Department for Transport

Digital connectivity for Transport

TTF May 2025

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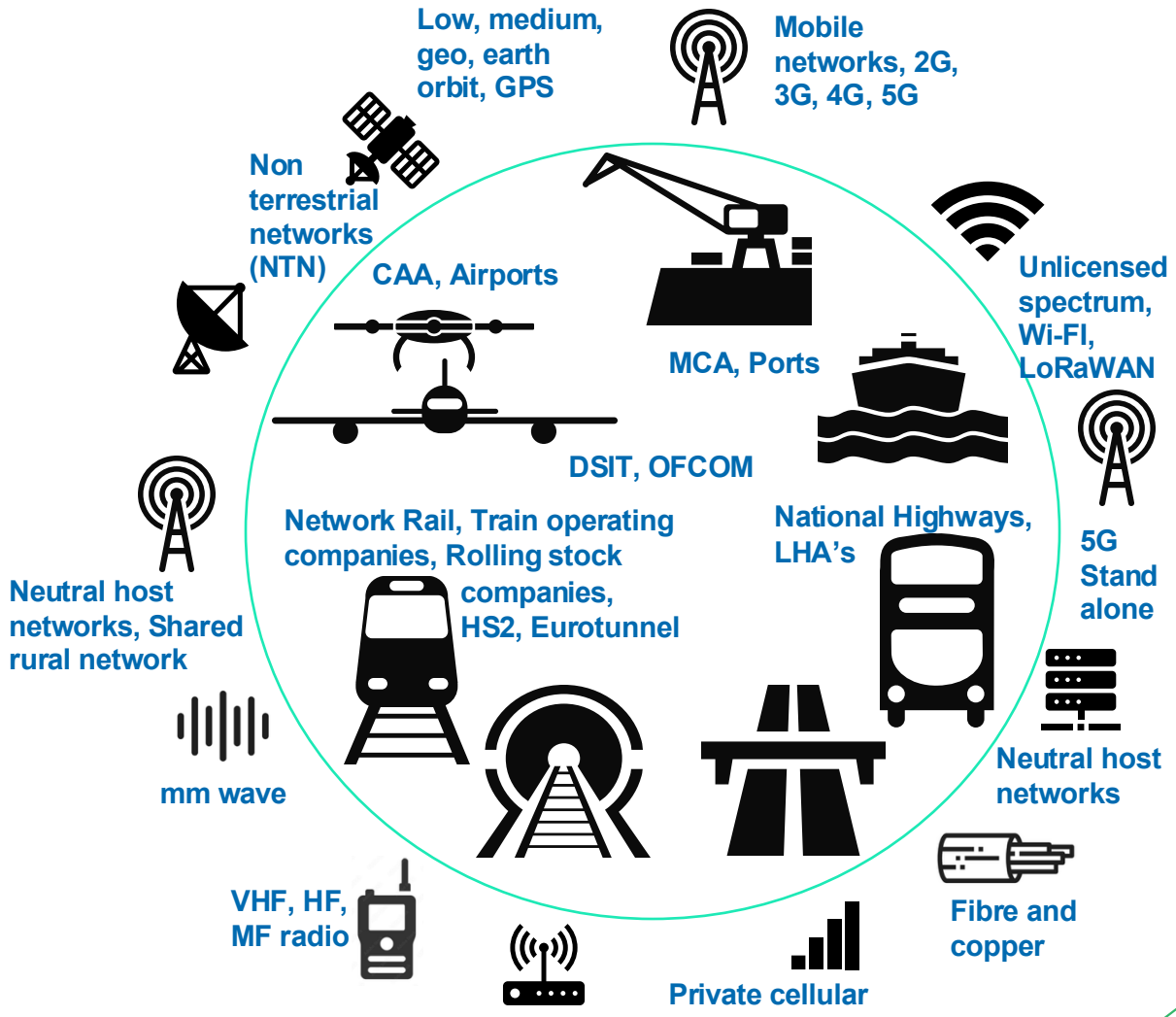
Digital Connectivity Across UK Transport Now

Modal connectivity today

- Digital connectivity on the UK's transport network is currently delivered modally.
- Highly fragmented stakeholder landscape across government, arms length bodies and the private sector
- A patchwork quilt of different technologies and services

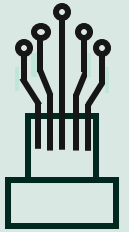


Digital Connectivity Across UK Transport Now

Digital connectivity is an invisible capability and we tend to only notice it when it doesn't work. If we do nothing, we will see more problems as demand grows and some underpinning technologies like 2G are retired.

Our railways use a **2G system** called GSM-R for voice and data communications on the railways. Work is underway to develop a new 5G system, Future rail mobile communications system, FRMCS, to replace it.

Fixed copper and fibre infrastructure is used across our transport network for traffic lights, train signals, variable message signs, ticket machines, parking meters, CCTV, level crossings, emergency telephones and many other applications.



Safety critical communications in aviation and maritime use dedicated radio frequencies and a mixture of terrestrial (on the ground) and satellite communications. Ofcom suggest some of these frequencies could be **shared with other applications** like mobile networks.

Mobile networks are used for a growing range of applications including eCall, traffic lights, maps and navigation, ticketing, EV charging, parking, enforcement cameras and many others. Mobile networks use optical fibre to connect the wireless signal to the internet backbone.

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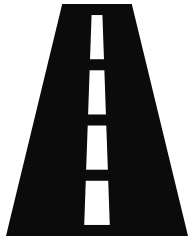
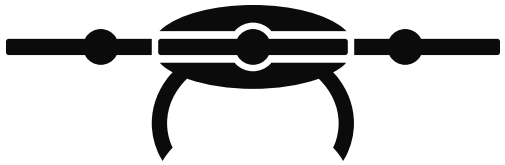
How could DC support the transport network?

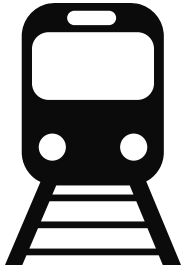
Vehicle to Everything (V2X) connectivity describes a new way of operating road vehicles where they communicate with infrastructure, other vehicles and other road users.





Digital connectivity could seamlessly integrate the transport network, inform better decisions for passengers and operators while enabling the diffusion and adoption of new technology.

Electronic communications have become a fundamental enabler for the evolution of modern port operations.



Drones have the potential to make a significant impact on UK productivity but need better digital connectivity to really flourish.

Digital train control systems could safely increase network capacity by 40%, but this requires better connectivity.

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New technologies and opportunities

New opportunities are emerging now:

- **Non terrestrial networks –** Satellite internet is ubiquitously available in Europe and is extending coverage to air, sea and remote areas where mobile networks can struggle.
- **5G stand alone –** the UK is about to get *full* 5G (5GSA). This will be a step change in network capability enabling may new applications for sensors, *internet of things* and other non-consumer applications.
- **Spectrum and infrastructure sharing –** the airwaves are a finite resource and need to be used efficiently. Transport already has dedicated bands, but as technology and needs change, so the way these frequencies are used also needs to change with the times.

Satellite
Starlink antennas are now certified for use on trains

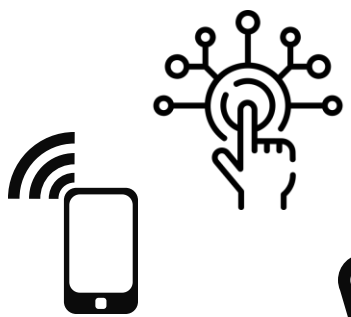
TfL
Shared infrastructure is providing mobile connectivity on the underground

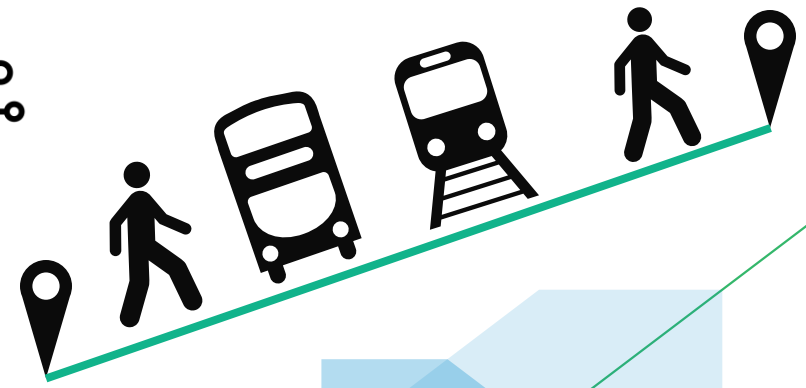
5G innovation regions
DSIT have funded a shared infrastructure and spectrum project to explore provide 5GSA coverage on Eastwest Rail

Belfast harbor are using private 5G to enable autonomous port vehicle operation and drone inspection.

Societal expectations are ever increasing:

- **Passengers expect connectivity**
- **Integration needs connectivity**
- **Emerging innovations expect connectivity**





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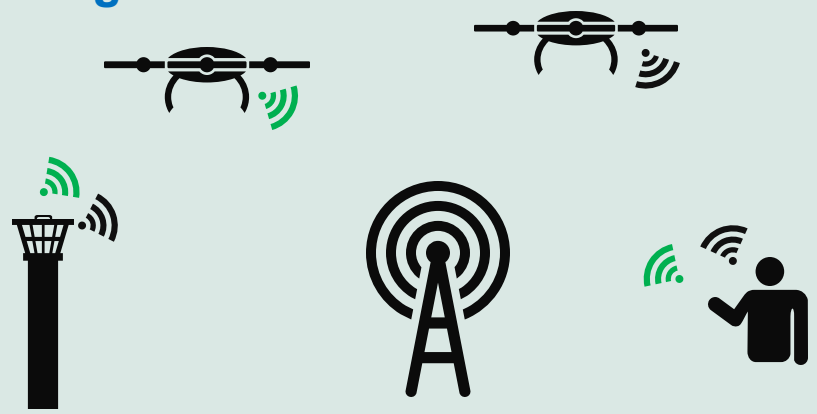
New use cases on the horizon

The CAA has set out plan to enable routine drone flights beyond line of sight.

The provision of **a reliable command and control link (C2 Link) is essential** for the safe and crucial for expanding the capabilities of drones and unlocking innovation.

There are opportunities here to:

- **Support innovation by ensuring better connectivity at altitude**
- **Speed up adoption of remote drone inspection, improving transport resilience and safety**



Connected vehicles are already on our roads and their capabilities are continuing to grow.

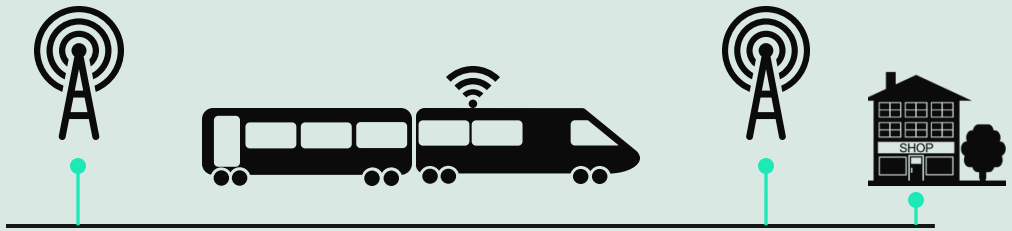
Cars continue to become smarter, increasingly have their own mobile data connections, whilst many can perform some actions automatically, like emergency braking or lane keeping.

There are opportunities here to:

- **Support connected vehicles and services by ensuring better connectivity across the road network**
- **Speed up adoption and diffusion of beneficial innovations like smart traffic systems, platooning and congestion smoothing**

New use cases on the horizon

In ~2035 there will be a massive upgrade to the communication system that underpins the rail network.
The Future Rail Mobile Communication System (FRMCS) will see the dedicated rail 2G mobile network (GSM-R) replaced with a new 5G network, in step with other railways around the world.

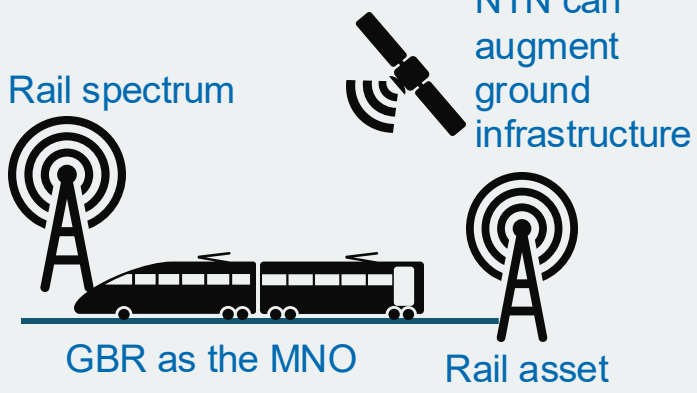


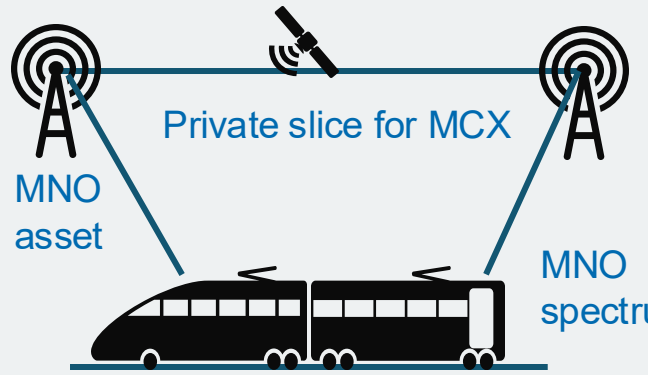
There are opportunities here to:

- **Support improved passenger connectivity**
- **Offer connectivity to other parts of the transport system with the same infrastructure investments**
- **Offer better connectivity to isolated places**

FRMCS could be delivered in a number of different ways

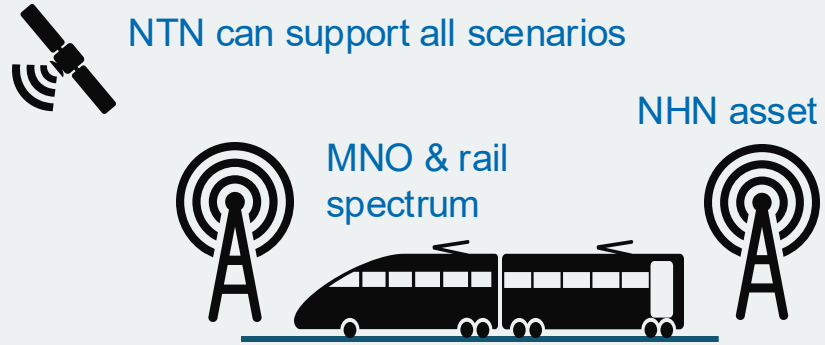
A private network





A private slice on a commercial network.

A neutral host network (NHN)



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Transport Telecoms Plan

DfT are developing a transport telecoms plan.

- Consider what public policy goals improved digital connectivity could deliver
- Network deployment models
- Spectrum requirements
- Infrastructure sharing
- Coordinate with INTS, Industrial strategy and Infrastructure strategy

> UK Wireless Infrastructure Strategy: "Advanced wireless connectivity will be the foundation on which we build industries, jobs, skills and services for the future, and this strategy sets out our plan to harness its potential for our economy and our society."

Contact me if you have any thoughts or insights on transport telecoms

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