



Digital Railway – SR&I Document Suite Baseline 4 Release Note

Prepared by
Peter Martell
Principal Systems Architect

PM-300322-213

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Reviewed by
Jonathan Evans
Engineering Expert, Technical Authority

JJE-300322-0043

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Approved by
Rubina Greenwood
Head of System Requirements and Integration

RNG-310322-438

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Document Use

This document has been created by Digital Railway's System Requirements and Integration (SR&I) Team as part of a generic suite of information (Policies, Strategies, Requirements Specifications etc.) to provide source material that users are encouraged to employ when generating their own application-specific document suites. The DR generic suite provides information across the full functionality of the System of Systems, which may be greater in scope than that specified for individual Deployment Projects. Deployment Project Teams may, therefore, need to adapt this source material to meet their project scope when developing their solution from the System Definition and Operational Concept Project Phase.

The information held in this document has been derived by Subject Matter Experts using their knowledge, experience and best practice from comparable activities around the world. This document will be updated and maintained throughout the life of the Digital Railway as further experience is gained and deployment lessons are learnt. However, this document has yet to be proven in use through application in support of an actual deployment / commissioning and must, therefore, be treated with due caution.

Although full assurance and Common Safety Method for Risk Evaluation and Assessment techniques have been applied by the DR SR&I Team, users will need to satisfy themselves that any information derived from this generic document is assessed within the context of their specific application.

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Document owner: Rubina Greenwood, Head of System Requirements and Integration

Version History

Issue	Date	Comments
0.1	5/1/2022	First Draft
0.2	13/1/2022	Update to review comments
0.3	26/01/2022	Further details added and comments resolved.
1.0	30/03/2022	Prepared for signature and issue.

Exclusions

These are items currently missing from this version of the document that should be included in a later publication.

1. None.

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Assumptions

These are items upon which the validity of this document relies and which will be delivered by others. Non-delivery of these items will necessitate a change to this document.

1. None

Dependencies

These are items upon which the validity of this document depends. Any changes to the dependencies document may require further changes to this document.

1. None

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ABBREVIATIONS

Abbreviations and acronyms are contained within the DR Glossary of Terms and Abbreviations [R11]. They are also explained on first use.

REFERENCES

Dependent References

The content of this document is a statement of the baseline at a point in time. The following documents are referred to in the content of the document giving the context of this release. Since this document is subject to any maintenance updates (a new document will be generated for the next baseline release) the versions of the references are cited here to allow the user to determine the correct iteration of the document on which this release note is based, but changes to the reference documents will not result in an update to this release note.

The documents which are the subject of this release are listed in the table in section [4] and are not repeated here unless they are specifically cited in the body of the document.

- RD1. Digital Railway – Change Briefing Paper (Release Baselines 1 and 2), 153819-NWR-MEM-ESE-000003, v1.0
- RD2. Digital Railway – Change Briefing Paper (Release Baselines 2 and 3), 153819-NWR-MEM-ESE-000005, v1.0
- RD3. Digital Railway – SR&I Document Suite v3.1 Release Note, 153819-DRP-MEM-ESE-000003, v1.0
- RD4. Digital Railway – System of Systems (SoS) System Definition Document, 153821-NWR-REP-ESE-000002, v6.3, 28th April 2021
- RD5. Digital Railway – SoS Hazard Record, 147883-NWR-LOG-ESS-000001, v4.8, 3rd November 2021
- RD6. Digital Railway Programme – System Management Plan, 153819-NWR-PLN-MPM-000002, v9.6, 7th July 2021
- RD7. Digital Railway – Configuration Data Remit, v2.1, 153821-DRP-ESE-000001, 12th May 2020
- RD8. Ricardo Certification – Digital Railway Safety Assessment Cenelec Stage Completion Report – AsBo / ISA, 750701-UK-ASBO-039, Issue 1.0, 15th March 2020
- RD9. Ricardo Certification – Safety Assessment Report CENELEC Stage 5 Completion (750701-UK-ASBO-078), 153821-RCR-REP-ESE-000001 v3.1 2nd December 2021

Informative Reference

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

- RI1. Digital Railway – Glossary of Terms and Abbreviations, 153819-NWR-SPE-ESE-000001, v2.1
- RI2. Digital Railway – Open Issues, 153821-NWR-REP-ESE-000016, v1.0
- RI3. Digital Railway – System Approval and Acceptance Plan (SApAP), 157005-NWR-REP-ESE-000013, v2.2
- RI4. Digital Railway Project Authorisation Strategies & System Definitions, NB201, v1
- RI5. ERTMS/ETCS Baseline 3 Onboard Subsystem Requirements: Retrofit, RIS-0797-CCS, Issue 1
- RI6. ERTMS/ETCS Baseline 3 Onboard Subsystem Requirements: New Trains, RIS-0798-CCS, Issue 1

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1 INTRODUCTION

1.1 Background

The Systems Requirements and Integration team (SR&I) have developed generic integrated requirements suites and associated documentation supported by Digital Railway System architecture and system definitions to ensure consistent operation and maintenance across the network.

This work has been done in parallel with a number of early deployment projects. This makes the setting of requirements and generation of ITTs for individual deployment projects complex, as the core mandated requirements are evolving. It is important that deployment projects have visibility of the changes associated with the SR&I suite of documents baseline release.

Building on the original reference design development and publication in 2016, the work of the SR&I team started in 2018 as part of the former Digital Railway Programme. Since then there have been several iterations of the documentation at increasing levels of completeness and maturity. The details of the state of development and maturity of the suite can be seen through briefing papers and release notes developed to accompany them as listed below.

Baseline	Date	Reference
1	April 2018	N/A
2	November 2018	RD1
3	March 2019	RD2
3.1	March 2020	RD3
3.2	March 2021	N/A (internal release only)
4	March 2022	This document

Alongside the development of the documents has been the ongoing hazard analysis work (both for the overall System of Systems and the ETCS reference design). This is recorded in the live safety documentation suite which is part of this release (and all other releases).

Each document has undergone internal and external review as part of the assurance process. This is not repeated here. Information on the assurance journey is recorded in the System Management Plan [RD6] and culminated in the issue of a Safety Assessment Report by Ricardo Certification in December 2021 [RD9].

1.2 Purpose

This release note provides technical readers an overview of the incremental changes in the SR&I suite of documents from Baseline 3.1 in March 2020 to Baseline 4 in March 2022. As such, this paper will enable Deployment Projects to understand changes associated with the SR&I suite of documents and the associated requirements, so that they can plan their own design and development activities with visibility of the evolution of the requirements.

Additionally, this Briefing Paper satisfies the requirements in The Digital Railway System Management Plan [RD6] for the issue of release notes. Note that since Baseline 3.2 was an internal milestone not formally published externally, there is no release note associated with Baseline 3.2.

1.3 Scope

This document is limited to the requirements and associated deliverables for the DR System of Systems (SoS) and its constituent systems [RD4]. It only describes the development of the SR&I requirements suite from Baseline 3.1 ('March 2020 milestone') to Baseline 4.0 ('March 2022 milestone'). Separate documents [RD1], [RD2] and [RD3] have been developed previously, focusing on the development from Baseline 1.0 to Baseline 3.1.

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1.4 Document Governance

This document will be approved and signed off in accordance with the DRP System Management Plan [RD6]. Since this document is a statement at a point in time related to this release, this document will not be subject to ongoing updates once issued.

1.5 Structure of this document

Section 3 provides a summary of the activities undertaken since the previous Baseline 3.1 release in March 2020 which have led to the creation of Baseline 4.

Section 4 lists each document within Baseline 4 and provides a summary of the purpose of each document with information about the intended use of the document (for example, whether the document content is mandatory, or is guidance/information). This section may be of particular value to new users of the document suite.

Section 5 provides information on the rationale for, and extent of, the changes that have occurred to each document between Baselines 3.1 and 4. It also identifies those documents that were part of Baseline 3.1, but which have since been withdrawn and do not form part of Baseline 4. This section is intended to assist existing users of the document suite to determine the level of analysis required to assess the impact of the update on any ongoing work which relies on the previous baseline.

Section 6 lists the standards that underpin the content of the document suite.

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2 SR&I DOCUMENT SUITE RELEASE BASELINE 4 OVERVIEW

2.1 Domain Knowledge Information and Document Maturity

The documents covered by this release note have been developed in accordance with the process documents governing the work undertaken by SR&I following the Head of System Authority System Approval and Acceptance Plan (SAPAP) [RI3] to arrive at a point where the industry considers them to be the basis for deployment of the relevant technologies.

This has involved the engagement of subject matter experts from organisations across the industry:

- Rail Safety and Standards Board (RSSB)
- Rail Delivery Group (RDG)
- Railway Undertakings (passenger, freight and On Track Machines (OTM))
- Rolling stock owners
- Infrastructure Managers
- Independent consultants
- System suppliers

This has been across a wide variety of fields:

- Railway operations
- Maintenance
- Engineering
- Human factors
- Safety, standards and assurance

However, it is recognised that the approval of these documents and their use is on the basis that they have not yet been fully tested through a full deployment cycle and that there may be open points, errors or omissions. As these documents are used, where issues are found, the SAPAP defines the Issue Management System as the vehicle to raise and have resolved those issues. This is emphasised in the content of Notice Board 201 [RI4] which highlights the need for projects implementing DR systems to include the use of the Issue Management System as part of their Project Authorisation Strategy. Feedback on the documents and requirements should therefore be fed directly into the [Issue Management System](#) for those with access to the NR system or in all cases by using the e-mail address DRSystemAuthority@Networkrail.co.uk.

2.2 Document authors and owners

Each document contains information about those involved with the production and approval of the document. Organisational changes mean that in many cases, the original author / owner does not endure in that role. The documents are not updated simply to note such a change. In the case of any query with the document, the reader should contact the System Authority post box DRSystemAuthority@Networkrail.co.uk

2.3 Document update summary

The following items are the high-level activities that have been carried out in the development of the SR&I documentation suite taking it from Baseline 3.1 in March 2020 to this issue of Baseline 4.

2.3.1 Ricardo Certification Review and Feedback

Ricardo have undertaken the ISA / AsBo review (level 3 assurance as outlined in [RD6]) of the documentation and the full detail of that assessment can be found in the Safety Assessment Record (SAR) [RD9]. Where documents have only been updated to these reviews to make improvements and give better alignment, this is noted in the tables as it does not fundamentally alter the operational model or the scope of overall System of Systems.

2.3.2 Supply Industry Review

The SR&I documents were reviewed by the East Coast Digital Programme (ECDP) Train Control Partner, Engineering Management office and Railway Industry Association (RIA) members via the

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Requirements, Issues and Configuration Management Working Group (RICMWG). This has resulted in greater confidence in the technology maturity and the ability of the specifications to be delivered by a range of suppliers.

2.3.3 European Train Control System (ETCS) Reference Design Update

The review of all reference design topics has now been completed which impacts all reference design topics. The requirements derived from the reference design topics have also been through a comprehensive consolidation exercise which has removed duplication (either between requirements or where a standard covers the requirement) and has improved the structure and wording of many requirements. For those requirements that impact the ETCS Rail Industry Standard (RIS) documents [RI5] and [RI6], request for help documents have been issued to RSSB.

2.3.4 Operations and Maintenance (O&M) Digital Railway Requirements (DRRs)

Previously, the DRRs for O&M had not been part of the suite. In order to address the measures needed to control hazards at the right level, these have been developed and published as a new document within Baseline 4.

2.3.5 Interface Requirements Specification Digital Railway Requirements

The development of a first release of this document describing constraints on the system architecture to afford efficient interoperability and integration between different systems described in the System Architecture.

2.3.6 Ongoing Improvement and Maintenance

The production period for many of the documents has seen legal and organisational change which has impacted the content and terminology used within the documents. Where documents have been amended for other reasons, the opportunity has been taken to make editorial and organisational alignments. Some documents have only had their version updated in order to make these alignment changes which do not result in a material change to their substantive content.

Among the changes that have been implemented are those that result from:

- Change of Digital Railway Internal Independent Assurance Team (DRIIAT) to System Authority Independent Assurance Team (SAIAT)
- The change from Digital Railway System Authority (DRSA) to Head of System Authority (HOSA)
- The migration of work from the former Digital Railway Programme and hence the amendment to places where this organisation was referred to
- The technical content of the Technical Standards for Interoperability being transposed into to the National Technical Specification Notices as a result of the UK departure from the EU. The documents have been updated to reflect this change

2.3.7 Ongoing RICMWG, Systems & Operations Board (S&OB) and Systems Review Board (SRB) Industry Review

SR&I documentation submissions have continued to the governance and industry groups in line with assurance plan set out. The formal comments received have been addressed with the relevant person raising them and any necessary changes to documents have been progressed with the updates. Many of the documents listed in section 4 note that there are updates from the review comments. Information on the dates of submissions and the record of the approval are not included within this note - the documents listed herein included in the baseline because they have been through the assurance process. Any detail about the assurance record can be obtained separately from the SR&I team if necessary.

2.3.8 Data Work

Completion of the Unified Data Model project which defined data quality values. This and other developments led to an updated Data Specification and merged the Logical Data Model and Basis of Design (BoD) into one model.

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The Data Remit [RD7] defines configuration data and supporting processes updating the relevant requirements.

2.3.9 Safety Workstream

The live nature of the hazard record and associated documents means that there have been continuous updates to the safety documentation. The activities driving this include:

- Lessons learned following SAR v2.0 report [RD8] and the resultant review of its recommendations
- Further review of the SoS Hazard Record and update to maintain alignment with the ETCS hazard record.

2.3.10 ETCS Multiple / Trailing Traction Operations

This activity has considered the operational and technical implications of operating trains with more than one ETCS-fitted traction unit in the formation, with particular emphasis on identifying the appropriate ETCS modes for those traction units which are not at the front of the train across a range of operational scenarios. This included the development of the newly issued operational concept document, a report with recommendations on solutions to be adopted and associated supporting preliminary hazard analysis. Further work is required on the detail of, and hazards associated with, the possible technical implementation of the adopted recommendations.

2.3.11 ETCS Axle Load Categorisation

The concept of Route Availability (RA) does not exist within ETCS; there is the risk that differential speed restrictions, when migrated from RA methodology to Axle Load categorisation, may not differentiate between vehicles where previously they operated at different speeds (or vice versa).

This new document undertakes an analysis on the impact of applying ETCS Axle Load categorisation to UK passenger trains and locomotives compared to the current RA categorisation, and how this could affect differential speed restrictions across the network. It looks specifically at differential speed restrictions related to the axle load of a vehicle compared to the acceptable load on the structure, and how this function may be managed such that safety and performance under ETCS operation can be maintained at the same level as it is today under conventional signalling with RA-based differential speeds.

2.3.12 ETCS Differential Speed Profiles

This report considers the approach taken to differential speed profiles today, and determine how they may be translated into ETCS on a Level 2 or Level 3 railway. The report looks specifically at the use of:

- Differential speed profiles for track with small radius curves;
- Differential speed profiles for track that is straight (or has a large curve radius);
- ETCS has the principle of 'Other Specific' train category, which allows differentiation between train types in this manner.

The report also looks at the necessity for procedural restrictions to remain where a standard Technical Specification for Interoperability (TSI) compliant ETCS is not capable of managing the restrictions technically.

2.3.13 ETCS Driveability Report

The focus to this new study is the ongoing work to develop the configuration of the braking curves of ETCS, including the ETCS National Values and a potential solution for a default braking performance level to be used in some cases (broadly known as the ETCS National Braked Weight Percentage).

The concept of a ETCS National Braked Weight Percentage is yet to be tested in service and endorsed by stakeholders, therefore no operational feedback has been gathered. This study, including driver simulator trials, had the key objective to investigate the driveability of this concept for which the proposed ETCS National Braked Weight Percentage is 69%.

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The trial was completed as documented in this report and while the work undertaken by SR&I has been accepted by the System Authority as adequate for an initial baseline, the overall conclusions have not been agreed by the freight community represented by the Freight Operations Steering Group.

2.3.14 Test Yard and ETCS Operational Test Scenarios

Following the consolidation of the ETCS requirements and taking account of the lessons learned from the development of the previous iteration of the OTS documents, a full review of the OTS has been carried out and the resultant changes reflected in an updated suite of OTS. The test yard exists to provide layouts on which suppliers' trackside products can show that they meet the requirements through demonstration of the OTS. The test yard document has been updated to reflect the changes to the OTS.

2.3.15 Level NTC

The development of Reference Design Topic W, concerning the operation of ETCS-fitted vehicles in Level NTC on non-ETCS-fitted infrastructure, has been completed with an associated update to the Level NTC Operational Concept document. The hazard work has been undertaken for this topic and the relevant requirements developed for publication in the relevant requirement specification documents.

2.3.16 Deployment Guides

The ETCS deployment guide has had incremental updates based on deployment projects' feedback, supporting the application of the updated ETCS Reference Design and associated system requirements.

The work on the TMS deployment guide development has been completed and the document issued for the first time.

The Human Factors Guidance for Deployment Projects has been completed and issued for the first time.

2.3.17 SR&I Risks, Assumptions, Issues and Dependencies (RAID) Log

Each of the items within the RAID logs have had action plans implemented which have either resulted in document updates in appropriate places or records of ongoing work being made (in the issue management system) to address the issues which continue beyond the March 2022 publication of Baseline 4.

A consolidated list of items identified by the SR&I work but which require further remits or work post March 2022 is given in Digital Railway – Open Issues [RI2].

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3 DOCUMENT OVERVIEW AND INTENDED USE

The tables below provide a high-level description of each of the documents published on the [NR website](#) and forming the set of documents for this release. The tables mirror the five categories of document types defined for the Industry Council reporting.

Table 1 - System Engineering

Table 2 - System Requirements Suite

Table 3 - Safety Management Suite

Table 4 - System Definition Suite

Table 5 - Operational Readiness and Deployment Guidance

The entries in the final four columns identify the document as being in the following categories:

- **M – Mandatory.** Knowledge and information which provide a constraint set out in the requirements that must be met. Failure to meet the requirement means that the projects may not get necessary approvals at various stages of project life cycle. Noncompliance with mandatory documents requires authorisation through the SA issue management system.
- **S – Supporting safety.** Knowledge and information which is required to deploy DR technology safely. Provides a focused chain of activities, knowledge and information for safety management for DR technologies.
- **G – Guidance.** Provides guidance on how to deploy DR technologies based on best available system knowledge and expertise. Areas of additional information on technologies which is important and cannot be captured in requirements documentation.
- **I – Informative.** Provided to enable users to get full context in which the SR&I requirements and associated material have been developed.

Table 1 - System Engineering

Number	Version	Title	Description	M	S	G	I
000000-NWR-PLN-MPM-000005	5	Integrated Concept of Operations	<p>The purpose of this Integrated Concept of Operations (ConOps) is to facilitate the production of a Customer Requirements Specification (CRS) and Digital Railway Requirements for the procurement of the new systems including:</p> <ul style="list-style-type: none"> - European Train Control System (ETCS), - Traffic Management System (TMS), and - Connected Driver Advisory System (C-DAS) <p>In line with the principles outlined in the 'Digital Railway Concept of Operations Strategy', this document describes the expected user experience once the relevant digital railway systems are operational, the predicted operational environment and the systems and applications technologies.</p>	X			

Number	Version	Title	Description	M	S	G	I
153821-DRP-REP-MPM-000003	1.2	ETCS Level-National Train Control Operational Concept	This document provides a Level NTC Operational Concept for trains which are fitted with ETCS equipment and are operating on GB infrastructure using TPWS/AWS train protection systems.	X			
153821-OPD-REP-ESE-000004	1.1	ETCS Multiple Traction Configuration Operational Concept	<p>This Concept of Operations for Multiple Traction Configuration describes how the operation of a train formation consisting of more than one traction unit will take place on the GB Railway. This includes current operating practices today and those required for operation when ETCS is introduced. The introduction of ETCS requires analysis which needs primarily to determine how any trailing traction will operate whilst still providing operational flexibility compatible with GB rail industry business needs including safety, security, capacity and performance.</p> <p>This Concept of Operations satisfies the requirements of key industry stakeholders and takes cognisance of the usefulness of previous cross industry documents, notably the suite of Reference Design topics and the Trailing Traction Unit Mode Finder (TTUMF). A Trailing Traction Operations (TTO) report is being developed which replaces the TTUMF and will provide an unambiguous understanding of the operating ETCS modes available that are safe and expedient for the scenario concerned. A safety review will be carried out with cross-industry subject matter experts to measure the hazards associated with different ETCS modes as identified in the TTO report. When the preferred mode has been identified and associated control measures are acceptable as part of the hazard review, a recommendation will be made to the Railway Undertakings to adopt the findings of the</p> <p>TTO report within their operational policies and procedures. The outcome from the hazard identification review will be recorded and addressed in the Safety Justification Report.</p> <p>This document is designed to:</p> <ul style="list-style-type: none"> • Identify the potential users of the system • Clearly identify the operational environment that it concerns • Describe the operational activities involved from a user's point of view, and • Consider methods of working including possessions and maintenance. 	X			
153819-NWR-REP-ESE-000002	3.3	System of Systems Basis of Design	The Basis of Design (BoD) specifies "how" functionality and information exchanges will be realised - apportioned and integrated between C-DAS, TM and ETCS systems (On Board and Track Side systems). The DRP is using an Enterprise Architecture (EA) formal methodology as a means of modelling the rail network as a set of capabilities that	X			

Number	Version	Title	Description	M	S	G	I
			<p>provide the rail service. The System Requirements & Integration (SR&I) scope of work covers those capabilities delivered by Command, Control and Signalling (CCS) only.</p> <p>To support the EA activity, scenarios were identified as being critical to the normal operation of the railway. These scenarios were expanded upon by industry Subject Matter Experts (SMEs) in a series of workshops, resulting in scenario diagrams depicting how the rail system should operate.</p>				
153819-NWR-DRG-ESE-000003	5.4	System of Systems Architecture	<p>The System Architecture document provides the functional relationships between the constituent systems of Digital Railway Systems as described in the Digital Railway - System of Systems System Definition Document. It is aligned to the Concept of Operations and supports functional apportionment between the component systems (documented within the Enterprise Architecture and Basis of Design). It thus enables the generation of requirements for:</p> <ul style="list-style-type: none"> • the systems within the System of Systems; • the interfaces between systems; and, • export to systems outside the System of Systems (e.g. timetable production). <p>In addition to the System Architecture, architecture visualisations for each of the Systems have been developed. The aim of these deliverables is to provide a diagrammatic representation of the Digital Rail Systems that can be used by Stakeholders to understand the functions and interactions of each systems component parts.</p>	X			
152365-NWR-REP-ETL-000001	2.2	Guidance on the Telecoms Architecture	<p>The purpose of the telecommunications network is to enable the communication requirements of the rail industry to be met, whilst ensuring continual efficiencies and consistent value for money, first class asset management and the best life cycle cost. To maintain the ability to do so and continue to attract more passenger and freight business, it needs to become:</p> <ul style="list-style-type: none"> • a network of interoperability between the legacy Fixed Telecoms Network (FTN) and next generation (FTNx) platforms; and • automated and software driven, reporting and providing operational support, and giving warning of, and resolving, faults before they have an impact. <p>The Telecoms Architecture provides a means of determining the telecoms architecture necessary to support the needs of specific Deployment Projects. Specific requirements</p>			X	

Number	Version	Title	Description	M	S	G	I
			will be dependent upon the specific application and are determined by the Deployment Project.				
153819-NWR-PLN-ESE-000005	3	Configuration Management Plan	Configuration Management refers to the set of coordinated activities for directing and controlling configuration, and generally concentrates on technical and organisational activities that establish and maintain control of a product and its product configuration information throughout the product's life cycle. As Deployment Projects progress the development and implementation of the Digital Railway downstream, it is vitally important to manage the configuration of the System and its components over its life, especially as components will be provided and managed by multiple parties. Changes or upgrades to the railway will also need to be co-ordinated.	X			
152365-NWR-PLN-MPM-000004	2.4	Business Continuity Plan	This document aims to present a set of minimum requirements for a Business Continuity capability to ensure that the Digital Railway System implemented on infrastructure and in rolling stock across GB's rail network continue to provide the desired benefits. It forms the baseline for societal security and is a requirement under the Network Information Systems Directive (NISD).	X			
153819-NWR-PLN-EMG-000001	3.6	Data Management Plan	With the deployment of new digital systems, data becomes a more vital component of that system if it is to deliver its business benefits. e.g. as people or manual tasks are replaced in a digital system by software and automation, the level of reliance on data for the successful completion of those activities increases. The Digital Railway (DR) Systems of Systems (SoS), requires that the data consumed by the systems supporting railway operations is correct and is the required quality. That means that: <ul style="list-style-type: none"> • data is well defined and specified; • data Management processes are common and appropriate across all business functions supporting the operation of DR technologies; and, • data is accessed from a Single Source of Truth (SSoT). This is delivered through Semantic Interoperability which is the ability of computer systems and people to exchange data with unambiguous, shared meaning. This is a requirement for the DR SoS as it enables machine computable logic, inferencing, knowledge discovery, and data federation between the DR applications and information systems. The purpose of this document is to describe the work undertaken by SR&I and is needed		X		

Number	Version	Title	Description	M	S	G	I
			by the Deployment Project Teams in defining, obtaining and managing the data that supports Semantic Interoperability across the DR SoS applications.				
153819-NWR-PLN-ESE-000009	2.2	Human Factors Management Plan	<p>The Human Factors Management Plan:</p> <ul style="list-style-type: none"> - Specifies the governance and controls for managing human factors risks at the DR programme level. - Describes the human factors integration work completed during hazard analysis and the specification of system requirements. - Sets out eight goal-based outcomes to provide an overarching human factors integration framework that is aligned with, and informed by, International Standards, lessons learned and regulatory requirements. - Defines a process for building a modular human factors assurance case so that programmes, projects and suppliers can maximise benefits, minimise implementation risk and demonstrate compliance. 		X		
153819-NWR-PLN-MPM-000004	2.2	Interface Management Plan	<p>This plan covers the development and management of the technical interfaces associated with the DR SoS as defined by the SoS Functional Architecture, SoS System Definition Document and Generic Interface Requirements Specification. The focus is the management of the interfaces associated with the generic solution. These interfaces will be further developed through update of the Generic System Interface Specification.</p> <p>The scope of this plan also includes:</p> <ul style="list-style-type: none"> • an overview of the process to be adopted by the DRP for managing technical interfaces to support the definition of the generic solution; and, • identification of the roles and responsibilities necessary to implement the requirements of this plan. 		X		
147883-NWR-PLN-ESE-000001	4.2	Interoperability Certification Plan	<p>This Interoperability Certification Management Plan defines the interoperability-specific activities required to support the creation of a generic System of Systems baseline architecture (that could be deployed as a Digital Railway configuration). The approach outlined here:</p> <ul style="list-style-type: none"> • defines the systems that are subject to the interoperability regime; • provides a baseline suite of interoperability deliverables that could be used to develop the same for other configurations (by analysing the deltas between the System of Systems and other system configurations rather than starting from scratch every time); 		X		

Number	Version	Title	Description	M	S	G	I
			<ul style="list-style-type: none"> ensures that a consistent approach to interoperability is adopted for all generic system development activities (where system includes people, product and process); provides input to guidance material and templates to help a delivery project to produce the interoperability deliverables required for their specific DR technologies deployment. 				
158875-NWR-PLN-OPP-000001	2	Operations and Maintenance Readiness Plan	<p>The Operations and Maintenance (O&M) Readiness Plan describes the work required in order to achieve the O&M readiness objectives.</p> <p>In the context of Digital Railway technologies, O&M readiness is the measure of operational preparedness of the industry's O&M staff to accept DR technologies and enable the benefits of DR technologies to be fully realised. Those who are affected by implementation of DR technologies both directly (e.g. DR operators and maintainers) and indirectly (e.g. track maintainers) will require all the necessary operational processes, the recruitment and training of people, development and update of rules and standards, as well as acquiring the right tools and spare parts to be in place to ensure that the railway can be run safely and efficiently.</p> <p>O&M readiness must be integrated into the design processes adopted for the DR technologies. Trade- off and compromise will be required between the design of in-built functionality and the design of the support system that surrounds the DR technologies.</p>		X		
153819-NWR-PLN-PPC-000001	4	Quality Management Plan	<p>The Quality Management Plan sets out the DR SR&I approach and arrangements for the managing quality across all activities over the lifecycle of the DR SR&I function. Compliance with the arrangements specified in this QMP will provide the necessary assurance and demonstration to stakeholders that Quality underpins all business activities, that deliverables are fit for their intended purpose and all appropriate requirements of the standards ISO 9001:2015 and EN50129 are met.</p> <p>The Quality Management System will also minimise the incidence of human errors at each stage and to reduce the risk of systemic faults through employing a managed life cycle with appropriate processes and stage gates.</p>	X	X		
153819-NWR-PLN-MPM-000002	9.6	System Management Plan	<p>The System Management Plan outlines the process involved in developing business and system requirements for Network Rail's Routes/Regions and the wider industry to procure and implement the Digital Rail, aligned to European specifications (such as the European Union Agency for Railways specifications for the European Train Control System (ETCS)). The Plan establishes the technical effort necessary to achieve the outcomes for the Systems Requirements & Integration Team within the DRP.</p>	X			X

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153819-NWR-PLN-ESE-000013	2.1	Verification & Validation Plan	The Verification and Validation Plan establishes the methods for demonstrating that the Programme Requirements have been met. It also includes the development of process requirements for Deployment Projects to ensure that appropriate V&V activities for the generic and project-specific requirements have been conducted and the requirements have been met.		X		

Table 2 - System Requirements Suite

Number	Version	Title	Description	M	S	G	I
000000-NEW-PRG-MAN-000002	1.1	Generic Outcome - Based Business Requirements for Digital Railway Technologies	The Business Requirements document is an all-embracing, structured expression of the highest-level Customer Requirements for the implementation of Digital Railway Technologies on infrastructure and rolling stock across GB's rail network. It forms the baseline for DR project development and is used as the parent for the Concept of Operations (ConOps), the Enterprise Architecture Model, and all the Customer Requirement Specifications (CRSs).	X			
153819-NWR-SPE-ESE-000003	5.4	Systems of System Customer Requirements Specification	This document provides the Generic Customer Requirements for the overall SoS, including functional, non-functional, and process requirements. The document is derived from the scenarios described in the SoS Basis of Design (BoD). It has been aligned to the Integrated Concept of Operations, which describes how the GB railway is intended to operate when digital technologies are deployed These Customer Requirements are intended as a generic baseline to ensure that the system solutions adopted on any individual Deployment Project will integrate and be compatible across route boundaries.	X			
153821-NWR-REP-ESE-000007	4	Customer Requirements Specification	Sets out the requirements of the ETCS Trackside needed to meet the SoS Requirements. This will include functional requirements of interfaces, process	X			

Number	Version	Title	Description	M	S	G	I
		for ETCS Trackside	requirements and non-functional requirements. Apportionment is determined by the SoS Basis of Design.				
153821-NWR-SPE-ESE-000008	4	Customer Requirements Specification for ETCS Onboard	Sets out the requirements of the ETCS Onboard needed to meet the SoS Requirements. This will include functional requirements of interfaces, process requirements and non-functional requirements. Apportionment is determined by the SoS Basis of Design.	X			
153821-NWR-SPE-ESE-000011	4.4	Customer Requirements Specification for Traffic Management Systems	The purpose of this document is to set out the generic Customer Requirements that apply to the Traffic Management System (TMS) when it is deployed on the GB railway network. These generic Customer Requirements are intended as a baseline to ensure that the TMS solutions adopted on any individual deployment project will integrate and be compatible across route boundaries and with the generic ETCS trackside, using TMS in the context of the System of Systems Generic Baseline Architecture. All deployment projects involving the TMS will use this document as a basis of their requirements suite for this system.	X			
153821-NWR-SPE-ESE-000010	3.3	Customer Requirements Specification for Connected Driver Advisory System	Sets out the requirements of C-DAS needed to meet the SoS Requirements. This will include functional requirements of interfaces, process requirements and non-functional requirements. Apportionment is determined by the SoS Basis of Design.	X			
153819-NWR-PLN-ESE-000014	5	Customer Requirements Specification for Operations and Maintenance	Provides the generic Customer Requirements for the O&M, including functional, non-functional and process requirements. It is aligned to the Digital Railway (DR) – Integrated Concept of Operations (ConOps), which describes how GB’s railway is intended to operate where Digital Railway solutions are deployed.	X			
153821-NWR-SPE-ESE-000013	3.4	Interface Customer Requirements Specification	Specifies requirements for the information and data that need to be exchanged across each system internal and external interface in order to function correctly. These interfaces may require further adaptation in order to function as required for any particular deployment.	X			

Number	Version	Title	Description	M	S	G	I
153868-NWR-SPE-OPP-000001	1.2	Exported Requirements Specification for Timetabling	Sets out the generic exported requirements to apply to the Timetable and its development process. Developed in partnership with Network Rail Capacity Planning (System Operator) to ensure future timetables are in accordance with these requirements and they understand the specific features in order for a Deployment Project to construct their timetable.	X			
153821-NWR-SPE-ESE-000016	2	Digital Railway Requirements - ETCS Trackside	“How” the ETCS (Trackside) Subsystem is to be implemented in order to optimize its application on the GB rail network and to promote consistency between applications where this has been identified as being in the best long-term interests of the GB rail industry. It complements, constrains, and should be applied in conjunction with, the Customer Requirements Specification for the ETCS (Trackside) which sets out what the ETCS (Trackside) System is intended to achieve.	X			
153821-NWR-SPE-ESE-000017	2	Digital Railway Requirements - ETCS Onboard	“How” the ETCS (Onboard) Subsystem is to be implemented in order to optimize its application on the GB rail network and to promote consistency between applications where this has been identified as being in the best long-term interests of the GB rail industry. It complements, constrains, and should be applied in conjunction with, the Customer Requirements Specification for the ETCS (Onboard) which sets out what the ETCS (Onboard) System is intended to achieve.	X			
153821-NWR-SPE-ESE-000014	3.4	Digital Railway Requirements - Traffic Management System	“How” the TMS is to be implemented in order to optimise its application on the GB rail network and to promote consistency between applications where this has been identified as being in the best long- term interests of the GB rail industry. It complements, constrains, and should be applied in conjunction with, the Customer Requirements Specification for the TMS which sets out what the TMS is intended to achieve.	X			
153821-NWR-SPE-ESE-000015-1	1.4	Digital Railway Requirements – C-DAS Railway Undertaking Subsystem	“How” the C-DAS RU Subsystem is to be implemented in order to optimize its application on the GB rail network and to promote consistency between applications where this has been identified as being in the best long-term interests of the GB rail industry. It complements, constrains, and should be applied in conjunction with, the Customer Requirements Specification for the C-DAS System which sets out what the C-DAS System is intended to achieve.	X			
153821-NWR-SPE-	1.4	Digital Railway Requirements – C-DAS Infrastructure	“How” the C-DAS IM Subsystem is to be implemented in order to optimise its application on the GB rail network and to promote consistency between applications where this has been identified as being in the best long-term interests of the GB rail industry. It complements, constrains, and should be applied in conjunction with, the Customer	X			

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ESE-000015-2		Manager Subsystem	Requirements Specification for the C-DAS System which sets out what the C-DAS System is intended to achieve.				
153821-OPD-SPE-ESS-000001	3	Digital Railway Requirements for Operations and Maintenance	<p>This document provides the Digital Rail Requirements (DRR) intended to promote effective implementation of Operations and Maintenance for the Digital Rail System of Systems. It is applicable to both retrofit and new-build installations and provides requirements that are optimised for operation on the GB rail network and will support the GB rail industry in achieving the outcomes described in the Digital Railway (DR) Requirements Framework.</p> <p>The document provides the DR Requirements which have been developed as part of a suite of requirements covering all elements required to optimise performance and operation of a digitally-enabled railway.</p> <p>This document forms part of a suite of related requirements and specifications for both the individual subsystems and the DR System of Systems (SoS) as described in the DR Introduction to the Requirements Structure document. The document is set out in the form of standard requirements with the Operations and Maintenance requirement (DRR-O&M-O-n) or (DRR-O&M-M-n) identifier, followed by rationale and guidance notes, where appropriate.</p>	X			
153819-DRP-SPE-ESE-000001	1.3	Interface Digital Railway Requirements	<p>Specifies the “how” requirements for the information and data that need to be exchanged across each system internal and external interface in order to function correctly.</p> <p>These interfaces may require further adaptation in order to function as required for any particular deployment.</p>	X			
Various		ETCS Reference design	The target end state of the SoS application is ETCS Level 2 implementations without signals. However, specific Facilities, or options or variants, may utilise or consider other ERTMS operating levels where required to support particular operational or functional needs. The scope of the reference design is for a wider application of ETCS including Hybrid Level 2, ETCS with signals and ATO operation using the soon to be published ATO over ETCS specifications.	X			
NEPT/ERTMS/REQ/0005	5	ETCS System Requirements Specification	<p>This document provides a specification that is intended to promote effective implementation of the ETCS. It is applicable to ETCS installations and provides requirements that are optimised for operation on the GB rail network.</p> <p>This Specification for the ETCS has been written to complement the Command, Control</p>	X			

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			and Signalling Technical Specification for Interoperability (CCS TSI) and European Union Agency for Railways (known as 'The Agency') specifications for ETCS Baseline 3. The document is set out in the form of standard requirements with the ETCS System Requirement (ESR) identifier, followed by rationale and guidance notes, where appropriate.				
NEPT/ERTM S/REQ/0006	3	ETCS Trackside Sub-System Requirements Specification	These documents provide specifications that are intended to promote effective implementation of the ETCS. They are applicable to both retrofit and new-build installations and provide requirements that are optimised for operation on the GB rail network.	X			
NEPT/ERTM S/REQ/0008	4	ETCS Telecoms Sub-System Requirements Specification					
NEPT/ERTM S/REQ/0009	3	ETCS Operational Sub-Systems Requirements Specification					
153819-NWR-PLN-ESE-000007	1	Customer Requirements Acceptance Plan	This Plan describes the generic V&V principles, structure, processes, roles and responsibilities associated with the pragmatic management of Acceptance for the Customer Requirements Specifications (CRSs) being developed and implemented as part of the DR Programme (DRP).			X	
153819-DRP-RCD-ESE-000002	1.2	Verification, Validation & Requirements Matrix for SoS CRS	The Verification, Validation & Requirements Matrix (VVRM) documents take the requirements that have been developed as a stand-alone specification for the relevant component systems of the SR&I suite and matches them to an expected validation event and acceptance criteria for each individual requirement.			X	
153821-DRP-RCD-ESE-000017	2.1	Verification, Validation & Requirements	The Verification, Validation & Requirements Matrix (VVRM) documents take the requirements that have been developed as a stand-alone specification for the relevant			X	

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		Matrix for ETCS Trackside CRS	component systems of the SR&I suite and matches them to an expected validation event and acceptance criteria for each individual requirement.				
153821-DRP-RCD-ESE-000029	2.1	Verification, Validation & Requirements Matrix for ETCS Onboard CRS	The Verification, Validation & Requirements Matrix (VVRM) documents take the requirements that have been developed as a stand-alone specification for the relevant component systems of the SR&I suite and matches them to an expected validation event and acceptance criteria for each individual requirement.			X	
153821-DRP-RCD-ESE-000033	1.0.	Verification, Validation & Requirements Matrix for TMS CRS	The Verification, Validation & Requirements Matrix (VVRM) documents take the requirements that have been developed as a stand-alone specification for the relevant component systems of the SR&I suite and matches them to an expected validation event and acceptance criteria for each individual requirement.			X	
153821-DRP-RCD-ESE-000019	1.1	Verification, Validation & Requirements Matrix for C-DAS CRS	The Verification, Validation & Requirements Matrix (VVRM) documents take the requirements that have been developed as a stand-alone specification for the relevant component systems of the SR&I suite and matches them to an expected validation event and acceptance criteria for each individual requirement.			X	
153821-DRP-RCD-ESE-000020	2.0	Verification, Validation & Requirements Matrix for O&M CRS	The Verification, Validation & Requirements Matrix (VVRM) documents take the requirements that have been developed as a stand-alone specification for the relevant component systems of the SR&I suite and matches them to an expected validation event and acceptance criteria for each individual requirement.			X	
NEPT/ERTM S/REQ/0021	2.2	ETCS - Baseline 3 - System Verification, Validation & Requirements Matrix (VVRM)	The Verification, Validation & Requirements Matrix (VVRM) documents take the requirements that have been developed as a stand-alone specification for the relevant component systems of the SR&I suite and matches them to an expected validation event and acceptance criteria for each individual requirement.			X	

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NEPT/ERTM S/REQ/0022	2.3	ETCS - Baseline 3 - Trackside Sub-system Verification, Validation & Requirements Matrix (VVRM)	The Verification, Validation & Requirements Matrix (VVRM) documents take the requirements that have been developed as a stand-alone specification for the relevant component systems of the SR&I suite and matches them to an expected validation event and acceptance criteria for each individual requirement.			X	
NEPT/ERTM S/REQ/0024	2.1	ETCS - Baseline 3 - Telecommunications Sub-system Verification, Validation & Requirements Matrix (VVRM)	The Verification, Validation & Requirements Matrix (VVRM) documents take the requirements that have been developed as a stand-alone specification for the relevant component systems of the SR&I suite and matches them to an expected validation event and acceptance criteria for each individual requirement.			X	
NEPT/ERTM S/REQ/0025	2.2	ETCS - Baseline 3 - Operational Sub-system Verification, Validation & Requirements Matrix (VVRM)	The Verification, Validation & Requirements Matrix (VVRM) documents take the requirements that have been developed as a stand-alone specification for the relevant component systems of the SR&I suite and matches them to an expected validation event and acceptance criteria for each individual requirement.			X	
153821-DRP-RCD-ESE-000035	1.0.	Verification, Validation & Requirements Matrix for TMS DRR	The Verification, Validation & Requirements Matrix (VVRM) documents take the requirements that have been developed as a stand-alone specification for the relevant component systems of the SR&I suite and matches them to an expected validation event and acceptance criteria for each individual requirement.			X	

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153821-DRP-RCD-ESE-000025	1.1	Verification, Validation & Requirements Matrix for C-DAS IM DRR	The Verification, Validation & Requirements Matrix (VVRM) documents take the requirements that have been developed as a stand-alone specification for the relevant component systems of the SR&I suite and matches them to an expected validation event and acceptance criteria for each individual requirement.			X	
153821-DRP-RCD-ESE-000026	1.1	Verification, Validation & Requirements Matrix for C-DAS RU DRR	The Verification, Validation & Requirements Matrix (VVRM) documents take the requirements that have been developed as a stand-alone specification for the relevant component systems of the SR&I suite and matches them to an expected validation event and acceptance criteria for each individual requirement.			X	
153821-DRP-RCD-ESE-000027	2.0	Verification, Validation & Requirements Matrix for O&M DRR	The Verification, Validation & Requirements Matrix (VVRM) documents take the requirements that have been developed as a stand-alone specification for the relevant component systems of the SR&I suite and matches them to an expected validation event and acceptance criteria for each individual requirement.			X	
571012-OPD-PMP-PDC-000002	1.0	Operational Test Scenarios (OTS)	Each OTS tests one or more of the ETCS Trackside subsystem requirements which specify aspects of the interaction between the ETCS Trackside and ETCS Onboards. They form part of the Acceptance Criteria for the ETCS Trackside subsystem requirements.	X			
153821-OPD-SPE-ESE-000004	1.2	Data Architecture Design	This document defines a Data Architecture for the DR System of Systems by fulfilling the following objectives: <ul style="list-style-type: none"> • Demonstrating how the SoS scenarios in the BoD [RD3] operate in terms of data created or used by functions (section 5). • Defining Configuration Data processes for the main SoS systems in terms of data created or used (section 6). • Standardising the activities and exact data attributes required (as detailed in the DR Data Specification) for functions to acquire or provide information (section 7). • Informing the data-related requirements which need to be imposed on the Digital Railway System of Systems and where necessary its interfacing systems (section 8). • Documenting the process followed to achieve the above (section 4). This will allow stakeholders such as RUs, IMs, TOCs, FOCs, ROSCOs and their	X			

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			suppliers to understand the data requirements applicable to the systems they own, develop, maintain, and operate.				
153819-NWR-PLN-ESE-000006	2.9	Digital Technology Projects Requirements Management Plan	<p>This Requirements Management Plan (RMP) describes the plan, processes, roles and responsibilities associated with the creation, development and ongoing management of Customer Requirements Specifications (CRSs) and Digital Railway Requirements (DRRs) associated with the Digital Railway System, where:</p> <ul style="list-style-type: none"> •CRSs contain the 'Normative' and 'Application-Specific' 'What' requirements that can be tailored by Deployment Project Teams to enable the business benefits to be realised by Digital Railway (DR) technologies. These Customer Requirements must provide scope for innovation and creativity whilst meeting the overall needs. •DRRs define the 'Normative', 'Application-Specific', 'Preferred', and 'Generic Product' 'How' requirements that provide the constraints against which the CRS requirements may be validated. <p>The Requirements Management Plan (RMP) is supported by the Customer Requirements Deployment Policy which provides clarity for Deployment Projects on how to achieve a specific set of requirements that constitute a suitable basis for scheme development, option selection, and inclusion within 'Invitation to Tender' (ITT) and Contract documentation.</p> <p>The RMP contains generic elements related to all requirements suites associated with DR systems and separate annexes related to the different workstreams managing the different elements.</p>	X			
153821-DRP-REP-ESE-000017	3.3	ETCS Test Yard Layout	<p>The purpose of this document is to present a series of Test Yards that can be used to undertake the tests defined in the Operational Test Scenarios (OTSs) which are primarily concerned with the testing of functionality for ETCS Level 2, including the associated transitions into non-equipped or overlay areas of the railway network. This document is produced to develop isolated pieces of layout to represent infrastructure, each capable of carrying out one or more of the OTS.</p> <p>The aim of the Test Yard document is to generate a generic infrastructure specification for each element of a 'Test Yard' which can be used to test/run OTS in a simulated environment. Thereby testing requirements for all the OTS associated to all Reference Design Topics. The proposed infrastructure specifications should be representative of sufficient varied types of traffic and infrastructures assets (e.g under bridges, over</p>	X			

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			bridges, tunnels, types of stations, types of level crossings etc) and cover the range of OTS.				
153821-NWR-REP-EMN-000002	1.2	Integrated System - Maintenance Strategy	The key purpose of this document is to develop a high-level maintenance strategy for DR Integrated Systems. This maintenance strategy provides a fundamental for routes and Deployment Projects to produce their own outcome-based maintenance strategy. It is targeted at all maintainers who are involved in supporting the rail operation and in delivering the service. There is a requirement involving a level of goodwill from all parties. Through a cohesive, collaborative industry- wide approach to maintenance, this strategy offers the opportunity to build on the existing maintenance strategies and realise benefits that the Digital Railway technologies will offer.	X			
153819-NWR-PLN-ESE-000012	1.3	Introduction to Requirements Structure	<p>The purpose of this document is to provide a high-level introduction to the requirements structure for DR covering:</p> <ol style="list-style-type: none"> 1) The role of each group of requirements in the structure 2) The relationship between the groups of the requirements in the structure 3) The relationship between the requirements in the structure and standards 4) The parties responsible for the governance of each group of requirements in the structure 5) The associated documentation that supports the use of the requirements in the structure 6) The application of the requirements in the structure to deployment projects 7) The distinction between generic and deployment-specific requirements <p>Thus, the primary focus of this document is on describing the requirements structure, its supporting documentation and the processes surrounding these. This document does not concern itself with the actual requirements within the requirements structure or with any particular architectural solutions.</p>			X	
158875-NWR-PLN-OPP-000002	1	Operation and Maintenance Rules and Standards Framework	The introduction of Digital Railway systems will fundamentally change the way that the GB Railway is operated and maintained. Some of the changes that will be introduced will result in changes to nationally- applicable Rules and Standards in order for there to be consistency of operations, rules and driving experience across different deployment areas. Some of those changes will be deployment- specific and result in local changes to Rules and Standards. However, it is critical that operations should be as consistent as			X	

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			possible to provide for a railway that can be safely operated without changes in practice across deployment boundaries. This Operations and Maintenance Rules and Standards Framework has been produced to support Deployment Projects by identifying those areas of national- applicable Rules and Standards that need to be reviewed in more detail with a view to initiating a change activity.				
153819-NWR-PLN-MPM-000005	3.1	System Integration Plan	The System Integration Plan (SIP) describes the activities required to demonstrate how the DR systems function together as an overall integrated system and with rest of the railway. The plan also provides the basis for the development of appropriate process requirements for integration management by the Deployment Projects. These requirements are recorded within the SoS Customer Requirements Specification (CRS).		X		
147883-NWR-ASS-ESS-000001	1.2	System of Systems Significance of Change Assessment	When a proposed change has an impact on safety, the CSM RA requires the proposer to decide, by expert judgement, the significance of the change based on stated criteria (Article 4). The ORR Guidance (Dec 2012) states that the: '...preliminary system definition' is in effect an analysis of what is being changed and a preliminary risk assessment of that change.' The proposed change is summarised in the Significant Change Assessment document, with greater detail provided in the System Definition. The System Definition has been used to support the significance test instead of the Preliminary System Definition as it provides greater detail.			X	
153819-NWR-REP-ESE-000005	1	Verification and Validation Report	This report covers the processes & activities undertaken during the development and management of the following documents which comprises the System of Systems Customer Requirements Specification and the following System-level Customer Requirements Specifications and Digital Railway Requirements : <ul style="list-style-type: none"> • European Traffic Control System (ETCS) – Trackside: CRS & DRR • European Traffic Control System (ETCS) – Onboard: CRS & DRR • Traffic Management System (TMS): CRS & DRR • Connected Driver Advisory System (C-DAS): CRS & DRR • Interface Requirements: CRS and DRR • Operations and Maintenance: CRS & DRR 				X

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Table 3 - Safety Management Suite

Number	Version	Title	Description	M	S	G	I
147883-NWR-PLN-ESS-000004	4	System Assurance Plan	<p>This System Assurance Plan details how the System Assurance processes are being implemented on the Digital Railway Programme to develop the “System of Systems’ (SOS) Assurance Case.</p> <p>The System of Systems Assurance Case will build a structure of claims, arguments and evidence to support the development of a clear, comprehensive and defensible safety argument to demonstrate that the generic System of Systems baseline architecture can be deployed as a Digital Railway.</p> <p>The assurance case and safety argument will be contained in the System of Systems Preliminary Hazard Analysis Report that will be produced by the Safety & Assurance Manager, in accordance with the System Safety Plan. The Preliminary Hazard Analysis Report will be the primary evidence offered to the Independent Digital Railway System Review Body (SRB) for authorisation and approval of the generic System of Systems baseline architecture.</p>			X	
147883-NWR-PLN-MPM-000008	6.1	System Safety Plan	This System Safety Plan defines the system safety activities required to support the creation of a generic System of Systems baseline architecture (that will be used to enable deployment of digital technologies).				X
147883-NWR-PLN-MPM-000005	4.2	Hazard Management Plan	<p>Hazards identified in the hazard record will not be ‘closed’; however, the hazard record activity should be concluded when all hazards are at least ‘resolved’. A clear means of hazard resolution will be required to establish the safety measures necessary to manage or eliminate hazard or reduce the risk ALARP (as low as reasonably practicable).</p> <p>It is encouraged that the Deployment Projects comply with this plan and design their hazard management activities as a continuation of the activities already undertaken by the DRP. This will facilitate the demonstration of “safe by design” and reduce duplication.</p>				X
153819-NWR-PLN-ESE-000008	2.3	Health Safety and Environment Management Plan	Deployment Projects that will oversee the application design of digital technologies on the railway have an important role through taking all reasonable steps to mitigate or eliminate risks to people (death, injury, illness or other health impacts), assets (damage, destruction or loss) and the environment (contamination, pollution). This should also include specifying digital technologies to be implemented on the railway that have been designed to eliminate HS&E risks where possible or mitigate them to an acceptable level. Assurance evidence for all of the above will be expected, as well as adherence to GB HS&E legislation and good HS&E practices, including compliance with the CDM Regulations.			X	

Number	Version	Title	Description	M	S	G	I
			<p>The Safety HS&E Plan provides:</p> <ul style="list-style-type: none"> •the basis for the development of a set of non-functional and process HS&E requirements that <p>Deployment Projects will need to comply with; and</p> <ul style="list-style-type: none"> •to define SR&I's HS&E considerations during the design development of the SoS architecture. 				
147883-NWR-REP-ESS-000009	7.2	System of Systems Functional Failure Analysis	<p>The purpose of Functional Failure Analysis (FFA) is to identify all possible functional failures of the System of Systems (SoS) baseline architecture in a systematic manner.</p> <p>Each functional failure is prioritised according to the seriousness of its consequences (Safety and / or Reliability affecting) and how easily they can be detected. This allows deployment projects to eliminate or reduce failures by changing their baseline architecture or implementing existing or new procedures (Operational Readiness), starting with the highest-priority ones.</p> <p>The FFA is based upon the SoS specific Operational Scenarios that show the relationships between each system and their functions currently at the time of the analysis.</p> <p>All hazards identified in the FFA have been entered into the Hazard Record for subsequent management and issued in a separate SoS Hazard Record report.</p>	X			
147883-NWR-LOG-ESS-000001	4.8	System of Systems Hazard Record	<p>The System Safety Hazard Record (SoS HR) is being used to capture all SoS Safety hazards (at the boundary level) derived from hazard identification activities and reviews of historical safety assessments. This enables effective tracking and collating of all relevant evidence to demonstrate that all SoS related hazards are being controlled and managed, as required by CSM RA.</p> <p>The SoS HR meets the requirements of the CSM RA, up to the point where a System specification is developed for a Deployment project to be able to apply the full extent of the regulation. The SoS HR records and references the necessary fields as described in the Hazard Management Plan.</p>	X			

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Number	Version	Title	Description	M	S	G	I
147883-NWR-REP-ESS-000008	5.1	System of Systems Interface Hazard Analysis	The Interface Hazard Analysis (IHA) considers the cause and effect of hazards that may arise across the inter and intra system level interfaces for SoS. The document should be read in conjunction with the Functional Failure Analysis Report.	X			
147883-NWR-REP-ESS-000006	7.3	Operation & Support Hazard Analysis	The purpose of the O&SHA is to identify hazards arising from procedurally controlled activities that are inherently dangerous to personnel, or in which a human error could be hazardous to equipment or people. The procedures include management during normal, abnormal and emergency / failure conditions, effects of perturbations and the process required to recover the failed system. The bulk of these actions are being performed by signallers, drivers and by maintainers.	X			
147883-NWR-REP-ESS-000007	6.5	Preliminary Hazard Analysis Report	This Preliminary Hazard Analysis Report (PHAR) has been developed in accordance with the System Safety Plan to support the development of the generic SoS baseline architecture. This PHAR provides process information and the results of the system-wide assessments used to assess the safety of the public, train passengers, and those involved in the operation and maintenance of the SoS. All issues, assumptions, dependencies, recommendations, and constraints arising from the SoS safety analyses have been resolved through system design.	X			
153830-NWR-LOG-PRK-000001	7.1	System of Systems Hazard Record Report	The purpose of this SoS Hazard Record Report is to: <ul style="list-style-type: none"> • Define the process by which the hazards and causes have been identified and; • Summarise the status of the SoS HR. 	X			
147883-NWR-PLN-ESS-000001	3.5	Reliability, Availability & Maintainability Management Plan	The Reliability, Availability, Maintainability (RAM) Plan describes the concept, organisation and process being implemented to ensure that RAM is fully considered during the development of the generic System of Systems (SOS) baseline architecture of the DR system and its subsequent use on Deployment Projects.			X	
153821-NWR-REP-ESS-000002	4.3	Review of Safety of National Braking Curves	This report addresses whether the fixed ETCS National Brake Percentage keeps the level of performance and safety levels consistent with that currently seen on the network under the Train Protection Warning System (TPWS).	X			

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Number	Version	Title	Description	M	S	G	I
		for Freight Trains					
153821-OPD-REP-ESE-000001	1.3	Level-National Train Control Safety Justification Report	<p>The objective of this Safety Justification is to demonstrate that the design options selected have suitable safety controls.</p> <p>As ETCS is fitted to the GB rail network, there will be occasions where it will be necessary for ETCS- fitted trains to operate on infrastructure that is not yet equipped with ETCS Trackside systems.</p> <p>The design has been carried out in accordance with good engineering practice and identifying sufficient safety controls to manage the risk from L-NTC operation. Codes of practice and safety measures have been identified to manage the risk from these hazards to a level that is both tolerable and ALARP (As Low As Reasonably Practicable).</p> <p>The safety measures will need to be converted into formal safety requirements for deployment projects to demonstrate compliance with.</p>	X			
153821-NWR-REP-ESE-000014	1.4	Multiple Traction Configuration Safety Justification Report	<p>This report covers the safety analysis carried out for the operation of multiple traction configurations. This safety analysis has been carried out in accordance with good engineering practice identifying and recording hazards related to NTSN-compliant operation as well as two alternatives (implementing an ETCS temporary isolation switch and the use of non-NTSN compliant Non-Leading (NL mode). Safety measures have been identified to manage the risk from these hazards to a level that has been considered by the attendees at the workshops and reviewers of the Hazard Record to be both tolerable and ALARP. The safety measures still have to be converted into formal safety requirements for deployment projects to be able to demonstrate compliance.</p> <p>Although the safety analysis covered by this report includes the alternative options mentioned above, the detailed implementation design and associated operating procedures for these two options have not yet been defined. This report has assessed the safety, performance and financial impacts of the options for all the different ETCS modes. An agreement will be required from the industry as to whether the option with the least safety impact can be used for the trailing traction operation. Therefore, if either option is to be implemented, further HAZID and risk assessment will need to be carried out by deployment projects.</p>	X			

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Number	Version	Title	Description	M	S	G	I
153821-DRP-PLN-ESE-000001	4.0	Security Assurance Document	<p>This document has been created as the Digital Railway Programme System of Systems Security Assurance Document (SAD). It describes the process used in accordance with the Network Rail (NR) Security Assurance Framework (SAF) to identify, grade and mitigate security risks within a railway system, using the IEC62443 Security Standard, and presents the outputs of the individual security assessment stages for the System of Systems architecture up to GRIP Stage 3 using the following NR Security Assurance Framework (SAF) documents:</p> <ul style="list-style-type: none"> •the Security Accreditation Questionnaire (SAQ); •the Security Accreditation Plan (SAP); and, •the Security Risk Assessment (SRA). 		X		

Table 4 - System Definition Suite

Number	Version	Title	Description	M	S	G	I
153821-NWR-REP-ESE-000002	6.3	System of Systems - System Definition Document	The SoS System Definition Document specifies the architecture and the boundary for DR systems. Describes how the railway will look after the deployment of Digital Technology. It provides the foundation for the development of system architecture and requirements.	X			
153821-NWR-REP-ESE000004	3.5	Traffic Management System Definition Document	<p>This document defines the key details of the TMS. TMS comprises of the Traffic Management Planning Layer (TMPL) and Traffic Management Control Layer (TMCL). The rationale for the split between TMPL and TMCL in this document is that it provides the flexibility for Deployment Project Teams to implement only a partial TMS (e.g. TMPL only), whilst still being able to understand the overall perspective should the full TMS be implemented later. This includes its purpose, functions, and interfaces, and the existing safety measures that apply to it. It provides a generic application design in support of subsequent development and deployment (i.e. application-specific design and implementation). The System Definition allows the generic application specification and design for the TMS to be assessed in accordance with the CSM RA in order to provide a basis for a safety case and the associated business change, operational rules, and processes to be developed to support it. This document has been written to promote a high-level understanding of the TMS. It is</p>	X			

Number	Version	Title	Description	M	S	G	I
			also intended to support the early stages of impact and hazard analysis of the proposed solution.				
153821-NWR-SPE-ESE-000009	3	C-DAS System Definition Document	The C-DAS System Definition describes the functions, boundary interfaces, environment, existing safety measures and assumptions for C-DAS.	X			
153821-NWR-REP-ESE-000005	4	ETCS Onboard System Definition Document	The ETCS Onboard System Definition describes the functions, boundary interfaces, environment, existing safety measures and assumptions for ETCS Onboard.	X			
153821-NWR-REP-ESE-000006	4	ETCS Trackside System Definition Document	The ETCS Trackside System Definition describes the functions, boundary interfaces, environment, existing safety measures and assumptions for ETCS Trackside.	X			
153821-DRP-REP-ESE-000003	1.4	Level NTC System Definition Document	<p>This System Definition document defines Level NTC (AWS/TPWS systems only) and its interfaces and thus minimises integration risks. It is in addition to the existing suite of four System Definitions (Onboard, Trackside, C-DAS, Traffic Management System) that support the deployment of the DR System of Systems, including the System of Systems Definition Document.</p> <p>This System Definition defines the key details of Level NTC, its purpose, functions and interfaces, and the existing safety measures that apply to it.</p> <p>It also allows the generic application specification and design for Level NTC to be assessed in accordance with the CSM RA in order to provide a basis for a safety case and the associated business change, operational procedure and processes to be developed to support it.</p> <p>This document has been written to facilitate a high-level understanding of Level NTC and is also intended to support the early stages of impact and hazard analysis of the proposed solution. It is a fundamental requirement that Level NTC is compliant with CCS TSI.</p>	X			

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Number	Version	Title	Description	M	S	G	I
153821-DRP-REP-ESE-000020	7	Trailing Traction Operations	<p>This report:</p> <ul style="list-style-type: none"> • defines the scenarios where an ETCS-fitted vehicle may be required to operate as part of a consist where it is not at the front (e.g. being hauled by another vehicle, propelling another vehicle, tandem working). The leading vehicle may or may not be ETCS-fitted (it is not important for this exercise); however, the trailing vehicle is ETCS-fitted. • reviews the options available for operating the trailing vehicle under ETCS, specifically, the mode and level. In each case, there may be several modes available, each with different advantages and disadvantages. The relative merits of these modes are discussed in order to arrive at a proposed solution. Where feasible, this will result in a single proposed mode for use. 				X

Table 5 - Operational Readiness and Deployment Guidance

Number	Version	Title	Description	M	S	G	I
153819-NWR-SPE-ESE-000001	2.1	Digital Railway – Glossary of Terms & Abbreviations	This document provides a glossary of terms and abbreviations relevant to the deployment of the Digital Railway (DR) System of Systems (SoS). It supports the documentation suite produced by the DR System Requirements and Integration (SR&I) Team.			X	
153819-NWR-SPE-ESE-000002	3.5	Generic Requirements Suite - Deployment Policy	The Requirements Deployment Policy provides clarity for Infrastructure Deployment Project Teams on how to achieve a specific set of requirements that constitute a suitable basis for scheme development, option selection, and inclusion within 'Invitation to Tender' and Contract documentation.	X			
153819-NWR-GDN-MPM-000001	3.2	Integration Fundamentals Handbook	This includes information from specific elements of the management plans so that individual engineering deployment guides can be produced to help understand, from an engineering perspective, how Digital Railway technologies can be used on the GB railway. Where remitted to do so, the SR&I Team may provide support to deployment programmes in the development of their application specification and design phases via the Head of Route Engineering and Integration.			X	

Number	Version	Title	Description	M	S	G	I
153821-DRP-REP-ESE-000016	4	ETCS - Deployment Guide	This document gives guidance to projects deploying ETCS as part of a Digital Railway Programme or as a stand-alone ETCS application. It is aimed at ETCS projects from CP7 onwards, using experience gained from the earlier ETCS deployments projects of Cambrian EDP (Early Deployment Project), Thameslink and Great Western 0-12/Heathrow. The lessons learnt from these early projects have been included in this guide and used by the later CP6 ETCS projects, ECML(S) (East Coast Main Line South) and TPU (Trans Pennine Upgrade), in scoping and developing the project documentation plans and processes to deliver ETCS.			X	
153821-NWR-REP-ESE-000013	1.1	Traffic Management System Deployment Guide	This document gives guidance to projects deploying Traffic Management System as part of a Digital Railway Programme or as a stand-alone TMS application. It is aimed at TMS projects from CP7 onwards, using experience gained from the earlier TMS deployments projects.			X	
153821-DRP-GDN-ESE-000003	1.2	Human Factors Guidance for Deployment Projects	This document offers guidance to accompany the DR Human Factors Management Plan which sets out the approach for human factors integration on projects responsible for the introduction of strategic control, command and signalling technologies. The Human Factors Guidance for Deployment Projects: <ul style="list-style-type: none"> • Presents the case for the systematic integration of human factors on DR deployment projects. • Sets out the approach required for programme-level human factors integration management. • Specifies the human factors integration goals required to deliver a successful human factors assurance case. • Provides sources of further information and support. By following the guidance in this document, projects will be better equipped to successfully manage uncertainty and to control human factors risks relating to the adoption, performance, safety and sustainability of future rail systems.			X	
153831-NWR-SPE-ESE-000001	3.3	Data Specification	The Data Specification is a complete and defined list of the data attributes and properties (metadata) required by the SoS to perform the designed functions as described in the Basis of Design. It represents the attributes required to quantify data definition and its	X			

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Number	Version	Title	Description	M	S	G	I
			<p>semantics (meaning). For the DRP SoS, the Data Specification is a flat output (i.e. spreadsheet) of the logic and information held within the coupled Logical Data Model (LDM), e.g. Data Entity, Data Attribute, Attribute Definition, Attribute Properties, Links to processes where Data Attribute is used, Application of Consumption, Potential System of Record, and Data Quality Criteria, etc. The Data Specification can be extended to include new attribute properties, as appropriate, via a suitable change control process e.g. Single Source of Truth - this is not currently included as a property in the baselined Data-Specification but will be required for deployment and operational configuration management. Changes to the Data Specification must be approved by the DR Systems Authority to ensure that Semantic Interoperability is achieved by the DR SoS.</p>				
153821-DRP-REP-ESE-000005	3	ETCS Axle Load Categorisation Report	<p>The GB uses the measure of Route Availability to determine the axle load / mass distribution of vehicles for the purpose of determining the speed at which a train may traverse a weak structure. Under ETCS, a different measure is used – the Axle Load Category, which follows slightly different rules for its calculation. The ETCS trackside equipment transmits all axle load related speed restrictions to the train, and the onboard, knowing its own axle load category, determining the most appropriate speed profile from those available.</p> <p>Trains subject to weight related speed restrictions today shall be subject to the same ones under ETCS, and vice versa. Weight restriction categories don't necessarily align between Route Availability and Axle Load categorisation so there is scope to propose solutions to keep the trains running as they are today, without causing any delays to the network.</p>	X			
165768-DRP-SPE-ESE-000007	5	ETCS Speed Profiles Report	<p>Track in the GB is banked (canted) around curves to improve line speeds and maintain train stability. However, track is typically not canted enough to balance the cornering forces generated at the line speed. Trains with a higher cant deficiency tolerance may traverse a curve faster than those with a lower cant deficiency tolerance. ETCS uses the concept of cant deficiency to differentiate between trains on a curve, therefore the value of cant deficiency must be known for all stock – as well as the corresponding track cant deficiency.</p> <p>Speed around curves shall also be maintained in the same manner as they are today. Cant deficiency characterisation is not currently done in such an explicit manner as ETCS standards require. Other restrictions that apply on the network today need to be replicated in ETCS. A direct analogue for some types of restrictions may not exist in ETCS to allow a simple transfer of the logic to characterise the restrictions.</p>	X			

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Number	Version	Title	Description	M	S	G	I
153819-OPD-REP-MPM-000001	5.0	Impact upon the freight driving task of ETCS configuration	This report gives details of the study that was carried out using Eye Tracking Glasses to review the behaviour of a cross section of drivers operating an ETCS simulator in a series of scenarios, to gain feedback of the drivability of ETCS as proposed for the GB rail industry, as well as provide driver behaviour data to feed into driver behaviour models. Note: The conclusions from this document have not yet been ratified by FOSG.			X	
153821-NWR-REP-EMN-000001	3.1	Maintenance Framework	This document is a child of the Operational Readiness Plan and will provide guidance to Deployment Project Teams, Infrastructure Managers and Railway Undertakings in understanding a Digital Railway System of Systems implementation. This will, in turn, influence Route Asset Management Plans for the deployment of the Digital Railway SoS on GB's railway network. This framework further supports DPTs in understanding maintenance considerations during the early development stages of an integrated system. The guidance in this document will also incorporate lessons learned from previous projects deploying similar digital technologies.			X	
158875-NWR-PLN-OPP-000003	1.1	Operation and Maintenance Readiness Handbook	Operations and Maintenance readiness is the measure of preparedness of the industry's O&M staff to accept the DR SoS into operational service. Those who operate and maintain the DR SoS require all necessary O&M processes, training, rules, and material resources to be in place to enable the railway to be run safely and efficiently. This O&M Readiness Handbook provides support for the running of trains on a DR SoS railway, enabling the benefits of digital technologies to be fully achieved. It also provides guidance for Deployment Projects on O&M readiness activities.			X	
153821-DRP-REP-ESE-000018	4.2	Performance Modelling - Impact on Technical Running Times	This study has been undertaken to determine whether the deceleration rates achieved under ETCS, when driving to the permitted speed curve, is sufficient to allow a train to be conducted in this manner to meet the technical running times currently set by industry planning tools. This is checked for a train using real train data, and one which is using the national brake percentage.	X			

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4 INFORMATION ON CHANGES FOR BASELINE 4

The tables below provide information on the version of the documents in the current release and the previous published release (Baseline 3.1). It also gives a narrative as to what has changed and why that change has taken place and to give the reader information about the extent of the change.

Where the document is a requirements document which has content under full configuration control in DOORS, information on the requirements change requests (CRs) which document the agreed changes to the requirements is given. If the reader requires detailed information about the individual requirement changes, this CR information can be obtained separately from the System Authority.

The tables mirror the five categories of document types defined for the Industry Council reporting.

- Table 6 – System Engineering
- Table 7 – System Requirements Suite
- Table 8 – Safety Management Suite
- Table 9 – System Definition Suite
- Table 10 – Operational Readiness and Deployment Guidance

Note: There is a sixth section on the Network Rail Website which contains documents which support or are referenced in this Baseline 4 release but which are not readily accessible elsewhere to users.

The significance of the change must be assessed by each user and to guide that assessment, each of the documents has been marked with a category in the “Extent of change” column.

The entry “**significant change**” indicates the documents which have been significantly altered and lead to some or all of:

- changed requirements
- additional scope
- changes to philosophy / policy.

The other categories are

- **New document** – This document has been published for the first time as part of Baseline 4
- **No change** – There has been no change to this document between Baselines 3.1 and 4
- **Deployment responsibility defined** – where change to the outcome is not altered but information is now given as to whether the work has been part of the SR&I work or if it sits at a later delivery stage for the deployment team to undertake
- **Updates from assurance review** – where the substance of the document has not altered but changes were needed to keep it aligned with other documents

Editorial – The substance of the document has not changed but items such as templates, organisational names and minor references have been made

Table 11 – Withdrawn documents contains details of documents that were part of previous baseline releases which are no longer included with this Baseline 4. There is a rationale given for the withdrawal of each relevant document.

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Table 6 – System Engineering

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
000000-NWR-PLN-MPM-000005	5.0	3.0	Integrated Concept of operations	Significant change	<ul style="list-style-type: none"> introduction of Appendix D as recommended by SAIAT to show the elements covered by the concept which are not part of the System of Systems. review and update to comments from the ConOps Alignment exercise and Technical Author review. updates to remove the Glossary which will be imported into the DR Glossary updates and also includes minor formatting updates. updates following on from comments provided to the changes between v3.0 and v4.1 from Systems and Operations Board updates to address assurance reviews by SAIAT 	
153821-DRP-REP-MPM-000003	1.2	1	Level NTC Operational Concept	Updates from assurance review	As part of Baseline 4 the changes to this document include update in conjunction with industry stakeholders review and assurance activities. These did not fundamentally amend the detail of the document.	
153821-OPD-REP-ESE-000004	1.1	N/A	ETCS Multiple Traction Configuration Operational Concept	New document	This Concept of Operations for Multiple Traction Configuration is to describes how the operation of a train formation consisting of more than one traction unit will take place on the GB Railway. This includes current operating practices today and those required for operation when ETCS is introduced. The introduction of ETCS requires analysis which needs primarily to determine how any trailing traction will operate whilst still providing operational flexibility compatible with GB rail industry business needs including safety, security, capacity and performance.	

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
153819-NWR-REP-ESE-000002	3.3	3.1	System of Systems Basis of Design	Significant change	<p>Minor updates have been made following work on the data workstream and development of its main products, the Data Architecture Design and the Data Specification;</p> <ul style="list-style-type: none"> - The BoD was used as the basis for this workstream and thereby extensively reviewed during workshops with SMEs, which led to small changes. <p>Alignment with the new documents required small changes in the way diagrams are displayed in the BoD.</p>	
153819-NWR-DRG-ESE-000003	5.4	5.2	System of Systems Architecture	Updates from assurance review	Minor updates have been made to reflect L2 comments and SRB comments.	
152365-NWR-REP-ETL-000001	2.2	2.0	Guidance on the Telecoms Architecture	Significant change	Updated to address the changes associated with the System of Systems (SoS) architecture and minor changes associated with new information and additional learning	
153819-NWR-PLN-ESE-000005	3.0	3.0	Configuration Management Plan	No change	N/A	
152365-NWR-PLN-MPM-000004	2.4	1.0	Business Continuity Plan	Deployment responsibility defined	Updated to clarify activities of SR&I and deployment projects	
153819-NWR-PLN-EMG-000001	3.6	2.0	Data Management Plan	Updates from assurance review	<p>Updates following:</p> <ul style="list-style-type: none"> - Incorporation of and alignment to data workstream and its deliverables, - additional L2 and L3 review comments, and SRB review comments, - technical author check. 	
153819-NWR-PLN-ESE-000009	2.2	2.1	Human Factors Management Plan	Editorial changes	Minor updates following a new generic document format and updated reference documents.	

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
153819-NWR-PLN-MPM-000004	2.2	2.0	Interface Management Plan	Updates from assurance review	Updates following: <ul style="list-style-type: none"> - ECDP TCP and SRB review, - technical author check. 	
147883-NWR-PLN-ESE-000001	4.2	3.0	Interoperability Certification Plan	Deployment responsibility defined	Updated to clarify activities of SR&I and deployment projects	
158875-NWR-PLN-OPP-000001	2.0	2.0	Operations and Maintenance Readiness Plan	No change	N/A	
153819-NWR-PLN-PPC-000001	4.0	3.0	Quality Management Plan	Editorial	Minor updates following a new generic document format and updated reference documents.	
153819-NWR-PLN-MPM-000002	9.6	9.1	System Management Plan	Significant change	Major updates following review cycles. Besides a wide range of smaller changes, key changes include: <ul style="list-style-type: none"> - Addition of an executive summary, - update of document format, reference versions, and key dates & deliverables overview, - addition of a 'Purpose' section, - addition of outline sections on the ETCS Reference Design, the Data Management Plan, Multiple Traction Configuration Operating Modes, and Level NTC, - expansion of the section on data management following the data workstream, and the section on SoS deliverables. 	
153819-NWR-PLN-ESE-000013	2.1	2.0	SoS Verification & Validation Plan	Editorial	No material change – update to reflect document template changes and organisation names following feedback from SAIAT.	

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Table 7 – System Requirements Suite

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
000000-NWR-PRG-MAN-000002	1.1	1.1	Business Requirements	No change	N/A	
153819-NWR-SPE-ESE-000003	5.4	5.1	SoS Customer Requirements Specification (CRS)	Significant change	<p>Updated to address:</p> <p>Review comments received from external parties (RICMWG, East Coast Digital Programme Train Control Partner and Traffic Management Partner).</p> <p>A change in the approach to non-functional requirements has led to the deletion and amalgamation of requirements from this document which are already covered by other DR documentation, or legislation, standards and/or 'normal business'.</p>	<p>This includes changes in:</p> <p>SoS CRS v5.2:</p> <ul style="list-style-type: none"> • CR#11 • CR#12 <p>SoS CRS v5.3:</p> <ul style="list-style-type: none"> • CR#13 • CR#14
153821-NWR-REP-ESE-000007	4.0	3.1	ETCS Trackside Customer Requirements Specification (CRS)	Updates from assurance review	As part of Baseline 4 the changes to this document include the thorough review of the body of the document and its requirements and update in conjunction with industry stakeholders and assurance activities.	<p>153821-NWR-REP-ESE-000007</p> <p>#6 & #7 (TCP review of the ETCS(T) CRS v3.3 and ConOps Alignment exercise)</p>
153821-NWR-SPE-ESE-000008	4.0	3.1	ETCS Onboard Customer Requirements Specification (CRS)	Significant change	As part of Baseline 4 the changes to this document include the thorough review of the body of the document and its requirements to confirm alignment with the remainder of the documentation and update in conjunction with industry stakeholders and assurance activities.	<p>153821-NWR-SPE-ESE-000008</p> <p>#7, #8 (TCP review of the ETCS(T) CRS v3.3 and ConOps Alignment exercise)</p>

Reference 153821-OPD-BRF-ESE-000002

Issue/Ver: v1.0

Date: 30th March 2022

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
153821-NWR-SPE-ESE-000011	4.4	3.0	TM Customer Requirements Specification (CRS)	Significant change	<p>The update separates the TMS CRS into two parts: a TM Planning Layer (TMPL) and a TM Control Layer (TMCL). This aligns with the change to the SDD thereby providing flexibility in migration for Routes, from a procurement perspective, to enable them to choose between Operational Decision Support Tool (ODST), Interfaced and Integrated TMS applications.</p> <p>There have been substantial changes to the requirements whereby several requirements have moved to now reside at TMS DRR level. Furthermore, requirements have been separated into either the TMPL, the TMCL or both (where applicable)</p> <p>The requirements identifiers have changes from CRS-TMS-xxx to new identifiers CRS-TMPL-xx and CRS-TMCL-xxx.</p>	<p>TMS CRS CR#4 applied to updating from v3.0 to v3.1 (doc ref: 153821-NWR-CHG-ESE-000004).</p> <p>With the policy change (split into TMPL and TMCL), the requirements were completely reassigned.</p> <p>Subsequently, TMS CRS CR#5 applied to update from v4.2 to v4.3 (doc ref: 153821-OPD-SPE-ESE-000005)</p>
153821-NWR-SPE-ESE-000010	3.3	3.0	C-DAS Customer Requirements Specification	Significant change	<p>As part of Baseline 4 this document has undergone significant restructure including the thorough review of the body of the document and its requirements to confirm alignment with the remainder of the documentation and update in conjunction with industry stakeholders and assurance activities.</p>	<p>CR#1 Customer Requirement Change request</p> <p>153821-NWR-COM-ESE-000018</p> <p>153821-OPD-CHG-ESE-000003</p>

Reference 153821-OPD-BRF-ESE-000002

Issue/Ver: v1.0

Date: 30th March 2022

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
153819-NWR-PLN-ESE-000014	5.0	3.0	O&M Customer Requirements Specification (CRS)	Significant change	<p>Document restructured to create a separate section for the Maintenance and Operations applicable Customer Requirements Specification and identify by adding an M or O to the unique requirement identifiers</p> <p>Improved the information on the source of the requirements to help with the alignment and linking of the CRS to its source</p> <p>Review requirements for industry wide maintenance application, duplication or identified gaps.</p> <p>With the creation of Operations and Maintenance DRR document, some requirements have been transferred from the CRS to that DRR document.</p>	<p>Maintenance Change Paper ref.</p> <p>153821-OPD-CHG-ESE-000005</p> <p>(Operations & Maintenance CRS CR#3)</p>
153821-NWR-SPE-ESE-000013	3.4	3.0	Interface Customer Requirements Specification (IRS)	Significant change	<p>This document has undergone major change as it was split into a CRS-level document (this document) and a DRR-level document (the Interface Digital Railway Requirements, see next row). This was done for consistency with the other requirements documents (i.e. for TMS, ETCS Onboard and Trackside, C-DAS). Where this document details what interfaces are required, the Interface DRR document constrains how these interfaces work.</p> <p>Furthermore, updates incorporate L1, L2, and L3 review comments as well as review comments from RICMWG, the East Coast Digital Programme Train Control Partner and Traffic Management Partner.</p>	<p>This includes changes in:</p> <p>IRS v3.1: CR#4</p> <p>IRS v3.2: CR#5</p> <p>IRS v3.3: CR#6</p> <p>IRS v3.4: CR#7</p>
153868-NWR-SPE-OPP-000001	1.2	1.2	Timetabling Customer Requirements Specification (CRS)	No change	N/A	

Reference 153821-OPD-BRF-ESE-000002

Issue/Ver: v1.0

Date: 30th March 2022

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
153821-NWR-SPE-ESE-000016	2.0	1.2	ETCS Trackside Digital Railway Requirements	Significant change	The document provides a signpost to the detailed ETCS requirement specifications and the update here is to point to the current version of those specifications. It also addresses the comments received through the review process from the industry stakeholders and assurance activities and to align with the update SoS Hazard Records.	153821-NWR-SPE-ESE-000016 #2 and #3
153821-NWR-SPE-ESE-000017	2.0	1.1	ETCS Onboard Digital Railway Requirements	Significant change	The document provides a signpost to the detailed ETCS requirement specifications and the update here is to point to the current version of those specifications. It also addresses the comments received through the review process from the industry stakeholders and assurance activities and to align with the update SoS Hazard Records.	153821-NWR-SPE-ESE-000017 #2 and #3
153821-NWR-SPE-ESE-000014	3.4	2.2	TM Digital Railway Requirements	Significant change	<p>The update separates the TMS DRR into two parts: a TM Planning Layer (TMPL) and a TM Control Layer (TMCL). This aligns with the change to the SDD thereby providing flexibility in migration for Routes, from a procurement perspective, to enable them to choose between Operational Decision Support Tool (ODST), Interfaced and Integrated TMS applications.</p> <p>There have been substantial changes to the requirements whereby several requirements previously at CRS level now reside at TMS DRR level. Furthermore, requirements have been separated into either the TMPL, the TMCL or both (where applicable).</p> <p>The requirements identifiers have changes from CRS-TMS-xxx to new identifiers CRS-TMPL-xx and CRS-TMCL-xxx. There is no link between the old and new identifiers.</p>	<p>TMS DRR CR#1 applied to updating from v2.0 to v2.1 (doc ref: 153821-NWR-CHG-ESE-000004).</p> <p>With the policy change (split into TMPL and TMCL), it was not possible to CR the document.</p> <p>Subsequently, TMS DRR CR#2 applied to update from v3.2 to v3.3 (doc ref: 153821-OPD-SPE-ESE-000006)</p>

Reference 153821-OPD-BRF-ESE-000002

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Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
153821-NWR-SPE-ESE-000015-1	1.4	1.0	CDAS IM Digital Railway Requirements	Significant change	This update has incorporated substantial changes to requirements which were previously at the CRS level and now been apportioned to the DRR level. It also has removed duplication of requirements and aligned with the requirements repository.	C-DAS DRR change request 153821-OPD-CHG-ESE-000004
153821-NWR-SPE-ESE-000015-2	1.4	1.0	C-DAS RU Digital Railway Requirements	Significant change	This update has incorporated substantial changes to requirements which were previously at the CRS level and now been apportioned to the DRR level. It also has removed duplication of requirements and aligned with the requirements repository.	C-DAS DRR change request 153821-OPD-CHG-ESE-000004
153821-OPD-SPE-ESS-000001	3.0	N/A	O&M Digital Railway Requirements (DRR)	New document	Created to address hazards and safety measures identified in the PHAR.	N/A – new requirements document.
153819-DRP-SPE-ESE-000001	1.3	N/A	Interface Digital Railway Requirements (DRR)	New document	It sits below the IRS and details constraints on the interface requirements set out in that document. Since its creation, L1, L2, and L3 review comments as well as review comments from RICMWG, the East Coast Digital Programme Train Control Partner and Traffic Management Partner have been incorporated.	This includes changes in: IDRR v1.1: CR#1 IDRR v1.2: CR#2 IDRR v1.3:CR#3
64363474 65029860 64406798 64344605 64734109 64344606 64381686	4.0 5.1 7.0 3.0 4.0 4.0 4.0	N/A*	ETCS Reference Design	Significant change	*The ETCS Reference Design previously existed outside of the SR&I documentation baseline, with the last formally published versions released in October 2016. As part of SR&I Baseline 4 the ETCS Reference Design has been comprehensively reviewed and updated in conjunction with industry stakeholders to: <ul style="list-style-type: none"> Reflect the widening of the scope of the ETCS Trackside within the ETCS Trackside System 	

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
64623191	4.0				Definition Document to include interlocking functions	
64406799	4.1				<ul style="list-style-type: none"> • Include changes to the proposed solutions for managing operational scenarios using ETCS in the GB railway 	
64344608	4.0				<ul style="list-style-type: none"> • Resolve issues encountered in later development work on ETCS Requirements and Operational Test Scenarios (OTS) – within SR&I Baseline 4 the ETCS Reference Design Topics, Requirements Specifications and OTS are aligned around a common suite of requirements 	
64344610	4.0				<ul style="list-style-type: none"> • Include feedback received from suppliers, duty holders and Deployment Project Teams 	
64609520	5.0				<ul style="list-style-type: none"> • Improve clarity of the descriptions of the scenarios and draw clear linkages between these and the requirements suite to aid understanding 	
64401416	4.0				<ul style="list-style-type: none"> • Reflect updated hazard analysis. The Consolidated Reference Design Hazard Record is maintained on the ETCS reference design Hub and is available via the System Authority. 	
64381686	5.0					
64401417	4.0					
64609522	6.0					
64424605	4.0					
64724970	4.0					
64401418	7.0					
64609523	7.0					
64401420	6.0					
64375796	4.0				This has resulted in changes to all the existing ETCS Reference Design Topic documents. The complete list of impacted existing ETCS Reference Design Topic documents is:	
64381687	4.0					
64363474	1.0					
64547689	5.0				A - Continuing Movement	
64528341	6.0				B - Operation in a Possession	
64375797	6.0				C - End of Mission (EoM)	
65030841	5.0				D - Train Dispatch	
64401415	6.0				E - Stopping at an End of Authority (EOA)	
90000002	2.0				F - Applying Speed Restrictions	
90000001	1.0				G - Starting	
					H - Permissive Moves	
					I - Attaching and Detaching	
					J - Management of Requests to Stop Trains	

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Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
64531861 64444893	5.1 3.0				<p>K - Changing Driver Identity (ID) number and Train Running Number (TRN) during mid-journey L - Pathway Locking and Release M - Neutral Sections, Traction Changeover and Pantograph Management N - Entering ETCS O - Exiting ETCS (Leaving Level 2 and 3) R - Boundaries S - Degraded and Abnormal Working [this replaces earlier Topic S5] T - Inhibition of Transition to ETCS Levels where driver not authorised to drive in those levels U - Pathway Controls for the Issue of Movement Authorities V - Provision of Routing Information Y - Miscellaneous Z - Non Trackside AA - Consistent Provision of Lineside Signage CC - Utilisation of Packet 44 in ETCS Areas EE - Key Management HH - Train Maintenance and Testing II - Balise Configuration Rules JJ - Level Crossing Operation & Protection KK - Transmission of National Values LL - Use of Track Condition Functions</p> <p>In addition, the following new ETCS Reference Design Topic documents have been added to the overall suite to address aspects not previously covered: P – Shunting W – Level NTC X – Pathway Controls</p> <p>The ETCS Reference Design Topics also contain material related to some configurations of ETCS which are outside the scope of the SR&I SoS work relating to ETCS Hybrid Level 3 and Automatic Train Operation. This material has been developed within other projects which have</p>	

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
					collaborated with SR&I to create a common ETCS Reference Design documentation suite.	
NEPT/ERTM S/REQ/0005	5.0	N/A*	ETCS System Requirements Specification	Significant change	<p>*The ETCS System Requirements Specification previously existed outside of the SR&I documentation baseline, with the last formally published version released in November 2018. Within the SR&I baseline this document is sometimes referred to as 'ETCS Level B requirements'.</p> <p>As part of SR&I Baseline 4 the ETCS System Requirements Specification has been comprehensively reviewed and updated in conjunction with industry stakeholders to:</p> <ul style="list-style-type: none"> • Reflect the changes to the ETCS Reference Design • Include feedback received from suppliers, duty holders and Deployment Project Teams • Reflect updated hazard analysis <p>This has resulted in changes of varying degrees to virtually all the requirements in the specification.</p> <p>The ETCS System Requirements Specification also contains material related to some configurations of ETCS which are outside the scope of the SR&I SoS work relating to ETCS Hybrid Level 3 and Automatic Train Operation. This material has been developed within other projects which have collaborated with SR&I to create a common ETCS System Requirements Specification.</p>	Change Request ESR#2 version 3.0
NEPT/ERTM S/REQ/0006 – Trackside	3.0	N/A*	ETCS Subsystem Requirements Specifications:	Significant change	<p>*The ETCS Subsystem Requirements Specifications previously existed outside of the SR&I documentation baseline, with the last formally published versions released in November 2018. Within the SR&I baseline these documents are sometimes referred to a 'ETCS Level C requirements'.</p> <p>There is one specification for each of the following subsystems:</p> <ul style="list-style-type: none"> • Trackside 	Change requests: ETrckSS#4 version 3.0
NEPT/ERTM S/REQ/0008 – Telecoms	4.0		Trackside			ETCSS#3 version 3.0
NEPT/ERTM	3.0		Telecoms			EOPSS#4 version 3.0

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S/REQ/0009 - Operational			Operational		<ul style="list-style-type: none"> • Telecoms • Operational <p>As part of SR&I Baseline 4 the ETCS Subsystem Requirements Specifications have been comprehensively reviewed and updated in conjunction with industry stakeholders to:</p> <ul style="list-style-type: none"> • Reflect the changes to the ETCS Reference Design • Include feedback received from suppliers, duty holders and Deployment Project Teams • Reflect updated hazard analysis <p>This has resulted in changes of varying degrees to virtually all the requirements in the specifications.</p> <p>The ETCS Subsystem Requirements Specifications also contains material related to some configurations of ETCS which are outside the scope of the SR&I SoS work relating to ETCS Hybrid Level 3 and Automatic Train Operation. This material has been developed within other projects which have collaborated with SR&I to create common ETCS Subsystem Requirements Specifications.</p>	
153819-NWR-PLN-ESE-000007	1.0	1.0	Customer Requirements – Acceptance Plan	No change	N/A	
153819-DRP-RCD-ESE-000002	1.2	N/A	Verification, Validation & Requirements Matrix for SoS CRS	New document	This document provides the expected validation events aligned with the requirements in the amended SoS Customer Requirements Specification.	
153821-DRP-RCD-ESE-000017	2.1	N/A	Verification, Validation & Requirements	New document	This document provides the expected validation events aligned with the requirements in the amended ETCS Trackside Customer Requirements Specification.	

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Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
			Matrix for ETCS Trackside CRS			
153821-DRP-RCD-ESE-000029	2.1	N/A	Verification, Validation & Requirements Matrix for ETCS Onboard CRS	New document	This document provides the expected validation events aligned with the requirements in the amended ETCS Onboard Customer Requirements Specification.	
153821-DRP-RCD-ESE-000033	1.0.	N/A	Verification, Validation & Requirements Matrix for TMS CRS	New document	This document provides the expected validation events aligned with the requirements in the amended TMS Customer Requirements Specification.	
153821-DRP-RCD-ESE-000019	1.1	N/A	Verification, Validation & Requirements Matrix for C-DAS CRS	New document	This document provides the expected validation events aligned with the requirements in the amended CDAS Customer Requirements Specification.	
153821-DRP-RCD-ESE-000020	2.0	N/A	Verification, Validation & Requirements Matrix for O&M CRS	New document	This document provides the expected validation events aligned with the requirements in the amended O&M Customer Requirements Specification.	
NEPT/ERTM S/REQ/0021	2.2	N/A	ETCS - Baseline 3 - System Verification, Validation & Requirements Matrix (VVRM)	New document	This document provides the expected validation events aligned with the requirements in the amended ETCS System Requirements Specification.	

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
NEPT/ERTMS/REQ/0022	2.3	N/A	ETCS - Baseline 3 - Trackside Sub-system Verification, Validation & Requirements Matrix (VVRM)	New document	This document provides the expected validation events aligned with the requirements in the amended ETCS Trackside Sub-system Requirements Specification.	
NEPT/ERTMS/REQ/0024	2.1	N/A	ETCS - Baseline 3 - Telecommunications Sub-system Verification, Validation & Requirements Matrix (VVRM)	New document	This document provides the expected validation events aligned with the requirements in the amended ETCS Telecommunications Sub-system Requirements Specification.	
NEPT/ERTMS/REQ/0025	2.2	N/A	ETCS - Baseline 3 - Operational Sub-system Verification, Validation & Requirements Matrix (VVRM)	New document	This document provides the expected validation events aligned with the requirements in the amended ETCS Operational Sub-system Requirements Specification.	
153821-DRP-RCD-ESE-000035	1.0.	N/A	Verification, Validation & Requirements Matrix for TMS DRR	New document	This document provides the expected validation events aligned with the requirements in the amended TMS Digital Railway Requirements Specification.	
153821-DRP-RCD-ESE-000025	1.1	N/A	Verification, Validation & Requirements	New document	This document provides the expected validation events aligned with the requirements in the amended CDAS IM Digital Railway Requirements Specification.	

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
			Matrix for C-DAS IM DRR			
153821-DRP-RCD-ESE-000026	1.1	N/A	Verification, Validation & Requirements Matrix for C-DAS RU DRR	New document	This document provides the expected validation events aligned with the requirements in the amended CDAS RU Digital Railway Requirements Specification.	
153821-DRP-RCD-ESE-000027	2.0	N/A	Verification, Validation & Requirements Matrix for O&M DRR	New document	This document provides the expected validation events aligned with the requirements in the amended O&M Digital Railway Requirements Specification.	
571012-OPD-PMP-PDC-000002	1.0	N/A	Operational Test Scenarios (OTS)	New document	This is the first formal release of ETCS Operational Test Scenarios (OTS) associated with the ETCS Reference Design. Each of the ETCS Trackside subsystem requirements has been considered to determine whether they meet the criteria for the creation of an OTS.	
153821-OPD-SPE-ESE-000004	1.2	N/A	Data Architecture Design	New document	<p>This document has been developed within the data workstream of SR&I. The goal of the workstream is to enable a consistent, sustainable and scalable management of data. To support this goal, the purpose of the Data Architecture Design is:</p> <ul style="list-style-type: none"> - To link the DR systems and their functionality to specific data attributes, <p>to list the data involved in system configuration processes, and to define data-related requirements for the SoS.</p>	N/A change control on the data requirements included in this document has started following the release of v1.2.
153819-NWR-PLN-ESE-000006	2.9	2.0	Requirements Management Plan	Significant change	Originally, each individual Digital Railway project created an individual Requirements Management Plan (RMP). This was deemed to be inefficient and did not follow the basic	

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
					<p>Systems Engineering (SE) principle of reuse of knowledge, experience, processes and documentation.</p> <p>As a result, this generic RMP has been created to consolidate and harmonise 'best practice' from each of the individual RMPs into an integrated RMP. It now contains generic items and activities in the core part of the document that are to be carried out by all projects. Items and activities specific to individual programmes appear in Appendices.</p> <p>This generic RMP supports the generic SE principles and processes associated with the management of requirements. Therefore, it is intended to accommodate existing projects and any future project that falls within the scope of the System Authority.</p> <p>Appendix: A is a Template Appendix for any future project to complete, thereby enabling their system to be included within the scope of the generic principles and processes contained within this document.</p> <p>The scope of this generic RMP is currently limited to requirement management of the following:</p> <ol style="list-style-type: none"> 1. Digital Railway's Customer Requirements Specifications (CRSs) and Digital Railway Requirements (DRRs) – see Appendix: B 2. European Train Control System (ETCS) – Level B System – see Appendix: C 3. Automatic Train Operation (ATO) – Level B System – see Appendix: D <p>This generic RMP includes the outline process (see Annex: C) for creating a Request for Help (RfH) to initiate the relevant Rail Safety and Standards Board (RSSB) update to Rail Industry Standards (RISs) (see Appendix: C).</p> <p>While the scope of the document has been extended, the core requirements management elements as far the scope</p>	

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					of the SR&I work is concerned have not been altered by this update to the document.	
153821-DRP-REP-ESE-000017	3.3	N/A	Test Yard Layout	Significant change	The test yard document reflects the layouts and facilities needed to complete the Operational Test Scenarios associated with the ETCS requirements derived from the reference design. This new document provides the link between the OTS and the proposed layouts.	
153821-NWR-REP-EMN-000002	1.2	1.0	Maintenance Strategy	Editorial	Updated version incorporates minor clarifications post SAIAT and updated template	
153819-NWR-PLN-ESE-000012	1.3	1.0	Introduction to the Requirements Structure	Significant change	<p>Provide clearer descriptions of each element of the requirements structure, including adding details of the governance and ownership of each element of the generic parts of the requirements structure within section 2.2</p> <p>Provide clearer descriptions of the tasks which must be performed by a Deployment Project Team (including the client roles) to select the generic requirements applicable to the deployment in question and to develop the deployment-specific materials which will be needed (particularly the Operating Model and Customer Requirements)</p> <p>Standardise the use of terminology within the document</p> <p>This has resulted in changes being made throughout the document. As part of these changes the following sections have been removed from the document between Baselines 3.1 and 4:</p> <ul style="list-style-type: none"> • section 3 on Governance – the relevant information is now incorporated into section 2. • Appendix A providing example requirements – this is no longer necessary given the maturity of the requirements specifications within Baseline 4. 	

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Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
158875-NWR-PLN-OPP-000002	1.0	1.0	O&M Rules and Standards Framework	No change	N/A	
153819-NWR-PLN-MPM-000005	3.0	3.0	System Integration Plan	No change	N/A	
147883-NWR-ASS-ESS-000001	1.2	1.0	Significance Change Assessment	Updates from assurance review	Updated following minor comments from SRB and Ricardo with no change to the outcome.	
153819-NWR-REP-ESE-000005	1.0	N/A	Verification and Validation Report	New document	Developed to summarise the steps and V&V activities performed with regards to development and management of the Requirements Specifications by the SR&I team in order to demonstrate that the systems requirements produced (as detailed in the SoS System Definition) satisfies the requirements of EN50126. This report also aims to demonstrate the tools, documentation and processes being used to produce evidence to satisfy the requirements are fit-for-purpose (e.g. valid and represent the real world) to enable system acceptance and provide justification.	

Table 8 – Safety Management Suite

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
147883-NWR-PLN-ESS-000004	4.0	3.0	System Assurance Plan	Deployment responsibility defined	Updated to clarify activities of SR&I and deployment projects	

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Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
147883-NWR-PLN-MPM-000008	6.1	5.0	System Safety Plan	Deployment responsibility defined	Updated to clarify activities of SR&I and deployment projects	
147883-NWR-PLN-MPM-000005	4.2	4.0	Hazard Management Plan	Deployment responsibility defined	Updated to clarify activities of SR&I and deployment projects	
153819-NWR-PLN-ESE-000008	2.3	2.0	Health Safety and Environment Management Plan	Deployment responsibility defined	Updated to clarify activities of SR&I and deployment projects	
147883-NWR-REP-ESS-000009	7.2	6.0	Functional Failure Analysis report	Significant change	Updated to convert document from input document to SoS Hazard Record to one that shows the relevant items within the Hazard Record and to incorporate updates to the Hazard Record and comments from assurance reviews.	
147883-NWR-LOG-ESS-000001	4.8	4.0	SoS Hazard Record	Significant change	Updated following comprehensive review of Hazard Record following L3 review and to confirm alignment with the relevant hazard entries from the ETCS reference design hazard log.	
147883-NWR-REP-ESS-000008	5.1	4.0	Interface Hazard Analysis report	Significant change	Updated to convert document from input document to SoS Hazard Record to one that shows the relevant items within the Hazard Record and to incorporate updates to the Hazard Record and comments from assurance reviews.	
147883-NWR-REP-ESS-000006	7.3	6.0	Operating and Support Hazard Analysis (OSHA) Report	Significant change	Updated to convert document from input document to SoS Hazard Record to one that shows the relevant items within the Hazard Record and to incorporate updates to the Hazard Record and comments from assurance reviews	

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
147883-NWR-REP-ESS-000007	6.5	6.0	Preliminary Hazard Analysis report / Safety Justification report	Significant change	Updated to incorporate updates to the Hazard Record and comments from assurance reviews.	
153830-NWR-LOG-PRK-000001	7.1	4.0	SoS Hazard Record Report	Significant change	Updated to incorporate updates to the Hazard Record and comments from assurance reviews.	
147883-NWR-PLN-ESS-000001	3.5	3.0	RAM Plan	Deployment responsibility defined	Updated to clarify activities of SR&I and deployment projects	
153821-NWR-REP-ESS-000002	4.3	4	Review of Safety of National Braking Curves	Updates from assurance review	As part of Baseline 4 the changes to this document include update in conjunction with industry stakeholders and assurance activities.	
153821-OPD-REP-ESE-000001	1.3	N/A	Level NTC Safety Justification Report	New document	This document provides details of the steps taken in the safety assessment of the concept of the level NTC operation and how the outcomes of those steps provide assurance of that safety assessment.	
153821-NWR-REP-ESE-000014	1.4	N/A	Multiple Traction Configuration Safety Justification Report	New document	This document provides details of the steps taken in the safety assessment of the concept of the multimode and how the outcomes of those steps provide assurance of that safety assessment.	
153821-DRP-PLN-ESE-000001	4.0	3.1	Security Assurance Document	Update from industry review	As part of update to Baseline 4 submission document realigned to NR Security Assurance Framework (SAF) process and updates in conjunction with industry stakeholders	

Table 9 – System Definition Suite

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
153821-NWR-REP-ESE-000002	6.3	6.1	SOS System Definition	Updates from assurance review	Minor updates have been made following L2 and L3 review, and review by industry.	
153821-NWR-REP-ESE-000004	3.5	3.0	TM System Definition Document (SDD)	Significant change	The update separates the TMS SDD into two parts: a TM Planning Layer and a TM Control Layer. By defining them separately, the SDD provides flexibility in migration for Routes, from a procurement perspective, to enable them to choose between Operational Decision Support Tool (ODST), Interfaced and Integrated TMS applications.	
153821-NWR-SPE-ESE-000009	3.1	3.0	C-DAS System Definition	Updates from assurance review	Minor updates have been made following L2 and L3 review, and review by the industry.	
153821-NWR-REP-ESE-000005	4.0	3.1	ETCS Onboard System Definition Document (SDD)	Significant change	The update includes the Technical Author review and the comments received through the review process from the industry stakeholders and assurance activity.	
153821-NWR-REP-ESE-000006	4.0	3.1	ETCS Trackside System Definition Document (SDD)	Significant change	Document template updated and aligned with revised SoS architecture diagram. Section added to clarify limits of SDD in relation to those functions impacted by error correction CRs listed in ERA/OPI/2017-2. It includes the Technical Author review and comments received through the review from the industry stakeholders and assurance activity.	
153821-DRP-REP-ESE-000003	1.4	1.0	Level NTC System Definition Document	Updates from assurance review	Changes to this document include update in conjunction with industry stakeholders review and assurance activities. These include changes to template text and references and addition of detail on staff affected and reference to the specific LNTC hazard documentation.	

Reference 153821-OPD-BRF-ESE-000002

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Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
153821-DRP-REP-ESE-000020	7.0	N/A	Multimode Technical Report (Trailing Traction Operations)	New document	<p>The purpose of this report is to:</p> <p>define the scenarios where an ETCS-fitted vehicle may be required to operate as part of a consist where it is not at the front (e.g. being hauled by another vehicle, propelling another vehicle, tandem working). The leading vehicle may or may not be ETCS-fitted (it is not important for this exercise); however, the trailing vehicle is ETCS-fitted.</p> <p>review the options available for operating the trailing vehicle under ETCS, specifically, the mode and level. In each case, there may be several modes available, each with different advantages and disadvantages. The relative merits of these modes are discussed in order to arrive at a proposed solution. Where feasible, this will result in a single proposed mode for use.</p>	

Table 10 – Operational Readiness and Deployment Guidance

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
153819-NWR-SPE-ESE-000001	2.1	2.0	Digital Railway – Glossary of Terms & Abbreviations	Significant change	Updates to include additional terms used within other documents.	
153819-NWR-SPE-ESE-000002	3.5	2.0	DR Requirements Deployment Policy	Deployment responsibility defined	<p>Document has been updated in the following major areas:</p> <p>Identification of deployment team responsibilities and extension to include all DR generic requirements. Progressive assurance through the different levels have also resulted in improvements. It has been updated to the</p>	

Reference 153821-OPD-BRF-ESE-000002

Issue/Ver: v1.0

Date: 30th March 2022

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
					new organisational template text and has been aligned to the content of NB201.	
153819-NWR-GDN-MPM-000001	3.2	1.0	Integration Fundamentals Handbook	Significant change	<p>This document provides guidance to deployment projects and programmes, who aim to introduce Digital Railway Systems, for their future Command Control & Signalling (CCS) renewals or enhancements.</p> <p>This document should be considered a high-level guide to support the initiation of Digital Railway projects, giving the main elements, tools and signposts to information that could help deliver an integrated programme. It notes where there is best practice and provides some good integration techniques as well as detailing specific methodologies for integrating DR Systems.</p> <p>It also forms part of the supporting 'informative' documentation aimed at helping projects understand and value the significance of integrating DR Systems. This applies not just within its own digital sphere but also within other, existing systems or processes. It also signposts relevant European, national and industry standards and legislation, as well as SR&I's own requirements and supporting documents suite.</p> <p>This version has been produced following challenge and a review workshop. Includes complete restructure and redrafting to improve content breadth; compress and shorten sections; and seek to make it more valuable for new teams considering or starting a deployment scheme.</p>	
153821-DRP-REP-ESE-000016	4.0	3.1	ETCS Deployment Guide	Significant change	<p>The update includes the Technical Author review and the comments received through the review process from the industry stakeholders and assurance activity.</p> <p>The update includes additional information to some existing sections such as:</p> <ul style="list-style-type: none"> Operational Test Scenarios 	

Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
					<ul style="list-style-type: none"> List of SR&I documents <p>It also includes new sections to explain the following headings:</p> <ul style="list-style-type: none"> ETCS Service Introduction Process Register of National Infrastructure ERA Database EUG Guidelines Generic Background. 	
153821-NWR-REP-ESE-000013	1.1	N/A	Traffic Management Systems Deployment Guide	New document	This deployment guide addresses a Traffic Management System's deployment journey, offering advice and guidance, and highlighting key decisions and issues that may need addressing. This document has been authored after consulting the projects which have already deployed TM and lessons learned.	
153821-DRP-GDN-ESE-000003	1.2	N/A	Human Factors Guidance for Deployment Projects	New document	<p>The Human Factors Guidance for Deployment Projects:</p> <ul style="list-style-type: none"> Presents the case for the systematic integration of human factors on DR deployment projects. Sets out the approach required for programme-level human factors integration management. Specifies the human factors integration goals required to deliver a successful human factors assurance case. Provides sources of further information and support. <p>By following the guidance in this document, projects will be better equipped to successfully manage uncertainty and to control human factors risks relating to the adoption, performance, safety and sustainability of future rail systems.</p>	
153831-NWR-SPE-ESE-000001	3.3	1.2	Data Specification	Significant change	This document has been updated extensively based on the work done in the data workstream, most of which is included in the Data Architecture Design (see next row):	

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Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
					<p>Workshops were held to run through the data in the Data Specification, check completeness, identify data sources, and identify configuration data.</p> <p>Only data that could be linked to SoS functionality, using the work done in the data workstream, has been included in the Data Specification.</p> <p>The Data Specification was simplified in order to make it more accessible</p> <p>Review on the updated document was carried out. L1, L2, and L3 review comments as well as review comments from RICMWG have been incorporated.</p>	
153821-DRP-REP-ESE-000005	3.0	1.0	ETCS Axle Load Categorisation report		<p>As part of Baseline 4 the changes to this document include update in conjunction with industry stakeholders review and assurance activities.</p> <p>These changes include:</p> <ul style="list-style-type: none"> Review of Axle Load categorisation to address some errors in results. Addition of new sections to include information for the 'Preparation for migration to ETCS' and 'Compatibility with future ETCS'. <p>Extension to the conclusion section and the recognition for the future work with clear list of recommendations.</p>	
165768-DRP-SPE-ESE-000007	5.0	1.0	ETCS Speed Profiles report		<p>As part of Baseline 4 the changes to this document include update in conjunction with industry stakeholders review and assurance activities.</p> <p>These changes include</p> <ul style="list-style-type: none"> New Executive Summary section Reference to the ETCS Track Sub-System Requirements New section on different train types 	

Reference 153821-OPD-BRF-ESE-000002

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Number	Ver - B4	Ver - B3.1	Title	Extent of change	Narrative describing the update	CR information (if applicable)
					<ul style="list-style-type: none"> Outline of recommendations for both the technical proposals and actions required by the industry Significant changes to the main body of the report to include further clarification. 	
153819-OPD-REP-MPM-000001	5.0	N/A	Impact upon the freight driving task of ETCS configuration	New document	Report produced based on the simulator trials to assess the drivability of freight trains with the default braked weight percentage. Note: The conclusions from this document have not yet been ratified FOSG.	
153821-NWR-REP-EMN-000001	3.1	3.0	Maintenance Framework	Editorial	Updated template and disclaimer	
158875-NWR-PLN-OPP-000003	1.1	1.0	O&M Readiness Handbook	Updates from assurance review	As a result of assurance reviews, the document has had updates to template text, references and to confirm alignment to revised system architecture diagram.	
153821-DRP-REP-ESE-000018	4.2	4.0	Performance Modelling Report	Updates from assurance review	As part of Baseline 4 the changes to this document includes update in conjunction with industry stakeholders and assurance activities.	

Table 11 – Withdrawn documents

Number	Ver – B3.1	Title	Reason for withdrawal
153819-NWR-SPE-ESE-000004	1.0	Requirements Change Control Process	The Requirements Change Control Process document was a useful tool for controlling the requirement update process within a controlled configuration management structure. However, the Requirements Change Control Process has now been captured in the updated Requirements Management Plan

Reference 153821-OPD-BRF-ESE-000002

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Number	Ver – B3.1	Title	Reason for withdrawal
153819-NWR-PLN-ESE-000011	2.0	DR Requirements Framework	<p>The Requirements Framework document was a useful tool for explaining the intended framework structure, and the position within it, of the new DRR suite. However, the DRR suite has now been issued and is within the 'continuous improvement' phase prior to use by Deployment Project Teams. Therefore, it has archived and removed from future SR&I documentation baselines and submission proposals.</p> <p>571012-DRP-STM-PDC-000001 provides details of the new location of material which is still relevant.</p>
153819-NWR-PLN-ESE-000015	1.0	Digital Railway – Deployment Guide	Originally a single deployment guide was proposed and the outline produced. Subsequently, the approach was changed to develop deployment guides for specific areas. The intent of this document is therefore now covered by the ETCS Deployment Guide, the TMS Deployment Guide, the Human Factors Guidance for Deployment Projects, the Integration Fundamentals Handbook and the (not yet published) ETCS Service Introduction Process.

Reference	153821-OPD-BRF-ESE-000002
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5 STANDARDS

The development of the SR&I documents has been carried out in the context of the GB legal framework, international standards and standards published in the railway industry as set out in section 5.1.

There are two additional tables which provide further detail of:

- standards which must be adhered to because the standard / clause is the industry recognised method of applying a relevant control (section 5.2).
- specific clauses within railway industry publications which must be adhered to where there were previously requirements within the SR&I requirements suite which duplicated what the standard calls for (section 5.3).

5.1 General

Legislation, including, but not limited to:

- Railways (Interoperability) Regulations 2011 (RIR 2011) (S.I. 2011/3066)
- Railway & other Guided Transport Systems (Safety) Regulations 2006 (ROGS) (as amended as a result of the UK exit from EU)

Where an aspect of the System of Systems is within the scope of documents contained in the following suites, the controls laid out in those documents must be adhered to.

- The National Technical Specification Notices published by UK Government (<https://www.gov.uk/government/publications/railway-interoperability-national-technical-specification-notices-ntsns>)
- The National Technical Rules published by RSSB (<https://www.rssb.co.uk/standards/understanding-and-applying-standards/national-technical-rules>)
- Standards published by RSSB listed in the Live Standards Catalogue as at December 2021 (<https://www.rssb.co.uk/-/media/Project/RSSB/RssbWebsite/Documents/Public/Public-content/Using-Standards/Standards-Catalogue-Dec-2021-Live-Docs.xlsx>)

The practices set out the following international standards underpin the System of Systems development and implementation.

- BS EN 50125 series Standards – Environmental Conditions
- ISO 8000:150 – Information Management
- BSEN50126-1, BSEN50126-2, BS EN 50128, BSEN50129
- BS EN 14363:2005: GEGN 8650
- BS ISO/IEC 25062:2006
- BS ISO 45001:2018 – Health, Safety & Environment
- BS ISO 14001:2015 – Health, Safety & Environment
- BS ISO 14001:2015 - Environmental Management Systems
- ISO 6385:2016 – Ergonomics principles in the design of work systems
- BS ISO/IEC/IEEE 15288:2015 – Systems and Software Engineering – System Life cycle processes
- BS EN 16186-1:2014

5.2 Standards which are in place and which implement safety measures

The following standards clauses are those which provide mitigation towards hazard and are cited as safety measures in the hazard record. The safety measure to which each standard item listed below relates can be found in the entries in Column G of the safety measures tab in the SoS Hazard Record [RD5].

CoP Number	Title or quoted text
147883-NWR-REP-MPM-000001	Security Assurance Document
BS EN 50121	Railway applications. Electromagnetic compatibility
BS ISO 14001-2015	Environmental Management
COP0032 Iss 3	Code of Practice for Plant Any Line Open (ALO) Working
CR-KMS-002	The KMS shall protect ETCS key deployment to both RBC and train On Board systems.
CR-T/M2/SY/02	Standard Technical Requirements, Ergonomics and Human Factors (NR-IP-EN-3214) include contractual requirements for human error analysis for NR projects.
EN 50128	Railway applications - Communications, signalling and processing systems - Software for railway control and protection systems.
EN50126	Railway applications, The specification and demonstration of Reliability, Availability, Maintainability and Safety
GERM8000-signallersignallingtechnician	Signaller and Signalling Technician Manual
GERM8000-traindriver Iss 9	Train Driver Manual
GERT8000-G1 section 5	General safety responsibilities and personal track safety for non-track workers; Communications procedure
GERT8000-HB1	Rule Book: General duties and track safety for track workers
GERT8000-HB11 ERTMS Iss 2	Duties of the person in charge of the possession (PICOP) on ERTMS lines where lineside signals are not provided
GERT8000-M3 Iss 3	Managing incidents, floods and snow
GERT8000-S5 Section 1.2	Passing a signal at danger or an end of authority (EoA) without a movement authority (MA) - Driver getting authority
GERT8000-S7 Section 1.2	Observing and obeying fixed signals. Train warning systems. Reporting signalling failures and irregularities - Train signalled towards a wrong route
GERT8000-SP	Speeds
GERT8000-SS1	Station duties and train dispatch
GERT8000-SS2	Shunting
GERT8000-T3 issue 10	Possession of a running line for engineering work.
GERT8000-T3 ERTMS issue 4	Possession of an ERTMS running line for ERTMS engineering work where lineside signals are not provided.
GERT8000-TS1	Replacing a stop signal to danger after it has been cleared or withdrawing a movement authority (MA)
GERT8000-TS9	Level Crossings - Signallers' Regulations
GERT8000-TS10	ERTMS level 2 train signalling regulations
GERT8000-TS10 ERTMS	Level 2 Train Signalling Regulations
GERT8000-TS11	Failure of, or Work on, Signalling Equipment - Signallers' Regulations
GERT8000-TW1 Iss 16	Preparation and movement of trains
GERT8000-TW5 Section 5	Brake defects
GERT8000-TW8	Level crossings - drivers' instructions
Rulebook form RTW001	Written Order 01 Permission To Start In SR Or To Pass An EOA Form
GERT8402 Iss 3	ERTMS/ETCS DMI National requirements
GERT8402 Iss 3 sec 2.1.1.1 and 2.2.1	ERTMS/ETCS DMI National Requirements
GERT8402	RSSB standard for the driver DMI
GIRT 7033	Lineside Signs

CoP Number	Title or quoted text
GO/RT3056	Working Manual for Rail Staff (White pages)
GOGN3655	Guidance on Medical Fitness for Railway Safety Critical Workers
GOOTS303 Iss 1	Secondary Door Locking - Operational Requirements
GORT3451	Train Movement - Staff Suitability and Fitness Requirements
Handbook RS521	Signals, Handsignals, Indicators and Signs
Handbook RS523	GSM-R Handbook
Network Rail National Operating Instructions Section 4	Working of Signalling Equipment
NR/L2/CTM/021	Competence & Training In Track Safety
NR/L2/CTM/201	Competence Management
NR/L2/ERG/24020	Engineering assurance requirements for Ergonomics within design and development projects
NR/L2/INI/0300	Integrated Engineering Lifecycle for Projects (IELCP)
NR/L2/OHS/003	Fatigue risk management for IM staff
NR/L2/OHS/0047	Application of the Construction (Design and Management) Regulations to Network Rail Construction Projects
NR/L2/OHS/019	Safety of people at work on or near the line
NR/L2/OHS/053	Assessing the Risk of Stress in the Workplace
NR/L2/OPS/031	Assessing and assuring the impact of operational risks relating to changes to the train plan
NR/L2/OPS/110	Requirements for the Weekly Operating Notice, Periodical Operating Notice and Local Operating Instructions (incl. Sectional Appendix)
NR/L2/OPS/250	Network Rail National Emergency Plan
NR/L2/OPS/290	Business Continuity Management
NR/L2/OTK/5100	Boundary management manual
NR/L2/RSE/0005	Product Design for Reliability
NR/L2/SIG/11201 Mod A2-16	Signalling Design Handbook - Dependability (including RAMS)
NR/L2/SIG/11201/Mod B11	Standards to be followed for dependability.
NR/L2/SIG/11201/Mod B7	Proving and detection for objects
NR/L2/SIG/11201/MODX01, Issue 1 Signalling Design Handbook	Level Crossings - General
NR/L2/SIG/11201	Signalling Design Handbook
NR/L2/SIG/30009/D410 Issue 1, Signalling Principles Handbook	Provision Of Trapping Protection (Including Catch Points and Derailers)
NR/L2/SIG/30009/E063	Standard for Approach Locking and Train Operated Route Release
NR/L2/SIG/30009/E420 Issue 2, Signalling Principles Handbook	Overrun Detection And Management
NR/L2/SIG/30009/GERT807 1 Issue 1, Signalling Principles Handbook	Control Facilities for Use During Lineside Signalling Failures
NR/L2/SIG/30009/GKRT006 0 Issue 2, Signalling Principles Handbook	Interlocking Principles
NR/L2/TEL/30127	GSM-R Air Interface Functionality, Availability Management and Compliance Validation,

CoP Number	Title or quoted text
NR/L2/TRK/001	Inspection & Maintenance of Track
NR/L3/OPS/045/2.06	Competence Standard Assessment Framework for Operating Signalling Equipment
NR/L3/OPS/045/3.07	Signalling System Failures, Lineside Safety Equipment, Failures, Track Defects and Receiving and Responding to RT3185 Forms
NR/L3/OPS/045/3.37	Operational Workload Assessment
NR/L3/OPS/045/4.01	Evacuation and Security Management of Signalling Locations, Controls, Stations and Trains
NR/L3/OPS/045/4.02	Preparation and Distribution of Emergency Plans
NR/L3/SIG/10663/MANUAL	Signal Maintenance Specifications (SMS)
NR/L3/SIG/10665	Reliability Centred Maintenance of Signalling Equipment
NR/L3/SIG/11231/Index	Signalling Maintenance Testing Handbook (NR/SMTH)
NR/SP/SIG/10067	Network Rail control systems and cab design
NTSN CCS 6.3.4	Assessment requirements for a Trackside Subsystem
OPE TSI 4.2.2.5	Train composition
OPE TSI 4.2.2.7	Ensuring that the train is in running order
OPE TSI Appendix A to Technical Specifications	Operation and traffic management
OPE TSI to Technical Specifications Operation and traffic management Annex A	ERTMS Written Orders
PTS	Personal Track Safety
RDG-GN041	SI 2010/724: The Train Driving Licences and Certificates Regulations 2010
RIS-0744-CCS Issue 1	Permissive Working Risk Assessment and Risk Controls
RIS-0797 Section 3.14.1	The ETCS DMI data entry process shall minimise the likelihood of train driver error when selecting the train type or entering parameters.
RIS-0797-CCS 2.1.5.1	The performance and reliability of the brake shall not be compromised by the presence and operation of the ETCS onboard subsystem. (Normative)
RIS-0797-CCS 2.1.6.1	Retro-fitting a rail vehicle with an ETCS onboard subsystem shall not result in any additional restrictions that would adversely affect operation of the rail vehicle on the routes where it is currently permitted to be operated. (Normative)
RIS-0797-CCS 3.1.1.1	The ETCS onboard subsystem shall be able to apply the service brake. (Normative)
RIS-0797-CCS 3.1.2.1	A service brake application initiated by the ETCS onboard subsystem shall be applied at a rate, and with a response time equivalent to that achieved by a train driver initiated full service brake application. (Normative)
RIS-0797-CCS 3.1.4.1	The performance and reliability of the brake shall not be compromised by the presence and operation of the ETCS onboard subsystem. (Normative)
RIS-0797-CCS 3.10.4.1	The power requirements of the ETCS onboard subsystem shall not affect the reliability of the existing rail vehicle power supply system.
RIS-0797-CCS 3.10.8.2	In the event of a loss of primary power, the ETCS onboard subsystem shall be load shed before the rail vehicle's unsupported back-up power voltage becomes critically low. (Normative)
RIS-0797-CCS 3.11.1.1	The ETCS 'cab active' signal shall be derived from existing rail vehicle controls.
RIS-0797-CCS 3.12.1.1	The ETCS onboard subsystem shall automatically indicate to the train driver whether, upon start-up, the ETCS is functioning safely and correctly. (Normative)

CoP Number	Title or quoted text
RIS-0797-CCS 3.13.20.1	The ETCS DMI alarms shall be audible above background noise at all speeds throughout the operational context applicable to the rail vehicle to which it is fitted.
RIS-0797-CCS 3.13.6.1	The ETCS DMI shall comply with the principles set out in BS EN 894-1:1997 Chapter 4.
RIS-0797-CCS 3.14.2	The ETCS DMI data entry process shall be configured to enable data entry to be completed within 60s of the ETCS onboard subsystem being ready to accept data entry in Standby (SB) (Status S0). (Preferred)
RIS-0797-CCS 3.14	Data entry and interaction
RIS-0797-CCS 3.19.5.1	The ETCS Cold Movement Detection function shall monitor absolute movement of the rail vehicle.
RIS-0797-CCS 3.2.3.1	Rail vehicle traction shall be cut in response to the traction cut-off command from the ETCS onboard subsystem at a rate equivalent to a train driver-initiated command. (Normative)
RIS-0797-CCS 3.22.3.1	The ETCS Onboard subsystem shall be configured so that the neutral section symbols displayed on the ETCS Driver Machine Interface (DMI) are those indicating automatic control of the rail vehicle in-feed circuit breakers. (Application-Specific)
RIS-0797-CCS 3.23.7.1	The ETCS onboard subsystem shall be configured so that the neutral section announcement symbol is displayed in area B3/4/5 a minimum of 10 seconds before the maximum safe front end of the train reaches the start of the neutral section, as defined in the packet 68 information received from the ETCS trackside subsystem. (Application specific)
RIS-0797-CCS 3.4.10.1	Where two EVCs are fitted onboard, the ETCS onboard subsystem shall: a) Indicate the isolated status of both EVCs in both cabs. b) Indicate which EVC is isolated.(Application specific)
RIS-0797-CCS 3.4.6.1	The ETCS reset control shall be located so that it is out of reach of the train driver when in the normal driving position. (Normative)
RIS-0797-CCS 3.4.9.1	If there is only one EVC onboard, the ETCS onboard subsystem shall provide a visual indication to the train driver that the other cab has ETCS isolated. (Normative)
RIS-0797-CCS 4.1.2.1	The ETCS onboard subsystem shall not prevent the rail vehicle from operating in the current train management and control environment based on lineside signalling using Class B train protection systems.
RIS-0797-CCS 4.2.10.1	The cab shall include functionality that draws the train driver's attention to a failed or malfunctioning AWS/TPWS system, before, or upon, the train transitioning from any level to Levels NTC, NID_NTC=20 or 21. (Normative)
RIS-0797-CCS 4.2.13.1	The AWS shall display a black and yellow visual indicator upon transitioning from Level 0, 1, 2 or 3 to Level NTC (NID_NTC=20 or 21). (Normative)
RIS-0797-CCS 6.2.4.1	The ETCS onboard subsystem shall not cause discomfort to passengers or train crew. (Normative)
RIS-0797-CCS 7.5.1.1	An access control system for ETCS onboard subsystem configuration settings and data shall be provided.
RIS-0797-CCS 7.5.2.1	The ETCS onboard subsystem shall be designed to reduce the risk from cyberattack to an acceptable level. (Normative)
RIS-0797-CCS and RIS-0798-CCS sections 7.2-7.4	Diagnostic tools, Failure reporting and data recording, Diagnostic information
RIS-0797-CCS Part 4 National Systems	The ETCS onboard subsystem shall interact with all existing on-board train protection systems in a manner that does not cause unnecessary distraction to the train driver
RIS-0797-CCS section 3.20.2.1	The data radio antenna installation shall not compromise the performance of other communication and data systems.

CoP Number	Title or quoted text
RIS-0798 Section 3.14.1	The ETCS DMI data entry process shall minimise the likelihood of train driver error when selecting the train type or entering parameters.
RIS-0798-CCS 3.1.1.1	The ETCS onboard subsystem shall be able to apply the service brake. (Normative)
RIS-0798-CCS 3.1.2.1	A service brake application initiated by the ETCS onboard subsystem shall be applied at a rate, and with a response time equivalent to that achieved by a train driver initiated full service brake application. (Normative)
RIS-0798-CCS 3.1.4.1	The service and emergency braking rates used within the ETCS brake model shall be modified automatically from detection of the operational status of any special brake systems used.
RIS-0798-CCS 3.10.4.1	The power requirements of the ETCS onboard subsystem shall not affect the reliability of the existing rail vehicle power supply system.
RIS-0798-CCS 3.10.4	The ETCS onboard subsystem shall remain active for at least 10 minutes after loss of primary power. (Normative)
RIS-0798-CCS 3.11.2.1	The ETCS onboard subsystem shall be configured so that an open desk will automatically close after a configurable time delay, subject to certain conditions being met. (Application specific)
RIS-0798-CCS 3.11.4.1	Where there is only one ETCS onboard subsystem provided on a rail vehicle or unit, an indication shall be provided in the active cab so that the train driver can see that the ETCS onboard subsystem has been isolated from the other cab. (Application specific)
RIS-0798-CCS 3.12.1.1	The ETCS onboard subsystem shall automatically indicate to the train driver whether, upon start-up, the ETCS is functioning safely and correctly. (Normative)
RIS-0798-CCS 3.12.2.1	Where two ETCS Onboard subsystems exist on a rail vehicle or unit, an indication as to the status of both ETCS Onboard subsystems shall be indicated in both cabs. (Application specific)
RIS-0798-CCS 3.13.20.1	The ETCS DMI alarms shall be audible above background noise at all speeds throughout the operational context applicable to the rail vehicle to which it is fitted.
RIS-0798-CCS 3.13.6.1	The ETCS DMI shall comply with the principles set out in BS EN 894-1:1997 Chapter 4.
RIS-0798-CCS 3.14.2	The ETCS DMI data entry process shall be configured to enable data entry to be completed within 60s of the ETCS onboard subsystem being ready to accept data entry in Standby (SB) (Status S0). (Preferred)
RIS-0798-CCS 3.14	Data entry and interaction
RIS-0798-CCS 3.19.5.1	The ETCS Cold Movement Detection function shall monitor absolute movement of the rail vehicle.
RIS-0798-CCS 3.2.3.1	Rail vehicle traction shall be cut in response to the traction cut-off command from the ETCS onboard subsystem at a rate equivalent to a train driver-initiated command. (Normative).
RIS-0798-CCS 3.4.4.1	The ETCS reset control shall be protected against accidental operation. (Normative)
RIS-0798-CCS 3.4.6.1	It shall not be possible for the train driver to reset the ETCS onboard subsystem whilst the rail vehicle or train is in motion (Normative).
RIS-0798-CCS 4.2.3.1	The ETCS Onboard solution shall work in conjunction with any applicable Class B protection systems so as to allow the rail vehicle to operate correctly on non ETCS fitted infrastructure.
RIS-0798-CCS 4.2.11.1	The cab shall include functionality that draws the train driver's attention to a failed or malfunctioning AWS/TPWS system, before, or upon, the train transitioning from any level to Levels NTC, NID_NTC=20 or 21. (Normative)

CoP Number	Title or quoted text
RIS-0798-CCS 4.2.5.1	The ETCS onboard subsystem shall un-suppress the AWS / TPWS when operating in Levels NTC, NID_NTC=20 or 21.
RIS-0798-CCS 7.5.1.1	An access control system for ETCS onboard subsystem configuration settings and data shall be provided.
RIS-0798-CCS 7.5.2.1	The ETCS onboard subsystem shall be designed to reduce the risk from cyberattack to an acceptable level. (Normative)
RIS-0798-CCS Part 4 National Systems	The ETCS onboard subsystem shall interact with all existing on-board train protection systems in a manner that does not cause unnecessary distraction to the train driver
RIS-0798-CCS section 3.20.2.1	The data radio antenna installation shall not compromise the performance of other communication and data systems.
RIS-2747-RST Iss 1	Functioning and Control of Exterior Doors on Passenger Vehicles
RIS-3215-TOM	Weekly Operating Notice, Periodical Operating Notice and the Sectional Appendix
RIS-3451-TOM Iss 1	Train Drivers - Suitability and Medical Fitness Requirements
RIS-3451-TOM	Train driver Suitability and Medical Fitness Requirements
RIS-3452-TOM	Train Movement - Medical Fitness Requirements
RIS-3702-TOM	Management of Route Knowledge
RIS-3703-TOM Iss 4	Passenger Train Dispatch and Platform Safety Measures
RIS-3751-TOM	Rail Industry Standard for Train Driver Selection
RIS-3780-TOM Iss section 3.2.2	If a failure within the GSM-R system affects signaller and driver communication, then drivers shall be advised to use an alternative means of communication within the affected area, for example, lineside telephones or public mobile.
RIS-8046-TOM	Spoken Safety Critical Communications
ROGS Regulation 24	SI 2006/599 Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS) regulation 24 - competence and fitness
ROGS Regulation 25	The Railways and Other Guided Transport Systems (Safety) Regulations 2006 SI2006/599 regulation 25 - Fatigue
RS100 Iss 1	Good Practice Guide on Competence Development
RS504	Fatigue Management - A Good Practice Guide
RTW001	Written Order 01 Permission To Start In SR Or To Pass An EOA Form
Subset 026 Section 3.16	Data Consistency
Subset 026-3 3.12.3.4.7	In case a confirmation of the text message is requested, it shall be possible to define whether the service brake or emergency brake application shall be commanded if the driver does not acknowledge before the end condition is fulfilled.
Subset 034 Section 2.3 (inc sub-clauses)	Control of Brakes
Subset 036 section 4.3	The telegram format allows for quantitative evaluation of the effect of random bit errors, burst errors, bit slips and bit insertions, and all combinations thereof, with particular attention to the potential problems of telegram change and format misinterpretation (long as short and vice versa).
Subset 091 ETCS_OB10	ETCS Auxiliary Hazard THR
Subset 091 Sec 7.1.1.2 and 8.1.1.2	7.1.1.2 (On Board) & 8.1.1.2 (Trackside): The defined targets shall be achieved in a specified environment (temperature, vibration, electromagnetic interference etc) according to the indications in the applicable Technical Specification for Interoperability.

CoP Number	Title or quoted text
Subset 26 3.18.2.7	The National Values currently applicable when the on-board equipment is switched off (i.e. enters No Power mode) shall be retained and shall remain applicable when powered on.
Subset 26 System requirement Specification, Chapter 4 Modes and Transitions, section 4.4.11.1.3.1	The ERTMS/ETCS on-board shall determine the start location of the SR distance as follows: points a-c.
Subset 26/3 3.13.3.1.1	For trains with variable composition (loco hauled trains), the brake characteristics can vary together with the composition of the train. In this case, it is not convenient to preprogram the brake parameters necessary to calculate the braking curves. The only practical way to obtain the correct values for the current train composition is to include them into the data entry process by the driver. However, it cannot be expected from the driver to know deceleration values and brake build up times. Conversion models are therefore defined to convert the parameters entered by the driver (brake percentage and brake position) into the parameters of the corresponding brake model.
Subset 26/3 3.13.3.3 (inc sub clauses)	Brake percentage conversion model
SUBSET-026/4 4.8	Acceptance of received information (inc sub clauses)
Subset-026-3 section 3.15.1.3.8	the on-board shall however retain the RBC ID/phone number of the Handing Over RBC until at least one of the following conditions is fulfilled: a) Min safe rear end of the train has passed the border and the communication session with this Handing Over RBC has been terminated, b) The RBC transition order is deleted according to A.3.4 or 4.10.
Subset-026-3 v.360 sec 3.16.3.4.1	When the difference between the time stamp of the latest consistent received message and the current on-board time is greater than the T_NVCONTACT parameter (national value), the on-board shall apply the reaction required by trackside (see 3.16.3.4.2).
SUBSET-026-4 3.6.0	4.7 DMI versus Mode Table
SUBSET-026-4 System Requirements Specification, Chapter 4	Modes and Transitions, 4.4.5 SYSTEM FAILURE
Subset-027	FIS Juridical Recording
SUBSET-037 v3.2.0	This FIS is applicable to radio communication systems providing communication services for safety-related application processes using open networks. It specifies for ERTMS/ETCS the Radio System Interoperability for message exchange between on-board and trackside equipment in respect to safety-related application processes, like Automatic Train Protection of ETCS level 2/3.
Subset-040	Dimensioning and Engineering Rules
Subset 091 section 4.6.1.1	The safety performance of the system where ETCS is applied is crucially dependent not only upon the performance of ETCS itself, but also upon the quality of data from sources external to ETCS, transferred to ETCS.
Subset 091 section 5.2	Insertion of messages
Subset-091 section 7.2.1.4 - ETCS_OB02	Configuration data entry primarily concerned with the ETCS DMI. As well as the TSI, RSSB and NR have produced applicable standards regarding the ETCS DMI design and use of to help with ensuring configuration data entry is correct.

CoP Number	Title or quoted text
TSI Subset 26 3.18.3.4	Following any entry/modification of Train Data when a communication session is already established or following the successful establishment of a communication session when valid Train Data are already available (e.g. when approaching a level 2/3 area or an accepting RBC area), the ERTMS/ETCS on-board equipment of the leading engine shall send the following set of Train Data to the RBC: a) Train category(ies). b) Train length. c) Maximum train speed. d) Loading gauge. e) Axle load category. f) Traction system(s) accepted by the engine. g) Train fitted with airtight system. h) List of National
WON & WEN	Weekly Operating Notice & Weekly Engineering Notice

5.3 Standards which are in place which were replicated in requirements

The following standards clauses are those which were duplicated in requirements. The requirement has been removed from the SR&I requirements suite to avoid requirements which repeat what is set out in standard clauses. The items listed below are therefore to be included in the standards baseline associated with the use of the requirements.

Standard	Version at this baseline	Section	Info	Former requirement
RIS-0708-CCS	Issue 1	All	This RIS was developed to fulfil this requirement and contains requirements and guidance for a process to determine or revise a set of values of ERTMS/ETCS National Values.	ESR-573
RIS-0036-CCS	Issue 1	2.11	Adherence to this RIS section will mean that integration of transitions with driving tasks undertaken.	ESR-64
Subset 026	3.6.0	5.10.1.4, 5.10.2.2	Subset 026 requires the transition to be marked by balise.	ETrckSS-339
Subset 040	3.4.0	4.1.1.4	Limits on balise positioning are set out in subset 040.	ETrckSS-25
NR/L2/SIG/11201	Issue 13	X12 & X13	The requirement called for principles already included in the level crossing standards.	ETrckSS-211
RIS-0733-CCS	Issue 1	All	The form of lineside signage is set out in the RIS.	ETrckSS-36
RIS-0733-CCS	Issue 1	All	The form of lineside signage is set out in the RIS.	ETrckSS-242
RIS-0733-CCS	Issue 1	All	The form of lineside signage is set out in the RIS.	ETrckSS-259

Standard	Version at this baseline	Section	Info	Former requirement
RIS-0713-CCS	Issue 1.1	Issue 3.2	The outcome needed is obtained by following the principles in the RIS.	ETrckSS-924
RIS-0036-CCS	Issue 2	All	The RIS requires the driver workload to be understood as part of the driveability assessment.	ETrckSS-956
NR/SP/SIG/10067	Issue 2	6.1.5	The requirement is delivered by adherence to the standard.	ETrckSS-16
Rulebook SS1	Issue 7	Issue 3	The check that the MA is sufficient is undertaken by the driver.	ETrckSS-60
NR/SP/SIG/10067	Issue 2	6.1.15	Following the standard means that the requirements is discharged.	ETrckSS-218
NR/SP/SIG/10067	Issue 2	6.1.5	Following the standard means that the requirements is discharged.	ETrckSS-374
NR/SP/SIG/10067	Issue 2	6.1.6	Following the standard means that the requirements is discharged.	ETrckSS-376
GK/RT0025	Issue 2	C3.3e	GK/RT0025 is mandated via TI175. Following the standard means that the requirements is discharged.	ETrckSS-773
NR/SP/SIG/10067	Issue 2	6.2.6	Following the standard means that the requirements is discharged.	ETrckSS-992
GL/RT1210	Issue 2	3.6.1.4	Following the standard means that the requirements is discharged.	ETrckSS-243
RIS-3215-TOM	Issue 1	C.1.1.3	In the context of the content of the sectional appendix "The permissible speeds (mph or km/h) for each line, with the point of speed change shown."	EOPSS-785
RIS-3437-TOM	Issue 2	2.2.1.1	In the context of the content of DOTE contingency plans "DOTE contingency arrangements shall detail the action to be taken when any item of on-train equipment set out in Part 4 becomes defective."	EOPSS-156
RIS-3215-TOM	Issue 1	C1.1.10	In the context of the content of the Sectional Appendix "On an ERTMS line, the identity, contact number and area of control of each Radio Block Centre (RBC)"	EOPSS-58
NR/L2/ERG/24020	Issue 3	Process	The HF assurance process determines the level of assessment needed and the	EOPSS-4

Standard	Version at this baseline	Section	Info	Former requirement
			controls to make sure that this is carried out.	
RIS-0797-CCS	Issue 1	7.2.6	In the context of the OB maintenance, this section calls for downloads to be possible when the train is in service.	EOPSS-82
RIS-0798-CCS	Issue 1	7.3.4	In the context of the OB maintenance, this section calls for downloads to be possible when the train is in service.	EOPSS-82
RIS-3702-TOM	Issue 3	All	The requirement called up the BAU process	EOPSS-1003
RIS-3703-TOM	Issue 4.1	All	The use of RIS-3702-TOM calls up RIS-3703-TOM	EOPSS-1003
Rulebook TS10	Issue 4	Section 5	The requirement was for the rules to be in place for the actions to be taken if the train is proceeding without authority which is what this rule book section covers.	EOPSS-109
Rulebook G1	Issue 9	Sections 2 and 3	The requirement was for the rules to be in place for the actions to be taken if the train is proceeding without authority and this section covers how a train may be stopped in an emergency by people on track.	EOPSS-109
RIS-3437-TOM	Issue 2	4.13	DOTE specifically includes consideration for ERTMS equipment	EOPSS-111
Rulebook TW5	Issue 10	12	Contains the specific rules for ERTMS equipment	EOPSS-111
RIS-3437-TOM	Issue 2	4.5 and 4.26	DOTE specifically includes consideration for AWS and TPWS failures on trains operating on ETCS lines.	EOPSS-112
Rulebook S7	Issue 5	5,6, & 7	The rules containing information about ATW and TPWS failures are contained here.	EOPSS-112
RIS-3437-TOM	Issue 2	4.9	DOTE specifically includes consideration for DSD failures on trains operating on ETCS lines.	EOPSS-113
Rulebook TW5	Issue 10	7	This section contains the specific rules related to DSD.	EOPSS-113
RIS-3437-TOM	Issue 2	2.2.1.1	In the context of the content of DOTE contingency plans "DOTE contingency arrangements shall detail the action to be	EOPSS-114

Standard	Version at this baseline	Section	Info	Former requirement
			taken when any item of on-train equipment set out in Part 4 becomes defective."	
Rulebook TW5	Issue 10	12 & 21	This section contains the specific rules related to speedometers and ETCS.	EOPSS-114
Rulebook S7	Issue 5	8	Contains the specific rules for transition failures	EOPSS-115
Rulebook S5	Issue 10	3	This module contains the information for the rules on passing EoA when an MA cannot be issued, including in areas with signals.	EOPSS-117
Rulebook TW5	Issue 10	12	Contains the specific rules for ERTMS equipment	EOPSS-119
RS523	Issue 1.2	4 & 10	Actions for registration failures and faults are contained within RS523	EOPSS-121
Rulebook TW5	Issue 10	12	Contains the specific rules for ERTMS equipment	EOPSS-121
Rulebook TS11	Issue 5	5 & 7	The signaller's actions for interaction with the driver are detailed in TS11	EOPSS-123
Rulebook TW7	Issue 8	1	The need for authority to make wrong direction moves are detailed in TW7	EOPSS-126
Rulebook S7	Issue 5	7	The list of items to be reported include those where there is inconsistent information between the two sources.	EOPSS-128
Rulebook TW1	Issue 17	28	Rules for low adhesion, including within areas controlled by ETCS are given.	EOPSS-129
RS523	Issue 1.2	8	Berth triggered broadcasts are included within current driver / signaller competence regimes and the principles are unaltered.	EOPSS-130
Rulebook S7	Issue 5	7.6	This section covers the signaller's action on report of missing or defective equipment before sending the next train.	EOPSS-131
Rulebook TS11	Issue 5	7	The approach to defective or missing ETCS equipment is documented here.	EOPSS-131
Rulebook S5	Issue 10	9.1 & 9.3	Rules for drivers and signallers in the event of a trip are contained within these sections.	EOPSS-144
Rulebook S7	Issue 5	8.3	Details the action when a trip occurs.	EOPSS-144

Standard	Version at this baseline	Section	Info	Former requirement
Rulebook S5	Issue 10	1	This section includes the rules for moving when MA cannot be issued in lines with and without signals	EOPSS-146
Rulebook S5	Issue 10	1	This section provides the rules for proceeding when an MA cannot be issued, whatever the technical cause (eg in this instance, lack of data communication)	EOPSS-148
RS521	Issue 6	7 & 8	Provides the definition of the form and meaning of speed signage.	EOPSS-149
Rulebook S5	Issue 10	1.1 & 1.2	The use of override means passing an EoA or a signal at danger and this is covered in these sections.	EOPSS-901
Rulebook S5	Issue 10	1.1 & 1.2	The use of override means passing an EoA or a signal at danger and this is covered in these sections.	EOPSS-902
Rulebook S5	Issue 10	3.1	The rules containing the need for information about speed details are contained here.	EOPSS-927
Rulebook S5	Issue 10	3.1	The rules containing the need for information about level are contained here.	EOPSS-943
Rulebook S5	Issue 10	3 & 4	These rules contain the information on how the train must be driven including whether caution / on sight actions are required.	EOPSS-973
Rulebook TW1	Issue 17	41	This has the overarching rule for the driver to tell the signaller if the train is stopped out of course.	EOPSS-164
Rulebook TW8	Issue 9	4.3	The rules related to locally monitored crossings in the event that a train comes to a stand out of course.	EOPSS-164
Rulebook G1	Issue 9	5	Sets out the need to use the correct communication protocol.	EOPSS-165
Rulebook TS9	Issue 4	All	TS9 is applicable irrespective of the crossing type and the signalling method.	EOPSS-173
Rulebook TS10	Issue 4	4 & 5	The rules make provision for a variety of communication methods for emergency allowing the signaller to determine the appropriate one if some are unavailable.	EOPSS-184

Standard	Version at this baseline	Section	Info	Former requirement
RS523	Issue 1.2	4.4	The information for preregistration are included within this section.	EOPSS-190
NR/L3/SIG/10064; NR/GI/A017	Issue 03	3	Technicians are required to keep the signaller informed, irrespective of the signalling system.	EOPSS-191
Rulebook TW8	Issue 9	4	This section covers indication failures and is agnostic of the signalling system.	EOPSS-205
RS523	Issue 1.2	8	Berth triggered broadcasts are included within current driver / signaller competence regimes and the principles are unaltered.	EOPSS-209
Rulebook S7	Issue 5	8	The rules relating to failures to train cover requires the driver to obey the entry signal which gives authority to enter the ETCS area, irrespective of whether they have or have not got an MA.	EOPSS-858
Rulebook T3 ERTMS	Issue 4	2.3	The closure of routes leading to or across possessions is required by this rule book clause.	EOPSS-917
Rulebook TS1	Issue 15	4	Actions around the procedure for emergency stop are given in this section.	EOPSS-995

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