Digital Railway

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Generic Outcome-Based Business Requirements for Digital Railway Technologies

Prepared by:
Colin Brown
Principal Architect

Date: 19th Nov 2018

Reviewed by:
Rubina Greenwood
Head of System Requirements and Integration

Date: 19 Nov 2018

Approved by:
James Drury
Head of Investment Strategy, Franchising & Sponsorship

Date: 22 Nov 2018

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Document owner: **James Drury**

Version History

Issue	Date	Comments
0.1	12/07/2018	Initial Draft
0.2	19/07/2018	Add in RTS CDP
0.3a	01/08/2018	Major improvement with Technical Author comments included
0.4	08/08/2018	Additional outcome added to address Shaw Report core problem statement
0.5	03/09/2018	Comments from reviews addressed some outstanding issues still present.
0.6	08/10/2018	Further comments from follow on review
1.0	23/10/2018	For Presentation to Programme Board
1.1	07/11/2018	For Presentation to the SFS Board prior to Presentation to the Programme Board

Exclusions

There are no items currently missing from this version of the document that should be included in a later publication.

Dependencies

There are eight items upon which the validity of this document depends. Any changes to these referenced documents may require further changes to this document.

1. Formal letter and updated mandate, DfT to NR, 17 February 2010 [RD1]
2. The Rail Technical Strategy Capability Delivery Plan (CDP), 27 Jan 2017 [RD2]
3. Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 concerning measures for a high common level of security of network and information systems across the Union (NISD) [RD3]
4. Draft Outline Business Case (OBC), Unreferenced, dated March 2016 [RD4]
5. The Shaw Report "The future shape and financing of Network Rail" March 2016 [RD5]
6. Connecting people: a strategic vision for rail [RD6]
7. The Hansford Review Unlocking rail investment – building confidence, reducing costs [RD7]
8. Digital Railway Strategy [RD8]

CONTENTS

ABBREVIATIONS AND DEFINITIONS

Abbreviations are explained in full on first use within this document. A comprehensive list of abbreviations and definitions is contained in the Glossary [RI1].

REFERENCES

Dependent References

An update to one of these references requires a review to identify any potential need for an update to this document.

[RD1] Formal letter and updated mandate sent to Network Rail from Department for Transport 17 February 2010
[RD2] The Rail Technical Strategy Capability Delivery Plan (CDP) 27 Jan 2017
[RD3] Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 concerning measures for a high common level of security of network and information systems across the Union (NISD)
[RD4] Draft Outline Business Case (OBC) Unreferenced, dated March 2016
[RD5] The Shaw Report "The future shape and financing of Network Rail" March 2016 ISBN: 978-1-84864-177-8
[RD6] Connecting people: a strategic vision for rail November 2017 ISBN: 978-1-5286-0125-2
[RD7] The Hansford Review Unlocking rail investment – building confidence, reducing costs, June 2017
[RD8] Digital Rail Strategy, April 2018
[RD9] Digital Railway Programme Strategic Business Plan, Jan 2018.

Informative References

These references have no material bearing on the content of this document, but are referenced in the processes.

[RI1] DR Glossary of Terms and Abbreviations, 153819-NWR-SPE-ESE-000001
[RI2] 2018 No. 506, Electronic Communications, The Network and Information Systems Regulations 2018, Made 19th April 2018, Laid before Parliament 20th April 2018, came into force 10th May 2018

1 INTRODUCTION

1.1 Background

At peak times on the busiest parts of the network, Britain's railway is at full capacity and many of the signalling assets are scheduled for renewal in the next control periods. Additional capacity is urgently required to meet the continued rise in demand, which it is estimated will result in an extra one billion journeys a year by 2030. Cheaper means of effecting signalling renewals at a faster pace are required to overcome the accumulated bow wave of renewals. The Digital Railway Programme (DRP) has been set up to take advantage of emerging digital technologies that will help tackle capacity and renewal issues. It is a cross-industry programme that brings together systems, technology and business change to focus on areas that offer the best balance between benefit and affordability.

The Digital Railway is expected to bring a host of benefits for railway users, the taxpayer and the industry itself; these have been listed as a set of Outcomes which the programme will need to achieve.

1.2 Purpose

This Generic Outcome-Based Business Requirements document is an all-embracing, structured expression of the highest-level Customer Requirements for the implementation of Digital Railway (DR) technologies on infrastructure and rolling stock across GB's rail network. It forms the baseline for DRP project development and is to be used as the parent for the Concept of Operations (ConOps), the Enterprise Architecture Model, and all the Customer Requirement Specifications (CRSs).

Therefore, the purpose of the Generic Outcome-Based Business Requirements document for the DR technologies is to:

1. define the formal highest-level Customer Requirements;
2. provide a benchmark against which analysis of trade-offs can be conducted;
3. provide clear (but not overly-prescriptive) direction and guidance against which subsequent option selection can take place (this includes development of requirements and plans covering areas such as equipment, operations, and organisations);
4. allow easy assessment of completeness and consistency against engineering and operations documents at a lower level of detail (e.g. ConOps, Basis of Design);
5. provide high-level statements against which the final solution can be accepted; and
6. provide a generic suite of high level requirements to facilitate consistency between Deployment Project Teams across the GB railway.

The Generic Outcome-Based Business Requirements document, then, constitutes the generic basis on which Deployment Project Teams can develop their own Deployment-specific Business Requirements.

NB These Business Requirements do not anticipate or prescribe selection of a particular capability or solution. The requirements, therefore, exclude unjustified constraints and leave options to the lower level requirements.

1.3 Scope

Elicitation of the requirements has been derived from the DR Strategy [RD8] document and other source documentation. See section 2.2

NB This document contains requirements at a high level, covering the entire scope of the DR Programme. More detail will be provided in the System of Systems (SoS) Requirements and the System Requirements, where the Generic Business Requirements will be decomposed, and further detail added. These requirements will form the acceptance criteria used in the validation of the DR technologies against the requirements laid down in this document.

1.4 Requirements Structure

The generic requirements follow a set structure:

1. **Requirement ID** – A unique identity allowing individual identification of the requirement within this document and allowing the requirement to support the Customer Requirements in a hierarchical structure. (e.g. Outcome 1).
2. **Requirement Text** – The actual requirement text is taken from the relevant source but expressed as a single statement of need.
3. **Rationale** – Justification for the existence of the requirement and for any parameters specified along with the sources that have generated the need.
4. **Guidance** – Any additional information which provides clarification or context.
5. **Measures** – The methods of collecting sufficient evidential information such that success, or otherwise, can be assessed.

1.5 Requirements Use by Deployment Projects

The Deployment Project Teams are expected to use the generic set of outcome-based Business requirements to formulate their particular project needs and priorities and include them in their Deployment-specific Business Case and Requirements. This will then help the Deployment Project Teams to determine which of the linked Customer Requirements are relevant to their particular Deployment, and also enable them to trace their requirements both down through the Customer Requirements to avoid any 'gold-plating' and back to the overall Business Requirements to facilitate Verification and Validation.

1.6 Update Policy

This Generic Outcome-Based Business Requirements document will be reviewed prior to each Digital Railway Technologies contract being let, and whenever an implementation is to be validated as having met these requirements, in order to determine whether it accurately reflects current needs.

2 OUTCOMES

2.1 List of Outcomes

The Digital Railway Programme was accountable for successfully preparing the DR Outline Business Case and delivering it to the Department for Transport in 2016 for incorporation into the Control Period 6 (CP6) Digital Railway Programme Strategic Business Plan[RD9]. It was also responsible for defining and developing the Digital Railway SoS.

The DRP will bring about business change and exploit new technologies to achieve 12 outcomes. These requirements (outcomes) are not in any priority order and application to deployment projects will be different, dependent on individual needs and trade-offs:

1. Better connectivity
2. Better customer information
3. Better business information
4. Greater environmental sustainability
5. Improved capacity
6. Improved performance
7. Improved safety and security
8. Increased global leadership and skills
9. Increased network availability
10. Lower whole-rail-industry whole-life cost
11. Reduced journey times
12. Greater business flexibility and agility to align to business needs

The application of new DR technologies across GB's rail industry will provide evidence that the benefits which can be realised will meet the outcomes in this list. The individual sources for each of the outcomes is defined in the Rationale section of each Requirement.

2.2 Source Documentation

The information to create the 12 outcomes listed above, and to support the requirements in Section 3, below, has been derived from a number of sources:

- A formal letter and updated mandate dated 17 February 2010 [RD1]. In 2006, Network Rail was given a mandate to provide the strategic direction to the cross-industry ERTMS Programme Team for the creation and delivery of the ERMTS National Implementation Programme.

  Subsequently, Network Rail published a roll-out programme and business case, which became the basis of the ERTMS Implementation Plan that was notified to the European Commission in 2007. Further work identified a number of issues with the original implementation plan and on the 17th February 2010 a formal letter and updated mandate was sent to Network Rail to commence that work.

- The Rail Technical Strategy Capability Delivery Plan (CDP) [RD2]. This builds on the Industry's Rail Technical Strategy, published in 2012. The CDP has been developed through consultation with experts from across the rail industry and the supply chain.

This CDP document, and the supporting online resources, identifies 12 whole-system 'Key Capabilities' that the railway needs to develop in order to meet the industry's objectives of increasing capacity and improving customer service in a sustainable and affordable manner.

The outcomes listed in this document constitute Digital Railway's alignment with the Key Capabilities and milestones defined in the CDP. The CDP approach has been endorsed by the Rail Supply Group and the Rail Delivery Group (RDG) as the Technology Leadership Group (part of RDG) owns the RTS. From the CDP "*The key capabilities have been developed in accordance with the RTS, in consultation with industry experts, and are endorsed by the industry's Technical Leadership Group (TLG)*".

- The Network and Information Systems Directive (NISD) [RD3]. This aims to raise the overall security and resilience levels of network and information systems across the European Union(EU). It came into law through Regulation [RI2].

- Draft Outline Business Case (OBC) [RD4]. This was intended to demonstrate the case for change by presenting a clear rationale for making the investment, as well as providing strategic support for the aims and objectives of the organisation and government.

- The Shaw Report 'The future shape and financing of Network Rail' [RD5]. In the Summer Budget of 8 July 2015, the government announced that Nicola Shaw had been asked to advise on how it should approach the longer-term future shape and financing of Network Rail. The Report was published in March 2016.

- Connecting people: a strategic vision for rail [RD6]. This document details the strategic vision of the railway as presented to parliament by the Secretary of State for Transport.

- The Hansford Review [RD7]. This was *'an independent review of contestability in the UK rail market to consider third party investment and infrastructure delivery, on the national railway' (ibid. p.4).* The review had the intent of encouraging third party investment and infrastructure delivery on the national railway. Hansford stated that, *'where the barriers to entry into a contestable market were few, and incumbents faced the threat of competition, this could lead to greater innovation and customer benefits, e.g. better value for money, increased/improved services. Where little threat of competition existed', he said, 'the organisation holding the monopoly could become complacent, failing to respond to customer feedback and lacking any incentive to reduce costs.'*
- The Digital Rail Strategy [RD8]. The purpose of this document is to outline the strategic context, drivers for change, and overall direction of the Digital Railway Programme, setting out its objectives and benefits, and how the Digital Railway relates to wider economic, social and environmental objectives. The Strategy sets out the strategic direction and delivery approach for the Digital Railway Programme. As the highest-level document which has been signed off by the Stakeholders, this document will be used to help derive the Business Requirements.

- The Digital Railway Programme Strategic Business Plan [RD9] presents DRPs plan for Britain's Digital Railway development between 2019 and 2024. At the heart of the plan is greater alignment between track and train, with shared targets and priorities.

The following Figure 1 Digital Rail Requirements' shows the flow of source documents to Business Requirements down to individual System Requirements and their alignment to Deployment Project documentation.

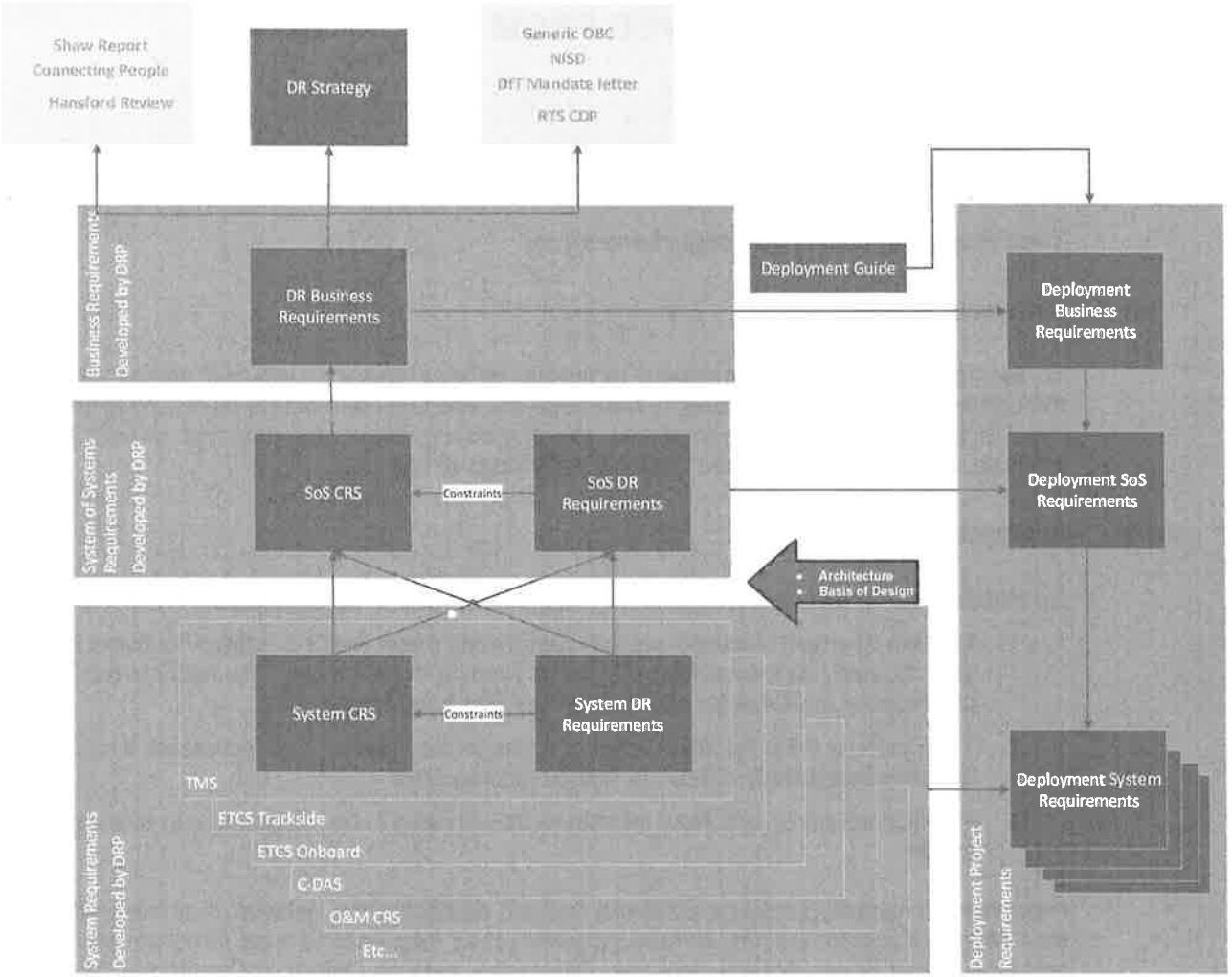

Figure 1 Digital Rail Requirements Hierarchy

3 REQUIREMENTS DERIVED FROM THE OUTCOMES

3.1 Outcome 1: Better Connectivity

3.1.1 Requirement

The DR solution shall enable better connectivity.

3.1.2 Rationale

To facilitate more services, matched to regular journey demand; reduced station crowding through intelligent traffic flow; and *'to rebalance the economy and create more homes we also need to forge new links between places, spurring development and economic growth'* from a strategic vision for rail [RD6] and Digital Rail Strategy [RD8] 3.2.2.

3.1.3 Guidance

Connectivity comprises three major elements that will need to be addressed:

1. Number of stops: Network capacity restrictions mean that it is difficult for trains to stop regularly as they delay other trains running behind them. This restricts the connectivity available for both passenger and freight customers.
2. Train journey time: As the number of trains on the network has increased, it has become increasingly difficult to reduce journey time.
3. Physical infrastructure: New infrastructure will need to be integrated into existing routes.

Improved connectivity could be achieved through managing the network in a more effective way. More trains could be run, thereby increasing their frequency to meet forecast demand as part of a line of route upgrade package. Old routes such as Oxford to Cambridge, could be restored and new routes such as HS2 could be integrated.

To reduce train journey time, the number of stops on a service could be traded off against the overall running time of that service or, as already stated, old routes could be restored to invigorate economic growth.

3.1.4 Measures

- Reduce number of changes required per route;
- Reduction in stops between source and destination; and
- Increase in number of destinations within route.

3.2 Outcome 2: Better Customer Information

3.2.1 Requirement

The DR solution shall enable better customer information.

3.2.2 Rationale

To facilitate clear, real-time journey / transit planning information; '*Improved passenger experience*' [RD8] and '*a better deal for passengers*' [RD6]) and helpful passenger / transit information during disruption.

3.2.3 Guidance

Passengers rely on a customer information system, especially during times of disruption, where they need to understand the consequences of that disruption. Inefficient systems can have an impact upon reputation and brand, whereas improved information could be perceived by passengers as time-saving, thereby attracting more rail users.

3.2.4 Measures

- Customer satisfaction.

3.3 Outcome 3: Better Business Information

3.3.1 Requirement

The DR solution shall enable better Business Information.

3.3.2 Rationale

To facilitate effective management of information, which is vital to the railway enterprise, and essential if the other outcomes are to be achieved. Same as 3.2.2 and see 3.28 of A Strategic Vision for Rail [RD6] which indicates the government is going to drive a Rail Action Data Plan to ensure better business use of data.

3.3.3 Guidance

Businesses are likely to benefit from the improved information that can be provided by the Digital Railway.

Rationalising the myriad information sources and systems in the railway will require a deep understanding of the information the railway collects and how this is used by the different parts of the industry.

3.3.4 Measures

- Customer satisfaction.

3.4 Outcome 4: Better Environmental Sustainability

3.4.1 Requirement

The DR solution shall enable better environmental sustainability.

3.4.2 Rationale

To facilitate reduced energy consumption by minimising start/stop during journeys. To facilitate the Clean Growth Strategy, which promotes the shifting of freight from road to rail (3.49 Connecting people: a strategic vision for rail [RD6]). The DR Strategy [RD8] also includes guidance on how freight can be moved off the road to reduce congestion and, hence, help in implementing the government's environmental strategy.

3.4.3 Guidance

To achieve greater environmental sustainability, three areas will need to be targeted for reduction: direct energy consumption, carbon impact of modal shift to rail, and environmental impact of construction.

The use of advisory speeds should help to reduce the number of stops and starts, and optimise energy usage.

New approaches are needed to meet the energy requirements of the railway system for an increasing number of higher frequency services on major routes. Optimised on-board and lineside energy storage technologies could allow the railway to move energy around the system according to supply and demand. Additionally, a higher proportion of energy could be recovered through regenerative braking, and small-scale energy generation and harvesting technologies that feed energy-efficient trackside systems.

Implementation of the UK Clean Growth Strategy will promote the movement of freight from road to rail.

3.4.4 Measures

- Energy efficiency of journeys;
- Modal shift of traffic on to rail; and
- Total energy consumed for the different construction solutions deployed.

3.5 Outcome 5: Improved Capacity

3.5.1 Requirement

The DR solution shall enable improved capacity.

3.5.2 Rationale

To facilitate better informed capacity planning and the running of trains closer together ([RD2] CDP milestone A). The railway '*needs to get the most out of the existing assets as well as building the capacity needed to meet demand*' (1.3 Connecting people: a strategic vision for rail [RD6], Program Mandate [RD1] and also reproduced in DR Strategy [RD8] benefits area).

3.5.3 Guidance

The rail network has reached peak capacity across several key regions, resulting in a need to increase train capacity (more trains and / or more carriages).

A lack of capacity limits the ability of the network to act flexibly and also to respond to incidents.

Increased capacity would allow routes and local authorities greater flexibility and choice to strike the right balance between:

- more trains – improving the ability of passengers and businesses to access the resources of neighbouring cities and regions.
- a more connected service – creating a timetable with a greater number of stops within the same overall running time. By increasing the number of stops, the rail service would be accessible to a greater number of users.
- better reliability across the network – creating a service on which passengers and businesses can depend.

Capacity could be improved by:

1. optimising block sections, thereby reducing headway and allowing trains to run closer together;
2. removal of signal sighting restrictions, thereby increasing the Static Speed Profile; and
3. reducing the performance buffer.

3.5.4 Measures

- The number of passengers moved at peak times.

3.6 Outcome 6: Improved Performance

3.6.1 Requirement

The DR solution shall enable improved performance.

3.6.2 Rationale

To facilitate a greater number of reliable train paths throughout the day; optimised train management during disruption (DR Strategy[RD8] Better Performance benefits); faster recovery from faults (1.2 Connecting people: a strategic vision for rail [RD6]); and a simpler network with fewer assets/asset types.

3.6.3 Guidance

As already stated here, the rail network has reached peak capacity across several key regions. As a consequence, there is a need to improve overall performance or reduce journey times. The current inadequate performance limits the ability of the network to move passengers and freight swiftly and efficiently.

With an increasing demand for rail journeys, it is necessary to maximise the reliability, availability, and maintainability of the infrastructure and rolling stock assets.

Every train should be in the right place, at the right time, and travelling at the appropriate speed. This is not to say that the setting of a train's journey profile should be rigid; instead, known and reliable train performance, and the ability to determine the precise locations of trains, will enable greater flexibility in the running of services.

Performance could be improved by:

1. optimising block sections, thereby reducing headway and allowing trains to run closer together;
2. removal of signal sighting restrictions, thereby increasing the Static Speed Profile; and
3. reducing the performance buffer.

3.6.4 Measures

- Delay minutes per passenger per route; and
- Total delay minutes per incident.

3.7 Outcome 7: Improved Safety and Security

3.7.1 Requirement

The DR solution shall enable improved safety and security.

3.7.2 Rationale

For safety to facilitate fewer Signal Passed at Danger (SPAD) equivalents and less trackside work (programme mandate [RD1] for safety benefits and DR Strategy [RD8] Enhanced safety benefit). Improved security will be required as the railway becomes more reliant on connected digital systems along with the assurance that this can be achieved by implementing the Directive on Security of Network and Information Systems (NISD) ((EU) 2016/1148 [RI2]).

3.7.3 Guidance

Although Britain has one of the safest railways in Europe, an even higher level of safety and security can be provided for passengers, members of the public, railway staff, and GB railway industry assets.

This could be achieved through better information for drivers:

- The asset-intensive safety control system that was built around lineside signals could give way to a digital, authorised speed display in the cab, cutting costs and carbon emissions.
- Drivers would have a clearer view of the track ahead, with minimal distracting factors (e.g. signal sighting and boards on the Trans Pennine network could be replaced by in-cab indication).
- Trains could be driven closer together, at optimum speeds, by drivers who have the flexibility to operate across the network (could be achieved via ATO).

Signalling on the network currently involves a mixture of different forms, systems and processes. By giving precise information about the location of trains, drivers have a much richer source of information on which to base decisions, while other tools could provide signallers with a range of options for running trains, maximising their ability to respond quickly and effectively to delays.

The reduction of lineside assets could cut down the number of times (and their duration) that track workers need to access the operational railway either with or without possessions. Possession management could also be improved.

There has been a growing threat from both organised crime and other threat actors attempting to penetrate various Railway Systems to seek monitory, monetary or political effect. Businesses identified as operators of essential services will have to take:

- appropriate and proportionate technical and organisational measures to manage the risks posed to the security of network and information systems in the provision of their service; and
- appropriate measures to prevent or minimise the impact of incidents affecting the security of the network and information systems used in the provision of their service.

3.7.4 Measures

- Use metrics from the Office of Rail and Road (ORR) and apply trend analysis for safety;
- Look at the trend analysis for all recorded security incidents;
- Record the number of successfully defended incidents by complexity of attack; and
- Trend analysis for pre and post implementation of the SoS.

3.8 Outcome 8: Increased Global Leadership and Skills

3.8.1 Requirement

The DR solution shall enable increased global leadership.

3.8.2 Rationale

To harness the energy, drive and innovation of UK Small-Medium Enterprises, and provide them with a 'first mover advantage' on digital technologies so that they can meet the needs of the global railway market. The UK's rail export performance lags behind that of our competitors and the government, therefore, wishes to increase exports and investment from overseas (5.10-5.14 Connecting people: a strategic vision for rail [RD6]).

3.8.3 Guidance

Increased global leadership could enable technologies to be more readily and rapidly integrated into GB's railway system. This will ensure that society benefits from innovations.

Rapid deployment requires a systematic building of innovation and integration capability at industry level to ensure that barriers to the adoption of new technology are removed.

Although the DRP offers the opportunity to redefine and reconfigure the way the industry works and offers an unprecedented opportunity to introduce new/enhance existing skills, knowledge and expertise within the railway, there is no established methodology by which to quantify the associated benefits; therefore, a qualitative assessment of increased global leadership and skills will be required.

3.8.4 Measures

- Look at the direct impact on sales from UK companies to other economic areas which can be directly related to Network Rail innovation; and
- Examine the influence of Network Rail on standards and architecture committees within Europe and further afield. This will require independent assessment and trend analysis.

3.9 Outcome 9: Increased Network Availability

3.9.1 Requirement

The DR solution shall enable increased network availability.

3.9.2 Rationale

To facilitate greater reliability and simpler networks through there being fewer assets/ asset types. The government wants to create a more reliable network(DR Strategy[RD8] Better Performance) with investment in new and more reliable solutions which should increase the availability of the network for customer services (1.6-1.10 Connecting people: a strategic vision for rail [RD6]).

3.9.3 Guidance

Increased network availability could be achieved through reducing the maintenance requirements of the Command, Control and Signalling system and from the disruption associated with renewals, maintenance and enhancement works.

Intelligent trains could reduce the reliance on complex and expensive rail infrastructure and control systems and, through automation, change the role of railway staff from one of direct control and operation to one of supervision.

Investment in new and more reliable solutions meeting their PRAMSS will also increase network availability.

3.9.4 Measures

- The complexity of the current Network Rail infrastructure; and
- The service affecting outages per railway system in terms of delay minutes per customer.

3.10 Outcome 10: Lower Whole Rail-Industry Whole-Life Cost

3.10.1 Requirement

The DR solution shall enable lower whole rail-industry whole-life cost.

3.10.2 Rationale

To facilitate improved reliability; simpler networks through there being fewer assets/asset types (Programme Mandate [RD1]); lower energy consumption by reducing the number of starts/stops in a journey; optimised train management during disruption; and faster recovery from faults. The use of digital technology will result in much more sustainable solutions, with reduced costs (DR Strategy [RD8] Better Asset Sustainability) for rail users and taxpayers (1.37 Connecting people: a strategic vision for rail [RD6]).

3.10.3 Guidance

More efficient enhancement, renewals, maintenance, and operating activities could result in lower whole-life cost.

The following benefits could be realised through the utilisation of modern technologies:

- Savings – through the removal of trackside signalling and the need for rolling stock to be dual-fitted with other safety systems.
- Standardisation of signalling systems – by fitting rolling stock with the same equipment, advantage could be taken of the 'economies of scale'.

Increases in computational power and advances in communications, automation and sensing could provide the railway with the opportunity to develop and deploy intelligent rolling stock. Intelligent trains could then reduce the reliance on complex and expensive rail infrastructure and control systems and, through automation, change the role of railway staff from one of direct control and operation to that of supervision.

The low-cost railway could adopt ideas and technologies from the light rail sector (and other sectors, such as automotive) and integrate these with mainline rail requirements.

Cost savings through use of open systems, more competition / prevention of vendor lock-in should also be considered as part of the solution.

3.10.4 Measures

- The overall cost of design, installation, operation, maintenance, and decommissioning of the system and the System of Systems. Do the actual costs meet the projection of business case costs, and are costs being pushed onto other parts of the railway?

3.11 Outcome 11: Reduced Journey Time

3.11.1 Requirement

The DR solution shall enable reduced journey times.

3.11.2 Rationale

To facilitate the reduction of passenger/journey transit times (2.10 Connecting people: a strategic vision for rail [RD6] and DR Strategy[RD8] Improved Passenger Experience).

3.11.3 Guidance

Journey times could be improved by:

1. optimising block sections, thereby reducing headway and allowing trains to run closer together;
2. removal of signal sighting restrictions, thereby increasing the Static Speed Profile; and
3. reducing the performance buffer.

3.11.4 Measures

- The journey time per passenger between the start and arrival at destination per passenger. Is it reducing?

3.12 Outcome 12: Improved Business Flexibility and Agility to Align to Business Needs

3.12.1 Requirement

The DR solution shall enable improved business flexibility and agility to align to business needs.

3.12.2 Rationale

To achieve aligned business change with increased cost-effectiveness, flexibility and agility, thereby creating competitive pressure and overcoming limited responsiveness (and accountability) to customer and end-user needs. (Derived from, and answering, Shaw Report [RD5] core problem statement 1 and recommendations 1-3,6,8,10-12 of The Hansford Review [RD7])

3.12.3 Guidance

Improved business flexibility and agility could be accomplished by:

1. reducing cost and time taken to alter facilities as business needs change;
2. avoiding the necessity of living with layouts and facilities for 40 years; and
3. increasing accountability and competitive pressures to achieve aligned business change cost-effectively.

3.12.4 Measures

- Are the business needs of the railway being met by the solution?
- What are the strategic, economic, commercial, financial and management costs of the change in solution to meet business needs (e.g. SOBC lite proposed in the Future Communications and Positioning System).

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Working together for a better railway:

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Group Digital Railway, Network Rail, 4th Floor, One Eversholt Street, London, NW1 2DN