

RCA



Reference CCS Architecture

An initiative facilitated by the ERTMS Users Group and the EULYNX consortium

RCA Glossary

Preliminary issue

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	2

REVISION HISTORY

Version	Date	Superseded documents/description/details	Change Request No
0.0.7	27.11.2019	Joined the general glossary from RCA and the glossary from the RCA specifications	
Gamma 1	28.01.2020	Integrated review feedback from RCA Core Group	
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	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	3

TABLE OF CONTENTS

Revision History 2

1. Introduction 4

1.1. Release information 4

1.2. Imprint 4

1.3. Methodology conformance declaration 4

1.4. Purpose of the document 4

1.5. References 4

2. Terms RCA 6

3. Abbreviations 17

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	4

1. INTRODUCTION

1.1. *Release information*

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RCA Glossary

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Disclaimer:

This issue is a preliminary version of this document. The content of this document reflects the current ongoing specification work of RCA. Formal requirements management and change management will be introduced in future iterations. The content may be unfinished, will likely contain errors and can be changed without prior notice. Unfinished work is declared by using the [ToDo](#) label in this document.

1.2. *Imprint*

Publisher:

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

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Support and Feedback

For feedback, or if you have trouble accessing the material, please contact rca@eulynx.eu.

1.3. *Methodology conformance declaration*

This RCA interface specification shall conform to the EULYNX Modelling Standard Baseline 3.0 (<https://eulynx.eu/index.php/documents/documents-overview/baseline-set-3>).

1.4. *Purpose of the document*

This document contains the terms and abbreviations defined and used in [RCA](#).

1.5. *References*

The last delivered version of all [RCA](#) documents are available on Basecamp (<https://3.basecamp.com/4168621/buckets/10801981/vaults/1592502777>).

Every release includes a document plan with an overview of all available documents and their current version. Refer to [RCA.Doc.6](#)

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	5

Other referenced documents:

- [CCS TSI ATO over ETCS SUBSET-126](#)
- [CCS TSI ATO over ETCS SUBSET-130](#)
- [CCS TSI ATO over ETCS SUBSET-131](#)
- [CCS TSI ATO over ETCS SUBSET-132](#)
- [CCS TSI ETCS SUBSET-026](#)
- [CCS TSI ETCS SUBSET-039](#)
- [CCS TSI ETCS SUBSET-098](#)
- [CCS TSI ETCS SUBSET-119](#)
- [CCS TSI ETCS SUBSET-129](#)
- [EULYNX Eu.Doc.36](#)
- [EULYNX Eu.Doc.43](#)
- [EULYNX Eu.Doc.45](#)
- [EULYNX Eu.Doc.9](#)
- [EULYNX Eu.Doc.32](#)
- [EULYNX Eu.Doc.33](#)
- [EULYNX Eu.Doc.38](#)
- [EULYNX Eu.Doc.39](#)
- [EULYNX Eu.Doc.40](#)
- [EULYNX Eu.Doc.41](#)
- [EULYNX Eu.Doc.44](#)
- [EULYNX Eu.Doc.46](#)

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	6

2. TERMS RCA

This section provides definitions for the terms used in this specification.

Name	Description
Advanced Protection System	A group of subsystems in the RCA interface architecture, aggregates approximately the function of today's interlockings.
Application Lifecycle Management	Application Lifecycle Management is the product lifecycle management (governance, development, and maintenance) of computer programs and continues after development until the application is no longer used.
Application Programming Interface	In computer programming, an Application Programming Interface is a set of subroutine definitions, communication protocols, and tools for building software.
Area of Control	ToDo
ATO Execution	A movement control component in the RCA interface architecture. See SubSys AE .
ATO GoAx	ATO is an operational safety enhancement device used to help automate operations of trains. See Grade of Automation .
ATO Transactor	Device abstraction component in the RCA interface architecture. See SubSys AT .
ATO Vehicle	Device control component in the RCA interface architecture. See SubSys AV .
Business Continuity Management	The process of creating systems of prevention and recovery to deal with potential threats to a company. In addition to prevention, the goal is to permit ongoing operation, before and during execution of disaster recovery.
Capacity Object	The Capacity Object denotes a usage of the capacity to carry out a transport service or a Railway Undertaking offer. A Capacity Object can be a train run, a shunting movement, stabling or a Usage Restriction Area
Capacity Reservation	A Capacity Reservation is needed to be able to produce a transport service demanded by an RU . A Capacity Reservation can be a train run, a shunting movement or stabling.
Capacity Restriction	The Capacity Restriction is a restriction of the usage of the topology resulting from construction, maintenance or inspection work, as well as special environmental events or disturbances.

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	7

Name	Description
Change Control Board	A Change Control Board is a committee that consists of subject matter experts and technical chiefs, who will make decisions regarding whether or not proposed changes to a software project should be implemented.
Change Request	A Change Request is a document containing a call for an adjustment of a system; it is of great importance in the change management process.
Command Control and Signalling	Systems that ensure the safe operation of the railways as e.g. the train control system or the interlocking.
Community of European Railway and Infrastructure Companies	CER's role is to represent the interests of its members on the EU policy-making scene, in particular to support an improved business and regulatory environment for European railway operators and railway infrastructure companies. Source: www.cer.be
Confidentiality, Integrity, and Availability	Confidentiality, Integrity, and Availability , also known as the CIA triad, is a model designed to guide policies for information security within an organisation. The elements of the triad are considered the three most crucial components of security.
Consortium Management Bureau	The Consortium Management Bureau forms the central core team of the consortium and consists of the technical lead, liaising expert and the support staff. Source: https://www.eulynx.eu/
Consortium Management Committee	Organisation group in EULYNX .
Design Rationale	Explains the reason for a certain design decision.
Device	A Device is a "technical thing" in the real world like a Field Element , a VD (deprecated) , etc.
Device & Configuration Management	Generic function component in the RCA interface architecture. See SubSys DCM .
Diagnostics & Monitoring	Generic Function component in the RCA interface architecture. See SubSys DM .
Digital Railway	Digital Railway (DR) is the name of the British programme for digitalisation of CCS Systems (see DSD , SR40).
Digitale Schiene Deutschland	Digitale Schiene Deutschland is the German programme for digitalisation of CCS Systems (see also DR , SR40).

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	8

Name	Description
Driver Machine Interface	The interface to enable direct communication between the ERTMS/ETCS on-board equipment and the Train Driver .
Engineering & Data Preparation	Generic Function component in the RCA interface architecture. See SubSys EDP .
ERTMS Users Group	The mission of the ERTMS Users Group is to help the railway companies in applying ERTMS/ETCS in a harmonized and interoperable way, to enable the free flow of trains and a competitive railway. Source: www.ertms.be
EULYNX	EULYNX is a European initiative by 13 Infrastructure Managers to standardise interfaces and elements of the signalling systems. Aiming for defining and standardising interfaces in future digital control command communication, signalling and automation system, the goal is a significant reduction of lifecycle cost. A full set of EULYNX specifications was published as Baseline 3 in 2018 and 2019.
EUROBALISE	ToDo
European Committee for Electrotechnical Standardization	CENELEC is the European Committee for Electrotechnical Standardization and is responsible for standardization in the electrotechnical engineering field. Source: http://www.cenelec.eu/
European Rail Infrastructure Managers	The role of EIM is to provide a single voice to represent its members (infrastructure managers vis-à-vis to the relevant European institutions and sector stakeholders. EIM also assists members to develop their businesses through the sharing of experiences and contributing to the technical and safety activities of the Agency (ERA). Source: www.eimrail.org
European Rail Traffic Management System	The European Rail Traffic Management System is a major industrial project developed by eight UNIFE members - Alstom Transport, Ansaldo STS, AZD Praha, Bombardier Transportation, CAF, Mermec, Siemens Mobility and Thales - in close cooperation with the European Union, railway stakeholders and the GSM-R industry.
European Train Control System	The European Train Control System is the signaling and control component of the European Rail Traffic Management System (ERTMS). It is a replacement for legacy train protection systems and designed to replace the many incompatible safety systems currently used by European railways. ETCS is specified at four numbered levels (x = 0, 1, 2, 3).
European Union Agency for Railways	The European Union Agency for Railways is established to provide the EU Member States and the Commission with technical assistance in the development and implementation of the Single European Railway Area. Source: www.era.europa.eu
European Union	The European Union Public Licence is a free software licence that has been created and approved by the European Commission.

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	9

Name	Description
Public Licence	
European Vital Computer	The European Vital Computer is the heart of local computing capabilities in the driving vehicle. It is connected with external data communication, internal controls to speed regulation of the locomotive, location sensors and all cab devices of the Train Driver .
Fixed Object Transactor	A device abstraction component in the RCA interface architecture. See SubSys FOT .
Flank Protection	A means of protecting movements of trains across junctions by the setting of Points (either manually or automatically) that prevent any other unauthorised movement coming into contact with it. Source: https://safety.networkrail.co.uk
Form Fit Function Interface Specification	Form, Fit, and Function (FFF) is the identification and description of characteristics of a part or assembly. Each defines a specific aspect of the part to help engineers match parts to needs. The FFF framework increases design change flexibility by allowing changes to a part with minimal documentation and design cost as long as the fit, form and function of the product are maintained.
Future Railway Mobile Communication System	Future Railway Mobile Communication System (FRMCS) has the objective to become the worldwide standard, conforming to European regulation as well as responding to the needs and obligations of rail organisations outside of Europe. As such, the UIC FRMCS project duly associates non-European members and is a first concrete application of UIC strategy to build a Global Rail Traffic Management System for the whole rail industry. Source: www.uic.org/frmcs
Global Navigation Satellite System	Global Navigation Satellite System refers to a constellation of satellites providing signals from space that transmit positioning and timing data to GNSS receivers. The receivers then use this data to determine location.
Global Positioning System	The Global Positioning System is a satellite-based radio navigation system owned by the United States government and operated by the United States Air Force. It is a global navigation satellite system that provides geolocation and time information to a GPS receiver anywhere on or near the earth where there is an unobstructed line of sight to four or more GPS satellites.
Global System for Mobile Communication Railway	Global System for Mobile Communication Railway (GSM-R) is an international wireless communications standard for railway communication and applications.
Grade of Automation	<p>Grade of Automation refers to the degree of automation in remote train control (ATO). The list of automatable activities of the Train Driver is divided into 5 categories:</p> <p>GoA 0: No automation, everything is in the hands of the Train Driver.</p> <p>GoA 1: The Train Driver is prevented from unsafe actions (e.g. driving over a signal).</p> <p>GoA 2: The Train Driver is present, but during the journey a system takes over the speed control or at the station the door control (autopilot).</p>

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	10

Name	Description
	<p>GoA 3: No person is present in the driver's cab, most processes are automated. In situations that are difficult to automate (e.g. driving on sight in the event of faults), manual remote control is provided by the train attendant or the operations centre, for example.</p> <p>GoA 4: All train control processes are automated. Intervention groups only intervene on site in the event of locomotive malfunctions or evacuations.</p>
Hardware	Hardware includes the physical, tangible parts or components of a computer.
Horizon 2020	Horizon 2020 is the financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness. Source: https://ec.europa.eu/programmes/horizon2020/en
Human Machine Interface	The Human Machine Interface (also called User Interface) is the space where interactions between humans and machines occur. The goal of this interaction is to allow effective operation and control of the machine from the human end, whilst the machine simultaneously feeds back information that aids the operators' decision-making process.
Identity and Access Management	Identity and Access Management (IAM) is, in computer security, the security and business discipline that "enables the right individuals to access the right resources at the right times and for the right reasons". Generic Function component in the RCA interface architecture. See SubSys IAM .
Independent Verification & Validation	Independent Verification & Validation is targeted at safety-critical software systems and aims to increase the quality of software products, thereby reducing risks and costs through the operational life of the software. IVV provides assurance that software performs to the specified level of confidence and within its designed parameters and defined requirements.
Infrastructure Manager	A railway Infrastructure Manager is any body or undertaking that is responsible in particular for establishing and maintaining railway infrastructure. This also includes the management of infrastructure control and safety systems.
Institute of Electrical and Electronics Engineers	The Institute of Electrical and Electronics Engineers (IEEE) is the world's largest technical professional organisation dedicated to advancing technology for the benefit of humanity. IEEE and its members inspire a global community through its highly cited publications, conferences, technology standards, and professional and educational activities. Source: www.ieee.org
Intellectual Property Rights	Intellectual property is a category of property that includes intangible creations of the human intellect. Intellectual property encompasses two types of rights; industrial property rights (trademarks, patents, designations of origin, industrial designs and models) and copyright.
Interlocking	In railway signalling, an Interlocking is a system composed by a set of signal apparatus that prevent trains from conflicting movements through only allowing trains to receive

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	11

Name	Description
	authority to proceed when routes have been set, locked and detected in safe combinations. See also APS .
International Electrotechnical Commission	The International Electrotechnical Commission (IEC) is the world's leading organisation for the preparation and publication of International Standards for all electrical, electronic and related technologies. These are known collectively as "electrotechnology". Source: www.iec.ch
International Organization for Standardization	The International Organization for Standardization (ISO) is an independent, non-governmental international organisation with a membership of 164 national standards bodies. Through its members, it brings together experts to share knowledge and develop voluntary, consensus-based, market relevant International Standards that support innovation and provide solutions to global challenges. Source: www.iso.org
International Requirements Engineering Board	The International Requirements Engineering Board (IREB) , a non-profit organisation, is the provider of the CPRE (Certified Professional for Requirements Engineering) certification scheme. The board consists of leading RE representatives, who come from science, research, industry and consulting.
Layer	ToDo
Level Crossing	A place where a railway and a road cross at the same level. Source: https://safety.networkrail.co.uk
Life Cycle Cost	Life Cycle Cost refers to the total cost of ownership over the life of an asset. Costs considered include the financial cost, which is relatively simple to calculate, and also the environmental and social costs, which are more difficult to quantify and assign numerical values. Typical areas of expenditure that are included in calculating the whole-life cost include planning, design, construction and acquisition, operations, maintenance, renewal and rehabilitation, depreciation and cost of finance and replacement or disposal.
Mean Time to Recovery resp. Repair	Mean Time to Recovery is the average time that a device will take to recover from any failure.
Middleware	Middleware is computer software that provides services to software applications beyond those available from the operating system. It can be described as "software glue".
Mission	Any train movement started under the supervision of an ERTMS/ETCS on-board equipment in one the following modes: FS, LS, SR, OS, NL, UN, or SN. The ETCS Mission is ended when any of the following modes is entered: SB, SH. A concept used in the ETCS Standard. Source: ETCS Specification SUBSET-023 v330

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	12

Name	Description
Mobile Object	Objects like persons or cars that are close to the track.
Mobile Object Locator	A device control component in the RCA interface architecture. See SubSys MOL .
Mobile Object Transactor	A device abstraction component in the RCA interface architecture. See SubSys MOT .
Model-Based Systems Engineering	Model-Based Systems Engineering is a systems engineering methodology that focuses on creating and exploiting domain models as the primary means of information exchange between engineers, rather than on document-based information exchange.
Movement Authority	Movement Authority is the permission for a train to move to a specific location within the constraints of the infrastructure and with supervision of speed. End of Authority is the location to which the train is permitted to proceed and where target speed is equal to zero. See description of Movement Authority in the Domain Knowledge .
Movement Authority Transactor	A device abstraction component in the RCA interface architecture. See SubSys MT .
National Safety Authority	Authority responsible for authorisation of CCS components and systems.
Non Functional Requirement	In systems engineering and requirements engineering, a Non Functional Requirement is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviours.
Object	An Object is an abstract, logical representation of one or several Devices .
Object Aggregation	Object Aggregation subsystem in the RCA interface architecture. See SubSys OA .
Object Controller	A device control component in the RCA interface architecture. The different OC component types and their interfaces are defined in EULYNX . See SubSys OC (deprecated) .
On Board Unit	The ETCS equipment located on the driving vehicle.
Open CCS Onboard Reference Architecture	European initiative to define the CCS vehicle architecture. Conforms with the COAT program of smartrail 4.0 .
Operating State	The Operating State is the representation of all relevant objects known to the Advanced Protection System , including their state. It is the only true representation of all safety

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	13

Name	Description
	critical objects and their states.
Operating System	An Operating System is system software that manages computer hardware and software resources and provides common services for computer programs.
Operation Point	Infrastructure elements such as railway stations. In TAF/TAP Operation Points are called locations
Operational Train Number	A number which, within certain limits, defines the type of train, the traffic relationship and the direction of travel and enables the unambiguous identification of the moving unit.
Overlap	Overlap is the space of the track beyond the end of Movement Authority that is kept clear in case the trains overruns the end of its Movement Authority .
Person Supervisor & Locator	A device control component in the RCA interface architecture. See SubSys PSL .
Plan Execution	A component in the RCA interface architecture. See SubSys PE .
Platform of Rail Infrastructure Managers in Europe	PRIME was established between DG MOVE and Infrastructure Managers at the end of 2013 with the objective to improve the cooperation of rail infrastructure managers across borders, support implementation of European rail policy and develop performance benchmarking for the exchange of best practices.
Point	A junction of two railway lines that can be set to guide a train onto one of two alternative routes, or allow two lines to merge into one. Points can either be in “Reverse” or “Normal”. Reverse being: The position of Points where the reversed position indicates that the Points are set for the less commonly used route. Normal being: The position of Point where the normal position indicates that the Points are set for the more commonly-used route, usually straight running. Source: https://safety.networkrail.co.uk
Radio Block Centre	A Radio Block Centre is a specialised computing device with specification Safety Integrity Level (SIL4) for generating a Movement Authority and transmitting it to trains. It gets information from signalling control and from the trains in its section. It hosts the specific geographic data of the railway section and receives cryptographic keys from trains passing in. According to conditions the Radio Block Centre will attend the trains with Movement Authority until leaving the section.
Railway Undertaking	Railway Undertaking is a private or public undertaking which is authorised to carry persons or goods by rail and which ensures traction or which only ensures traction.
RCA Architecture	RCA Architecture Overview Document, published on the ERTMS Website. Version:

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	14

Name	Description
Overview	Alpha.1. Source: https://ertms.be/sites/default/files/2019-02/RCA_Alpha_Architecture_Overview_1.pdf
RCA Publication	RCA Publication . Source: https://public.3.basecamp.com/p/Q7K78GLEqPbKNYSE5LaDc7yKh
Reference CCS architecture	Reference CCS architecture (RCA) is an initiative by the members of EUG and EULYNX to define a harmonised architecture for the future railway CCS , with the main goal to substantially increase the performance/TCO ratio of CCS in comparison with today's implementations.
Reliability, Availability, Maintainability (and Safety)	Reliability, Availability, Maintainability (and Safety) (RAM(S)) constitutes the key element of the assessment in the rail industry today. For rail system operators, RAMS means a safe, reliable, high-quality service and lower operating and maintenance costs. For rail system providers, RAMS represents a high-quality system and product.
Research and Development	Research and Development refers to the work a business conducts for the innovation, introduction and improvement of its products and procedures. It is a series of investigative activities to improve existing products and procedures or to lead to the development of new products and procedures.
Safety Integrity Level	Safety Integrity Level (SIL) is defined as a relative level of risk reduction provided by a safety function, or to specify a target level of risk reduction. In simple terms, Safety Integrity Level is a measurement of performance required for a safety instrumented function. The Safety Integrity Levels are defined in the European norm EN 50128.
Safety Logic	Safety Control component in the RCA interface architecture. See SubSys SL .
Safety Manager	Safety control component in the RCA interface architecture. See SubSys SM .
Shift2Rail	Shift2Rail fosters the introduction of better trains to the market (quieter, more comfortable, more dependable, etc.), which operate on an innovative rail network infrastructure reliably from the first day of service introduction, at a lower Life Cycle Cost , with more capacity to cope with growing passenger and freight mobility demand.
SIL4	Safety Integrity Level 4. Level 4 is the highest level.
smartrail 4.0	With the smartrail 4.0 program, the Swiss railway industry is harnessing digitalisation and the potential of new technologies to further increase capacity and safety, make more efficient use of railway infrastructure, save costs and thus maintain the railway's competitiveness in the longer term. Source: www.smartrail40.ch

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	15

Name	Description
Software	Software is a collection of data or computer instructions that tell the computer how to work. Software includes computer programs, libraries and related non-executable data, such as online documentation or digital media.
Systems Modeling Language	The Systems Modeling Language is a general purpose architecture modeling language for systems engineering applications. Systems Modeling Language supports the specification, analysis, design, verification and validation of a broad range of systems and systems-of-systems. These systems may include hardware, software, information, processes, personnel, and facilities. Source: www.sysml.org
Technical Specification for Interoperability	The Technical Specification for Interoperability are specifications drafted by the European Railway Agency and adopted in a decision by the European Commission, to ensure the interoperability of the trans-European rail system. The interoperability issues apply to the lines within the Trans-European Rail network.
Total Cost of Ownership	Total Cost of Ownership is a financial estimate intended to help buyers and owners determine the direct and indirect costs of a product or system. It is a management accounting concept that can be used in full cost accounting or even ecological economics where it includes social costs.
Trackside Asset	Trackside Assets are installations such as rail Points , level crossing barriers, signals, Train Detection System (axle counters, track circuits), etc. Trackside Assets are external actors in the RCA interface architecture. See Field Element .
Traffic Management System	Traffic Management System provides permanent control across the network, automatically sets routes for trains and logs train movements as well as detects and solves potential conflicts.
Train Detection System	Train Detection System is a system which determines the occupancy status of track vacancy proving sections. Train detection system may be a track circuit or an axle counting system. (Source: EULYNX Glossary)
Train Integrity Monitoring System	System to monitor and confirm train integrity when train detection is absent.
Train Position Report	ToDo
Union des Industries Ferroviaires Européennes	Union des Industries Ferroviaires Européennes represents the European rail manufacturing industry. Union des Industries Ferroviaires Européennes purpose is to represent its members' interests at international and EU level. The mission of the association is to proactively foster an environment where its members can provide competitive railway systems for the growing demand for rail transport. Source:

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	16

Name	Description
	www.unife.org
Union Industry of Signalling	Union Industry of Signalling is a working group of UNIFE with the goal to create the ERTMS/ETCS specifications.
Union Internationale des Chemins de fer or International Union of Railways	The worldwide railway organisation. Source: www.uic.org
Unique Selling Proposition	A Unique Selling Proposition refers to the unique benefit exhibited by a company, service, product or brand that enables it to stand out from competitors. The Unique Selling Proposition must be a feature that highlights product benefits that are meaningful to consumers.
Vehicle Devices	An external actor in the RCA interface architecture, See VD (deprecated) .
Vehicle Locator	A device control component in the RCA interface architecture. See SubSys VL .
Vehicle Supervisor	A device control component in the RCA interface architecture. See SubSys VS .
Verification and Validation	Verification and Validation are independent procedures that are used together for checking that a product, service, or system meets requirements and specifications and that it fulfils its intended purpose.
Workbench	A component in the RCA interface architecture. See SubSys WB .

Table 1 Terms RCA

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	17

3. ABBREVIATIONS

Name	Description
AE	Abbreviation for ATO Execution .
ALM	Abbreviation for Application Lifecycle Management .
AoE	Abbreviation for ATO over ETCS.
API	Abbreviation for Application Programming Interface .
APS	Abbreviation for Advanced Protection System .
AT	Abbreviation for ATO Transactor .
ATO	Abbreviation for Automatic Train Operation.
AV	Abbreviation for ATO Vehicle .
BCM	Abbreviation for Business Continuity Management .
CCB	Abbreviation for Change Control Board .
CCS	Abbreviation for Command Control and Signalling .
CENELEC	Abbreviation for European Committee for Electrotechnical Standardization .
CER	Abbreviation for Community of European Railway and Infrastructure Companies .
CIA	Abbreviation for Confidentiality, Integrity, and Availability .
CMB	Abbreviation for Consortium Management Bureau .
CMC	Abbreviation for Consortium Management Committee .
CR	Abbreviation for Change Request .

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	18

Name	Description
DCM	Abbreviation for Device & Configuration Management .
DM	Abbreviation for Diagnostics & Monitoring .
DMI	Abbreviation for Driver Machine Interface .
DPL	Abbreviation for Drive Protection Level.
DPS	Abbreviation for Drive Protection Section .
DR	Abbreviation for Digital Railway .
DSD	Abbreviation for Digitale Schiene Deutschland .
EDP	Abbreviation for Engineering & Data Preparation .
EIM	Abbreviation for European Rail Infrastructure Managers .
ERA	Abbreviation for European Union Agency for Railways .
ERTMS	Abbreviation for European Rail Traffic Management System .
ETCS	Abbreviation for European Train Control System .
EUG	Abbreviation for ERTMS Users Group .
EUPL	Abbreviation for European Union Public Licence .
EVC	Abbreviation for European Vital Computer .
FFFIS	Abbreviation for Form Fit Function Interface Specification .
FOT	Abbreviation for Fixed Object Transactor .

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	19

Name	Description
FRMCS	Abbreviation for Future Railway Mobile Communication System .
GNSS	Abbreviation for Global Navigation Satellite System .
GoA	Abbreviation for Grade of Automation .
GPS	Abbreviation for Global Positioning System .
GSM-R	Abbreviation for Global System for Mobile Communication Railway .
HMI	Abbreviation for Human Machine Interface .
HW	Abbreviation for Hardware .
IAM	Abbreviation for Identity and Access Management .
IEC	Abbreviation for International Electrotechnical Commission .
IEEE	Abbreviation for Institute of Electrical and Electronics Engineers .
IM	Abbreviation for Infrastructure Manager .
IPR	Abbreviation for Intellectual Property Rights .
IREB	Abbreviation for International Requirements Engineering Board .
ISO	Abbreviation for International Organization for Standardization .
IVV	Abbreviation for Independent Verification & Validation .
IXL	Abbreviation for Interlocking .
LCC	Abbreviation for Life Cycle Cost .
MA	Abbreviation for Movement Authority .

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	20

Name	Description
MBSE	Abbreviation for Model-Based Systems Engineering .
MO	Abbreviation for Mobile Object .
MOB	Abbreviation for Movable Object .
MOL	Abbreviation for Mobile Object Locator .
MOT	Abbreviation for Mobile Object Transactor .
MP	Abbreviation for Movement Permission . See RCA Domain Knowledge .
MT	Abbreviation for Movement Authority Transactor .
MTTR	Abbreviation for Mean Time to Recovery resp. Repair .
MW	Abbreviation for Middleware .
NFR	Abbreviation for Non Functional Requirement .
NSA	Abbreviation for National Safety Authority .
OA	Abbreviation for Object Aggregation .
OBU	Abbreviation for On Board Unit .
OC	Abbreviation for Object Controller .
OCORA	Abbreviation for Open CCS Onboard Reference Architecture .
OS	Abbreviation for Operating System .
OTN	Abbreviation for Operational Train Number .

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	21

Name	Description
PE	Abbreviation for Plan Execution .
PRIME	Abbreviation for Platform of Rail Infrastructure Managers in Europe .
PSL	Abbreviation for Person Supervisor & Locator .
R&D	Abbreviation for Research and Development .
RAM(S)	Abbreviation for Reliability, Availability, Maintainability (and Safety) .
RBC	Abbreviation for Radio Block Centre .
RCA	Abbreviation for Reference CCS architecture .
RU	Abbreviation for Railway Undertaking .
S2R	Abbreviation for Shift2Rail .
SCI	Abbreviation for Standard Communication Interface. (Source: EULYNX, Eu.Glo.1869).
SDI	Abbreviation for Standard Diagnostic Interface. (Source: EULYNX, Eu.Glo.1870).
SIL	Abbreviation for Safety Integrity Level .
SL	Abbreviation for Safety Logic .
SM	Abbreviation for Safety Manager .
SoM	Abbreviation for Start of Mission. A Term used in ETCS .
SR40	Abbreviation for smartrail 4.0 .
SW	Abbreviation for Software .
SysML	Abbreviation for Systems Modeling Language .

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	22

Name	Description
TA	Abbreviation for Trackside Asset .
TCO	Abbreviation for Total Cost of Ownership .
TDS	Abbreviation for Train Detection System .
TIMS	Abbreviation for Train Integrity Monitoring System .
TMS	Abbreviation for Traffic Management System .
TMS-PAS	Abbreviation for TMS Planning System.
TSI	Abbreviation for Technical Specification for Interoperability .
UI	Abbreviation for user interface. See Human Machine Interface .
UIC	Abbreviation for Union Internationale des Chemins de fer or International Union of Railways .
UML	Abbreviation for Unified Modelling Language.
UNIFE	Abbreviation for Union des Industries Ferroviaires Européennes .
USP	Abbreviation for Unique Selling Proposition .
V&V	Abbreviation for Verification and Validation .
VD	Abbreviation for Vehicle Devices .
VL	Abbreviation for Vehicle Locator .
VS	Abbreviation for Vehicle Supervisor .
WB	Abbreviation for Workbench .

	Document Number and Issue	0.2 (0.A)
	Date of Publish	11 Sep 2020
	Page No	23

Table 2 Abbreviations