

# The Digital Railway Programme

*Digital Railway*



# Modernising our Railways

By quickly, safely and efficiently transporting large volumes of passenger and freight traffic, Britain's rail industry plays a vital role in supporting the nation's economic growth. However in the context of rapidly increasing demand and significant funding constraints, the industry is now facing a number of major challenges.



## Safety

Our railway is already one of the safest in Europe, with the opportunity for digital technologies to provide enhanced levels of train protection and further reduce the risk of harm to passengers and rail workers, for example:

- Passenger safety - reducing the risk of Signals Passed at Danger.
- Trackside worker safety - reducing the amount of work that needs to be carried out trackside.



## Cost

About two-thirds of the rail network's signalling system needs to be replaced in the next 15 years, and the costs of renewing conventionally are expected to rise dramatically over the next 5 years. This is a significant affordability and deliverability challenge for the industry.

As a result, the industry must adopt a different approach, introducing digital technologies and new ways of working to replace conventional signalling systems at a lower whole life cost.



## Capacity & Performance

Britain's rail network is facing a capacity crunch. At peak times on the busiest parts of the network, the railway is full. Hundreds of thousands of passengers suffer overcrowding every day and the rail freight industry, vital to the national economy, suffers from a shortage of pathways which causes slow journeys and pushes freight onto the road network.

Where capacity constraints are caused by the limitations of conventional signalling systems, digital technologies can help to address these critical 'pinch-points'.

The industry has worked hard to reduce the number of incidents which cause delays, but the impact of each incident on passengers and freight customers continues to increase.

Digital technologies present the opportunity to improve performance across the network.

# What is the Digital Railway Programme?

The Digital Railway Programme aims to support the industry with transforming the rail network for passengers, businesses, and freight operators, introducing modern signalling and train control technology to increase capacity, reduce delays, enhance safety and drive down costs. It is an

industry-wide initiative that enjoys the support of government, train operators, freight companies, the supply chain, and trades unions. The Digital Railway Programme is helping address the industry's major challenges, introducing digital solutions in areas that will deliver the best value for money.



*Three Bridges Rail Operating Centre -  
signalling workstation*



Driver training using an ETCS simulator

# Digital technologies and ways of working

## European Train Control System (ETCS)

An in-cab signalling system that allows trains to run closer together, safely and to travel at their optimal speeds and braking distances.

## Traffic Management (TM)

Controls the flow of trains across the network in the most efficient way, maximising the throughput and adapting as conditions change.

## Supervised Automatic Train Operation (ATO)

Directly controls the train's traction and braking systems, making speed and braking decisions.

## Connected Driver Advisory System (C-DAS)

Provides decision-support to drivers to improve timetable adherence and therefore, overall performance and efficiency.

## Smart Infrastructure with Remote Condition Monitoring

Will improve performance, reduce disruption and improve safety.

## Telecommunications & Data

Providing the backbone to transfer data and information between systems and to rail staff and customers. As a data-configurable railway, Digital Railway requires high levels of data confidence and integrity, backed by cyber security and business continuity processes.

## People

The Digital Railway will enable a change in how people in the rail industry work in the future and help to address challenges in terms of an ageing workforce and changing skills requirements.



# Why do we need the Digital Railway?

The adoption of digital technologies presents the opportunity to reduce costs, and in doing so unlock capacity, performance and safety benefits for passengers and freight users.

The Digital Railway will also play a key role in improving the productivity of the wider economy, creating new high-value jobs, improving productivity, connecting the UK's manufacturing capability and developing a world-class industry with export potential.



Improved asset sustainability (lower whole life costs)



Better performance for passengers and freight customers



Faster journey times



Whilst not a direct benefit, Digital Railway technologies could enable data connectivity for passengers, freight customers and assets



Increased capacity to keep pace with demand



Improves safety for passengers and workers



# A phased delivery strategy

## Short Term to 2019

### ETCS deployments:

#### 2011

Cambrian line - ETCS (Shrewsbury to Aberystwyth and Pwllheli).

#### 2018

Thameslink Core Area - ETCS & ATO will increase train capacity through central London.

#### 2019

Crossrail 1 (London Paddington to Heathrow Airport) – in-cab signalling (ETCS) will replace lineside signalling on parts of the new Elizabeth line.

### TM deployments:

TM will be introduced for parts of the Anglia and Wales routes and between London and Bristol, helping reduce delays, improve passenger information and restore the normal timetable more quickly when disruption occurs.

The lessons learned from these early deployments, as well as from international schemes, will help inform future projects, ensuring best practice solutions are adopted.

## Medium Term 2019 - 2027

### Targeted Schemes

The most compelling schemes will be identified and prioritised.

The National Productivity Investment Fund (NPIF) will be used to accelerate the delivery of a number of digital schemes, to deliver benefits to rail users.

The Programme is exploring opportunities for a number of Digital Railway schemes, including Manchester to York, South East (Traffic Management), as well as the fitment of freight and passenger trains.

## Long Term 2027 & beyond

### Digital as the Norm

The delivery strategy will be based on the condition of our command, control and signalling assets, as well as business needs.

The strategy will take into account the need for infrastructure and train renewal, together with capacity, performance, journey time, safety and affordability considerations.

It is anticipated that digital solutions will become 'business as usual', as costs fall and experience is gained from early digital schemes and further innovation.

# Delivering the strategy

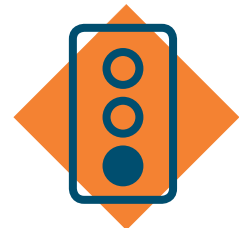
The Digital Railway strategy provides an integrated, industry-wide approach, matching infrastructure renewal needs to train fitment plans and franchise opportunities. The programme will safely, affordably and sustainably transition the industry to digital signalling and train control, prioritising key main line routes to deliver benefits to customers.



The rail industry has experience of successfully delivering large, complex programmes, but there have been few truly industry-wide change programmes on this scale.



To successfully deliver the Digital Railway strategy, we will have to overcome a number of delivery challenges, work more collaboratively as an industry and develop new commercial models, including funding and financing.



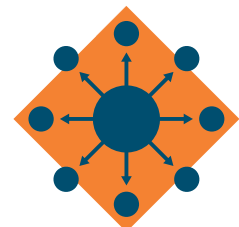
Compared to conventional signalling systems, digital solutions are deployed on rolling stock, track infrastructure and in operating centres, so will require new ways of working.



To encourage innovation and drive cost efficiencies, we will start to work with the supply chain much earlier - at the option development and design stages.



The opportunity for unlocking private finance will be considered for Digital Railway schemes, and the franchise competition process will be used to create opportunities for delivering digital solutions.



To develop the skills and capabilities required to deliver this programme, and to build confidence from the supply chain, a long-term pipeline of digital projects will be needed, supported by an industry-wide integrated implementation plan for digital deployments.

# Digital Railway



Working together for a better railway



**Rail Delivery Group**

