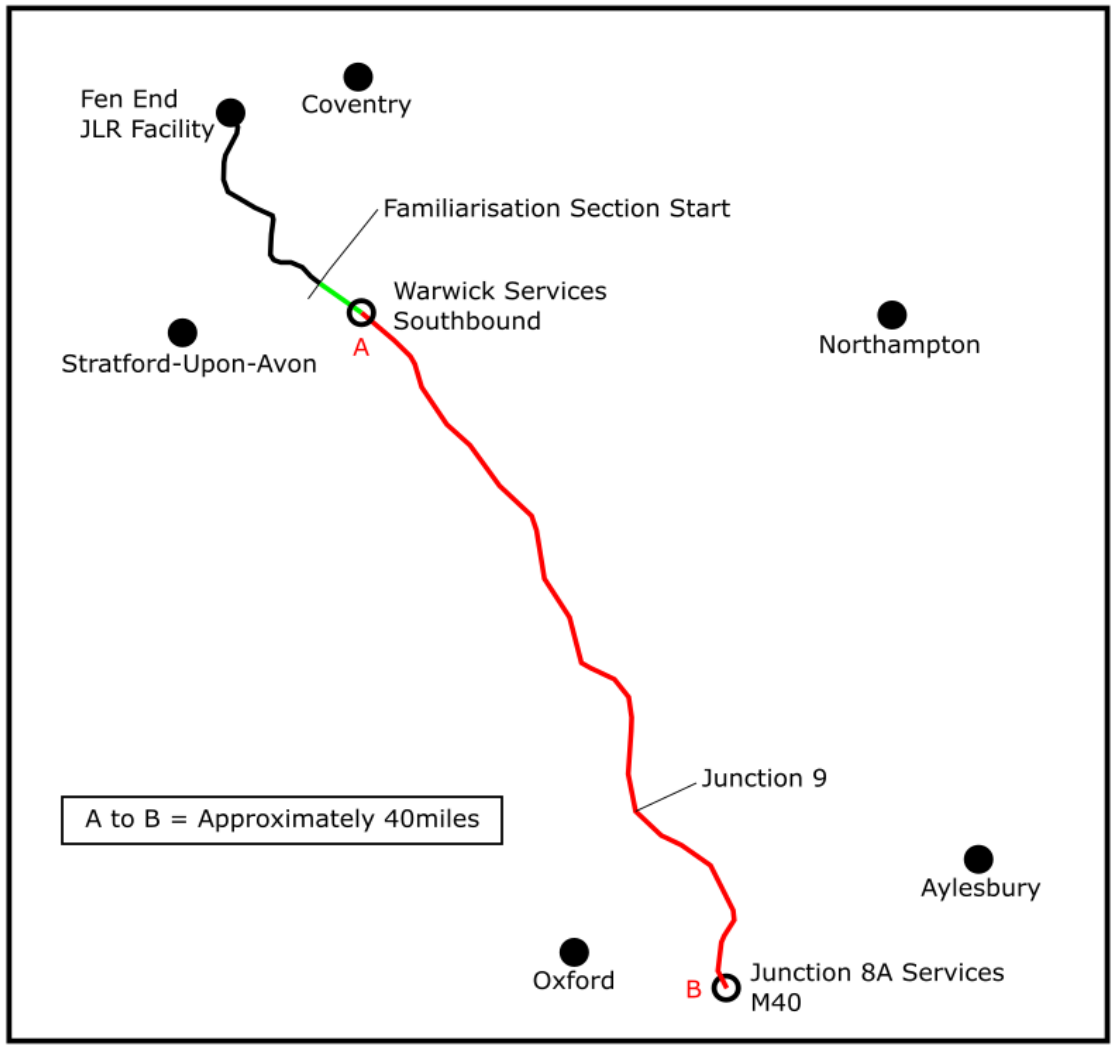

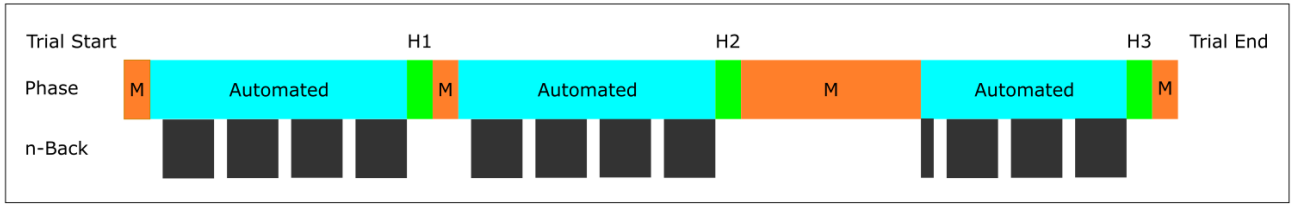

Driver interfaces

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Centre stack display for mode, instructions & updates

Voice prompt from vehicle

Head Up Display can show mode, instructions & updates

Instrument Cluster can show mode, instructions & updates

Interior ambient lighting colour reinforces mode awareness

Automation activation & deactivation buttons

Takeover times

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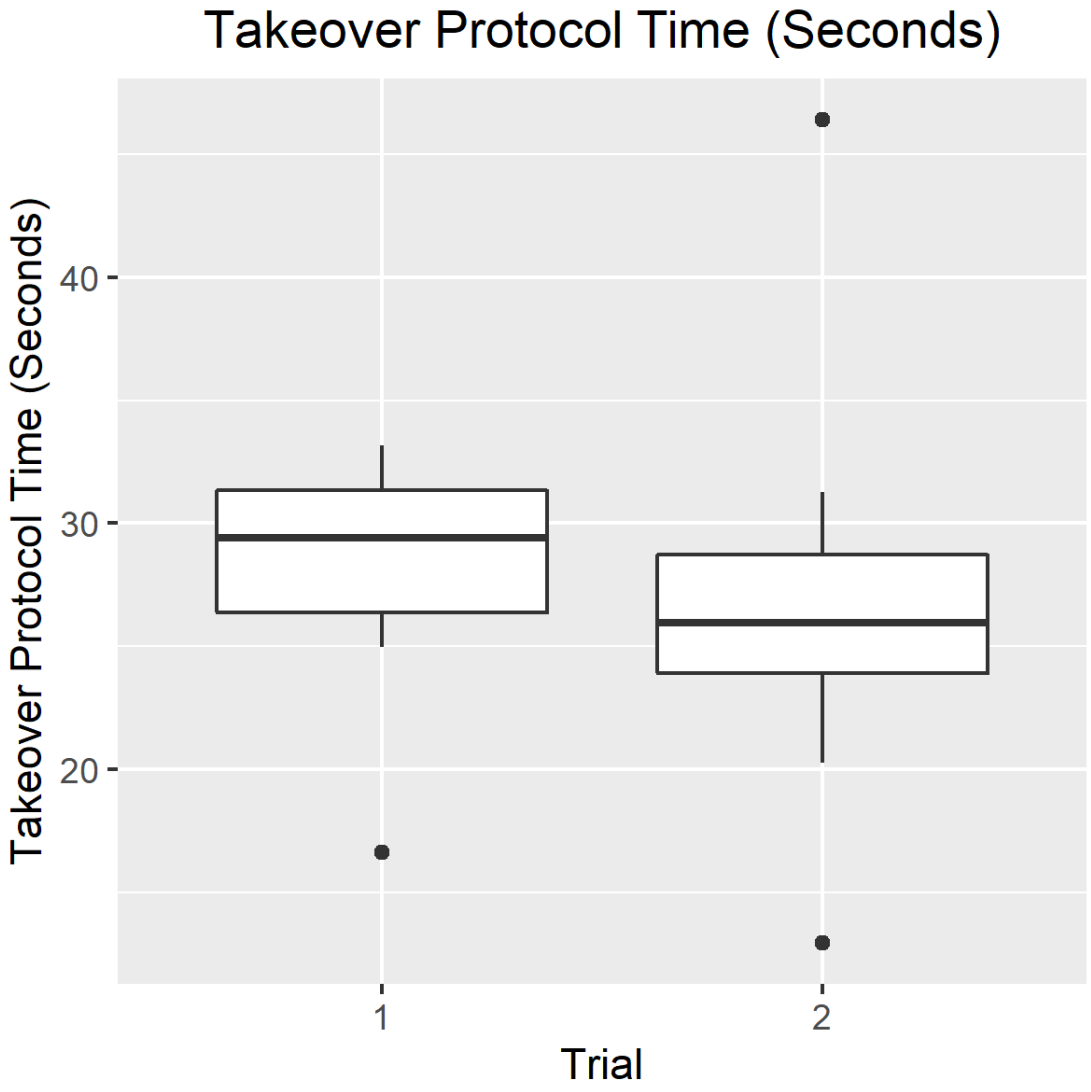

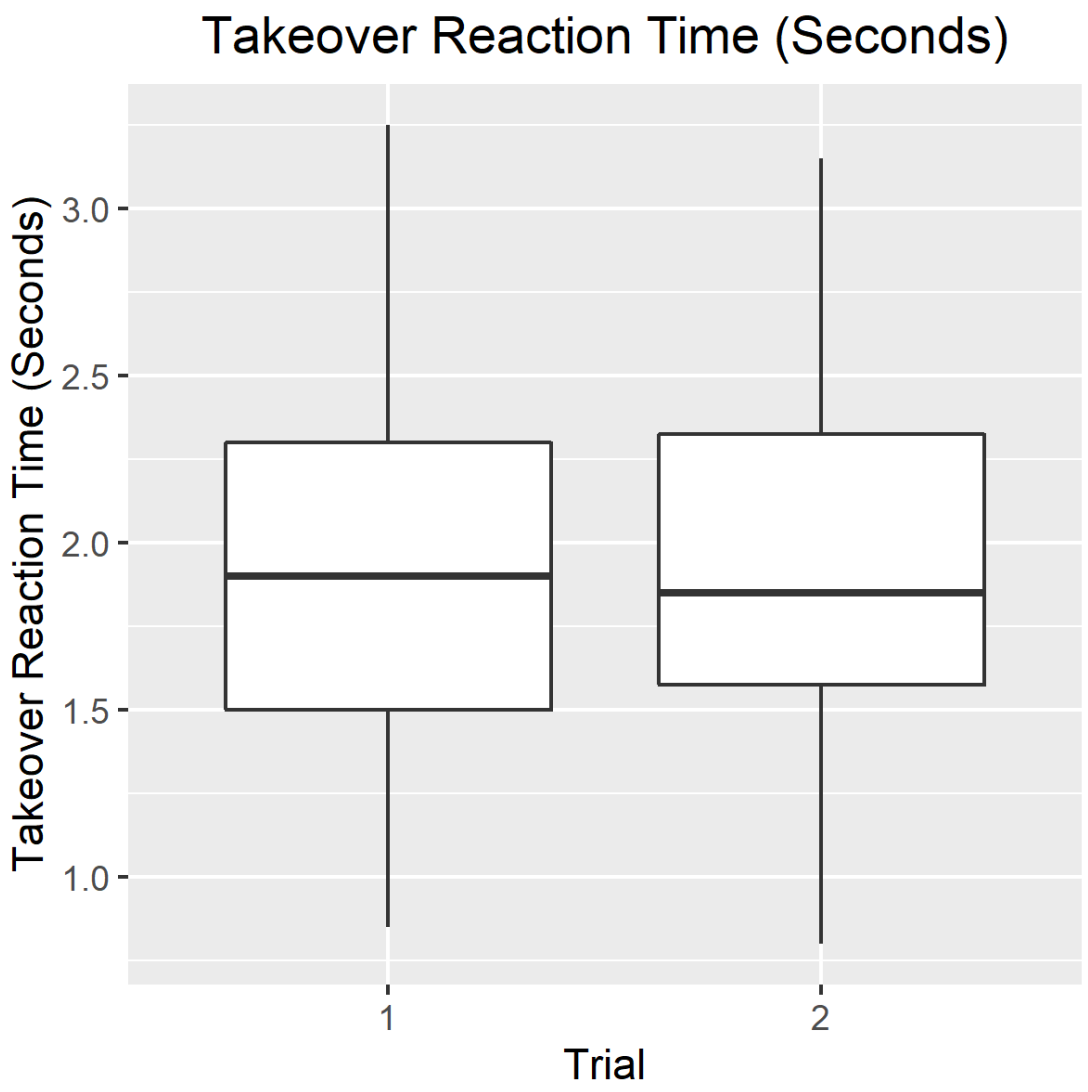

TRI Projects and Book in progress

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- *TRI projects and technology focus*
- *CAVFORTH autonomous buses and Public acceptance*
- *Bids for Decarbonisation related projects with Innovate UK on Public opinion and behaviour change*

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"Designing Interaction and Interfaces for Automated Vehicles: user-centred ecological interface design and testing"

CRC Press
Taylor & Francis Group

- In-depth case studies of interaction between drivers and automated vehicles
- Iterative design process from modelling to simulator to on-road studies

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