

# RCA



## Reference CCS Architecture

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

# RCA – Glossary

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## Glossary

<b>ALM</b>	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.
<b>API</b>	Application Programming Interface	In computer programming, an application programming interface is a set of subroutine definitions, communication protocols, and tools for building software.
<b>APS</b>	Advanced Protection System	Group of components in the RCA interface architecture, aggregates approximately the function of today's interlockings.
<b>APS-FOT</b>	APS Fixed Object Transactor	Device Abstraction component in the RCA interface architecture.
<b>APS-MOT</b>	APS Mobile Object Transactor	Device Abstraction component in the RCA interface architecture.
<b>APS-MT</b>	APS Movement Authority Transactor	Device Abstraction component in the RCA interface architecture.
<b>APS-SL</b>	APS Safety Logic	Safety Control component in the RCA interface architecture.
<b>APS-SM</b>	APS Safety Manager	Safety Control component in the RCA interface architecture.
<b>APS-OA</b>	APS Object Aggregation	Object Abstraction component in the RCA interface architecture.
<b>ATO-AT</b>	ATO Transactor	Device Abstraction component in the RCA interface architecture.
<b>ATO-AV</b>	ATO Vehicle	Device Control component in the RCA interface architecture.
<b>ATO GoAx</b>	Automatic Train Operation – Grade of Automation x	ATO is an operational safety enhancement device used to help automate operations of trains. Currently five grades of automation are defined (x = 0, 1, 2, 3, 4).
<b>BCM</b>	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.
<b>CCB</b>	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.
<b>CCS</b>	Command, Control & Signaling	The systems, which are ensuring the safe operation of the railways as e.g. the train control system or the interlocking.
<b>CENELEC</b>	European Committee for Electrotechnical Standardization	CENELEC is the European Committee for Electrotechnical Standardization and is responsible for standardization in the electrotechnical engineering field. <a href="http://www.cenelec.eu">www.cenelec.eu</a>

<b>CER</b>	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. <a href="http://www.cer.be">www.cer.be</a>
<b>CIA</b>	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 organization. The elements of the triad are considered the three most crucial components of security.
<b>CMB</b>	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.
<b>CMC</b>	Cluster Management Committee	Organization group in EULYNX.
<b>CR</b>	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.
<b>DCM</b>	Device & Configuration Management	Generic Function component in the RCA interface architecture.
<b>DM</b>	Diagnostics & Monitoring	Generic Function component in the RCA interface architecture.
<b>DMI</b>	Driver Machine Interface	The interface to enable direct communication between the ERTMS/ETCS on-board equipment and the driver.
<b>DR</b>	Digital Railway	DR is the name of the British programme for digitalization of CCS System (see DSD, SR40).
<b>DSD</b>	Digitale Schiene Deutschland	Digitale Schiene Deutschland is the German programme for digitization of CCS Systems (see also DR, SR40).
<b>EDP</b>	Engineering & Data Preparation	Generic Function component in the RCA interface architecture.
<b>EIM</b>	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). <a href="http://www.eimrail.org">www.eimrail.org</a>
<b>ERA</b>	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. <a href="http://www.era.europa.eu">www.era.europa.eu</a>
<b>ERTMS</b>	European Rail Traffic Management System	The European Railway 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.

		<a href="http://www.ertms.net">www.ertms.net</a>
<b>ETCS Lx</b>	European Train Control System (Level x)	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).
<b>EUG</b>	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. <a href="http://ertms.be">ertms.be</a>
<b>EULYNX</b>	The EULYNX Consortium	In EULYNX the European Infrastructure Managers define an internationally standardized signaling system, focusing on common interfaces. <a href="http://eulynx.eu">eulynx.eu</a>
<b>EUPL</b>	European Union Public Licence	The European Union Public Licence is a free software licence that has been created and approved by the European Commission.
<b>EVC</b>	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 loco, location sensors and all cab devices of the driver.
<b>FFFIS</b>	Form Fit Function Interface Specification	Form, Fit, and Function 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 the part with minimal documentation and design cost as long as the fit, form and function of the product are maintained.
<b>FOS</b>	Fiber Optic Sensor	A fiber optic sensor is a sensor that uses optical fiber either as the sensing element ("intrinsic sensors"), or as a means of relaying signals from a remote sensor to the electronics that process the signals ("extrinsic sensors").
<b>FRMCS</b>	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 organizations 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. <a href="http://uic.org/frmcs">uic.org/frmcs</a>
<b>GNSS</b>	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.

<b>GPS</b>	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.
<b>GSM-R</b>	Global system for mobile communication - Railway	GSM-R is an international wireless communications standard for railway communication and applications.
<b>Horizon2020</b>		Horizon 2020 is the financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness. <a href="https://ec.europa.eu/programmes/horizon2020/en">https://ec.europa.eu/programmes/horizon2020/en</a>
<b>HW</b>	Hardware	Hardware includes the physical, tangible parts or components of a computer.
<b>IAM</b>	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.
<b>IEC</b>	International Electrotechnical Commission	The IEC is the world's leading organization for the preparation and publication of International Standards for all electrical, electronic and related technologies. These are known collectively as "electrotechnology". <a href="http://www.iec.ch">www.iec.ch</a>
<b>IEEE</b>	Institute of Electrical and Electronics Engineers	IEEE is the world's largest technical professional organization 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. <a href="http://www.ieee.org">www.ieee.org</a>
<b>IM</b>	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.
<b>IPR</b>	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.
<b>IREB</b>	International Requirements Engineering Board	The International Requirements Engineering Board, a non-profit organization, 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.

		<a href="http://www.ireb.org">www.ireb.org</a>
<b>ISO</b>	International Organization for Standardization	ISO is an independent, non-governmental international organization 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. <a href="http://www.iso.org">www.iso.org</a>
<b>IVV</b>	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.
<b>IXL</b>	Interlocking	In railway signalling, an interlocking (IXL) is a system composed by a set of signal apparatus that prevents trains from conflicting movements through only allowing trains to receive authority to proceed, when routes have been set, lock and detected in safe combinations. See also APS.
<b>LCC</b>	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 which 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.
<b>MA</b>	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.
<b>MBSE</b>	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.
<b>MMI</b>	Man Machine Interface	The Man 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.
<b>MO</b>	Mobile Object	Objects like persons, cars that are close to the track.

<b>MOL</b>	Mobile Object Locator	Device Control component in the RCA interface architecture.
<b>MTTR</b>	Mean Time to Recovery resp. Repair	Mean Time to Recovery is the average time that a device will take to recover from any failure.
<b>MW</b>	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".
<b>NFR</b>	Non Functional Requirements	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 behaviors.
<b>NSA</b>	National Safety Authority	Authority for authorization of CCS Components and Systems.
<b>OBU</b>	On Board Unit	The ETCS equipment located on the driving vehicle.
<b>OC</b>	Object Controller	Device Control component in the RCA interface architecture. The different OC component types and their interfaces are defined in EULYNX.
<b>OCORA</b>	Open CCS Onboard Reference Architecture	European initiative to define the CCS vehicle architecture. Confirms with the COAT program of smartrail 4.0.
<b>OS</b>	Operating System	An Operating System is system software that manages computer hardware and software resources and provides common services for computer programs.
<b>PRIME</b>	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.
<b>PSL</b>	Person Supervisor & Locator	Device Control component in the RCA interface architecture.
<b>R&amp;D</b>	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.
<b>RAM(S)</b>	Reliability, Availability, Maintainability (and Safety)	RAMS constitutes the key element of the assessment in the rail industry today. For rail system operator, RAMS means a safe, reliable, high-quality service and lower operating and maintenance costs. For the rail system provider, RAMS is representing a high-quality system and product.
<b>RBC</b>	Radio Block Centre	A Radio Block Centre is a specialized computing device with specification Safety integrity level 4 (SIL) for generating Movement Authorities (MA) and transmitting it to trains. It gets information from signaling 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 RBC will attend the trains with MA until leaving the section.
<b>RCA</b>	Reference CCS architecture	RCA is an initiative by the members of EUG and EU-LYNX to define a harmonized 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.
<b>RU</b>	Railway Undertaking	Rail transport undertaking means a private or public undertaking which is authorized to carry persons or goods by rail and which ensures traction or which only ensures traction.
<b>S2R</b>	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.
<b>SIL x</b>	Safety Integrity Level x	Safety Integrity Level 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, SIL is a measurement of performance required for a safety instrumented function. (x = 1, 2, 3, 4)
<b>SR40</b>	smartrail 4.0	With the smartrail 4.0 program, the Swiss railway industry is harnessing digitalization 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. <a href="http://www.smartrail40.ch">www.smartrail40.ch</a>
<b>SW</b>	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.
<b>SysML</b>	Systems modeling language	The Systems modeling language is a general-purpose architecture modeling language for Systems Engineering applications. SysML 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. <a href="http://sysml.org">sysml.org</a>
<b>TA</b>	Trackside Asset	Device component in the RCA interface architecture.
<b>TCO</b>	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.
<b>TDS</b>	Train Detection System	Train detection systems are used for detecting the position of the train on the railway track e.g. by means of axle counters or track circuits.
<b>TIMS</b>	Train Integrity Monitoring System	System to monitor and confirm train integrity when train detection is absent.
<b>TMS</b>	Traffic Management System	Traffic Management Systems provide permanent control across the network, automatically sets routes for trains and logs train movements as well as detects and solves potential conflicts.
<b>TMS-AE</b>	TMS ATO Execution	Movement Control component in the RCA interface architecture.
<b>TMS-PE</b>	TMS Plan Execution	Movement Control component in the RCA interface architecture.
<b>TSI</b>	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.
<b>UI</b>	User Interface	→ MMI
<b>UIC</b>	Union Internationale des Chemins de fer or International Union of Railways	The worldwide railway organization. <a href="http://uic.org">uic.org</a>
<b>UNIFE</b>	Union des Industries Ferroviaires Européennes	UNIFE is representing the European rail manufacturing industry. UNIFE's 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. <a href="http://www.unife.org">www.unife.org</a>
<b>UNISIG</b>	Union Industry of Signaling	UNISIG is a working group of UNIFE with the goal to create the ERTMS/ETCS specifications.
<b>USP</b>	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.
<b>V&amp;V</b>	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 fulfills its intended purpose.
<b>VD</b>	Vehicle Devices	Device component in the RCA interface architecture.
<b>VL</b>	Vehicle Locator	Device Control component in the RCA interface architecture.
<b>VS</b>	Vehicle Supervisor	Device Control component in the RCA interface architecture.

<b>WB</b>	RCA Workbench	Component in the RCA interface architecture
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