

OCORA

Open CCS On-board Reference Architecture

Glossary

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Reader's note: please be aware that the document IDs in square brackets, e.g. [OCORA-BWS01-010], as per the list of referenced documents below, are used throughout this document to indicate the references to external documents. Wherever a reference to a TSI-CCS SUBSET is used, the SUBSET is referenced directly (e.g. SUBSET-026). OCORA always reference to the latest available official version of the SUBSET, unless indicated differently.

[\[OCORA-BWS01-010\] – Release Notes](#)

[\[OCORA-BWS01-030\] – Question and Answers](#)

[\[OCORA-BWS01-040\] – Feedback Form](#)

[\[OCORA-BWS03-010\] - Introduction to OCORA](#)

[\[OCORA-BWS04-010\] - Problem Statements](#)

1 Introduction

1.1 Purpose of the document

The purpose of this document is to provide clear definitions of terms used in the OCORA documentation.

This document is addressed to experts in the CCS domain and to any other person, interested in the OCORA concepts for on-board CCS. The reader is invited to provide feedback to the OCORA collaboration and can, therefore, engage in shaping OCORA. Feedback to this document and to any other OCORA documentation can be given by using the feedback form [\[OCORA-BWS01-040\]](#).

If you are a railway undertaking, you may find useful information to compile tenders for OCORA-inspired CCS building blocks, for tendering complete on-board CCS systems, or for on-board CCS replacements for functional upgrades or life-cycle considerations.

If you are an organization interested in developing CCS on-board building blocks according to the OCORA design principles, the information provided in this document can be used as input for your development.

1.2 Applicability of the document

The document is informative. Subsequent releases of this document will be developed based on a modular and iterative approach, evolving within the progress of the OCORA collaboration.

1.3 Context of the document

This document is published as part of the OCORA Delta release, together with the documents listed in the release notes [\[OCORA-BWS01-010\]](#). Before reading this document, it is recommended to read the Release Notes [\[OCORA-BWS01-010\]](#). If you are interested in the context and the motivation that drives OCORA we recommend to read the Introduction to OCORA [\[OCORA-BWS03-010\]](#) and the Problem Statements [\[OCORA-BWS04-010\]](#). The reader should also be aware of the Question and Answers [\[OCORA-BWS01-030\]](#).

2 Terms and Definitions

| Title | Abbreviation | Description |
|--------------------|--------------|---|
| Architecture | | <p>The fundamental concepts or properties of a system in its environment embodied in its elements, relationships, and in the principles of its design and evolution. (ISO 42010)</p> <p><i>Describes the structure of a coherent ensemble of building blocks and the glue (e.g. interfaces, bus system) between these building blocks that maintains structure consistency and coherence.</i></p> |
| Basic Software | | <p>Provides a replica-deterministic environment to the ETCS Kernel - typically using a super-loop architecture.</p> <p><i>The Basic Software is usually vendor specific and handles all input/output with peripheral functions.</i></p> |
| Building Block | BB | <p>A Building Block is a sourceable unit of the CCS on-board system (hardware and/or software), having standardised functionality, standardised PRAMSS requirements (including Tolerable Functional Failure Rate [TFFR], Safety Integrity Level [SIL] and Safety Related Application Conditions [SRAC]), standardised interfaces (on all OSI Layers) towards other building blocks and/or external systems.</p> <p><i>Building Blocks are separately sourceable from different suppliers and capable of being integrated by a third party.</i></p> <p><i>There are two types of building blocks: a) Hardware Building Blocks and b) Software Building Blocks.</i></p> |
| CCS Computing Unit | CCU | <p>A computing unit hosting all or parts of the CCS on-board and eventually other software.</p> <p><i>The unit consists of 1 to n processors and has a single connection to the CCN.</i></p> |
| Component | | <p>A component of a CCS on-board system is used to structure functionality within Building Blocks. It implements and encapsulates one or more behaviors (business logic) and exposes services via defined interfaces to other components.</p> |

| Title | Abbreviation | Description |
|---------------------------------|--------------|---|
| Device | | A physical entity performing a predefined (set of) task(s). It consists of software integrated on a hardware. |
| Diesel Multiple Unit | DMU | <p>Diesel Multiple Unit: combustion engine powered, self-propelled integrated combination of two or more rail cars for the transportation of passengers.</p> <p><i>Also known as 'train set'. Once broken, the combination can no longer perform its function. Propulsion can be direct (diesel hydraulic) or indirect (diesel electric) and distributed over the combination or concentrated in e.g. power heads or locomotives.</i></p> |
| Electrical Multiple Unit | EMU | <p>Electrical Multiple Unit: external power driven, electrically propelled integrated combination of two or more rail cars for the transportation of passengers.</p> <p><i>Also known as 'train set'. Once broken, the combination can no longer perform its function. Propulsion can be distributed over the combination or concentrated in e.g. power heads or locomotives.</i></p> |
| Entity in Charge of Maintenance | ECM | An Entity in Charge of Maintenance of a vehicle, and registered as such in a vehicle register referred to in Article 47 of Directive (EU) 2016/797. |
| European standard | | A standard adopted and formally ratified by a European standardisation organisation (CEN, CENELEC or ETSI). |
| European Vital Computer | EVC | <p>Device for performing the designated ETCS function of safe train operation.</p> <p><i>It includes the logic needed to perform the ETCS tasks, i.e. data exchange management between internal and peripheral functions like odometry or DMI.</i></p> |
| Evolvability | | <p>Evolvability (Flexibility) is the ability to easily adopt to new technologies or to extend the functionality of an on-board CCS system without the involvement of the original supplier.</p> <p><i>Evolvability is an architecture design principle, to be realised in the engineering concept of concrete products.</i></p> |

| Title | Abbreviation | Description |
|------------------------|--------------|---|
| Example | | <p>Any physical, graphical or textual representation of a concept, object or abstraction used for explaining or clarifying that concept, object or abstraction.</p> <p><i>Examples shall not in any way be limitative or perceived as limitative and are not in any way to be understood as prescriptive or as a requirement.</i></p> |
| Exchangeability | | <p>Exchangeability (Interchangeability) is the ability to replace one or multiple Building Blocks with (a) respective Building Block(s) of (an)other supplier(s), without affecting other Building Blocks or the overall CCS on-board system.</p> <p><i>Exchangeability is an architecture design principle that has to be achieved on the engineering concept of concrete products (hard- or software). Replaceability is the realisation of this design principle in concrete products.</i></p> |
| Formal Model | | <p>A Formal Model is the description of a Functional Model using formal grammar and the symbolism of a logical language.</p> <p><i>A precise mathematical set of rules by which a valid Functional Model description is constructed that eventually can be (directly) transformed into computer code.</i></p> |
| Function | | <p>A (coherent set of) task(s) to be performed in order to achieve a defined result.</p> <p><i>Functions express actions that are executed. They are usually embedded in structural elements of a system.</i></p> |
| Functional Application | | <p>Functional Application refers to the software that implements the actual (Business) Logic of a railway Function.</p> <p><i>Examples would be the Vehicle Locator or the Vehicle Supervisor. Functional Applications shall be platform independent and make use of a "generalized abstraction" (API) to the Computing Platform.</i></p> |

| Title | Abbreviation | Description |
|--|--------------|--|
| Functional Decomposition | | <p>The partition of a system into single structural elements that each represent one or more coherent functions to be performed that together fulfil the design objective of the system.</p> <p><i>Describes how (clusters of) Functions are embedded into the structural elements of a system.</i></p> |
| Functional Model | | <p>Abstraction of a system, describing interaction between individual functions of a system.</p> <p><i>OCORA targets using a formal language for functional modelling.</i></p> <p><i>Describes the actions performed by a coherent ensemble of building blocks and the glue between these Building Blocks (e.g. interfaces, bus system) that together constitute a system.</i></p> |
| Functional Vehicle Adapter | FVA | <p>The Functional Vehicle Adapter is a piece of software deployed on the OCORA computing platform, or on the OCORA Gateway. Its job is to provide an OCORA unified and standardized interface towards the CCS applications and services for vehicle functions and vehicle information needed by the OCORA on-board applications and services.</p> |
| Future Railway Mobile Communication System | FRMCS | <p>Railway specific radio communication system based on global 5G telecommunication standards and technologies.</p> |
| Hardware Building Block | HBB | <p>Hardware Building Blocks consist of hardware and typically software that provide the building block's functionality. They exclusively communicate with each other and with external systems through the CCS Communication Network (CCN) using standardised interfaces.</p> |

| Title | Abbreviation | Description |
|--------------------------|--------------|---|
| Harmonised Standard | | <p>A harmonised standard is a European standard elaborated on the basis of a request from the European Commission to a recognised European Standards Organisation (CEN, CENELEC or ETSI) to develop a European standard that provides solutions for compliance with a legal provision. (Source: CENELC)</p> <p><i>Its application can be mandatory (referenced standard) or voluntary (standard listed in the Official Journal of the EU in the New Legislative Framework).</i></p> |
| International Standard | | <p>A standard adopted and ratified by an international standardisation body.</p> <p>Examples are: ISO, IEC and ITU.</p> |
| Interoperability | | <p>Interoperability is the ability of a train service to run seamlessly, i.e. without the need to change either rolling stock or train staff, on any ERTMS equipped rail network.</p> <p><i>Interoperability is an architecture design principle, to be realised in the engineering concept of concrete products.</i></p> |
| Juridical Recording Unit | JRU | <p>A device mounted in a train with the purpose to record ATP data of all actions and exchanges relating to the movement of trains sufficient for off-line analysis of all events leading to an incident.</p> |
| Kernel | | <p>The term Kernel refers to the main tasks performed by the EVC: vehicle supervision, including data exchange management with peripheral Systems like DMI and odometry.</p> |
| Line Replacement Unit | LRU | <p>Line Replacement Unit</p> |
| Logic | | <p>Systematic set of principles for retrieving, dispatching, storing, modelling, analysing and predicting information so as to perform a specified task.</p> <p><i>Pertains specifically to the management of data by a System, both internal as in exchange with peripheral Systems.</i></p> |

| Title | Abbreviation | Description |
|------------------------------|--------------|---|
| Migrateability | | <p>The property of a system to allow changes to one or multiple building blocks, without affecting other building blocks or the overall system.</p> <p><i>Migrateability is an architecture design principle to be realised in the engineering concept of concrete products. It is a prerequisite for upgradeability.</i></p> |
| Mobile Communication Gateway | MCG | <p>The Mobile Communication Gateway provides train to track-side communication for the on-board CCS and depending on the vehicle, it may also provide track-side connectivity for the systems of the Train Control Bus (VCS and PIS).</p> |
| Model | | <p>A consistent digital representation of an Architecture, allowing to generate different views for documenting and explaining different aspects of the Architecture.</p> |
| Modular Safety | | <p>Is the concept to reduce the overall safety case workload by using modularity, not only for the technical design of components, but also to use modularity to foster independent, re-usable, composable safety cases.</p> <p><i>Overall, it means to reduce the workload of the impact analysis for changes and end2end corrections to a possible minimum.</i></p> |
| Modularity | | <p>The property of a system being composed of a coherent whole of single, independent building blocks or modules.</p> <p><i>Modularity is a prerequisite for having “plug & play”-like exchangeability of an on-board CCS system or its subsystems without the need to involve either the original supplier of the vehicle, of the CCS system or one of its subsystems.</i></p> |
| Non-Railway Component | | <p>A part of or a single building block that originates from a non-railway domain.</p> |

| Title | Abbreviation | Description |
|--|--------------|---|
| Non-Safe | | <p>Adjective indicating that a system or function in itself is not designed to protect against bodily harm or material damage when it fails.</p> <p><i>In general, the qualification of a system or function as ‘non safe’ indicates that the safety function, protecting both the involved animate or inanimate entities, is allocated to other safety systems or functions.</i></p> |
| Non-Vital | | See Non-Safe |
| OCORA Gateway | | <p>A hardware device providing communication capabilities between the CCN (CCS-ECN) and the legacy train control network or bus or the legacy actors and sensors residing outside the CCS domain but important to CCS. (Note: in release 5, the OCORA Gateway has been renamed to TCMS Adapter)</p> |
| Open CCS On-board Reference Architecture | OCORA | <p>OCORA is first and foremost a platform for cooperation to the benefit of the European Railway sector.</p> <p>Guiding principles, rules and regulations agreed between OCORA members, are expressed in the OCORA Memorandum of Understanding (MoU) and the OCORA Code of Conduct (CoC). Members collaborate on the development of an open reference architecture for on-board command-control and signalling systems that supports the mutually agreed OCORA main objectives.</p> |
| Physical Consist | PC | <p>A physically existent, independent item of rolling-stock, comprising one or more mechanically connected Physical Vehicles, whose composition cannot be changed within OCORA System Borders.</p> |
| Physical Train Unit | PTU | <p>A physically existent, driveable and made up of a single or an ordered sequence of Physical Consists coupled together.</p> |
| Physical Train Unit Operation Systems | PTU-OS | <p>The Physical Train Unit Operation Systems includes all systems of the train that interact directly or through the Train Adapter (TA) with the CCS On-Board.</p> |

| Title | Abbreviation | Description |
|-----------------------|--------------|--|
| Platform | | <p>Refers to the environment on which Functional Applications are executed.</p> <p><i>Comprised of</i></p> <ul style="list-style-type: none"> • <i>Hardware (i.e. Compute Nodes, Memory, etc.) and</i> • <i>Software (i.e. the Runtime Environment)</i> |
| Platform Independence | | <p>The property of allowing a functional application to work on different Computing Platform implementations.</p> <p><i>Platform Independence is the fact of using a “generalized abstraction” between Functional Application logic and the underlying (Computing) Platform.</i></p> <p><i>To concretely attain Platform Independence, the following elements are needed:</i></p> <ul style="list-style-type: none"> • <i>A definition of a “generalized abstraction” (in the form of an API specification)</i> • <i>At least one provider implementation of the “generalized abstraction” in form of a concrete (Computing) Platform</i> • <i>One or more Functional Applications applying the specification and being able to run on the (Computing) Platform.</i> <p><i>Platform Independence is achieved when a Functional Application, based on the generalized abstraction, runs unchanged on different (Computing) Platform implementations. For this, the Functional Application shall only use external functions through a defined application programming interface (API). Platform independence is a design principle, used in the development of the engineering (concept) of concrete products.</i></p> |
| Portability | | <p>The property that allows migrating a software from one concrete Computing Platform implementation to another concrete Computing Platform implementation.</p> <p><i>See also Platform Independence.</i></p> |

| Title | Abbreviation | Description |
|---------------------------|--------------|---|
| Presumption of Conformity | | <p>Condition of per se demonstrating product, service or process compliance with relevant EU legislation in case of consistent application of EU harmonised standards by manufacturers, other economic operators or conformity assessment bodies.</p> <p><i>The presumption of conformity is a concept that is widely used in the context of the European “New Approach” for better regulation. The presumption of conformity means that a manufacturer who has complied with a harmonised standard listed in the Official Journal of the European Union (OJEU) can legally assume he has met the requirements of the directive (or TSI) covered by that standard, as described in its Annex Z.</i></p> <p><i>ANNEX Z of standards and the OJEU</i></p> <p><i>The listing of a European standard in the OJEU requires a positive assessment of the Harmonized Standard Consultant and a corresponding positive statement of the European Council (EC) desk officer. Furthermore, it is required that the listed standard contains an Annex Z detailing to which requirements of the directive (or TSI) it provides presumption of conformity.</i></p> |
| Radio Block Centre | RBC | <p>The RBC is a centralised, radio communication enabled safety system to manage safe train movement based on train position information.</p> <p><i>The RBC is a specialised computing device with Safety Integrity Level 4 (SIL) for generating Movement Authorities (MA) 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 RBC will attend the trains with MA until leaving the section. RBC have defined interfaces to trains but have no regulated interfaces to Signalling Control and only follow national regulation.</i></p> |

| Title | Abbreviation | Description |
|---------------------|--------------|--|
| Referenced Standard | | <p>A standard or a part of a standard referenced in a Technical Specification for Interoperability (TSI).</p> <p><i>Furthermore, article 4.8 of Directive (EU) 2016/797 sets out that other normative documents, such as specifications or technical documents can also be referenced in a TSI. When referenced, their nature changes from voluntary to mandatory.</i></p> |
| Replaceability | | <p>The property of a component or a device to be removed and installed without support of the Original Equipment Manufacturer (OEM).</p> <p><i>Replaceability is the technical implementation of exchangeability, enabling components and devices to be removed and installed without support of the OEM.</i></p> <p><i>Replaceability is a design principle, used in the development of the engineering (concept) of concrete products. See also: Exchangeability</i></p> |
| Runtime Environment | RTE | <p>The Runtime Environment represents the execution context of Functional Applications. It consists of all software aspects required to provide that execution context including safety and security services, communication stack and if applicable Operating System and Virtualization. It provides a Platform Independent API - a general abstraction that allows Functional Applications to run unchanged on different Computing Platform implementations.</p> |
| Safe / Safety | | <p>Safety is defined as a property of railway functions or systems that safeguards humans, physical assets and environment against (fatal) injury or damage in conformity with predefined acceptable risk thresholds.</p> <p><i>Safe systems ensure that the defined risk levels are not exceeded and that the function or system enters its fail-safe state in case of failure. Since risks can never be completely mitigated, acceptable risk levels have to be established. Determining such levels is subject to ethical considerations and is, therefore, not within OCORA scope.</i></p> |

| Title | Abbreviation | Description |
|----------------------------|--------------|---|
| Security | | <p>(Cyber) Security is the protection of (especially safety related) communication and data used in on-board CCS systems against threats (like cyber-attacks and hacks). To achieve this, all main security functionality like identify, protect, detect, respond and recover are considered.</p> <p><i>(Cyber) security is a design principle, used in the development of the engineering (concept) of concrete products.</i></p> |
| Service | | <p>Services are specialised Functional Applications providing common functionality used by multiple other Functional Applications or an “input-output” conversion from and to other Functional Applications in coherence with the data model. An example of a Service is the "Vehicle Locator" (VL) which is used by the "Vehicle Supervisor" (VS) and the "ATO vehicle" (AV).</p> |
| Software Building Block | SBB | <p>Software Building Blocks consist of software that provide the building block’s functionality. They are deployed on an instance of the Generic Safe Computing Platform (SCP) and shall communicate with each other through the standardised Platform Independent Application Programming Interface (PI-API). Communication with computing platform external building blocks and systems is realised by the Computing Platform (integrating with the CCN).</p> <p><i>Software Building Blocks are portable i.e., they may be deployed on different Computing Platform implementations.</i></p> |
| Specific Vehicle Interface | | <p>Data exchange function between the on-board CCS system and the vehicle that defines data and data formats that are not otherwise defined in either formal TSI specifications or published UNISIG or OCORA proposals for TSI specifications.</p> |

| Title | Abbreviation | Description |
|-------------------------------------|--------------|--|
| Standard | | <p>A technical specification, adopted by a recognised standardisation body, for repeated or continuous application, with which compliance is not compulsory, except when referenced in a Technical Specification for Interoperability, or any other regulatory text (e.g. national rule, law, ...)</p> |
| System | | <p>A coherent group of interacting or interrelated entities that form a unified whole, described by its structure and purpose and expressed in its functioning.</p> <p><i>A System is described by its spatial and temporal boundaries as surrounded and influenced by its environment.</i></p> |
| TCMS Adapter | TCMSA | <p>A hardware device providing communication capabilities between the CCN (CCS-ECN) and the legacy train control network or bus or the legacy actors and sensors residing outside the CCS domain but important to CCS. (Note: in release 5, the OCORA Gateway has been renamed to TCMS Adapter)</p> |
| Train Control and Management System | TCMS | <p>The Train Control and Management System (TCMS) is an on-board distributed control, communication and train management system that provides data communications interfaces to other train-borne systems and is designed to control and monitor train equipment. The TCMS also includes wired control logic.</p> <p><i>At interface level it refers to all aspects of the integration into the "Train": conceptually it groups together the two types of interfaces "serial interface" and "hard-wired interface" indicated in SUBSET -119.</i></p> |

| Title | Abbreviation | Description |
|----------------------|--------------|---|
| Train Interface Unit | TIU | <p>The Train Interface Unit (TIU) defines the interface between the ERTMS / ETCS on-board equipment and the train.</p> <p><i>To avoid confusion, the term TIU is no longer used in context of OCORA as it would also be used in another context than only ERTMS / ETCS. The newly introduced Functional Vehicle Adapter (FVA) incorporates the full TIU functionality and ensures standardised communication with the TCMS on OSI layer 7. It is accessible to all OCORA applications like VS, ATO and any possible future extension.</i></p> |
| Train Set | | See Diesel Multiple Unit, Electrical Multiple Unit |
| Vehicle Supervisor | VS | The (Business) Logic enabling calculating location specific speed limits and activation of the braking system in case of speed limit overshoot. Includes data exchange management with peripheral systems like DMI and odometry. |
| Vital | | See Safe |

63 items found 

3 Stakeholders

| Title | Abbreviation | Description |
|-----------------------------------|--------------|--|
| CCS On-Board Integrator | | Entity in charge of the safe integration of all necessary OCORA certified Building Blocks to build a OCORA compliant CCS On-Board System. |
| Contracting Entity | | The contracting entity is a public or private entity which orders the design and/or construction or the renewal or upgrading of a subsystem (i.e. Directive 2016/798 and Directive 2016/797) |
| Infrastructure Manager/Management | IM | A (Railway) Infrastructure Manager is any body or undertaking that is responsible in particular for establishing and maintaining railway infrastructure, or a part thereof, as defined in Article 3 of Directive 91/440/EEC, which may also include the management of infrastructure control and safety systems. The functions of the infrastructure manager on a network or part of a network may be allocated to different bodies or undertakings. |
| Manufacturer | | Any natural or legal person who manufactures an OCORA certified Building Block or has it designed or manufactured, and markets it under his name or trademark. |
| Railway Undertaking | RU | A Railway Undertaking as defined in Directive 2001/14/EC, and any other public or private undertaking, the activity of which is to provide transport of goods and/or passengers by rail on the basis that the undertaking must ensure traction; this also includes undertakings which provide traction only. |
| Vehicle Integrator | | The entity in charge of the safe integration of an OCORA based CCS On-Board System (as a black box) into a physical train unit (rolling stock). |

6 items found 

4 Table of Abbreviations and Acronyms

| Abbreviation | Title |
|--------------|--|
| 2oo2 | Two out of two (redundancy) |
| 2oo3 | Two out of three (redundancy) |
| AC | Application Condition (not safety related) |
| AI | Artificial Intelligence |
| AP | Adaptive Platform, Autosar-specific term |
| API | Application Programming Interface |
| APM | Automatic Processing Module |
| APOM | Authorization for Placing On the Market |
| APS | Advanced Protection System |
| ASR | Assessor |
| AT | ATO Transactor |
| ATC | Automatic Train Control |
| ATO | Automatic Train Operation |
| ATO-OB | Automatic Train Operation On-Board |
| ATOM | Automatic Train Operation Monitoring |
| ATP | Automatic Train Protection |
| AV | ATO Vehicle |
| AsBo | Assessment Body |
| Autosar | Automotive Open System Architecture |
| BB | Building Block |

| Abbreviation | Title |
|--------------|---|
| BDD | Block Definition Diagram |
| BIU | Break Interface Unit |
| BSD | Berkeley Software Distribution |
| BTM | Balise Transmission Module |
| BWS | Business Workstream |
| CAN | Controller Area Network |
| CBM | Condition Based Maintenance |
| CCN | CCS Communication Network |
| CCS | Control-Command and Signalling |
| CCS-OB | Control-Command and Signalling On-Board |
| CCTV | Closed-Circuit Television |
| CCU | CCS Computing Unit |
| CDS | Configuration Data Storage |
| CENELEC | Comité européen de normalisation en électronique et en électrotechnique |
| CER | Community of European Railway and Infrastructure Companies |
| CI-* | Communication Interface |
| CM | Configuration Manager |
| CMD | Cold Movement Detection |
| COBSS | CCS Off-Board Support System |
| COM | Communication |
| CONS | Connectivity Service |
| COS | Customer Oriented Services |

| Abbreviation | Title |
|--------------|--|
| COTS | Commercial off-the-shelf |
| CP* | CENELEC Phase (1 to 12) |
| CPU | Central Processing Unit |
| CRC | Cyclic Redundancy Check |
| CS | Coupler Status |
| CS | Configuration Service |
| CS | Consist Switch |
| CSM-RA | Common Safety Method for Risk evaluation and Assessment |
| CU | Computing Unit |
| CVR | Cabin Voice Radio |
| CiA | CAN in Automation |
| CoC | Code of Conduct |
| ComId | Communication Identifier |
| D-PDU API | Diagnostic protocol adapter API (ISO 22900-2) |
| D-Server API | Diagnostic server (or diagnostic kernel) API (ISO 22900-3) |
| DAS | Driver Advisory System |
| DAS-OB | Driver Advisory System On-Board |
| DCM | Device & Configuration Management |
| DDS/RTPS | Data Distribution Service / real-time publish-subscribe |
| DES | Designer |
| DIA | Diagnostics |
| DIAG | Diagnostics |

| Abbreviation | Title |
|--------------|---|
| DM | Digital Map |
| DM | Diagnostic Management |
| DMI | Driver Machine Interface |
| DMU | Diesel Multiple Unit |
| DNR | Domain Name Resolver (DNS-Resolver) |
| DREP-OB | Digital Map Repository On-Board |
| DRV | Driver |
| DS | Data Service |
| DeBo | Designed Body |
| DoIP | Diagnostics over Internet Protocol (ISO 13400) |
| E/E | Electrics and Electronics |
| EB | Emergency Braking |
| EBA | Euro Balise Antenna |
| EBICAB | EBICAB is a trademark registered by Bombardier (later Alstom) for the equipment on board a train used as a part of an Automatic Train Control system. |
| EC | European Commission |
| ECM | Entity in Charge of Maintenance |
| ECN | Ethernet Consist Network |
| ECU | Electronic Control Unit, Automotive-specific term |
| ED | End Device |
| EDOR | ETCS Data Only Radio |
| EE | Emitting Entity |

| Abbreviation | Title |
|--------------|---|
| EMC | Electromagnetic Compatibility |
| EMU | Electrical Multiple Unit |
| ENV | Environment |
| ERA | European Union Agency for Railways |
| EREP | ETP Repository |
| ERJU | Europe's Rail Joint Undertaking |
| ERJU/FA | Europe's Rail Joint Undertaking / Flagship Area |
| ERORAT | EULYNX RCA OCORA Risk Assessment Tool |
| ERTMS | European Rail Traffic Management System |
| ETB | Ethernet Train Backbone |
| ETBN | Ethernet Train Backbone Node |
| ETBTopoCnt | ETB Topography counter |
| ETCS | European Train Control System |
| ETP-OB | European Train Protection On-Board |
| ETS | ETCS Transponder Service |
| EUB | Eurobalise |
| EUDD | European Driver's Desk |
| EUG | ERTMS User Group |
| EUL | Euroloop |
| EVAL | Evaluator |
| EVC | European Vital Computer |
| FAT | Factory Acceptance Test |

| Abbreviation | Title |
|--------------|---|
| FCS | Frame Check Sequence |
| FFFIS | Form Fit Function Interface Specification |
| FIS | Functional Interface Specification |
| FM | Formal Model |
| FMECA | Failure Mode and Effect Critical Analysis |
| FRMCS | Future Railway Mobile Communication System |
| FTA | Fault Tree Analysis |
| FVA | Functional Vehicle Adapter |
| GASC | Generic Application Safety Case |
| GNSS | Global Navigation Satellite System |
| GPSC | Generic Product Safety Case |
| GSM-R | Global System for Mobile Communications - Railway |
| GoA | Grade of Automation |
| HBB | Hardware Building Block |
| HI-* | Human Interface |
| HMI | Human Machine Interface |
| HPC | High Performance Computing |
| HTTP | Hypertext Transfer Protocol |
| HVAC | Heating Ventilation and Air-Conditioning |
| HW | Hardware |
| I/O | Input/Output |
| IAM | Identity & Access Management |

| Abbreviation | Title |
|--------------|--|
| IBD | Internal Block Diagram |
| ID | Identification |
| IEEE | Institute of Electrical and Electronics Engineers |
| IF | Interface |
| IM | Infrastructure Manager/Management |
| IMA | Integrated Modular Avionics |
| IMP | Implementer |
| IMU | Inertial Measurement Unit |
| INT | Integrator |
| IP | Internet Protocol |
| IPM | Incident Prevention Manager |
| IPv4 | Internet Protocol version 4 |
| ISA | Independent Safety Assessor |
| ISMS | Information Security Management System |
| ISO | International Organization for Standardization |
| IT | Information Technology |
| IU | Interface Unit |
| IVV | Integration, Verification and Validation |
| IXL | Interlocking |
| JRU | Juridical Recording Unit |
| JSON | JavaScript Object Notation |
| KER | KVB Contrôle vitesse balise, EBICAB, RSDD Ripetizione Segnali Discontinua Digitale |

| Abbreviation | Title |
|--------------|--|
| KMC | Key Management Center |
| LAN | Local Area Network |
| LOC | Localisation |
| LOC-OB | Localisation On-Board |
| LRBG | Last relevant balise group |
| LRU | Line Replacement Unit |
| LSIG | Light Signal |
| LTM | Loop Transmission Module |
| Len | Length |
| LibC | C-Library |
| MA | Movement Authority |
| MAC | Message Authentication Code |
| MAC | Media Access Control |
| MBSD | Model Based Software Development |
| MBSE | Model Based Systems Engineering |
| MC-OB | Monitoring & Configuration On-Board |
| MCG | Mobile Communication Gateway |
| MD | Message Data |
| MDCM | Monitoring, Diagnostics, Configuration, Maintenance |
| MIMOSA | Machinery Information Management Open Systems Alliance |
| ML | Maturity Level |
| MLM | Model and Level Manager |

| Abbreviation | Title |
|--------------|---|
| MNT | Maintenance Terminal |
| MOT | Mobile Object Transactor |
| MP | Movement Permission |
| MQTT | Message Queuing Telemetry Transport |
| MT | Movement Authority Transactor |
| MTC | Manoeuvre Train Control |
| MVB | Multifunction Vehicle Bus |
| MVCI | Modular Vehicle Communication Interface |
| MVP | Minimal Viable Product |
| MoU | Memorandum of Understanding |
| NAT | Network Address Translation |
| NFF | No Fault Found |
| NG | Next-Generation |
| NG-TCN | Next/New Generation TCN |
| NIC | Network Interface Card |
| NNTR | Notified National Technical Rules |
| NR | Non Regression |
| NSA | National Safety Authority |
| NTC | National Train Control |
| NTPs | National Train Protections |
| NoBo | Notified Body |
| OB | On-Board |

| Abbreviation | Title |
|--------------|--|
| OBS | On-Board Staff |
| OBU | On-board Unit |
| OCORA | Open CCS On-board Reference Architecture |
| OCS | Operation Control System |
| ODO | Odometry |
| ODS | Operational Data Storage |
| ODX | Open Diagnostic Data Exchange (ISO 22901-1) |
| OEM | Original Equipment Manufacturer |
| OMS | Online-Monitoring System |
| OOS | Operator Oriented Services |
| OPC-UA | Open Platform Communication Unified Architecture |
| OPTrnTopoCnt | Operational Train Topography Counter |
| ORD | Onboard Recording Device |
| OS | Operating System |
| OSA-CBM | Open System Architecture for Condition-Based Maintenance |
| OT | Operational Technology |
| OTA | Over The Air |
| OTIS | Onboard Train Integrity System |
| OTR | Other Train |
| OTX | Open Test sequence eXchange (ISO 13209) |
| OpMode | Operation Mode |
| PC | Physical Consist |

| Abbreviation | Title |
|--------------|--|
| PCP | Priority Code Point (VLAN priority) |
| PD | Process Data |
| PDU | Protocol Data Unit |
| PER | Perception |
| PETS | Physical ETCS Transponder System |
| PIN | Passenger Information Network |
| PIS | Passenger Information System |
| PKI | Public Key Infrastructure |
| PM | Project Manager |
| PS | Perception |
| PS-OB | Perception On-Board |
| PSMP | Project Security Management Plan |
| PTU | Physical Train Unit |
| PTU-OS | Physical Train Unit Operation Systems |
| PoC | Proof of Concept |
| QA | Quality Assurance |
| QoS | Quality of Service |
| R-NAT | Railway-NAT |
| RACI | Responsibility, Accountability, Consulted, Informed |
| RAMS(S) | Reliability, Availability, Maintainability, Safety, (Cyber Security) |
| RBC | Radio Block Centre |
| RC | Route Control |

| Abbreviation | Title |
|--------------|---|
| RCA | Reference CCS Architecture |
| RDH | Railway Duty Holder |
| RE | Receiving Entity |
| REST | Representational State Transfer; method used for designing “stateless” APIs |
| RFID | Radio-frequency identification |
| RIM | Radio Interface Module |
| RIU | Radio In-fill Unit |
| RMTO-OB | Remote Manual Train Operation On-Board |
| ROS | Robot Operating System |
| RQM | Requirements Manager |
| RST | Rolling Stock |
| RT | Reliability Target |
| RTE | Runtime Environment |
| RTM | Real-Time Model |
| RU | Railway Undertaking |
| S2R | Shift2Rail |
| SASC | Specific Application Safety Case |
| SB | Service Brakes |
| SBB | Software Building Block |
| SC | Safety Case |
| SCI-* | Standard Communication Interface |
| SCP | Safe Computing Platform |

| Abbreviation | Title |
|--------------|---|
| SCV | Signal Converter |
| SDT | Safe Data Transmission |
| SDTv2 | Safe Data Transmission version 2 |
| SDTv4 | Safe Data Transmission version 4 |
| SERA | Single European Railway Area |
| SFERA | Smart Communication for Efficient Rail Activities |
| SFM | Semi-Formal Model |
| SHI-* | Standard Human Interface |
| SIEM | Security Information and Event Management |
| SIL | Safety Integrity Level |
| SMI | Source Message Identifier |
| SMS | Short Message Service |
| SOC | Security Operation Center |
| SOME/IP | Scalable Service-Oriented Middleware over IP |
| SPSC | Specific Product Safety Case |
| SRAC | Safety Related Application Condition |
| SRD | Single Rules Database |
| SRP | Stream Reservation Protocol |
| SRS | System Requirements Specification |
| SS | Subset, ERTMS-specific term for specifications |
| SSRS | Sub-System Requirement Specification |
| SSS-OB | Shared Security Services On-Board |

| Abbreviation | Title |
|--------------|-------------------------------------|
| SSS-TS | Shared Security Services Trackside |
| STM | Specific Transmission Module |
| SW | Software |
| SWC | Software Cluster |
| SoA | Service-oriented Architecture |
| Stdclib | Standard C-library |
| SuC | System under Consideration |
| T&C | Test and Commissioning |
| TA | Train Adapter |
| TCMS | Train Control and Management System |
| TCMSA | TCMS Adapter |
| TCN | Train Communication Network |
| TCO | Traction Cut-Off |
| TCP | Transmission Control Protocol |
| TDS | Train Display System |
| TECH | Technician |
| TFFR | Tolerable Functional Failure Rate |
| TFM | Train Front Monitor |
| THR | Tolerable Hazard Rate |
| TI | Track Intrusion |
| TIMS | Train Integrity Monitoring System |
| TIU | Train Interface Unit |

| Abbreviation | Title |
|--------------|--|
| TLS | Transport Layer Service |
| TM | Train Management |
| TMS | Traffic Management System |
| TOBA | Telecom On-Board Architecture |
| TPR | Train Position |
| TRB | Train Born |
| TRDP | Train Real-time Data Protocol |
| TS | Trackside |
| TS | Time Service |
| TSE | Trackside System and Environment |
| TSI | Technical Specification for Interoperability |
| TSN | Time Sensitive Networking |
| TSN-PD | Time Sensitive Networking Process Data |
| TST | Tester |
| TTI | Train Topology Information Access |
| TWS | Technical Workstream |
| UADP | Unified Architecture Datagram Protocol |
| UC | Use Case |
| UDP | User Datagram Protocol |
| UDS | Unified Diagnostic Services (ISO 14229) |
| UI | User Interface |
| UIC | Union Internationale de Chemins de Fer |

| Abbreviation | Title |
|--------------|---|
| UNIFE | Union des Industries Ferroviaires Européennes (European Rail Supply Industry Association) |
| UNISIG | Union Industry of Signalling |
| URI | Uniform Resource Identifier |
| V&V | Verification & Validation |
| VAL | Validator |
| VCCU | Virtual CCS Computing Unit |
| VCS | Voice Communication System |
| VCU | Vehicle Control Unit |
| VER | Verifier |
| VETS | Virtual ETCS Transponder Service |
| VL | Vehicle Locator |
| VLAN | Virtual Local Area Network |
| VLS | Vehicle Localisation |
| VOS | Virtual Operating System |
| VS | Vehicle Supervisor |
| VTCS-OB | Virtual Train Coupling System On-Board |
| WBS | Work Breakdown Structure |
| WTB | Wired Train Bus |
| XML | Extensible Markup Language |
| YAML | Yet Another Markup Language |

347 items found 