



Innovating for a connected rail future

Enabling 5G for rail



Funded by



Department for
Digital, Culture,
Media & Sport

5G Testbeds and Trials Programme



The Department for Digital, Culture, Media & Sport's (DCMS) 5G Testbeds and Trials programme is part of the government's £740 million National Productivity Investment Fund (NPIF) activities, to support the next generation of digital infrastructure, including 5G and full fibre broadband.

In November 2017, DCMS announced funding to create the 5G rail testbed at the Rail Innovation & Development Centre (RIDC) at Melton Mowbray in Leicestershire. This capability enhancement at RIDC Melton is currently being installed and once open in May 2019, will support trials and Alpha phase testing, as well as the preparation of technologies for early mainline rail Beta testing and infrastructure deployment.

5G opportunities in rail

Passenger numbers have doubled in the last 20 years – much more than the current infrastructure was ever designed for.

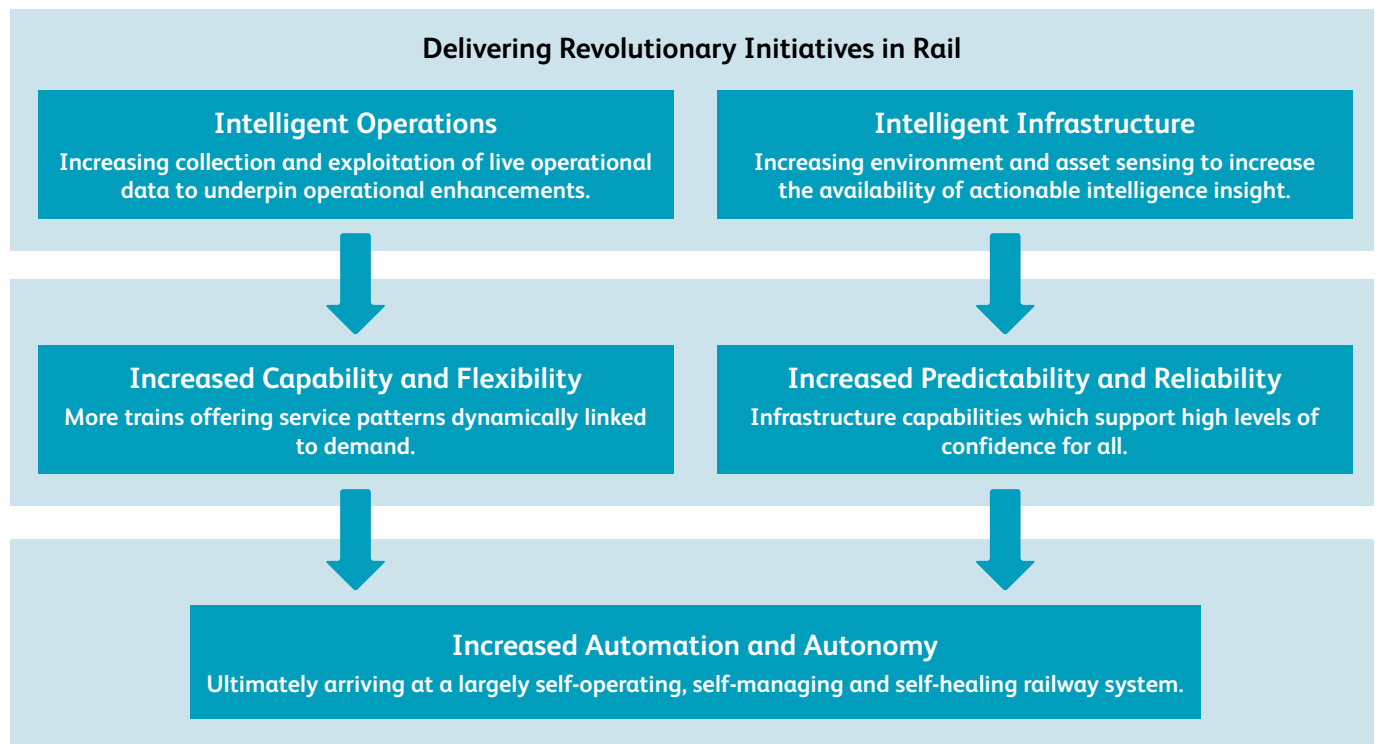
Railway infrastructure includes around 20,000 miles of track, 2,500+ stations, 6,000 level crossings, 30,000 bridges and viaducts and more.

Passenger numbers are set to double again in the next 25 years. We can't rely on more track to cater for this growth – engineering innovation and technology is the key to unlocking the railway, and in-turn GB productivity, for the 21st century.

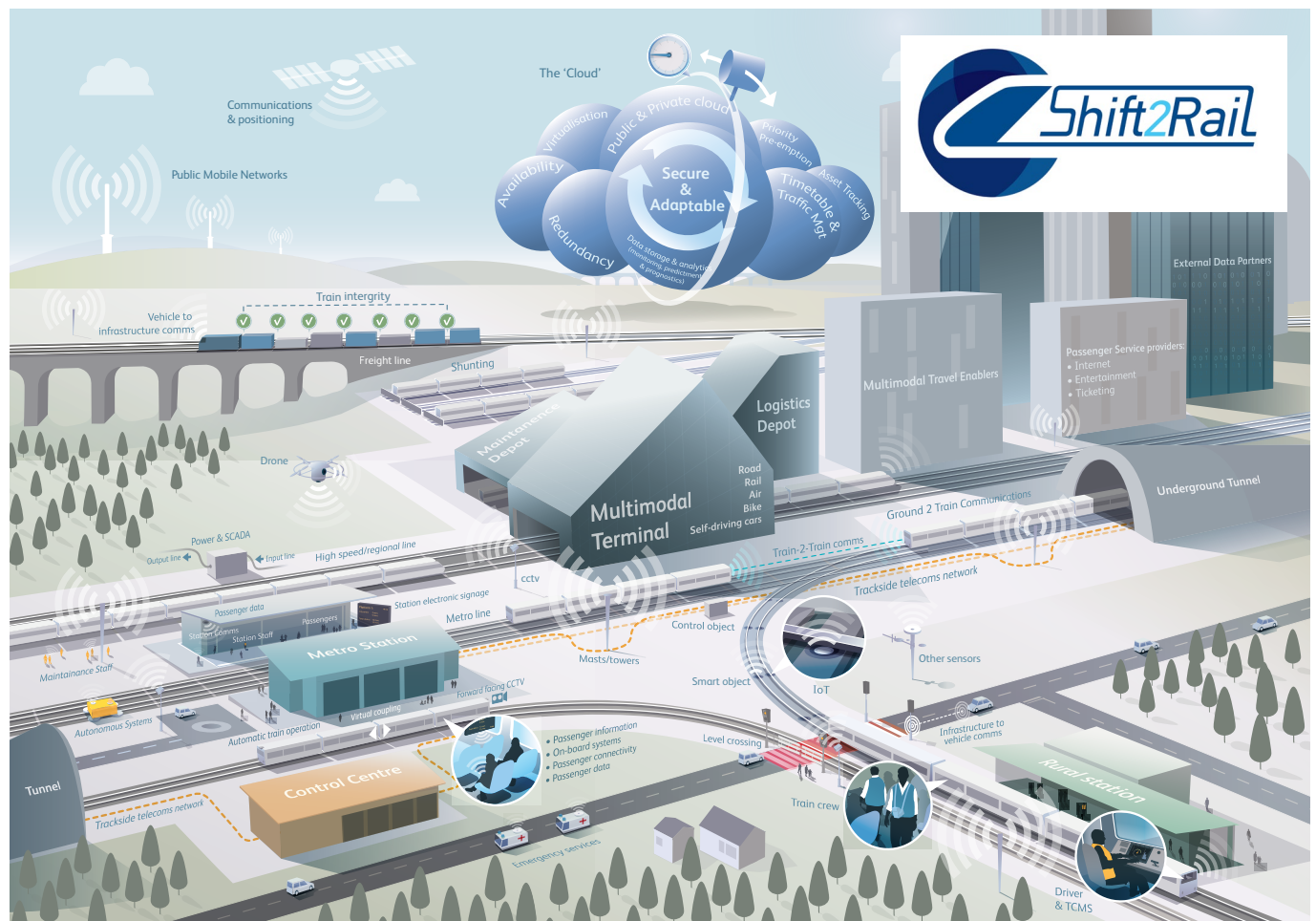


[Click this image to access the Rail Technical Strategy Capability Delivery Plan.](#)

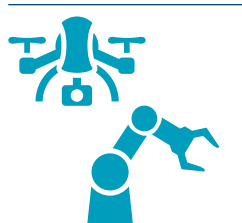
When Network Rail considers how technology can help cater for this growth, it foresees two revolutionary intelligent initiatives:



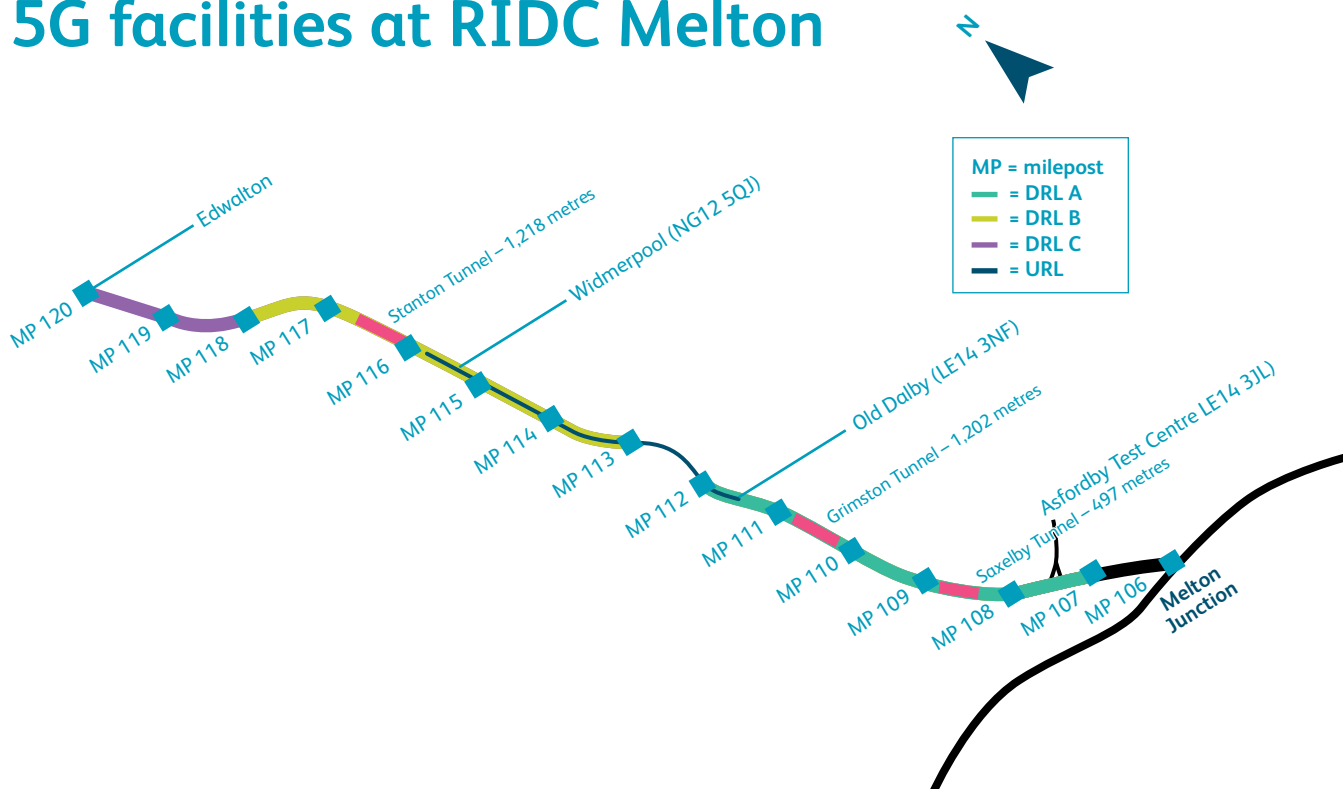
Network Rail is working hard with European colleagues to further understand the future communications capabilities that will be required to support the railway of the future. That work has shown the breadth of stakeholders and the number of, often unique, railway use-cases:



These important future rail capabilities, and their connectivity needs have been captured and grouped in to four umbrella use-cases:

	Connected Devices Remote condition monitoring using hundreds of thousands of sensors will underpin a data enabled railway. Predictive, prognostic and autonomous systems will need to maintain safety and security levels whilst significantly increasing infrastructure availability at a reduced cost.
	Connected Operations From in-cab signalling and driver voice communications, to trackside worker warning and enhancing level crossing safety. The common theme will be increasing rail infrastructure capacity through the delivery of exceptionally high levels of communications service integrity and network security in an affordable way.
	Connected Passengers Directly supporting Department for Transport's WiFi on trains policy work stream; delivering the Internet connectivity needs of both passengers and Train Operating Company (TOC) staff and systems. Affordably providing a high bandwidth and reliable connection for over a thousand passengers and staff on a train challenges today's providers.
	Connected Intervention Both connected robotic devices – delivering rail infrastructure intervention, and connected drones – offering both survey and delivery capabilities along the trackside. Technology solutions enabling autonomous activities to safely access the infrastructure with little or no impact to an increasingly congested railway timetable.

5G facilities at RIDC Melton



To see more detail of RIDC Melton's site layout, please [click here](#).

RIDC Melton (formerly known as the Old Dalby Test Track) is a dedicated testing and trialling facility for use by Network Rail and the rail industry.

It has a 13-mile high-speed electrified test track known as the Down Reversible Line (DRL), and a 4-mile low speed electrified test track known as the Up Reversible Line (URL) where new and modified railway infrastructure, rolling stock, plant and technology is tested prior to operational deployment. The test tracks can be configured in multiple ways as follows:

- **DRL – 13 miles (A+B+C), 11 miles (A+B) or two 5-mile (A&B) sections which can operate independently**
- **URL – 2.5 or 4 miles.**



It is possible to change the method of operating the test track between multiple operational configurations to offer best flexibility and accessibility for a range of 5G innovations that will benefit multiple industries as well as the rail sector. It is also possible for section C to be isolated for other testing such as drones.

The site has a strong history of cutting-edge innovation, which commenced in the late 1960s. Historical events include; the testing of the world's first tilting train (the APT), early tests of radiating cable propagation in railway tunnels and British Rail's spectacular collision of a fast-moving train with a nuclear flask. More recently, the site has hosted intensive testing of the 'S' stock tube trains, Intercity Express Programme (IEP) and Crossrail and London Overground rolling stock.

RIDC Melton, and its experienced team, is ready to play its part in the evolution of 5G technology. The site offers 5G innovators unparalleled exposure to both railway infrastructure challenges and the GB rail industry's vendor and supplier community. As a representative rail environment, RIDC Melton is heavily committed to the testing of new rolling-stock, which offers great opportunities for those wishing to innovate in the rail environment.

Network Rail is also the lead for Centre of Excellence in Testing as part of the newly created UKRRIN (UK Rail Research & Innovation Network) with its facilities at RIDC Melton and RIDC Tuxford – you can find out more at www.ukrrin.org.uk

The 5G testbed's scope makes it as accessible as possible so it is open for rail and non-rail related 5G testing, and able to keep up with technology advances. Trackside infrastructure includes; antenna support structures, optical fibre, equipment accommodation and power supplies.

These are present at over thirty locations along the test track and have been positioned to support the full complement of 5G pioneer spectrum bands, whilst reflecting the challenges of trackside deployment across the rail infrastructure. They are also linked to the secure on-site innovators' laboratory, which is capable of simultaneously hosting multiple innovators whilst ensuring their privacy is maintained.



Innovators will have access to:

- Masts, structures, power, equipment housings and trackside fibre
- Innovation laboratory
- Fibre internet connectivity
- Trackside environment
- Multi-disciplined rail professionals.

The site also includes an operational train workshop which can support test train installation with supervision, support, guidance and safety certification services available to innovators.

Innovator access to a mainline rail environment, with high speed trains running and infrastructure challenges (including tunnels and cuttings), is near impossible to offer on operational infrastructure; RIDC Melton makes this possible.

Engaging with the RIDC team is easy, contact us directly at RIDC@networkrail.co.uk

The 5G rail testbed and you

There are many reasons why you should innovate at RIDC Melton, here are just a few:

- **Direct engagement with Network Rail and other resident rail industry colleagues gives innovators access to train and railway system specialists who are able to describe the many and complex rail infrastructure challenges**
- **Innovators can use all or as little of the infrastructure to carry out their testing and RIDC Melton can provide facilitation for their installation requirements**
- **Innovators will be able to show a full and productive development and testing programme supported by Network Rail resource**
- **As a high-speed test railway RIDC Melton facilitates a number of train testing scenarios such as ground to train connectivity and critical railway operational safety systems**
- **RIDC Melton's relatively remote and geographically screened position, maximises the potential for innovators to manage de-confliction in the sharing of radio spectrum for the purposes of testing**
- **Innovators can build technical evidence from Alpha testing of technology components, laying the foundations for mainline Beta testing under a Product Acceptance trial certificate**
- **Physical security in equipment areas helps protect innovators' intellectual property**
- **Visits from innovators' stakeholders can be supported with meeting room and associated facilities**
- **The opportunity to work with the lead for the UKRRIN Centre of Excellence in Testing.**

For more information, visit: www.networkrail.co.uk/ridc and to express your interest in developing your innovation at RIDC, please email: RIDC@networkrail.co.uk

