Release notes
RCA Baseline 1 Release 0

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1. RCA Baseline 1 Release 0

RCA BL1 R0 is an external release (after Alpha, Beta, Gamma, BL0 R1, BL0 R2, BL0 R3 and BL0 R4) of the documents prepared by the RCA initiative that describes the Minimum Viable Product (MVP) of RCA.

- This release includes updates to previously released documents and several new documents. Content which belongs to future specification documents in strict sense is being prepared in a MBSE (model-based systems engineering) approach.
- The documentation structure is described in “RCA Documentation Plan” [RCA.Doc.6].
- Access: RCA public releases are made directly available here: https://public.3.basecamp.com/p/KeehzqFmXv5R2N7tGDjaEokq or through links on the EUG or EULYNX websites.
- This release is planned to be the last release for RCA and the RCA MVP results are planned to be integrated into the Europe’s Rail Joint Undertaking System Pillar.

2. Document classes

The RCA MVP release contains documents of different document classes, the position papers, the concept documents and the model-based documents. These classes are described in the following sections.

2.1. RCA poster

The RCA poster shows the most likely RCA subsystem architecture and the current state of the OCORA architecture, as far as it is relevant for RCA scope. It contains different viewpoints, e.g. regarding development scope and safety relevance of subsystems.

As the architecture has not yet been validated by a rigorous engineering process, the subsystem architecture might change in the future. Hence the RCA poster is marked as “Preliminary issue”.

2.2. Position paper

Position papers serve the purpose to outline first ideas, to sharpen the possible solution corridor, provide early sketches of functionality and/or architecture. The intention of those papers is to communicate the basic thinking about some engineering topics from RCA's point of view and to facilitate the start of a discussion.

Along with this, the following limitations must be considered for this document class:

- All content is subject to change and discussion
- Documents may contain inconsistencies inside the document as well as between position papers and other documents
- Content of documents is not derived from thorough engineering process

2.3. Concept documents

Concept documents serve the purpose to document aspects of the system in an orderly way with more in-depth analysis than position papers. The content usually focuses on the lower levels of architecture with concrete solutions in mind.
Along with this, the following limitations must be considered for this document class:

- All content might change, after it has been analysed by a thorough engineering process
- Although content of documents is not based on a systems engineering process, informal models might be used to clarify aspects of the concept. These models are not to be confused with the overarching, consistent engineering model following the ARCH process
- Documents are consistent inside the same concept document and between concepts of the same group
- Documents are not on the level of a specification and do not have any binding character for tendering, assessment, or political discussions

2.4. Model-based documents

Model-based documents serve the purpose of showcasing the output of thorough systems engineering processes, to explain

- how an architecture evolves over multiple layers,
- how it becomes traceable to higher levels of abstraction and
- how contractually binding documents might be derived from the engineering approach.

2.4.1. Scope of model

The scope of RCA has been deliberately defined as comprising track-side functionality as well as on-board functionality, as the system needs analysis for RCA cannot be performed only for the trackside without analysing the functionality for the on-board side as well. This is especially true taking future developments like GoA4 operation into account, that will require much tighter integration of track side and on-board functionality. GoA4 also will add functionality not yet established in the railway domain with unclear allocation to track side or on-board.

The need analysis is performed on SA (System Analysis) and LA (Logical Architecture) layer of the Capella model, where the SA layer focuses on the system border, actors and coarse system functions. The LA layer focuses on the decomposition of system functions into smaller logical functions that define how a system function is supposed to transform inputs to outputs. The actual RCA subsystem architecture on SSA (subsystem architecture) layer derived from the need analysis will only take the track side subsystems into account The on-board side subsystem architecture is in responsibility of OCORA and other cooperation projects.

The following figure shall clarify this.

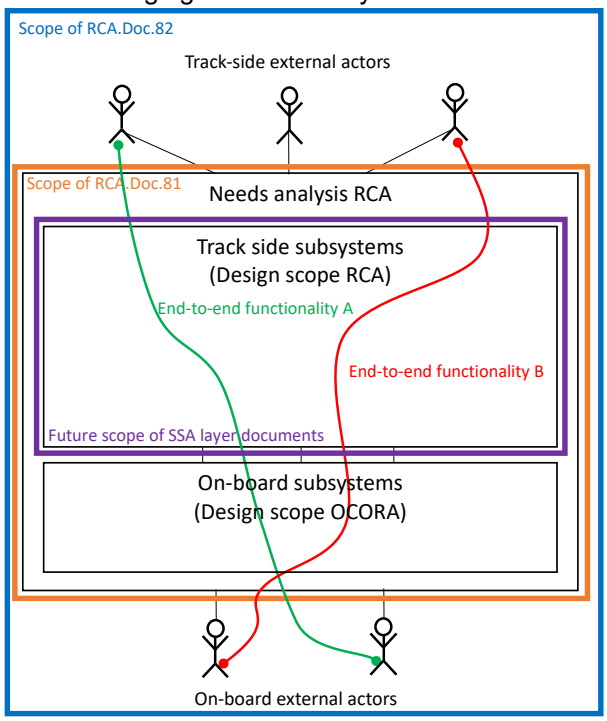

Figure 1 - Scope definition of RCA

2.4.2. Limitations

The model content has evolved iteratively. Hence, the model only contains content up to the milestone of the current iteration. The content present is developed in accordance with the engineering process and methodology definitions of ARCH (refer to [RCA.Doc.33]).

Due constraint time, not all system capabilities have been modelled over all layers of the ARCH process. Furthermore, the existing capabilities are not yet modelled to the full extent of all edge cases and all possible scenarios and features. To define the scope for each capability in each version of the model, a feature tree will be used. The model-based document set includes an export of this feature tree, showing what features are part of the model and what features are not yet. Again, for time constraints, the feature tree is not available for all capabilities. See the export of the feature tree in the System Feature Definition Document [RCA.DOC.80]. Elements (e.g. system functions) that are necessary to understand the context but are not in-scope at the time being are marked as “STUB”.

The following table gives an overview over the achieved state.

System capability	SA layer	LA layer	SSA layer	Feature tree
01: Set point to position required by mission	Modelled	Modelled	Not modelled	Included
02: Authorise train unit movement	Not existing	Modelled		Included
09: Move one train unit	Modelled	Modelled		Included
11: Prepare departure of train unit	Modelled	Modelled for GoA2 only		Not included

15: Respond autonomously to object on or near the line	Modelled	Modelled		Not included
65.1: Create warning area	Modelled	Not modelled		Not included
66.1: Start warning authorised trackside persons of approaching train unit	Modelled	Not modelled		Not included
66.2: Stop warning authorised trackside persons of approaching train unit	Modelled	Not modelled		Not included
85: Provide navigation data of train unit	Modelled	Modelled		Included
87: Activate map data	Modelled	Modelled		Not included

3. Imprint

- Publisher: RCA (an initiative of the ERTMS Users Group and EULYNX Consortium)
  ERTMS User Group (www.ertms.be) and EULYNX (www.eulynx.eu)
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4. New or updated content of RCA Baseline 1 Release 0

The list of all documents released with RCA Baseline 1 Release 0 is defined in the documentation plan [RCA.Doc.6]. This list also indicates change or new documentation for this release.
In the release of RCA Baseline 0 Release 4 the number of RCA.Doc.35 has been erroneously re-assigned from the RCA System Architecture Document to the document “System Needs Analysis”. This error has been corrected with this release and the document “System Needs Analysis” has been assigned the number RCA.Doc.82. Further the document “System Needs Analysis” was called “System Definition” at the release RCA Baseline 0 Release 4 and has been renamed for the release RCA Baseline 1 Release 0.
Related documents:

- RCA white paper: the rationale for starting RCA, accessible here https://ertms.be/workgroups/ccs_architecture and here https://www.eulynx.eu/index.php/home2/37-reference-ccs-architecture-white-paper.
- Command and Control 4.0 by Josef Doppelbauer (ERA): https://www.era.europa.eu/sites/default/files/library/docs/command_and_control_en.pdf

5. Feedback for RCA

Feedback for RCA is welcome! If you would like to attend a workshop or give feedback, please contact rca@eulynx.eu.
RCA will inform if and how feedback is integrated in future work.

6. Authors and Reviewers of RCA

The RCA initiative is initiated and supported by EUG and EULYNX.