# Department for Transport

# Ministerial Group - Digital Railway

# Recommendations on Government Policy for a Digital Railway Programme and accelerated deployment of digital signalling technology

**Moving Britain Ahead**

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# 1. Introduction

1.1 There are many opportunities to modernise the railway through the use of digital train control technology, providing considerable potential benefits. In this context, train control comprises automated Traffic Management (including decision support and train regulation), in-cab signalling (European Train Control system), Automatic Train Operation (ATO), Connected Driver Advisory systems (CDAS), and the enabling telecommunications network.

1.2 It is acknowledged, however, that the rail landscape is complex with significant delivery challenges and there have been a number of false starts to the implementation of innovative signalling and train regulation technology in the past.

1.3 The use of digital solutions will, increasingly, be at the centre of a modern and efficient railway, and this will support economic growth and productivity, improve connectivity and help people to get around more quickly and safely. The current traditional signalling infrastructure is gradually becoming life-expired with an ever-increasing backlog of renewals and a greater risk of failures and resulting delays.

1.4 To support the Government in the formulation of its future investment policy, a Ministerial Group was appointed to give advice on the key challenges of this significant change programme.

1.5 The Group, drawn from different parts of the rail industry and outside, has brought experience and expertise from different areas of digital transformation programmes. By drawing on a wider sphere of expertise, we hope to inject best practices from other industries that have successfully delivered digital transformation.

# 2. Background

2.1 Digital technology, such as in-cab signalling and intelligent traffic management systems, will become increasingly important if we are to deliver much needed extra capacity to the existing network and meet future growth demands. For the passenger, real-time management of traffic will reduce disruption, improve reliability and enable a better response to peak time demands.

2.2 The first phase Digital Railway (DR) projects including Thameslink, Crossrail, Traffic Management installation at Romford and Cardiff are all nearing completion and provisional results from the Strategic Outline Business Cases on five other targeted routes indicate a positive case for further investments, subject to affordability. This is due to a combination of reduced signalling costs, higher capacity and improved performance.

2.3 Attention is now shifting to the means of financing and delivering these investments, using the £450 million fund announced in the 2016 Autumn Statement to develop and de-risk the next phase of deployments.

2.4 Network Rail has taken the lead with the Rail Industry, through the introduction of a cross-industry digital team to develop a "Digital Railway" programme to identify where the deployment of digital signalling and traffic management provides the most benefit across the rail network. The programme will need to demonstrate that it is affordable and deliverable if it is to attract the funding it demands and the support from the many stakeholders who will be involved in its delivery.

2.5 Digital Rail has attracted much comment and debate including from the Transport Select Committee. In addition, transport ministers have hosted a series of round tables with leaders from industry. These discussions have generated supporting evidence that underpins the findings of the Ministerial Group. A summary of these discussions is set out below.

## Transport Select Committee - Report on Rail Technology: Signalling and Traffic Management

The Transport Select Committee developed a series of recommendations based on industry evidence from the most recent endeavours to introduce digital signalling and operational technology.

The Transport Select Committee met on four occasions during the summer of 2016 to discuss the signalling aspects of the Digital Railway programme and the approach being taken by Network Rail to deliver this programme. The Committee heard evidence from leading rail industry figures, Network Rail, passenger and freight train operators and suppliers, Rail Industry bodies and Trade Unions.

The Committee published its findings in November 2016 along with a series of conclusions and recommendations covering delivery of a programme of digital enhancement, engagement, supplier confidence and funding.

The Committee concluded that improvements to signalling and traffic management technology are needed to deliver a world-class rail network in the UK. It supported the idea that the development of the European Train Control System (ETCS), Traffic Management software and Driver Advisory systems should be accelerated, but that this should be subject to careful consideration of the Digital Railway business case, clarity about funding and a clear understanding of how this programme would affect existing plans for work on enhancements and renewals.

## Digital Railway Industry Round Tables

The Secretary of State for Transport, the Rail Minister and the Minister for Industry from BEIS hosted representatives from the rail supply chain and wider technology innovators at two round table events. They discussed the current ambitions and concerns of the supply chain including how to remove any potential barriers to entry into the market by new suppliers.

Ministers were particularly interested in promoting innovation and establishing the UK as a leader in the application of new technology to the railway.

The following key points arose in discussion:

- There is an appetite for new approaches and a preparedness to discuss and evaluate the implications for franchises, existing commercial models and funding arrangements and the role of Network Rail in these new approaches.

- There needs to be a greater understanding of the key programme risks and how they might be mitigated. Participants reiterated that this would not just be a technology programme but would involve wider change in the industry with implications for existing processes, skills and training and development.

- Any programme for the delivery of digital signalling technology must be delivered with cross-industry integration and collaboration. Of particular interest was the way in which disruption to the network from its enhancement could be managed better with less impact to the travelling public.

- There is a role for Government in supporting and championing a long term plan for the introduction of digital signalling technology. The industry needs confidence to invest, to encourage innovation and to drive better value through economies of scale.

- There was a recognition that industry needed to explain better how working effectively with government would guarantee lower costs, confident delivery schedules and the development of the UK's expertise.

2.6    The recommendations of the Ministerial Group have been framed by the Transport Select Committee's thinking and the Industry Round Tables.

2.7    The Group was also aware of the Government's broader ambitions for the railway and in particular the emphasis being given to:

- Ensuring that the passenger or user is at the heart of everything that we do. Investment by the government or by any party must deliver real and demonstrable benefits.

- Bringing the track and train closer together. This means ensuring that the railway operates as a more effective whole by removing the friction and disconnects between those responsible for the railway infrastructure and those who use it. Those tensions have so often resulted in inconvenience for the user. Digital Railway is itself an integrative set of technologies, between track and train, requiring a cross-industry approach as reflected by the cross-industry Digital Railway team, its membership and governance.

- Encouraging greater levels of private sector financing. The government believes that it has not made the most of the potential of the market to improve the efficiency and cost of the railway.

- Establishing the UK rail industry as a global leader. The government is clear that it wants an industry strategy that is fit for the next decades and that the industry should seize this opportunity to put itself at the forefront of global thinking and development.

# 3. Digital Railway Environment

## Network Rail Route Proposals

3.1 Proposals for the introduction of digital signalling and regulation technology are being developed jointly by the Digital Railway Programme and five Network Rail Routes in partnership with their respective train and freight operating companies. Some priorities for each route have been selected based on a series of route studies, as well as consultation between the Digital Railway Programme and Route stakeholders, including the train and freight operators.

3.2 Each case has been developed by a number of route-specific steering boards, chaired by Network Rail's Route Managing Directors with representation from Digital Railway, Network Rail Route Teams, route passenger and freight operators and the Department.

3.3 The proposals have been developed into Strategic Outline Business Cases for consideration by Ministers in their approach to a future investment pipeline.

3.4 There are four other specific Digital Railway schemes being explored:

- Trans Pennine – Development fund of up to £5 million to scope how digital technology could be embedded into the trans-pennine route to deliver Britain's first digitally controlled intercity main line railway.

- West Coast Main Line - Addressing performance issues for Euston, constrained during HS2 construction, through TM and also capacity around Crewe using ETCS for HS2 trains.

- South East and East London Line (with TfL) - Addressing capacity and performance through the East London Line tunnel and linking into the south-east network.

- Western Route - Digital Railway Programme has teamed up with Network Rail's Western Route and the British signalling and train control specialists, Resonate, to trial the 'Luminate' Traffic Management System to boost performance on train journeys between London Paddington and Bristol Parkway.

## National Productivity Investment Fund

3.5    The Chancellor's 2016 Autumn Statement confirmed that, as part the Government's National Productivity Investment Fund, £450 million would be made available to trial digital signalling technology, to expand capacity, and improve reliability on our railways between 2018 and 2022.

3.6    The primary objective of this investment is to give confidence to the market and potential investors by delivering some Digital Railway 'quick wins' and enabling projects, which generate maximum passenger benefits and facilitate the future wider rollout, as soon as possible.

## Early Contractor Involvement

3.7    The Digital Railway Programme has been engaging on behalf of the industry with the Rail Supply Chain to explore a series of options and opportunities that can be exploited through the use of digital signalling and regulation technology.

3.8    This new approach to early contractor involvement (ECI) has been strongly welcomed and has already resulted in the development of new ideas and potential solutions.  An innovative business information tool has also been used to provide illustrative benefits based on real asset performance data.  This has empowered suppliers to develop the right solutions which could bring significant benefits for customers of the railway.

3.9    By participating in the ECI programme, and producing the report, suppliers and DR have demonstrated a willingness to radically change the cultures and behaviours of project delivery. Collectively, the supply chain has shown that working across industry boundaries as well as investing and supporting the development of better processes will result in a better railway for the future. Critically, this work has also catalysed an appetite for bringing private finance to DR delivery

# 4. Digital Railway Ministerial Group

## Purpose

4.1 The Ministerial Group was formed in the autumn of 2016 in order to advise the Secretary of State for Transport on how best to establish government policy in support of the Digital Railway programme and accelerate the deployment of digital signalling technologies, whilst providing help to address the key challenges being faced by the Digital Railway Programme.

## Terms of Reference

4.2 The group have been required to consider a series of questions within a framework of subject areas to formulate the recommendations:

- To advise on how best to accelerate the programme, leverage private investment and establish government policy in support of the Digital Railway Programme.

- Providing input to help address the key challenges facing the Digital Railway Programme.

### Policy

— In the context of a fragmented industry what mechanisms are needed to ensure that the Digital Railway programme is delivered in a coordinated way across the rail industry, to time and to budget?

— Given that we would not wish to make structural changes to the railway industry, what lessons can we learn from other industries that has enabled them to successfully deliver transformation using digital technologies in a complex industry?

— What is the role for Government in ensuring data generated by a Digital Railway is leveraged to its full potential?

### Funding

— What are the barriers to securing private investment for the Programme and reduce the funding burden on government? How can we make the railway attractive for private investment?

— What can be done to ensure that railway staff buy into the transformation that digital technologies will bring?

### Programme

— Based upon work to date, what lessons can be learnt from other similar or relevant projects to ensure the deliverability of the programme?

## Approach

4.3 In advance of the meetings of the Ministerial Group, supplementary material was provided in order to help the group focus on the subject matter and also to provide some background on past and current activity. Further insight was also provided on the delivery of Major Capital Programmes as well as Investment and Commercial models and outputs and recommendations from the Transport Select Committee on Rail Technology, Signalling and Traffic Management.

4.4 The subject matter was considered through a series of questions and discussion in two workshops. The first workshop focused on policy and programme and the second on funding and commercial models.

# 5. Ministerial Group Considerations

5.1 The Group agrees that DR is a programme of national importance and has the potential to shape and transform key routes on the Railway for the next generation. It can achieve a path towards attaining a sustainable railway by; reducing the amount of equipment trackside, reducing maintenance costs, enabling higher performance and providing closer integration of track and train through technology.

5.2 A coherent Digital Railway Programme has the potential to support the key elements of the Government's Industry Strategy, and contribute positively both directly and indirectly to the country's economy by driving down the costs of the railway and improving efficiencies, which itself drives economic growth.

5.3 Embedding digital technologies into railway operations also has the potential to address a number of already pressing key capacity, performance and renewal issues affecting today's railway and to prepare for a future world where demand continues to grow in a way that an analogue railway can no longer support.

5.4 The group has considered that:

- Working with the National Infrastructure Commission (NIC) to ensure that enabling programmes such as digital may be helpful as part of government's overall approach to infrastructure investment.

- There is a need for industry to respond collectively with a single ambition to drive innovation, efficiency and standardise approaches.

- It will be important to learn from successful models such as the privatisation of the National Air Traffic Service (NATS) and its introduction of complex digital technologies for air traffic management.

- The supply chain should focus on the technology to deliver and innovate and build on the ECI work. For example incentivising the supply chain based on outputs such as capacity and performance and a focus on a whole-of-asset-life relationship.

- Network Rail should pursue alternative commercial and funding/financing models to underpin an incentivised high performing supplier-led delivery.

- A delivery programme should focus on what can be delivered in the near term and deliver incremental benefits to manage risk and provide separate focus on the future whilst not overpromising.

- An approach to managing technology risk is necessary to incentivise investment through whole of life.

- Addressing skills and capability through early investment in this area is essential.

5.5  In the light of the above, and the Transport Select Committee's recommendations, the Group has endorsed a targeted approach to investment for the areas of greatest need and where the business case demonstrates the best returns.  The Group recognises that the industry is national e.g. "go-anywhere" trains, therefore a holistic approach to benefits is required. Considered in isolation, some business cases may not provide the required return, but are a key enabler for a systems approach.

5.6  The group believes this is more than an investment programme.  It is a new technology rollout that needs to be managed as an effective change programme. Success will be achieved if delivery is coordinated through good leadership and an empowered programme team who track benefits, enable consistency, authorise spend, control high-level gateways and manage risks including technology.

5.7  The group acknowledges that the introduction of digital rail signalling technology will place greater dependence on a reliable mobile network.  This presents a possible opportunity to build on the SWIFT (Superfast Wi-Fi In carriage for Future Travel) project, which is an example of a coordinated Network Rail and technology supplier partnership, brought together to deliver benefits for the railway and potentially bring in additional investment.

- Project SWIFT is a Scottish Government project commissioned to deliver free Wi-Fi to passengers via a dedicated trackside infrastructure installations along the rail network.  The trial, scheduled to go live during the summer 2017 between Glasgow and Edinburgh, is funded through a mixture of Scottish Government innovation and private funding sources.  It will use unlicensed spectrum and existing Network Rail Telecoms networks to deliver greater connectivity and speeds for the customer.

5.8  The group believes that an effective change in the industry can only be brought about if:

- The Government shows leadership by setting outs its vision and a clear strategy for the introduction of the next generation of rail signalling technology that focuses on benefits for the passenger, helps position the UK as a global player in this field and is underpinned by an integrated approach to railway investment that delivers value for money.

- Network Rail works more effectively with industry to establish an approach to the introduction of digital signalling that is affordable, cost efficient and has robust programme delivery arrangements and controls.

- Industry contributes to the development of a programme of rail enhancements in which the digital railway is a coherent part and works collaboratively with Network Rail to ensure changes to people, processes and technology are fully considered and projected programme benefits are delivered.

- The supply chain works effectively with Network Rail to establish an approach to procurement that encourages private investment and innovation and improves whole-life costs and benefits.

- The Investment community sets out the criteria it would use for investment in innovative rail technology projects and works together to advise government on how best to overcome barriers to private investment.

# 6. Recommendations

The Group recommends:

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| 1 | **Policy & Investment** | To promote industry confidence, cross party support and attract private sector participation, the Government should publish a clear statement of policy for the delivery of digital signalling and the benefits expected for passengers and the freight community. |
| 2 | **Policy** | To position the UK as a global player in the delivery of rail signalling and operational innovation, and to increase export potential, the Government and industry partners should work together to stimulate the development of knowledge, skills and capability within the wider UK rail industry to embed digital signalling and technologies into the railways. |
| 3 | **Policy** | To stimulate innovation and reduce barriers of entry to the rail market, Network Rail should find ways to open up its supplier base to a wider range of organisations. Government should develop a proposal to accelerate the introduction of innovative technologies and processes for the Digital Railway. |
| 4 | **Investment & Risk** | The industry must challenge existing orthodoxy to drive greater value through a different approach to risk transfer. To secure third party investment, Network Rail should work with Government to encourage alternative models of funding, financing and delivery. The investor community must be involved much earlier in the planning and development of future investments. |
| 5 | **Programme** | Government should agree a programme of delivery and then incentivise the industry and give it space to deliver. In return, industry will be held to account for delivery. Where necessary, the programme should flex to ensure outcomes are delivered in the most cost effective way. |
| 6 | **Programme** | To establish an approach to delivery that is sustainable and affordable, Network Rail must work collaboratively with industry partners, including suppliers, operators, financiers, employees and trade unions. |
| 7 | **Programme** | To secure programme success, Network Rail and industry partners should develop an incremental programme for the delivery of targeted and scalable digital signalling and operational innovations, or early "quick wins", which build upon lessons learnt from previous deployments, demonstrate cost effective delivery and encourage industry and stakeholder confidence. |
| 8 | **Governance** | Government should work with Network Rail to establish an appropriate governance structure for the digital railway programme. This must ensure that there is clarity of roles responsibilities and accountabilities, with appropriate delegation and empowerment. |

# Annex A: Ministerial Group Membership

The group is made up of senior industry leaders from organisations including CISCO, NATS, Network Rail and RATP as well as financial institutions including Macquarie and Perella Weinberg.

| David Waboso | Managing Director Group Digital Rail | Network Rail | David joined Network Rail in June 2016 as MD of Group Digital Railway after eleven years at London Underground Limited. Whilst at LUL David was Capital Programmes Director, where he led the upgrade of both trains and infrastructure to digital technology. He has worked on infrastructure and train control projects for over thirty years and has previously held senior positions at the Strategic Rail Authority, The Nichols Group and Bechtel Corporation. |
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| David Azema | Partner | Perella Weinberg | David joined Perella Weinberg in November 2016. He previously served as Chairman of Global Infrastructure Group at Bank of America Corporation and has been a Director of EDF. He also served as an Executive Vice-President of Strategy and Finance at Société Nationale des Chemins de Fer Français. |
| Dr Alison Vincent | Chief Technology Officer | CISCO | Alison is the Chief Technology Officer for Cisco in the UK and Ireland and is a senior technical executive with 25 years of experience in international leadership of software projects. Alison joined Cisco in 2012 as a result of the NDS acquisition and was responsible for Innovation, Global Process improvement programs, Open Source policy and Intellectual Property Rights Management in the Video Business. Prior to NDS she held senior positions in both IBM and Micro Focus Ltd. |
| Andrew Byatt | Division Director | Macquarie | Andrew is Division Director at Macquarie European Rail in Luxembourg. Macquarie European Rail leases passenger and freight rolling stock to train operators across Western and Central Europe. Prior to this role Andrew was Senior Vice President at Macquarie Group based in London and MIS Associate in Sydney Australia. |

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| Gautier Bodéo | Senior Advisor – Railway Safety & European Railway Affairs | Régie Autonome des Transports Paris | Gautier is an expert in rail transport as part of RATP Group based in Brussels. His role has supported a programme of modernisation of metro-operating systems at RATP who are embracing a digital revolution. |
| Sir John Armitt | Chairman of the National Express Group and City & Guilds, | National Infrastructure Commission | Sir John has made a significant contribution to Britain's infrastructure and led the team responsible for constructing venues, facilities and transport systems for the London 2012 Olympics. He has a strong background in railway engineering and has been Chief Executive at Union Railways (responsible for developing the high-speed Channel Tunnel Rail Link), and Network Rail. |
| Martin Rolfe | Chief Executive Officer | National Air Traffic Service | Martin was appointed as CEO at NATS in May 2015. He has worked in the air traffic management domain for 18 years leading large multinational teams across Europe, the US, the Commonwealth of Independent States, and the Far East, with customers including air navigation service providers, central government departments and military organisations. |

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