



Department
for Transport

The role of technology in transport

Professor Sarah Sharples
May 2022

OFFICIAL

Transport – Evolution and Revolution

1909



Connor, L and Richman, G. 2016. *Evening Standard*. 'A look back at Oxford Street & Oxford Circus' - In pictures, <https://www.standard.co.uk/lifestyle/london-life/stunning-blackandwhite-photos-show-oxford-circus-through-the-years-a3274951.html>

1912



Connor, L and Richman, G. 2016. *Evening Standard*. 'A look back at Oxford Street & Oxford Circus' - In pictures, <https://www.standard.co.uk/lifestyle/london-life/stunning-blackandwhite-photos-show-oxford-circus-through-the-years-a3274951.html>

1928



Connor, L and Richman, G. 2016. *Evening Standard*. 'A look back at Oxford Street & Oxford Circus' - In pictures, <https://www.standard.co.uk/lifestyle/london-life/stunning-blackandwhite-photos-show-oxford-circus-through-the-years-a3274951.html>





Improving Transport for the User

- How do we design the transport system to ensure it is putting users at its heart?
- How do we prepare for the potential impacts of Emerging Technologies (EmTech)?
- How do we keep transport users safe from security and resilience threats?
- What are the major influences on system safety and how do we ensure transport is safe and secure?
- How will social and economic changes influence how people use transport?



Reducing Environmental Impacts

- What are the new technology requirements needed to deliver the Transport Decarbonisation Plan and reduce Environmental Impacts?
- How should new technologies in transport be accelerated and scaled-up to meet our environmental commitments? (I.e Net Zero)
- What are the impacts / demands of transport on the energy system?
- What behavioural change will be required to enable Net Zero 2050 and improve air quality?



Growing and Levelling Up the Economy

- How can investment in future transport infrastructure (e.g. high-speed rail) lead to accelerated change in the economy and subsequent levelling up?
- What interventions will continue to restore traveller confidence and drive mode shift towards public transport use?
- What financial incentives encourage certain types of travel behaviour and why? How can this be utilised to achieve Government Levelling Up objectives?



Global Impacts

- How can we embed learning from international contexts into the UK transport system?
- What metrics will we need to develop to understand the effectiveness of global focused investment and global collaborations?
- How will transport change and innovation in the UK interact with international change?





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National Public Transport Access Nodes (NaPTAN) API ¹ OAS3

/swagger/v1/swagger.json

Using the NaPTAN API

The NaPTAN API can be used to automatically download NaPTAN transport data.

The API creates a URL that enables you to download data either by ATCOAreaCode, a group of ATCOAreaCodes or the whole national dataset.

The data is available in either XML or CSV format.

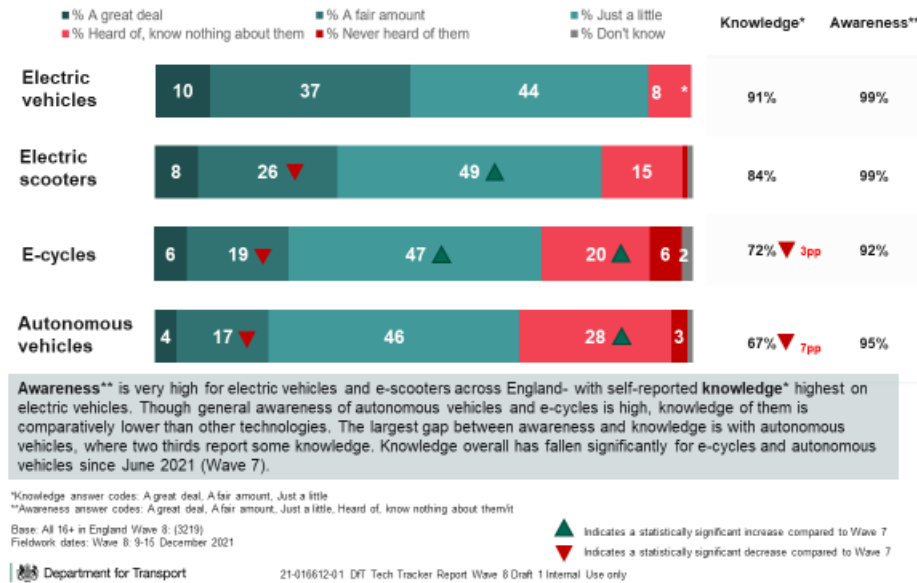
Want something more simple?

You can download the NaPTAN datasets in CSV and XML format from the [new NaPTAN website](#).

AccessNodes

GET /v1/access-nodes Gets access nodes data filtered by atco area codes in your chosen data format

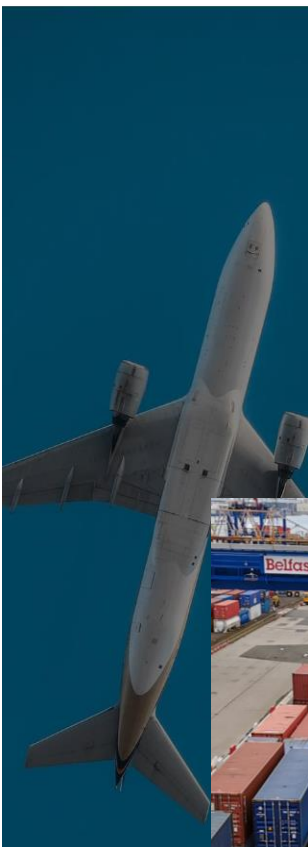
Knowledge and awareness by technology



In 2019 disabled adults (aged 16 years and over) in England made 757 trips on average per person per year, as compared to 1,016 for adults without a disability.

How do we design the transport system to ensure it is putting users at its heart?





Department of Transport

Integrated traffic control/route optimisation

V2x

Look round corners

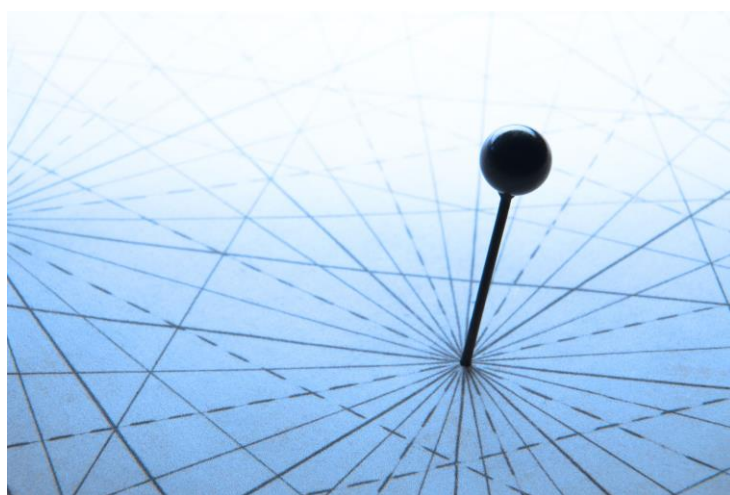
Meta surfaces

Smart streetlights



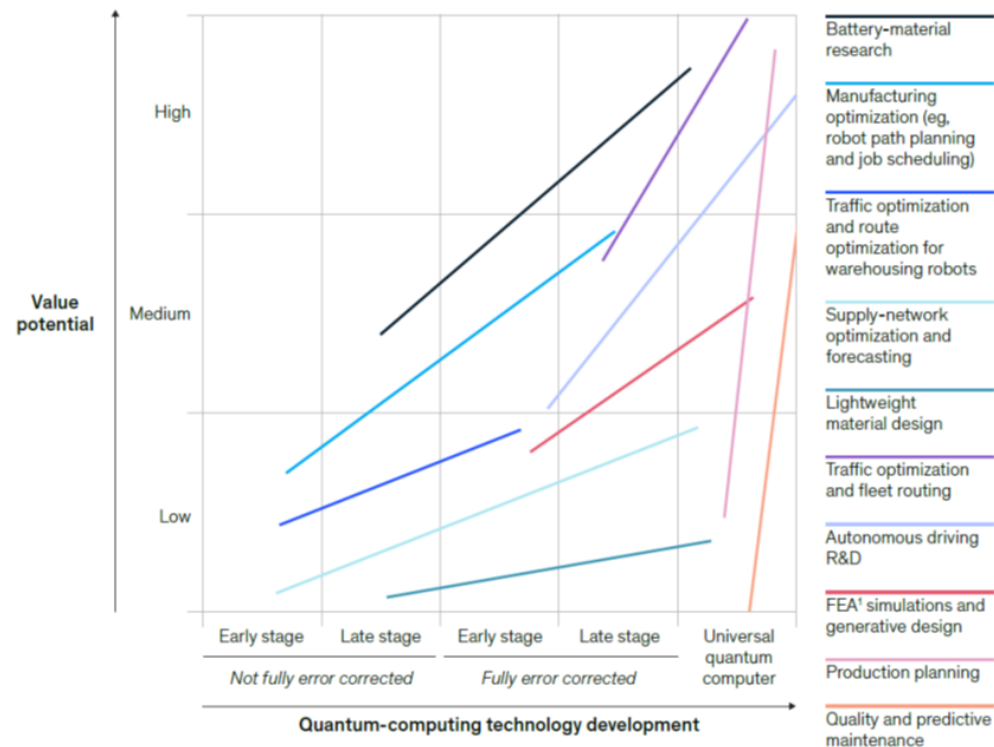
Highway maintenance

Monitoring pollution



How do we prepare for the potential impacts of Emerging Technologies (Em Tech)?

Potential viable transport use cases



(McKinsey & Company, 2021)

Solent Future Transport Zone NHS drone trial

- Solent Transport is part of the Future Transport Zones (FTZs) programme. DfT invested £92m in four zones to support local leaders and industry to trial new approaches.
- Solent Transport included an innovative proposal to transport medical supplies by fully automated drone from the mainland to the Isle of Wight in their FTZ bid
- Initial testing underwent between August – November 2021 and January – March 2022, using an electric vertical take-off and landing aircraft (eVTOL). Further testing is planned for summer 2022.
- These drones are autonomous but will be overseen by trained safety pilots and will carry life-saving drugs between Queen Alexandra Hospital in Portsmouth, the British Army's Baker Barracks on Thorney Island, and St Mary's Hospital on the Isle of Wight.
- Designed and developed by Skylift, eVTOL deliveries will offer a pioneering approach to a novel problem, with the potential to be replicated all over the world.

How do we prepare for the potential impacts of Emerging Technologies (Em Tech)?



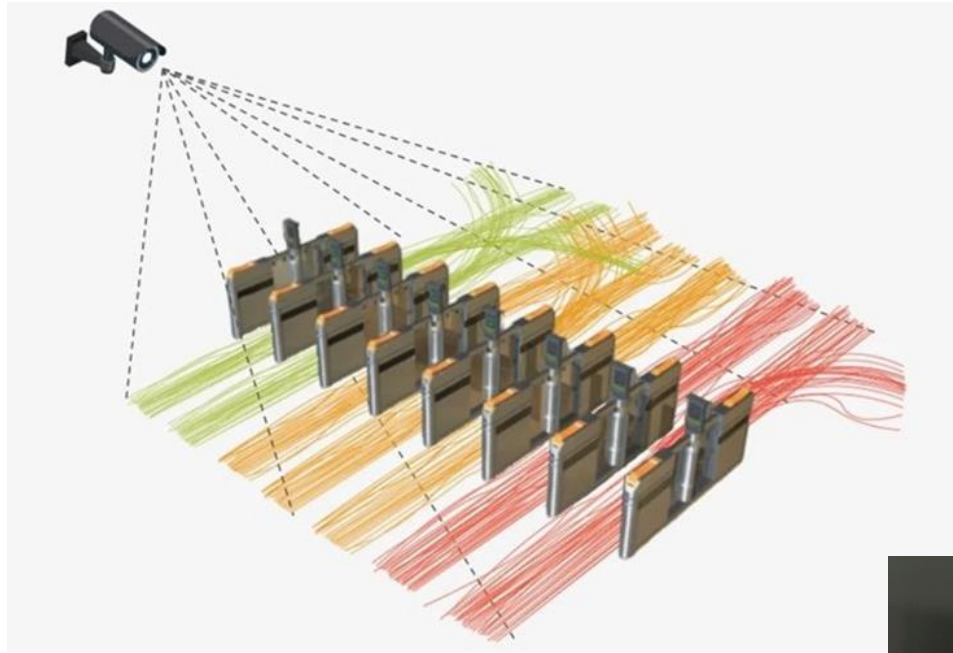
85kg Weight of eVTOL

5m Wingspan of eVTOL

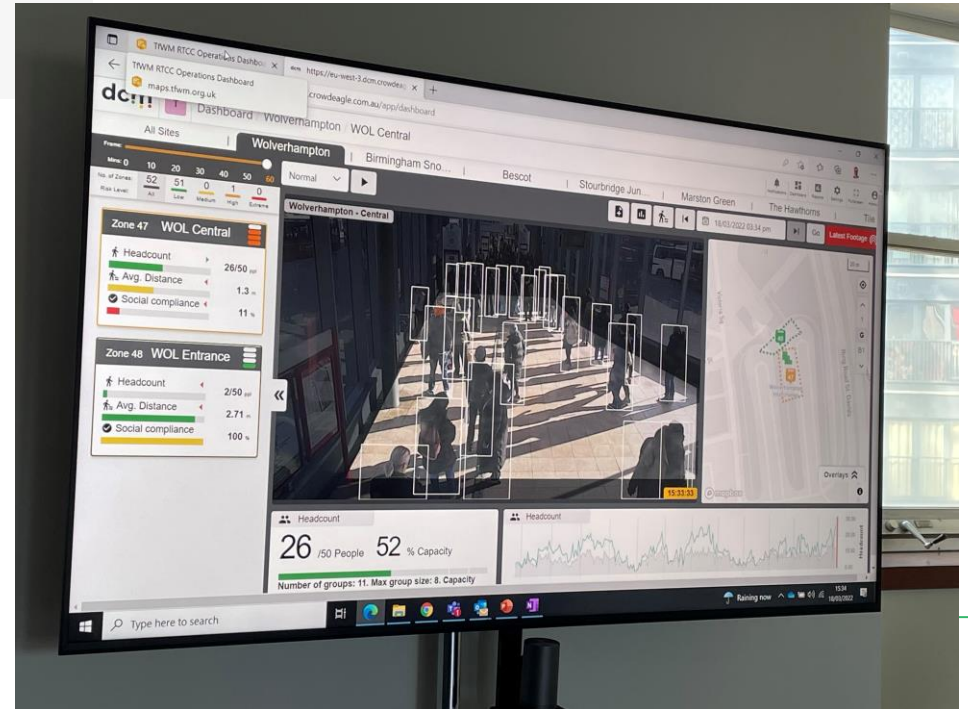
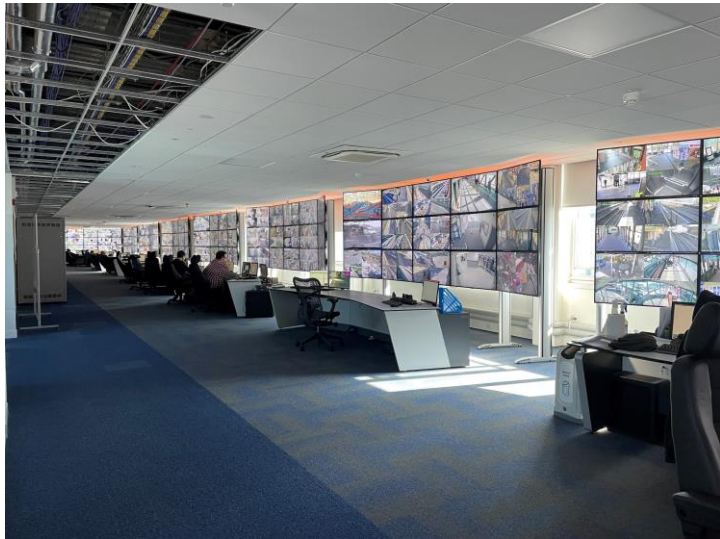
20kg Payload carried



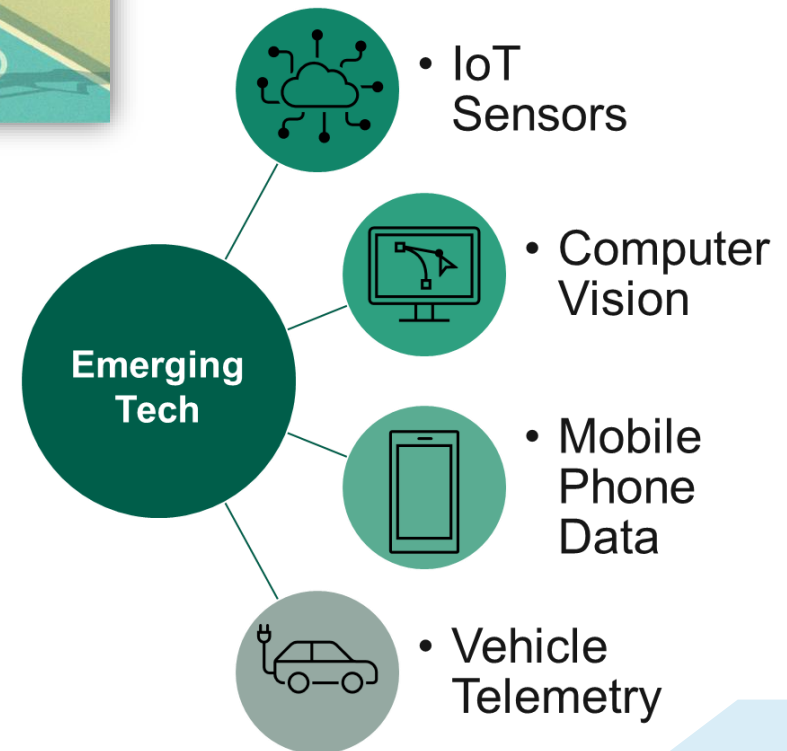
**Solent
Transport**



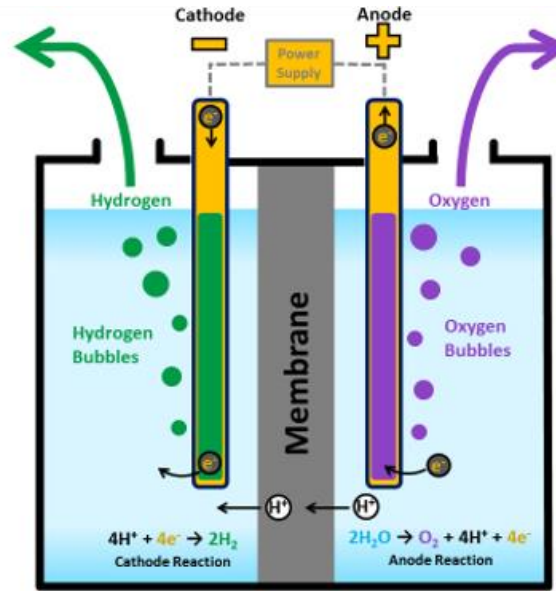
What are the major influences on system safety and how do we ensure transport is safe and secure?



What behavioural change will be required to enable Net Zero 2050?



Taking charge: the electric vehicle infrastructure strategy



What behavioural change will be required to enable NetZero by 2050?

PAUA believes that this innovation, when adopted, can save nearly 17,000 hours per year of non-productive time worth £400,000 to the economy base.

Initiate a charge by just plugging the charger to your car

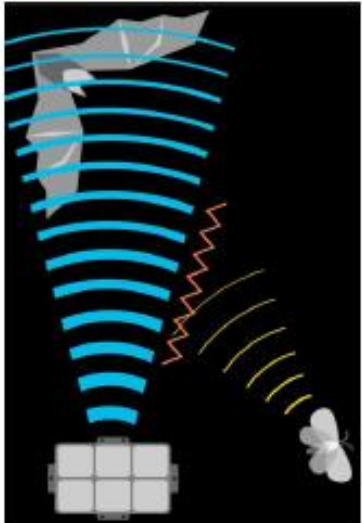
1. Plug
Driver plugs the cable to charger

2. Charge
Paua initiates the charge automatically without phone or RFID card

We make public EV charging simple for all
» PAUA



Bat Acoustic Deterrents



Enabled Benefits
£800k to ALIGN JV

Identified Potential Benefits
£1.8m Programme Wide

HS2

What is HS2 The route Why HS2 Building HS2 In your area Supply chain

News Media gallery Contact us

Five UK-based cutting-edge tech firms announced as first to join HS2 Innovation Accelerator initiative

Published on 11 Sep 2020

CLOUDCYCLE

How can investment in future transport infrastructure (e.g. high-speed rail) lead to accelerated change in the economy and subsequent levelling up?



Green Light Optimised Speed Advice

Service Description

The GLOSA service informs the driver in advance about the status of the traffic signals, and also advises them of an optimum approach speed that should minimise delay and ensure a smooth transition through the conflict area of an intersection.

The advisory speed information is derived from a combination of traffic signal phasing and timing information (SPAT) that is relevant to the position and direction of travel of the vehicle, and the topology of the intersection (MAP).

A2M2 Connected Corridor

The GLOSA service was implemented on the TfL and Kent CC test routes. The following GLOSA use cases were implemented:

- Time to Green information and Speed Advice
- Time to Red information and Speed Advice

The Kent GLOSA site uses fixed time control traffic signals, while the TfL traffic signals selected for the project include the following features:

- Use of Split Cycle Offset Optimisation Technique (SCOOT) signal control algorithms
- Link to a Bus Priority system (sites along Shooters Hill)
- SPAT messages were derived from data provided centrally from its UTC system

How can investment in future transport infrastructure (e.g. high-speed rail) lead to accelerated change in the economy and subsequent levelling up?



HMI showing GLOSA service displaying live traffic signal information from TfL's Urban Traffic Control system, and providing advice relating to the time to a red signal



In-Vehicle Signage

Service Description

The IVS service is a subset of the broader scope of In-Vehicle Information service, and can provide drivers with information on static and dynamic road signs via in-car information systems. Currently road operators use a range of Variable Message Signs (VMS) to send operational, tactical or strategic information to road users.

IVS information is similar to physical road signs erected on the carriageway and can include additional virtual information (virtual VMS or free text). IVS can also be used to target information to specific vehicle types or to individual vehicles.

A2M2 Connected Corridor

The IVS service was implemented on the TfL and Highways England test routes. The solution was configured to align with existing VMS infrastructure on the routes to allow easy driver comparison for evaluation purposes. The following IVS use cases were implemented:

- Dynamic speed limit information
- Embedded VMS
- Dynamic Lane Status information

Early software releases included simulated IVS messages to test the implementation. This was then extended to include interfaces to live traffic information services (TfL connecting to their HORUS Tunnels Management system, and Highways England connecting to the National Traffic Information Service (NTIS)).

How can investment in future transport infrastructure (e.g. high-speed rail) lead to accelerated change in the economy and subsequent levelling up?



HMI showing In-Vehicle Signage service providing live traffic information from Highways England's NTIS traffic information service, and replicating live VMS signing

"Find Transport Data is an online metadata catalogue that aims to remove these issues and improve the discoverability of UK transport data"

Electric vehicle public charging devices January 2022

Location: UK
Time period: 31/12/2021- Present
Update frequency: Monthly
Organisation: Department for Transport (DfT)

[Free](#) [Assets and asset management](#)

[View dataset](#)

Road length in the United Kingdom by road type

Location: United Kingdom
Time period: 1/1/2015 - 31/12/2017
Organisation: Statista

[Commercial](#) [Assets and asset management](#) [Other](#) [Traffic data](#)

[View dataset](#)

Air Quality

Location: West Midlands
Time period: 8/9/2020- Present
Update frequency: Live
Organisation: Transport for West Midlands

[Free](#) [Air quality and the environment](#)

What interventions will continue to restore traveller confidence and drive mode shift towards public transport use?

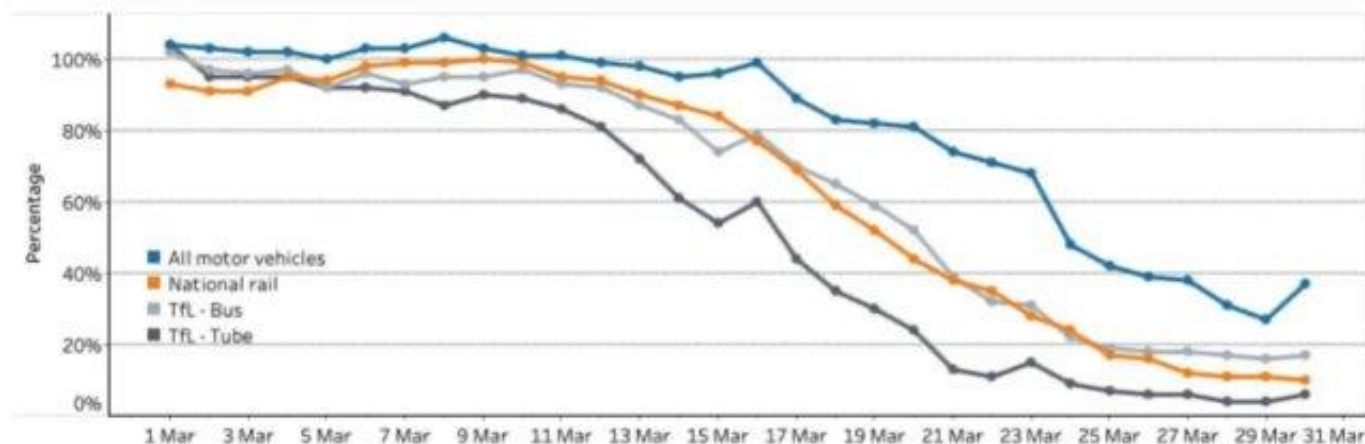


STAY HOME > PROTECT THE NHS > SAVE LIVES

COBR
 Cabinet Office Briefing Rooms

Transport Use Change

Transport use in Great Britain has decreased since the imposition of social distancing rules
 The percentage change in the use of all motor vehicles, National Rail, the London Underground (TfL), and bus travel (TfL)



Source: Department for Transport

Thanks to funding from



Transport Research and Innovation Grants
ACCESSIBILITY
Department for Transport



working in partnership



What interventions will continue to restore traveller confidence and drive mode shift towards public transport use?

*With disabled customers from the Northern Accessibility User Group & Community Rail Lancashire to develop an **Accessible Travel Simulation***



A Virtual Reality “Serious Game” providing a realistic immersive interactive learning experience on customer devices

*Enabling people with a wide range of accessibility support needs to take simulated railway journeys, exploring the support available from Northern
Developing familiarity, building confidence & **supporting better access to travel***



Department for Transport

Transport *is* technology



"The computing power in autonomous cars could be harnessed to tackle problems as personal as editing a high-definition video or as global as decoding a new virus."

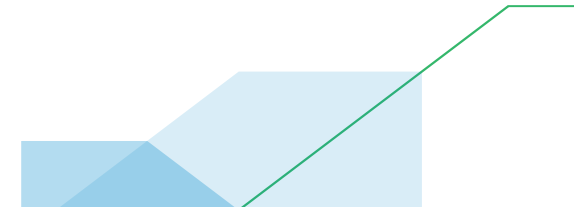
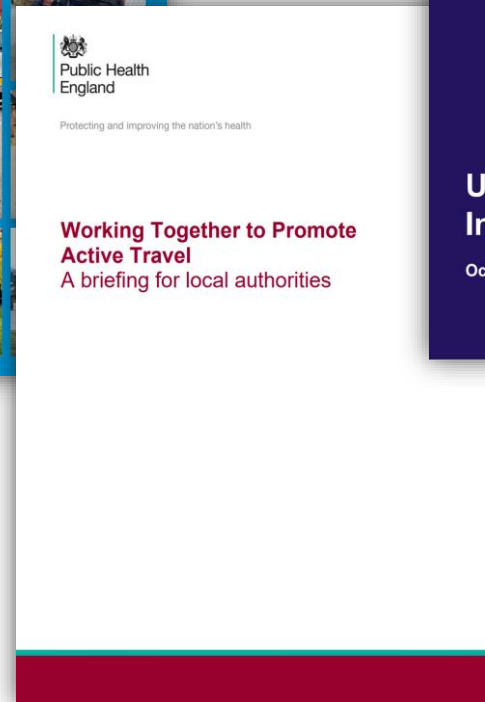
[Why Not Use Self-Driving Cars as Supercomputers? | WIRED](#)



[The power of Tesla's on-board brain \(selectcarleasing.co.uk\)](#)



Technology sits within a wider societal, legal, political and economic context



Thank you

