

RCA



Reference CCS Architecture

*An initiative of the ERTMS users group and
the EULYNX consortium*

RCA Documentation Plan

Document id: RCA.Doc.6
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Change history

Gamma.1	31.01.2020	B. Rytz	Ready for publication after review RCA core group
0.1 (0.A)	11.09.2020	M. Blazic	Updated document list for BL0 R1, sync introduction section setup
0.2 (0.A)	04.02.2021	M. Blazic	Updated document list for BL0 R1 update
0.3 (0.A)	16.04.2021	M. Blazic	Concepts for Digital map and Plan Execution added Realization of RCA goals added
0.4 (0.A)	02.07.2021	N. Hurman	Updated document list for BL0 R2
0.5 (0.A)	03.09.2021	M. Blazic	Architectural Design Concept Plan Execution added
0.5 (0.A)	29.11.2021	P. Moosmann	Updated document list for BL0 R3
0.6 (0.A)	19.04.2022	D.Iacopino	Updated document list for BL0 R4

1. Introduction

1.1. Release information

Basic document information:

RCA.Doc.6

RCA Documentation Plan

Cenelec Phase: -

Version: 0.6 (0.A)

RCA Baseline set: 0

Approval date: 25.04.2022

1.2. Imprint

Publisher:

RCA (an initiative of the ERTMS Users Group and EULYNX Consortium)

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1.3. Purpose of the document

This document lists, identifies and defines all documents of the RCA (reference CCS architecture).

The document contains:

- An overview of the document categories used in RCA
- A list of all documents developed by RCA, i.e. the documentation plan

A graphical depiction of the documentation plan can be found in RCA.Doc.36.

1.4. Related documents

- The “RCA Documentation Plan Visualisation” [RCA.Doc.36] provides a visualisation of the current and planned documents.
- The “RCA Release notes” [RCA.Doc.5] describe the relevant documents (according to this documentation plan) for a given release.
- The “RCA Change Management Control Process” [RCA.Doc.39, planned] describes how the documents / deliverables are managed (baselines, etc.).

2. Structure of the documentation plan

2.1. Document attributes

The documentation plan uses the following attributes for every document:

Id	A unique identifier for the document of the form RCA. Doc. XXX where XXX is a decimal number without special meaning.
Category	See description below
Type	Distinguish between <ul style="list-style-type: none"> ▪ Doc = Document ▪ MB = Model-based ▪ Dia = Diagram
Name	Name of the document
CENELEC	CENELEC phase(s) (if applicable)
First published	Release in which document was first published. May be “Planned”, when document is not yet published.
Comment	Important information, e.g., that the document is obsolete or has been superseded by other document.

As soon as formal change control is in effect (to be defined in Change Control Management process [RCA.Doc.39], the handling of versions / releases / baselines will be specified in more detail.

2.2. Documentation categories

The documentation plan for RCA includes different categories of documents with differing needs of formality and change control. The following table describes the defined categories:

Category	Purpose	Content (examples)	Degree of formality
A. RCA system specification	The (future) core RCA specification with CENELEC-compatible structure	formalised system, function, component, interface specification	High: formalized, modelled, formal QA, formal change-control (CC) in CCB
B. Concept development	Concepts not (yet) suitable for system specification (maturity, formality)	RCA effects, migration paths for RCA users, principles of the safety logic, capability-based protocols	Low-to-medium: free-form, QA and CC by RCA core group

C. Mission and Process description	Description of how the RCA process is organized	Process overview, modelling guidelines	Medium: free-form, QA and CC by RCA core & strategy group
D. Communication support	Material to explain RC and to create awareness	FAQ, presentations, films	Low: free-form, informal QA
E. Demonstrators	Support development by concrete experiments Showcase RCA	RCA demonstrator planned for InnoTrans	(for InnoTrans) Low: free-form, informal QA
X. eXternal documents	Documents provided / prepared by other working groups, but which (on mutual agreement) are included in an RCA release.	Documents on localisation from the LWG (Localisation Working Group).	See B. Concept development

Each document / artefact of the documentation plan is classified according to these categories.

Note on the relationship between categories «A. System specification» and «B. Concept development»:

- A given topic (e.g., modular safety or platform independence) is expected to start in «concept development» and to transition to «system specification» if and only if it is
 - needed for the formal specification and
 - mature enough (shared understanding achieved, efficient work process in formal environment)
- Such topics will typically end up in the «domain knowledge» or in the «generic ... requirements» part of the «system specification»
- In some cases, the treatment of a topic may remain distributed over documents both in «concept development» and in «system specification» if they differ in the need for formality (an example might be some architectural design principles).

3. List of documents

Id	Ca t	Type	Name	Short description	CENE- LEC phases	Valid	First Published	Latest Update
RCA.Doc.1	C	Doc	RCA White Paper	The rationale for starting RCA. Foundation for MoU between EUG and EU-LYNX.	-	Y	Alpha	Alpha
RCA.Doc.2	B	Doc	RCA Architecture Overview		-	N	Alpha	Beta
RCA.Doc.3	C	Doc	RCA Process Overview	How the RCA group works to prepare, maintain and bring the RCA specification to the sector.	-	Y	Alpha	Gamma
RCA.Doc.5	C	Doc	RCA Release Notes	Description of current release of RCA deliverables.	-	Y	Alpha	BLO R4
RCA.Doc.6	A	Doc	RCA Documentation Plan	Overview of the documentation set of RCA	-	Y	Gamma	BLO R4
RCA.Doc.7	D	Doc	RCA FAQ	Frequently asked questions and answers regarding RCA. Useful for a quick overview.	-	Y	Alpha	Gamma
RCA.Doc.8	B	Doc	Concept: Modular Safety	A modular architecture requires and enables concepts to reduce the safety workload.	-	Y	Beta	Beta
RCA.Doc.9	B	Doc	Concept: Sourcing scenarios		-	N	-	-
RCA.Doc.10	B	Doc	Concept: RCA Effects - Business Case	The economic effects (savings) of an RCA-based implementation, based on smartrail 4.0 and extrapolated to other IMs.	-	Y	Gamma	Gamma
RCA.Doc.11	B	Doc	Concept: Platform Independence	The need to achieve more modularity between applications and the platforms.	-	N ¹	Beta	Beta
RCA.Doc.12	B	Doc	Concept: RCA Effects - Capacity	The effects on traffic capacity for an RCA-based system.	-	Y	Beta	Beta
RCA.Doc.13	B	Doc	Concept: Architectural approach / System-of-systems perspective	Architectural principles for the RCA.	-	Y	Beta	Gamma
RCA.Doc.14	A	MB	RCA Terms and Abstract Concepts	Definition of used terms.	-	Y	Gamma	BLO R4
RCA.Doc.15	A	Doc	RCA System Concept	A high-level description of the goals and fundamental concepts of RCA:	1	Y	Gamma	
RCA.Doc.28	B	Doc	Migration	Illustrates how migration towards an RCA-based system can be planned, including examples of different IMs.	-	Y	Gamma	BLO R2
RCA.Doc.29	B	Doc	Concept: LSL - Enhanced L3, Supervision, Localisation	Evolution of ETCS, rationale for submitted TSI CRs.	-	Y	Gamma	Gamma
RCA.Doc.30	B	Doc	Concept: Principles of the safety logic	Geometric-based interlocking for more capacity and flexibility.	-	Y	Gamma	Gamma

RCA.Doc.31	B	Doc	Concept: Operational plan	Concept for the standardized interface between RCA and a TMS.	-	Y	Gamma	BLO R3
RCA.Doc.32	B	Doc	Concept: Degraded modes	The role of degraded modes in specifying RCA.	-	Y	Gamma	Gamma
RCA.Doc.33	C	Doc	Methods and Tooling : Arch Process	Describes the methods and tools used for developing the RCA specification.	-	N	BLO R3	BLO R4
RCA.Doc.34	C	Doc	RCA Roadmap	Overview planned development for RCA.	-	Y	Gamma	Gamma
RCA.Doc.35	A	MB	RCA System Definition	Definition of the RCA System architecture	2,4,5	Y	BLO R2	BLO R4
RCA.Doc.36	A	Dia	RCA Documentation Plan - Annex	Visualisation of the documentation plan.	-	Y	Gamma	Gamma
RCA.Doc.37	B	Doc	Concept: RCA effects overview	Overview of potential the effects / benefits of an RCA-based system.	-	Y	Gamma	Gamma
RCA.Doc.39	C	Doc	RCA Change Control Management Process		-	N	-	-
RCA.Doc.40	D	Doc	RCA Architecture Poster	Illustrative, high level architecture overview of RCA.	-	Y	Alpha	BLO R3
18E112	X	Doc	LWG: Railways Localisation System HL Users' Requirements	Provided by the Localisation Working Group of the EUG.	-	Y	Gamma	Gamma
19E100	X	Doc	LWG: Railways Localisation System Performance Requirements from Use Cases	Provided by the Localisation Working Group of the EUG.	-	N	-	-
RCA.Doc.41	C	Doc	Declaration of Intent by DB, NR and SBB	Public statement on contribution to RCA.	-	Y	Beta	Beta
RCA.Doc.42	A	Doc	RCA Reference document list	List of important referenced documents (documents outside RCA).	all	N	-	-
RCA.Doc.43	B	Doc	Concept: Informal Architecture Overview	Provides an informal overview, until the MBSE-generated documents are officially published.	all	Y	Gamma	Gamma
	X	Doc	LWG: Railways Localisation System Performance Requirements from Use Cases	Provided by the Localisation Working Group of the EUG.	-	N	-	-
	X	Doc	LWG: Railways Localisation System Performance Requirements from Use Cases	Provided by the Localisation Working Group of the EUG.	-	N	-	-
	X	Doc	White paper: An Approach for a Generic Safe Computing Platform for Railway Applications	Concept for generic safe computing platform for onboard and trackside CCS applications, prepared by RCA and OCORA	-	N	-	-

RCA.Doc.44	C	Doc	RCA-OCORA Liaison	Statement on collaboration between RCA and OCORA	-	N	-	-
RCA.Doc.45	B	Doc	(Cyber) Security Guideline	A guideline to and definition of a harmonized Security Risk Assessment for System Design process	-	Y	BLO R1	BLO R1
RCA.Doc.46	B	Doc	Concept: Digital Map	Provide a complete conceptual view of the Digital Map, its main scope, principles, environment, functional and non-functional requirements, etc.	-	Y	BLO R2	BLO R2
RCA.Doc.47	B	Doc	Concept: Plan Execution	System concept of SubSys Plan Execution	-	Y	BLO R2	BLO R3
RCA.Doc.48	B	Doc	Realization of RCA goals	Description of the goals and objectives of RCA	-	Y	BLO R2	BLO R2
RCA.Doc.49	B	Doc	Concept: Architectural Design for Plan Execution	Description for the architectural design related to plan execution.	-	Y	BLO R3	BLO R3
RCA.Doc.50	B	Doc	A.P.M business targets and strategy	Describes the strategy of the A.P.M. part of RCA and business requirements	-	Y	BLO R3	BLO R4
RCA.Doc.51	B	Doc	Concept: APS	Solution principles, objectives and requirements	-	Y	BLO R4	BLO R4
RCA.Doc.52	B	Doc	APS detailed concepts overview	Overview on detail concepts, their relation, their content, and common reading hints.	-	N	-	-
RCA.Doc.53	B	Doc	A.P.M objectives	Objectives (high level requirements) list for APS	-	Y	BLO R3	BLO R3
RCA.Doc.54	B	Doc	Solution Concept: MAP	Describes the solution concepts for the overall Map process from preparation until activation of Map Data	-	Y	BLO R4	BLO R4
RCA.Doc.55	B	Doc	Digital Map Business Case	Provides a short overview of the content of the Digital Map and presents its business case.	-	Y	BLO R3	BLO R3
RCA.Doc.56	B	Doc	Digital Map Evaluation Onboard Map	Provides a detailed evaluation of different approaches on provisioning of Map Data from trackside to on-board.	-	Y	BLO R3	BLO R3
RCA.Doc.57	B	Doc	Digital Map Evaluation Reference Model	Provides a detailed evaluation of different reference models used to represent topology.	-	Y	BLO R3	BLO R3
RCA.Doc.58	B	Doc	Digital Map Preliminary Hazard Analysis	Provide the results of Preliminary Hazard Analysis (PHA) of the Digital Map.	-	Y	BLO R4	BLO R4
RCA.Doc.59	B	Doc	Digital Map System Definition	Provides the basic system level understandings, boundaries, detailed functionalities, interfaces, Life-cycle aspects etc.	-	Y	BLO R4	BLO R4
RCA.Doc.60	B	MB	Explanation to the RCA ARCH Processes	Explanation of the architecture process applied in RCA	-	Y	BLO R3	BLO R4

RCA.Doc.61	B	Doc	APS Concept: Operating state and safety logic domain objects	Operating state and domain objects; geometric representation; relation to MAP model; abstract concepts;	-	N	-	-
RCA.Doc.62	B	Doc	APS Concept: Route setting and route protection	Route protection: Setting of field elements; flank protection; level crossings	-	N	-	-
RCA.Doc.63	B	Doc	APS Concept: Movement Permission	Train protection: Parts of MP; life cycle; safety checks; scenarios; relation of MA/signalling and MP	-	N	-	-
RCA.Doc.64	B	Doc	APS Concept: Transitions	Not yet defined	-	N	-	-
RCA.Doc.65	B	Doc	APS Concept: Operational application (scenarios)	Not yet defined	-	N	-	-
RCA.Doc.66	B	Doc	System Architecture Specification / System Usage Documentation	Description of the Overall System Architecture and System Usage	-	N	-	-
RCA.Doc.67	B	Doc	APS Concept: Movable Object and Object Aggregation	Taxonomy of movable objects; life cycle; object aggregation	-	N	-	-
RCA.Doc.68	B	Doc	Concept: Track Occupancy (Overall Solution Concept)	Not yet defined	-	N	-	-
RCA.Doc.69	B	Doc	MAP Object Catalogue	Defines and describes the Object Model used to provide reliable and validated topology and topography data in the form of Map Data	-	Y	BLO R4	BLO R4
RCA.Doc.70	B	Doc	Concept SCI-CMD	Not yet defined	-	N	-	-
RCA.Doc.71	B	Doc	Business Case for the Track Occupancy Concept	Description of the track occupancy	-	N	-	-
RCA.Doc.72	B	Doc	ATO Concept	Description of the automatic train operation	-	N	-	-
RCA.Doc.73	B	Doc	AE Concept	System concept of SubSys ATO Execution	-	N	-	-
RCA.Doc.74	B	Doc	SMI Concept	Concept for the standardized interface between DCM and RCA Subsystems.	-	N	-	-
RCA.Doc.75	B	Doc	IPM Concept	Not yet defined	-	N	-	-
TWS03-30	X	Doc	Draft Initial Specification of the PI API between Application and Platform	Whitepaper for Computing Platform	-	Y	BLO R3	BLO R3

TWS03-20	X	Doc	Generic Safe Computing Platform High-Level Requirements	Requirements for Computing Platform	-	Y	BLO R3	BLO R3
TWS03-10	X	Doc	White paper: An Approach for a Generic Safe Computing Platform for Railway Application	Definition of Computing Platform API	-	N	-	-
	X	Doc	Operational Harmonisation	Not yet defined	-	N	-	-
	X	Doc	MDM Concept Paper	Concept of the Minimization of the average passenger travel time with the microscopic delay management (MDM)	-	Y	-	-

Notes:

- This list will be extended over the course of RCA development.
- The column “Valid” indicates if this document is valid in the current release (i.e. available and not deprecated).
- “DS = Development snapshot” in the column “Latest Update” indicates, that the MBSE specifications will be made available as frequently updated snapshot, without being part of a specific release, until the first official baseline is achieved.