SIGNALLING CHANGE

Learning from the East Coast Digital Programme (ECDP)

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Railway Industry Association

The voice of the UK rail supply community

Front page image: Work to upgrade Northern City Line (NCL), ECDP

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About RIA: The Railway Industry Association (RIA) is the voice of the UK rail supply community. We help to grow a sustainable, high-performing, railway supply industry, and to export UK rail expertise and products. RIA has 300+ companies in membership in a sector that contributes £43 billion in economic growth and £14 billion in tax revenue each year, as well as employing 710,000 people. It is also a vital industry for the UK's economic recovery, supporting green investment and jobs in towns and communities across the UK; for every £1 spent in rail, £2.50 is generated in the wider economy. RIA's membership is active across the whole of railway supply, covering a diverse range of products and services and including both multi-national companies and SMEs (60% by number). www.riagb.org.uk

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LNER Azuma at Kings Cross Station

For years, many in our industry have been saying that we need to do certain things differently and learn lessons from past projects. The East Coast Digital Programme (ECDP) is an example of just that – taking a brave and important leap. It is fantastic to see a major client opting for an industry partnership approach - bringing the supply chain into the room as early as possible, working with them as partners and making the most of the capability they bring.

Speaking to those involved on the ECDP, it is clear that, although the project is not yet complete, there is a huge amount of positive work and excellent progress being made in delivering an undoubtedly challenging programme, which seems to be set up for success. It is testament to the leadership at Network Rail, notably Toufic Machnouk, establishing the ECDP as it is, and to every partner who has been involved to date.

Upgrading to digital signalling in the UK will be vital for improving the passenger experience, making trains more reliable and increasing capacity, as well as for improving safety on our network. We hope that this report helps share the learnings from the programme, and will help enable the roll out of digital signalling and other complex schemes across the country. This offers a delivery model for Great British Railways, bringing track and train together.

David Clarke, Technical Director, Railway Industry Association

When we launched this programme, we approached it from first principles, which made clear a number of truths. This programme is inherently one of the most complex enterprises the industry has ever taken on, as it changes how we run the railway across track and train underpinned by the opportunity of technology. The only way to organise for success was by creating a deep industry partnership, organised in a user centric change programme, and for the capability deliverers to be deeply embedded and close to the user community.

As a result, we now have an industry developed bottom-up plan unlike anything we have seen before, with a level of clarity, resilience and adaptability, and it is delivering, on the pathfinder tranche 1 northern city line and across the other areas of the programme.

This approach has created a unique user experienced change community that brings together every corner of this industry working closely with technology providers in an integrated industry model, leading with passion for the legacy of this programme and a deep collaboration to make it a reality.

Toufic Machnouk, Director, Industry Partnership Digital, Network Rail

ECDP is is truly integrating the industry like never before. In embracing a highly collaborative partnership approach, we are overcoming decades of legacy ways of working across the railway. Consciously re-aligning the focus of the programme to be one of 'transformational change enabled by technology' rather than 'technology enabled change' has rightly set the dial on the pProgramme to recognise that people will be core to the success of ECDP.

We are living up to the values we have set for the programme – Pioneering, Inclusive and Tenacious. I am overwhelmingly proud of how we have come together across over 30 partner organisations and how we continue to nurture an environment where we can all thrive, investing in our people and engaging the right people at the right time, on the right topics, to deliver at pace. We respect our collective diversity and support and challenge each other so that we can all be successful in delivering our next generation railway.

We are committed to learning from others, achieving the best from collective knowledge and in realising our ambition to leave a blueprint for the future, a positive legacy of shared learning and upskilled capability across the industry.

Caroline Crewther, ECDP Industry Change Lead, Railway Systems Integration Partner, Atkins

Executive Summary

The East Coast Digital Programme (ECDP) is pioneering a new approach to the delivery of a complex digital Command, Control & Signalling (CCS) upgrade. During a series of interviews, RIA found that this is already delivering benefits and there are a series of early lessons the railway industry can learn for future programmes.

The ECDP is upgrading the CCS on the East Coast Main Line to modern radio based digital signalling including the European Train Control System (ETCS) and a Traffic Management System (TMS), to improve railway capability and be the catalyst for a route and network roll-out. The ECDP is utilising a new unique programme structure and contractual partnership with their suppliers to improve the delivery of digital signalling and reap the benefits its brings.

Despite the hugely complex task of moving to the European Train Control System on the a major line, the ECDP team has established a lean structure that is different from previous CCS projects in the UK. It was established and has been led by Network Rail Eastern Director of Industry Partnership Digital, Toufic Machnouk, whose team has taken on a considerably different role than historically.

Map of the East Coast Main Line, Network Rail

He said: "We have taken on a greater role of industry integration, stepping into the void of the current structures and redefining relationships through deep partnership with operators, government and suppliers, because we don't have all the levers. This model with a commercial partnership therefore reduces the amount of shadowing Network Rail needs to do and allows us to build a more capable multi organisational open boundary team."

Toufic's vision and leadership has been instrumental to set out the structure of the ECDP, driven by six critical success factors: User led; Change enabled; Industry partnership; Technology partnership; Integration; and Learning enterprise.

Traditional members of the supply chain, companies including Atkins and Siemens, are working as 'partners' in the programme with significant responsibility to shape its delivery. The end users, including signallers, maintainers and a range of operators, are heavily involved, ensuring the outcomes will remain focused on delivering for the passengers and other railway users. The current model also enables 'open innovation' and iterations to be made as the ECDP progresses.

This pioneering approach has already yielded a wide range of benefits, enabling the team to respond to challenges and develop more efficient ways of working and delivery.

Yet it is not without its challenges, whether that is the steep learning curve partners have faced, the complexity of the task and long-term ambition to ensure the learning on the programme can translate to others in the industry.

This report follows a series of interviews with people working on the ECDP, including: those overseeing it at Network Rail; senior figures from companies including Siemens, Atkins and PWC; and from industry bodies including RSSB.

One of the main themes that came out of the interviews was the importance of having a vision and mission that is clearly understood and bought into by all members of the programme. Interviewees noted that the partnering structure has helped this to be extended throughout the entire programme, creating closer alignment. It is also clear that the teams understand that ECDP is not a technology delivery programme, but instead a business change programme which is being enabled through technology.

The suppliers have benefited from being significantly closer to the users, enabling them to offer better value to the programme and bring their expertise. Under the new structure, suppliers work much closer with the users of the system, i.e. signallers and operators, from the very start of the process. The end result is end-user requirements can be built into the new signalling system from its conception.

RIA's Six Key Takeaways

From these interviews, RIA has outlined six key takeaways from the ECDP for future complex programmes - this includes:

1. **A different approach is needed.** This is a transformational industry change programme enabled by technology, and therefore needs to behave like an integrated business bringing all parts together.

2. **User-centricity is paramount.** Working with the operating community and their understanding of the railway is central to realising user benefits.

3. **Success equals a lean multi-organisational delivery partnership with a shared vision.** Jointly defined principles, values, critical success factors and an open operating model are vital.

4. **Unleash the power of the supply chain**. Supplier and client should be responsible for the areas they are best equipped to deliver, and bring the supplier close to the user.

5. **This is not easy.** There is a steep learning curve for all parties involved when implementing new ways of working.

6. **Communicate, communicate, communicate**. If this is to be the default model for future complex programmes, the benefits and lessons need to be shared and embedded across the industry.

Whilst this report sets out the positives and important lessons to learn from ECDP, there remain several obstacles. There is a degree of concern outside the programme regarding its ability to be rolled out to the wider national digital signalling plan or other industry programmes - particularly about how the benefits as well as expertise and experience can be transferred across the industry. There are also internal obstacles to overcome with different companies and organisations working so closely, such as data ownership and sharing work across the programme, which is not easy to resolve.

Introduction

The East Coast Digital Programme (ECDP) will introduce in-cab radio based signalling - known as digital signalling - on the East Coast Main Line, one of the UK's major railway lines linking London to Edinburgh. Working in partnership with operators, the Government and the supply chain, the programme will upgrade the train control systems to create a greener, more reliable and flexible railway. It will also increase capacity on the line.

The ECDP is due to be the first intercity digital railway in the UK, fitting trains with the latest signalling technology and removing the old lineside signals. It will mean that the signalling system will be able to communicate with trains continuously rather than only at fixed points, instructing and responding in real time and reducing delays - thereby improving capability and performance. Funding for the programme was confirmed by Government in early 2020 after the project was initiated by Network Rail in 2018.

The programme will migrate around 3000 drivers to ETCS operations across tens of duty holders, and deploy ETCS on hundreds of vehicles.

Network Rail launched a procurement process to find private sector partners to help deliver the programme in September 2018. It was an entirely new way of working, to team up with partners from the supply chain from programme conception to design, develop and deploy the CCS upgrade, including ECTS and Traffic Management System (TMS) technology.

The key element of the scope of these relationships was that they were to be outcome based and to support and maintain the systems throughout the assets' life.

The procurement concluded with Siemens confirmed as the programme's Train Control Partner (TCP) and Traffic Management Partner (TMP), and Atkins as Railway Systems Integration Partner (RSIP) – with support from Ramboll and PWC. The programme was established and continues to be overseen by Network Rail, in partnership with operators with cross industry governance.

Benefits that ECDP is delivering

- Increased system availability
- Improved punctuality
- Improved track staff safety
- Improved passenger safety
- Reduced energy consumption and carbon costs

Programme status

At the time of publication, the Programme had delivered:

1. The full business case has been completed. It is founded on an industry-developed baseline plan, from blueprint to detail delivery partner and supplier cost plans. It is the first to be developed this way.

2. Northern City Line (NCL) was rapidly developed in the partnership model with operator, route and supplier. It is in delivery with commissioning of the upgraded system planned for 2022. This will be the first migration to a no signals ETCS since the Cambrian project in 2010, and the first for a higher capacity railway in the UK.

3. Business change projects have been mobilised from across duty holder organisations to deliver the shift to ETCS operations.

4. The train migration project has started work with operators to drive the technology deployment, .

5. The first migration on ECML between Welwyn and Hitchin is in design development and started delivering infrastructure upgrades in Christmas 2021. Train fitment and readiness projects are being progressed across the fleets and vehicles used on the line.

Currently, over 70% of the cost plan on ECDP is for items that go beyond upgrading the East Coast South section - preparing for roll-out on the wider network beyond ECML.

In October 2021, ECDP received a 'green' status from the Infrastructure and Projects Authority (IPA) review - one of only a few railway projects to do so. This has recognised that the industry partnership and operating model has been successful in exposing the risks of this enterprise and responding to them. It also recognised how the user centric approach meant that the plan is as resilient as possible given the inherent complexity and the range of organisations brought together.

In November 2021, the Government's Integrated Rail Plan confirmed further funding to upgrade the East Coast Main Line, including delivering full digital signalling.

Work on the Northern City Line, ECDP

Report methodology

During September to November 2021, the Railway Industry Association (RIA) held a series of interviews with key figures involved on the East Coast Digital Programme to hear their views on how the programme has been developed and its progress so far. The interviews included representation from:

- Network Rail
- Siemens - Train Control Partner (TCP) and Traffic Management Partner (TMP)
- Atkins - Railway Systems Integration Partner (RSIP) Lead
- London North Eastern Railway (LNER) - as the lead train operator on the route
- PWC - Part of the RSIP consortium
- RSSB - Developing the new supporting standards

Each group was asked a series of questions, including around the set-up of the programme, how it differs from others, the benefits, any potential drawbacks and wider lessons for the industry.

From these interviews, RIA has identified several common themes, which are set out in greater detail below.

Grand Central Class 180 at Biggleswade on ECML, Milda Manomaityte

How is the ECDP different?

First and foremost, it is clear that ECDP is indeed different from other railway programmes. Interviewees were unanimous that it differs significantly from previous projects or programmes they have been involved in. Primarily, this is in the structure, which was established as a partnership model.

The model means that traditional supply chain companies including OEMs are acting as partners, with operators also heavily involved.

The Railway Systems Integration Partner (RSIP) – led by Atkins, with support from Ramboll and PWC is responsible for the integration of the system onto the railway and the associated business change.

The Train Control Partner (TCP) – Siemens is responsible for the development, delivery and integration of the CCS technology and system architecture.

The Traffic Management Partner (TMP) – Siemens is also responsible for the development and delivery of the traffic management software.

These companies, or partners, also act as the main technical leads and have stepped up to take on more responsibility to manage the technical integration of the system with the operational railway as well as engage collaboratively with each other, Network Rail and the railway operators. Some of these responsibilities would traditionally fall on Network Rail.

The partners also take on risk on achieving the outcomes. Whereas with normal infrastructure or signalling programmes in the UK, where the responsibility to deliver successfully is on Network Rail, on ECDP the partners – including Siemens and Atkins – have far more responsibility for delivering outcomes. Partners are also given much more flexibility in specifying how these are met than is traditionally the case. So, from start to finish of the process, it is markedly different.

One interviewee from the RSIP, Atkins, said: "The partners have stepped up to take on more responsibility to realise outcomes - [this is] traditionally something that Network Rail would take on alone."

Moreover, each operator which uses the East Coast Main Line is embedded in the programme. This includes duty holder organisations including passenger train, freight, open access or heritage railway operators who will need to operate in ETCS. - e.g. LNER, GTR, Grand Central, Hull Trains, Lumo, amongst others. In addition, a senior representative from LNER acts as the lead coordinator for industry business change on behalf of the operators.

"The partners have stepped up to take on more responsibility to realise outcomes - [this is] traditionally something that Network Rail would take on alone."

Interviewee from the Railway Systems Integration Partner, Atkins

Train simulator at Kings Cross, ECDP

From very early in the discussions, the operators, including the Network Rail Route, were driving the outcomes and programme definition. While this has not been a completely clean slate, founded on ETCS principles, the purpose is to ensure the programme delivers integrated outputs that the operating community can use to deliver benefits to services.

The reasons for adopting such a structure were multiple. Primarily, this is one of the most complex endeavours the industry has undertaken and requires a user centric partnership model to bring all the parts together. In particular, there are several key takeaways from the ECI Digital Engagement Paper on new delivery models, published in 2016.

There has also been a strong vision from Toufic Machnouk, responsible for shaping this programme. Speaking to Toufic, he is clear that they would not have been able to deliver the necessary upgrades on the East Coast Main Line through a "business as usual" approach or the same model where Network Rail was the infrastructure deliverer, concern with shadowing or supervising suppliers, carrying out inhouse design, and using the network code to seek industry operators to respond to the change. He was clear from first principles that this 'existing structures' based approach would not work and therefore had to be different to transcend these structures and create an integrated operating model based on partnership.

RIA heard agreement with this view from other interviewees, with several highlighting that this approach was likely a lesson from the challenges of the Great Western Electrification Programme (GWEP), which saw costs spiral and was delayed, before parts of the plans were cut.

The different structure is further a reflection of the scale of what the programme has to deliver, with the range of partners. Firstly, with the quantity of new technology, it would

have been organisationally extremely complex to use the previous model and would have taken longer to develop the right requirements and technical solutions, as well as work with end users to create credible plans.

But secondly, and perhaps more importantly, there was consensus that given the number of organisations and partners involved it is more complex than other programmes the industry has delivered. Across ECDP, there are over 30 companies and organisations to engage with, including all those who operate on the railway. This means readying over 400 passenger trains, over 40 OTM vehicles, over 30 heritage and charter locomotives and more than 250 freight locomotives.

This feedback came from both Network Rail and partners. One respondent said: "This [ECDP structure and approach] is necessary to respond to the scale of what ECDP is trying to achieve, due to the sheer number of participants." Another added that this marks a "step change" from what has been required from previous digital signalling programmes in the UK, including on the Cambrian Line and Thameslink.

The need to establish it as an integrated enterprise was also highlighted – "The programmes need to be set up as an integrated enterprise, then consider what and how you deliver in a user centric partnership."

One partner remarked that there is an approach of 'best person for the job', saying: "If we need these roles, it does not matter whether they are from a supplier, Network Rail or operator".

Interviewees suggested this didn't mean the programme needed its own revenue streams or to act with a profit-motive, rather it meant focusing on new ways of working and not being shackled with the ways of the past - focused on a clear mission and approaching from first principles.

Key themes

According to those interviewed, it is a transformational industry change programme, that is enabled by technology. During the interviews, RIA heard that instead of focusing on the technology and attempting to install it, the focus has been on how partners and operators change to benefit from the technology.

Kings Cross Station

There was discussion amongst the interviewees about how this was driven, with some saying that at first the 'change' aspect was "tacked on", before becoming a central characteristic. Others said that it was central from the outset.

The crucial difference is that the emphasis is on encouraging behavioural and structural changes in the organisations and companies involved, in order to deliver a proven technology in ETCS. It is not about trying to deliver the technology, in the same way as previous projects and programmes. While ETCS is not widely rolled out across the UK, it is not a new technology for the industry, with significant usage across Europe.

There is a clear and shared vision, mission and success factors. One recurring theme that RIA heard, was that despite the complexity and the new responsibilities for partners, there is clearly one shared vision across the programme. Everyone who RIA spoke to echoed this message and was in harmony about what their overall ambitions are.

Representatives from partners including Siemens and Atkins said that there is always "programme first" attitude.

Perhaps the main reasons for this are the critical success factors and values instilled by the leadership. Every group interviewed referred to the key values and critical success factors which underpin ECDP, and referred to them positively as helping drive the project.

The core values are: Pioneering, Inclusive and Tenacious. These have set the tone and have been adopted by all those involved at all levels, giving a strong feeling of consistency, commitment and teamwork across the programme. Given the disparate elements, these have provided a central ambition for the teams.

The six 'Critical Success Factors' include:

- **User led;**
- **Change enabled;**
- **Industry partnership;**
- **Technology partnership;**
- **Integration; and**
- **Learning enterprise.**

It was noteworthy that the majority of interviewees could list the values and cited

THE CORE VALUES OF ECDP:

Pioneering	'We will be empowered transformers for our industry, inspired to leave a positive legacy.'
Inclusive	'We will nurture a diverse, creative and trusting environment in which we all thrive.'
Tenacious	'We will be bold and committed to doing the best together, inrestrained by convention.'

their importance. One partner remarked that there is an approach of 'best person for the job', saying: "If we need these roles, it does not matter whether they are from a supplier, Network Rail or operator".

It seemed getting the teams behind these values did not require elaborate solutions. Instead, through simply engaging with people regularly and honestly on these, on an education and engagement basis which echoes through the various communication channels on the programme, the messages are clearly well understood in Programme teams. RIA observed that people feel a sense of passion and legacy responsibility to the mission and approach of ECDP.

Building on this, partners and operators have bought in. During the interviews, RIA heard that buy-in and collaboration from all partners involved in the programme, whether those delivering the upgrades or the end-users of the system including train operators and Network Rail Route, has been consistent.

For example, one person highlighted that people tend to forget which company they are working for and put the programme first. Another said: "Making people feel connected is crucial for delivery."

In addition, Network Rail Director Toufic Machnouk has emphasised **the importance of the core principles of Managing Successful Programmes (MSP)** - an established process which is not just applicable to the railways. MSP is a methodology that comprises a set of principles and processes for use when managing a programme. A programme is made up of a specific set of projects identified by an organisation that together will deliver some defined objective, or set of objectives, for the organisation. The objectives, or goals, of the programme are typically at a strategic level so that the organisation can achieve benefits and improvements in its business operation. Interviewees confirmed that this is driving a benefits-led approach.

Freight train on ECML

The Managing Successful Programmes principles and processes are detailed below.

THE MSP PRINCIPLES ADVISE HOW TO:

- Organise people to ensure responsibilities and lines of communication are clear
- Plan the work in a way which achieves results
- Ensure that the organisation benefits from undertaking the programme
- Ensure that all interested parties (the stakeholders) are involved
- Resolve issues which arise
- Identify and manage risks
- Ensure quality
- Keep up to date information which tracks the continually changing environment
- Audit a programme to ensure standards are being followed

THE MSP PROCESSES ADVISE HOW TO:

- Identify the aim of the programme and envisaged benefits to the organisation
- Define the programme, and specify how the organisation will be different afterwards
- Establish the programme
- Monitor and co-ordinate the projects within a programme to a successful conclusion
- Manage the transition between the 'old' and 'new' ways of working, ensuring benefit
- Close the programme and ensure the 'end goal' has been achieved
- Interviewees confirmed that this is driving a benefits-led approach.

Finally, the ECDP feels like the industry experimenting, on itself. One theme RIA identified is that given the unique and arguably pioneering structure, there is a feeling that it is a constant experiment. Partners are taking greater responsibility for new roles and risk, sharing more information with others involved and the focus is on operators as end users – all of which are markedly different to how such programmes have traditionally been run in the industry.

Benefits of the programme structure

Building on this, RIA heard that the innovative structure and approach is driving a number of benefits. Indeed, according to Network Rail, the way in which the programme has been planned will maximise the benefits of digital signalling by delivering approximately 40% reduction in infrastructure costs and require 46% less access to the railway to implement than conventional signals.

Looking at its structure, **one of the key benefits of ECDP is the proximity of partners to the end-users**, i.e. operators and Network Rail Route. At each stage this close working ensures that they are delivering a solution that works for the users, delivering high certainty and confidence in delivery of outcomes.

This engagement from the users is vital for achieving the programme's aims, so it will continue to be guided by what the end-users will need, rather than forcing them to adopt the final product or getting it wrong. This is about getting the application design right and ensuring the operating community is ready for it, making it easier and quicker to implement.

There is a limit to this approach, in so far as it works provided it doesn't start with 'a blank sheet of paper' for something that already has a foundation like ETCS. For example, one partner said: "There needs to be clear parameters on what is fixed and what can be user-led, as there are some constraints that cannot be changed in the way ETCS is already been matured."

The innovative and lean structure also enables rapid and flexible delivery. ECDP was deliberately set up to avoid teams replicating work, 'person-marking', and to avoid expensive and time-consuming internal processes. Some of feedback highlighted how the programme does not have a fixed process for how it must be delivered - instead the team has the flexibility to test and adapt in order to deliver each stage.

This is not to say there isn't a clear plan for what needs to be delivered and by when. It means that programme partners have been entrusted to set out how each stage can be delivered, with tweaks and changes in approach encouraged to set up for success by constantly learning. It also reflects trust from Network Rail in its partners, by not setting overly prescriptive schedules and processes.

RIA heard that the ECDP is "re-defining [the] operating model. This has been essential as [the programme] evolves".

On industry engagement, there was also unanimity that **ECDP has secured very good engagement from all parties** who have a stake in the East Coast Main Line - a total of 30 organisations. There was consistent praise for how each party has been willing to come to the table and to share information at each stage.

One respondent said: "We are integrating industry like never before."

This could be a model for Great British Railways. One partner said: "It is about breaking down years of practice as an industry to find better ways of doing things."

This could be the model for a Great British Railways future. In several sessions, RIA heard that the ECDP model could be a template for how the industry should work under Great British Railways (GBR) – with a leaner client structure and bringing train and infrastructure together in a more systematic structure with partners taking a greater lead and responsibility in delivering new technology.

NCL works at Moorgate Station, ECDP

Setting out a new way of working was not the primary motivation for setting up the programme in such a way, but instead seems to be "natural consequence" One partner simply asked: "Why wouldn't we? It is about breaking down years of industry practice to find better ways of doing things."

Adaptation to the pandemic - for many involved, much of their time working so far on ECDP has been during the Coronavirus pandemic. This of course meant that for long periods, face-to-face engagement and shared working spaces have not been possible.

Despite having a shared spaces which was used increasingly as lockdown restrictions have eased across the UK, the vast majority of work so far was being undertaken virtually.

One upside of this has been to enable partners and stakeholders to attend more workshops than would have been possible previously. For instance, suppliers can now join various different virtual meetings in one day, rather than travelling to only one or two in a day, including innovative ways for users to bring suppliers closer to the operating environment using remote tools.

Supplier-user proximity - the suppliers have benefited from being significantly closer to the users which has enabled them to offer better value to the programme. The new structure allows for the suppliers to work much closer with the users of the system from the very start of the programme enabling end-user requirements to be built into the fundamental needs and requirements of the system from its conception.

Potential challenges

While the programme appears to be on track and despite the benefits, there are likely to be several significant obstacles to overcome to both deliver on its targets and pave the way for future programmes, according to those interviewed by RIA.

As the first intercity route deployment of digital railway technologies, **delivering ECDP will be complex - and it cannot afford to fail.** RIA heard that despite the progress and redefinition of operating structure, everyone involved is aware that delivering the ECDP will

still be incredibly complex. It is also seen as the UK's best chance to implement ETCS across major passenger and freight lines, according to the group. There is an awareness that this will likely impact the prospect of other digital signalling programmes and upgrades being given the green light in future.

Partners face a steep learning curve. Whilst the structure ensures that ECDP is comparatively lean, it also means that there are challenges and decisions that partners must make that have traditionally been carried out by Network Rail staff. All this is new for partners, who have all faced a significant learning curve.

> **"It should not be underestimated the amount of effort needed to bring [the programme] to life."**

The start proved particularly challenging, with a partner remarking: "It should not be underestimated the amount of effort needed to bring [the programme] to life". Moreover, RIA heard from one partner that "it has been like treacle" to get people to realise they are "it" – that is to say there is no person or team at Network Rail assuring or checking every decision.

This is a learning curve for all, not just partners, including the team at Network Rail.

According to senior figures, this learning curve was always expected and part of the programme objectives is to go through this curve and develop and mature the overall capability together. Going through this iterative and challenging process has also introduced efficiencies and identified new ways of working.

The data and information set up is not 'ideal'. The current set up is a Memorandum of Understanding (MoU) to cooperate, focused on behaviours. It was only envisaged as a starting point for the partners to build on and jointly develop and mature, it was never the end-product. There is now scope for clearer agreements on the how the partners work and share data in this open boundary working, which will need to evolve as ECDP matures and moves through its delivery phases.

Current agreements could also be improved - interviewees suggested parties should sign an official agreement.

It was also pointed out that IT tools, such as Microsoft SharePoint and Teams, are not yet configured optimally to provide a seamless platform for data-sharing across different organisations. Instead "a single platform is needed".

It is not clear how ECDP is translated to wider industry, as it stands. RIA heard feedback that although the work on ECDP is "pioneering", there is no clear or easy means to transfer knowledge to other programmes for several reasons.

Lumo Hitachi Class 803 train

First, as the programme involves a small number of supply chain companies, or partners, there is a risk much of the expertise will be retained by employees of these businesses in the long-term.

The same can be said for the Network Rail team providing oversight, which would usually be larger and facilitate the transfer of knowledge and resource elsewhere.

Finally, the unique structure and number of partners required to respond to the complexities of the East Coast Main Line makes gathering and sharing the lessons learnt in an open forum difficult. This may become clearer through RIA's report and a more established learning legacy, championed by Toufic Machnouk.

RIA heard from outside ECDP that they had some concerns that previously agreed national operational principles were being changed by ECDP. The programme's view is that with much greater engagement from the regional railway operators, they are making the principles work in reality, on an existing railway and in a migration state.

The benefits and approach needs communicating more widely. Listening to those who are not directly involved in the programme, their view is understandably less clear about what ECDP is delivering. The feedback was that there is more work to do to communicate the benefits and transferability of ECDP, as well as advantages of a digital signalling programme – both to the wider rail industry and government stakeholders.

Conclusion and Recommendations

The need to do things differently on major complex or cross industry programmes is clear. Historically these programmes have not always been successful, falling victim to limiting industry structures. One of the main themes that came out of the discussions with interviewers was the importance of having a clear vision, mission and success factors that are clearly understood, communicated and embedded by all partners.

The partnering structure on ECDP has allowed this to be embedded throughout the entire programme. It is also clear that the teams understand that it is not a technology delivery programme, but a business change programme that is being enabled through technology.

Looking ahead, RIA has outlined six key takeaways from the ECDP for future complex rail programmes - this includes:

1. A different approach is needed. This is a transformational industry change programme enabled by technology, and therefore needs to behave like an integrated business bringing all parts together.

2. User-centricity is paramount. Working with the operating community and their understanding of the railway is central to realising user benefits.

3. Success equals a lean multi-organisational delivery partnership with a shared vision. Jointly defined principles, values, critical success factors and an open operating model are vital.

4. Unleash the power of the supply chain. supplier and client should be responsible for the areas they are best equipped to deliver, and bring the supplier close to the user.

5. This is not easy. There is a steep learning curve for all parties involved when implementing new ways of working.

6. Communicate, communicate, communicate. If this is to be the default model for future complex programmes, the benefits and lessons need to be shared and embedded across the industry.

Whilst this report sets out the positives and important lessons to learn from ECDP, there remain several obstacles. There is a degree of concern outside the programme regarding its ability to be rolled out to the wider national digital signalling plan - particularly about how the benefits as well as expertise and experience can be transferred across the industry. There are also internal obstacles to overcome in a novel open boundary environment such as data ownership and sharing work across the programme, which is not easy to resolve.

Interviewees

During the course of producing this report, RIA interviewed:

- Jonathan Hayes, Senior Programme Engineering Manager, Network Rail
- Robert Forde, Business Change Lead, Network Rail East Coast Route and Lead Partner for Network Rail within programme
- Roger Hall, Project Director, Atkins
- Karl Dodsworth, Head of Technical Assurance, Atkins
- Caroline Crewther, Director, Business Transformation, Atkins, and Industry Change Lead for RSIP on the Programme
- Adam Lowery, Regional Engineer (S&T), Network Rail Eastern
- Paul Hooper, Head of EMO Safety and Interoperability Assurance, Atkins
- Luke Reger, Head of EMO Safety and Interoperability Assurance, Siemens
- James Webster, Head of Industry Sponsorship, Network Rail
- Ben Lane, Siemens
- Mark Ferrer, Engineering Director, Siemens
- Philip Bennett, Commercial Director, Network Rail
- Grant Klein, PWC
- Stuart McFarland, Principal CCS Engineer, RSSB
- Alex Savopoulos, Principal CCS Engineer, RSSB
- Toufic Machnouk, Director of Industry Partnership Digital, Network Rail Eastern

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