ERTMS/ETCS

Glossary of Terms and Abbreviations

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3. GENERAL

3.1. Scope of this document

This document defines the significant Terms and Abbreviations used in the ERTMS/ETCS specifications.

3.2. Introduction

Many of the terms and abbreviations used within the ERTMS/ETCS specifications have been defined elsewhere but they are repeated herein when they have a relevance to the ERTMS/ETCS system. The hierarchy of documents / glossaries consulted was as follows:-

European Interoperability Directive 2008/57/EC	1
Control Command Signalling Technical Specification for Interoperability (CCS TSI)	2
CENELEC EN50126 – September 1999	3
CENELEC EN50129 - December 1999	4

Note: 1. Only the highest level terms are repeated from references 3 and 4.

2. Any term not given a numbered reference is by definition an ETCS defined term.

3. Some terms from the references have been redefined to match the ETCS context. These are now ETCS defined terms

4. Low level ETCS documents such as those relating to Key Management contain their own definitions.

4. TERMS

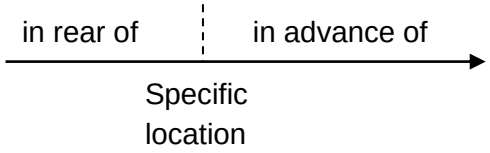
ACKNOWLEDGEMENT	Confirmation by an entity that it has received information
ACKNOWLEDGEMENT, DRIVER	Confirmation by the driver that he/she has taken into account information received through the DMI
AIRGAP	The set of interfaces between track and train. It is composed of the Eurobalise, the Euroloop and the Euroradio interfaces.
AIRGAP LANGUAGE	The ERTMS/ETCS application data, together with its harmonised rules, which is transmitted over the balise, loop and radio transmission media.
APPLICATION LEVEL	The different ERTMS/ETCS application levels are a way to express the possible operating relationships between track and train. Level definitions are related to the trackside equipment used, to the way the trackside information reaches the on-board units and to which functions are processed in the trackside and in the on-board equipment respectively.
AUTHENTICATION	The process of determining whether someone or something is who or what it is declared to be.
AUTHENTICATION KEY	Cryptographic key (KMAC) used to establish a safe connection according to the EURORADIO protocol.
AUTOMATIC DRIVING MODE	ERTMS/ETCS on-board equipment mode where the ERTMS/ATO on-board substitutes the driver for acting on the traction/brakes of the train according to the ERTMS/ATO journey profile, with the ERTMS/ETCS on-board equipment still giving full protection against overspeed and overrun.
AUTOMATIC TRAIN PROTECTION	A safety system that enforces either compliance with or observation of speed restrictions and signal aspects by trains.
AVAILABILITY	The ability of a product to be in a state to perform a required function under given conditions at a given instant in time or over a given time interval assuming that the required external resources are provided. (3) Definitions for other availability related terms are given in reference 3
BALISE	A passive transponder mounted on the track which can communicate with a train passing over it.
BALISE, FIXED	A balise that transmits data that does not change dynamically according to signalling information.
BALISE, SWITCHABLE	A balise that transmits data that can change dynamically according to signalling information.
BALISE GROUP	One or more balises which are treated as having the same reference location on the track. The telegrams transmitted by all the balises of a group form a track-to-train message.

BALISE GROUP CO-ORDINATE SYSTEM	The means to ensure common location referencing between on-board and trackside, for all location based information exchanged through the ERTMS/ETCS transmission media.
BALISE GROUP LOCATION REFERENCE	Location of balise number 1 in a balise group. It is the origin of the balise group coordinate system
BALISE TRANSMISSION MODULE	A module inside the ERTMS/ETCS on-board equipment for intermittent transmission between track and train, which processes Up-link signals and retrieves application data telegrams from a balise.
BASELINE	A baseline is defined by a stable kernel in terms of system functionality, performance and other non-functional characteristics.
BASELINE RELEASE	A baseline release is defined by a specific version of each of the CCS TSI annex A documents that are relevant for the system
BLOCK	A method of controlling the separation between trains by dividing the line into sections with, normally, no more than one train in each section. The block can either be a fixed block or a moving block.
BRAKING CURVE	Prediction of the train speed decrease versus distance by the ERTMS/ETCS on-board equipment, from a mathematical model of the train braking dynamics and of the track characteristics ahead.
BRAKING DISTANCE, EMERGENCY	The distance in which a train is capable of stopping with the emergency brake applied. Dependent upon train speed, train type, braking characteristics, train weight and gradient.
BRAKING DISTANCE, SERVICE	The distance in which a train is capable of stopping, with the full service brake applied. Dependent upon train speed, train type, braking characteristics, train weight and gradient.
CAB	The space in the power unit or driving unit of the train containing the operating controls and providing shelter and seats for the driver or engine crew.
CAB, ACTIVE	The active cab is the cab associated with an ERTMS/ETCS on-board equipment, from which the traction is controlled
CLEAR (A SIGNAL)	To change a signal aspect from its most restrictive aspect to a less restrictive aspect.
COMMON-MODE FAULT	Fault common to items which are intended to be independent.
CONDITIONAL LEVEL TRANSITION ORDER	A Conditional Level Transition Order is a spot check of the on-board operated level. This may cause a level transition if the ERTMS/ETCS on-board does not operate one of the allowed levels.

CONDITIONS, MAINTENANCE	The maintenance criteria adopted for maintaining the system referred to its Operating Conditions.
CONDITIONS, OPERATING	The rated performance required of the system.
CONDITIONS, SYSTEM	The conditions under which the system is called to operate, including: • environmental conditions; • operating conditions; • maintenance conditions.
CONFIGURATION	The structuring and interconnecting of the hardware and software of a system for its intended application.
CONFIGURATION MANAGEMENT	A discipline applying technical and administrative direction and surveillance to identify and document the functional and physical characteristics of a configuration item, control change to those characteristics, record and report change processing and implementation status and verify compliance with specified requirements. (3)
CONFLICTING MOVEMENTS	Movements that would require trains to occupy the same portion of track over all or part of their length.
CONTACT LENGTH	The distance between the place where a train becomes able to communicate with a device (e.g. a balise) to the place where communication becomes impossible.
CONTINOUS DATA TRANSMISSION	Track-to-train or train-to-track transmission that can take place continuously, independent of location (e.g. by radio).
CONTROL CENTRE	A centralised control system that controls the train movements in a large territory.
CRITICALITY	The point at which a failure or a number of failures renders the system unusable and/or unsafe.
CROSS-ACCEPTANCE	The status achieved by a product that has been accepted by one Authority to the relevant European Standards and is acceptable to other Authorities without the necessity for further assessment. (4)
CURRENT POSITION	The position of a train measured at a certain moment using defined system co-ordinates.
DANGER (ASPECT)	An indication given by a signal to stop.
DANGER POINT	The location beyond the End of Movement Authority that can be reached by the front of the train without creating a hazardous situation.
DATA INTEGRITY	The property that a message has not been modified or destroyed.
DECELERATION DATA	Data that relates to the braking performance of the train.

DEFAULT VALUE	Value stored in the ERTMS/ETCS on-board equipment and used if there is no other value available.
DESK	Inside a cab, the set of operating controls, which is dedicated to preferred movements in a given direction (i.e. forward movements, in which visibility from the cab is provided to the driver). Exception: some single cab locomotives are fitted with one single desk, allowing normal movements in both directions.
DIVERSITY	A means of achieving all or part of the specified requirements in more than one independent and dissimilar manner. (4)
DRIVER IDENTITY	Unique code which identifies a train driver.
DRIVER MACHINE INTERFACE	The interface to enable direct communication between the ERTMS/ETCS on-board equipment and the driver.
DRIVING ON SIGHT	The driver driving at a speed that allows him to stop the train to avoid obstacles on the track.
DUAL CAB ENGINE	Rolling Stock unit fitted with two driving cabs and one single ERTMS/ETCS on-board equipment.
DYNAMIC SPEED PROFILE	The speed / distance profile that a train may follow without violating the static speed profile and/or the EOA/LOA.
EMERGENCY BRAKING	Application of a predefined brake force in the shortest time in order to stop the train with a defined level of brake performance.
END OF LOOP MARKER	Information transmitted by a balise group intended to mark the beginning of a track area where loop messages can be received. In bidirectional applications, it is possible to have an EOLM at both sides of a loop.
END OF AUTHORITY	Location to which the train is permitted to proceed and where target speed = zero.
END OF MOVEMENT AUTHORITY	Location to which the train is permitted to proceed according to an MA. When transmitting an MA, it is the end of the last section given in the MA.
ENGINE	Association of one or two driving cab(s) of a Rolling Stock unit with one single ERTMS/ETCS on-board equipment. When a driving cab of the engine is used to lead a train/shunting consist, the ERTMS/ETCS on-board equipment supervises the movement of the train/shunting consist the engine belongs to. Each driving cab of an engine allows the driver communicating with the ERTMS/ETCS on-board equipment through the DMI.
ENGINE ORIENTATION	If there is an active cab, this one defines the orientation of the engine, i.e. the side of the active cab is considered as determining the front of the engine.
ENTRANCE SIGNAL	A main signal, intended for trains entering a station.

EQUIPPED LINE	Line equipped with ERTMS/ ETCS in application level 1 or 2
ERTMS/ETCS ON-BOARD EQUIPMENT	The part (software and/or hardware) of the on-board equipment, which fulfils the ERTMS/ETCS specification.
ESTIMATED SPEED	The speed the odometer estimates the train is running at, with the highest probability according to the physical characteristics of the train and to the odometer working conditions
ESTIMATED POSITION	The position the ERTMS/ETCS on-board equipment estimates the train front is at, with the highest probability according to the physical characteristics of the train and to the odometer working conditions. It is expressed as a distance from a location reference detected by the on-board.
ETCS IDENTITY	The ETCS identity of an on-board equipment is made of a single identity number. The ETCS identity of an RBC, balise group, loop or RIU is composed of a country/region identity number and of an identity number within the country/region.
EUROPEAN RAIL TRAFFIC MANAGEMENT SYSTEM	Signalling and operation management system encompassing ETCS for the Control Command, ATO for the Automatic Train Operation and FRMCS and/or GSM-R for voice and data communication. FRMCS and/or GSM-R are/is used as radio bearer for ETCS and ATO.
EUROPEAN TRAIN CONTROL SYSTEM	The Control Command part of ERTMS.
EUROBALISE	Balise compliant with the ERTMS/ETCS specification.
EUROLOOP	Loop compliant with the ERTMS/ETCS specification.
EURORADIO	The functions required, including the message protocols, to provide an acceptably safe communications channel between ERTMS/ETCS trackside and ERTMS/ETCS on-board equipment over an open radio network
EXIT SIGNAL	A main signal that is intended for trains leaving a station.
EXPECTATION WINDOW	The interval between the outer limits to accept a balise group.
FAIL-SAFE	A design philosophy which results in any expected failure maintaining or placing the equipment in a safe state.
FAILURE	Effect of an error on the intended service.
FAULT	An abnormal condition that could lead to an error in a system. A fault can be random or systematic. (4)
FAULT DETECTION TIME	Time span that begins at the instant when a fault occurs and ends when the existence of the fault is detected.
FAULT NEGATION TIME	Time span that begins when the existence of a fault is detected and ends when a safe state is enforced.

FIXED BLOCK	A block in which the extremities of the block sections are at fixed locations. The signalling allows a train to move from one block to the next, normally only when the block ahead is clear.
FORWARD MOVEMENT	A train movement in which the driver is situated in the leading engine and the train is moved in the direction of the train orientation.
FOULING POINT	The place where a vehicle standing on a converging line would come into contact with a vehicle on the other line.
FULL SUPERVISION MODE	ERTMS/ETCS on-board equipment mode giving full protection against overspeed and overrun.
HOME KMC	The KMC in a KM domain to which trackside and on-board entities belonging to that domain refer for key management.
IMMEDIATE LEVEL TRANSITION ORDER	An Immediate Level Transition Order means both a level transition ordered “now” and a level transition ordered at null distance not in relation with in-fill.
IN ADVANCE OF IN REAR OF	A term indicating a point beyond a specific location on the track, with respect to a given direction. A term indicating a point on the approach to a specific location on the track, with respect to a given direction. 
INDEPENDENCE, TECHNICAL	Freedom from any mechanism which can affect the correct operation of more than one item.
INFILL INFORMATION	Trackside data, referred to a main signal, which is transmitted at locations in rear of the main signal. Provides, for example, the ability to inform a train that the signal ahead has cleared.
INFILL LOOP	A loop which is installed at a place (e.g. in rear of a signal) to avoid unnecessary delay by transmitting in fill information advising the train at once when the signal ahead clears.
INFORMATION POINT	Specific location on the track where information can be transmitted from ERTMS/ETCS trackside to ERTMS/ETCS on-board equipment (see also SPOT TRANSMISSION)
INTERLOCKING	A general term applied to the controlling of the setting and releasing of “signals” and “points” to prevent unsafe conditions arising, and equipment which performs this function.
INTERMITTENT TRANSMISSION	A term that encompasses “SPOT TRANSMISSION” and “SEMI-CONTINUOUS TRANSMISSION”.

INTEROPERABILITY	Interoperability means the ability to allow the safe and uninterrupted movement of trains that accomplish the specified levels of performance. (1)
INTEROPERABILITY CONSTITUENT	Any elementary component, group of components, subassembly or complete assembly of equipment incorporated or intended to be incorporated into a subsystem, upon which the interoperability of the rail system depends either directly or indirectly. The concept of a constituent covers both tangible objects and intangible objects such as software. (1)
INTEROPERABILITY, OPERATIONAL	The set of harmonised operating rules that enables interoperability.
INTEROPERABILITY, TECHNICAL	The set of harmonised technical requirements that enables interoperability. The ERTMS/ETCS specification defines the requirements for technical interoperability.
INTERVENTION	Where ERTMS/ETCS takes control from the driver by cutting traction power or applying the full service brake and cutting traction power or applying the emergency brake and cutting traction power.
ISOLATION MODE	When the ERTMS/ETCS on-board equipment is disconnected from the vehicle braking system. Isolation is indicated to the driver.
JURIDICAL DATA	Data to record all actions and exchanges relating to the movement of trains sufficient for off line analysis of all events leading to an incident.
KERNEL	The core of the ERTMS/ETCS on-board equipment.
KEY	A predefined component or information necessary to be able to encrypt data or interpret encrypted data.
KEY MANAGEMENT	The generation, storage, secure distribution, deletion, archiving and application of key entries in accordance with the security policy in a KM domain.
KEY MANAGEMENT CENTRE	The entity responsible for key management functions in a KM domain.
KEY MANAGEMENT SYSTEM	The set of entities and operational procedures taking part in the key distribution system.
KEY VALIDITY PERIOD	The specific timespan during which a key is valid.
KM DOMAIN	One KMC (Home KMC) and all the on-boards, RBCs and RIUs using that KMC for key management purposes.
LAST RELEVANT BALISE GROUP	The LRBG is the last balise group marked as linked encountered by the train, whose message is accepted by the ERTMS/ETCS on-board. It is used as a common location reference between the ERTMS/ETCS on-board and trackside equipment.

LEADING ENGINE	The engine in which a driving cab is used to control the movement of a train/shunting consist, under the supervision of the ERTMS/ETCS on-board equipment associated with the driving cab.
LEVEL	Contracted form of APPLICATION LEVEL
LEVEL 0	A level of ERTMS/ETCS defined to cover instances when the ERTMS/ETCS on-board equipment is operating in an area where the trackside is neither fitted with operational ERTMS/ETCS equipment nor fitted with operational National System
LEVEL 0 AREA	Trackside area in which level 0 operation is supported.
LEVEL 1	A level of ERTMS/ETCS overlaid onto conventional line side signalling that uses Eurobalises / Euroloop / Radio Infill to pass movement authorities to the train whilst relying on conventional means to determine train position and integrity.
LEVEL 1 AREA	Trackside area in which level 1 operation is supported.
LEVEL 2	A level of ERTMS/ETCS that uses radio to pass movement authorities to the train. Train reported position and integrity may be used to determine the parts of the track that are occupied by the train.
LEVEL 2 AREA	Trackside area in which level 2 operation is supported.
LEVEL NTC	A level of ERTMS/ETCS that allows the supervision of the train with an existing National Train Control system.
LEVEL NTC AREA	Trackside area in which level NTC operation is supported.
LEVEL TRANSITION ANNOUNCEMENT	A Level Transition Announcement means both a level transition ordered for a further location and a level transition ordered at null distance transmitted as in-fill information
LEVEL TRANSITION BORDER	A location where the list of levels supported by the trackside changes.
LEVEL TRANSITION INFORMATION	This term is used for both Level Transition Order and Conditional Level Transition Order.
LEVEL TRANSITION ORDER	This term is used for both Immediate Level Transition Order and Level Transition Announcement.
LIFECYCLE COST (SYSTEM)	The sum of the costs sustained or to be sustained for performing and appropriately supporting the activities occurring in the context of the operational parts of the System Lifecycle.
LIFECYCLE (SYSTEM)	The activities occurring during a period of time that starts when a system is conceived and ends at decommissioning when the system is no longer available for use. (See Reference 3)

LIMITED SUPERVISION MODE	ERTMS/ETCS on-board equipment mode giving partial protection against over speed and over run. The driver has to observe and obey to line side signals and operating rules when in limited supervision mode.
LIMIT OF AUTHORITY	The place beyond which the train has no information but to which the train is authorised to run with a defined target speed higher than zero. The train is expected to receive new information before passing the Limit of Authority.
LINE	A continuous section of railway track.
LINE SIDE ELECTRONIC UNIT	A device for communicating variable signalling data to switchable balises.
LINE SIDE EQUIPMENT	see Trackside Equipment.
LINKING	A functionality to protect against missing data from BALISE GROUPS by announcing them in advance through LINKING INFORMATION and by checking whether they have been read within a certain EXPECTATION WINDOW
LINKING DISTANCE	The distance between announced balise groups.
LINKING INFORMATION	Data defining the distance between groups of balises, their identity and orientation, and the action to be taken if an announced balise group is not detected within given limits (EXPECTATION WINDOW).
LOCAL TIME	The time for ordinary transactions in a locality, which is likely to be shown on station clocks.
LOCATION ITEM	Classification of an individual location based information (i.e. the location of Location data or one of the locations of Profile data) as "estimated", "min" or "max" location item. An individual location based information may be classified as one, two or three location items.
LOOP	Track mounted device for the transmission of data between track-to-train within a defined area.
LOOP MESSAGE FORMAT	The format for transmitting data by a loop.
LOOP TRANSMISSION MODULE	A module (inside the ERTMS/ETCS on-board equipment), which retrieves application data from a loop.
MAIN SIGNAL	A fixed signal intended for train movements capable of showing a ‘danger aspect’ and one or more ‘proceed aspects’. In some cases main signals at danger are valid for shunt movements.

MAINTAINABILITY	The probability that a given active maintenance action, for an item under given conditions of use can be carried out within a stated time interval when the maintenance is performed under stated conditions and using stated procedures and resources. (3) (Definitions for other maintenance related terms are given in reference 3).
MALFUNCTION	A deviation from the specified performance causing the system to work incorrectly. This is normally due to an error or fault in the system.
MANDATORY	When it is compulsory to fulfil and to implement a requirement to realise a technically interoperable standard for the ERTMS/ETCS equipment or system.
MANUAL LEVEL CHANGE	Level transition initiated by the driver.
MAY	Is permissible.
MAX SAFE ANTENNA POSITION	The max safe antenna position differs from the max safe front end of the train by the distance between the active Eurobalise antenna and the end of the engine according to the train orientation plus, only in Supervised Manoeuvre mode, the max safe consist length in front of/in rear of the engine, depending on whether the train orientation is the same as/opposite to the active cab respectively
MAX SAFE FRONT END	The maximum safe front end position differs from the estimated position by the Under-reading Amount in the distance measured from the LRBG/ORBG plus the Location Accuracy of the LRBG/ORBG plus, when relevant, the difference between the max safe consist length and nominal consist length in front of/in rear of the engine, depending on whether the train orientation is the same as/opposite to the active cab respectively
MIN SAFE ANTENNA POSITION	The min safe antenna position differs from the min safe front end of the train by the distance between the active Eurobalise antenna and the end of the engine according to the train orientation plus, only in Supervised Manoeuvre mode, the min safe consist length in front of/in rear of the engine, depending on whether the train orientation is the same as/opposite to the active cab respectively
MIN SAFE FRONT END	The minimum safe front end position differs from the estimated position by the Over-reading Amount in the distance measured from the LRBG/ORBG plus the Location Accuracy of the LRBG/ORBG plus, when relevant, the difference between the min safe consist length and nominal consist length in front of/in rear of the engine, depending on whether the train orientation is the same as/opposite to the active cab respectively

MESSAGE	The combination of application data and protocol data that is transmitted by balise group, loop or radio to a train or from the train to trackside by radio.
MESSAGE AUTHENTICATION CODE (MAC)	Code to provide data origin authentication and data integrity.
MINOR FAILURE	see Failure, Minor
MISSION	An objective description of the fundamental task to be performed by a system. (3)
MISSION, ETCS	Any train movement started under the supervision of an ERTMS/ETCS on-board equipment in one the following modes: FS, LS, SR, OS, SM, NL, UN, or SN. The ETCS mission is ended when any of the following modes is entered: SB, SH, NP
MODE	An operating state of the ERTMS/ETCS on-board equipment with a specified split of operational responsibilities between the ERTMS/ETCS system and the driver.
MOST RESTRICTIVE SPEED PROFILE	The speed which a train must not exceed. It is the lowest speed taking into account all the various speed profiles.
MOVEMENT AUTHORITY	Permission for a train to run to a specific location within the constraints of the infrastructure.
MOVING BLOCK	A block whose length is defined by the position of the train occupying the section of track ahead. The minimum block length would be from the rear most part of the occupying train to a point on the track where, if the train braked from its current speed, the front of the occupying train would be when the train came to a stand.
MULTIPLE UNITS	Two or more traction units in service, mechanically, pneumatically and electrically coupled, which are operated by one driver.
NATIONAL SYSTEM MODE	ERTMS/ETCS on-board equipment mode in which the supervision of the train is ensured by a National System.
NATIONAL TRAIN CONTROL SYSTEM	A previously installed train control system defined as Class B system in CCS TSI.
NATIONAL VALUES	Values that are transmitted to a train when entering the infrastructure of an administration related to rules and regulations of that administration. National values may be changed within an administrations area.
NO POWER MODE	ERTMS/ETCS on-board equipment mode in which the on-board equipment is not powered and the emergency brake is commanded.
NON-EQUIPPED LINE	A line without operational trackside Automatic Train Protection system.

NON-LEADING MODE	ERTMS/ETCS on-board equipment mode when it is connected to an active cab which is not in the leading engine of the train.
NON-VITAL	A description applied to those parts of the signalling system whose failure or non-availability does not directly endanger rail traffic or reduce the integrity of the signalling system.
OCCUPIED	A track section having any part of a train present upon it.
ODOMETER ACCURACY	The extent to which the odometer might make underestimation/overestimation in measuring the movement of the train.
ODOMETRY	The process of measuring the train's movement along the track. Used for speed measurement and distance measurement.
ODOMETRY REFERENCE LOCATION	The reference location to which refers the train based odometer distance reading.
OFF-LINE KMS	KMS where distribution, deletion or updating of key entries requires staff intervention on the target device.
ON-BOARD EQUIPMENT	The equipment carried on the train with the aim of supervising vehicle operation.
ON-BOARD RECORDING DEVICE	A device (outside the ERTMS/ETCS on-board equipment) that records and stores data for subsequent analysis (e.g. further to a train accident).
ON-BOARD UNIT	See ERTMS/ETCS ON-BOARD EQUIPMENT.
ON-LINE KMS	KMS allowing remote distribution, deletion or updating of key entries in the target device.
ON SIGHT MODE	ERTMS/ETCS on-board equipment mode that gives the driver partial responsibility for the safe control of his train. In this mode the train possesses a movement authority but the track ahead might be occupied by another train.
OPERATED SYSTEM VERSION	For both trackside and on-board, to operate a system version means to comply with the requirements from all TSI annex A documents, which are applicable to this system version and to the concerned subsystem. The operated system version is ordered by trackside; however, to operate a system version number X within a delimited trackside area only means that an on-board equipment running on this area shall behave according to the set of requirements applicable to the system version number X.Y where X is the one ordered by trackside and Y is the system version number Y (which may be different from the one ordered by trackside) operated by the on-board within this version X.
OTHER REFERENCE BALISE GROUP	The ORBG is a balise group different from the LRBG, which is used as a common location reference between the ERTMS/ETCS on-board and trackside equipment.

OVERLAP	The section of line in advance of a stop signal that must be unoccupied and, where necessary, locked before and during a signalled running movement to the rear of the signal to avoid an accident if the train brakes do not perform as well as expected and the train passes the END OF MOVEMENT AUTHORITY.
OVER-READING AMOUNT	The distance the train may have travelled less far than the estimated position. The distance is estimated by the ERTMS/ETCS on-board equipment taking into account the odometer inaccuracy plus the error for the detection of a balise location, as defined in the Eurobalise specifications.
PACKET	Packets are multiple variables grouped into a single unit with a defined internal structure. Packets are part of telegrams and messages.
PANTOGRAPH	Device for transmitting power from the overhead catenary to the train.
PARTIAL SUPERVISION MODES	A defined set of ERTMS/ETCS on-board equipment modes used where insufficient track data is available to allow full supervision. The set of partially supervised modes are as follows : • limited supervision • unfitted mode • on sight mode • staff responsible mode • shunting • post trip mode • reversing
PERMISSIVE SIGNAL	A signal aspect or a signal identification, which enables a main signal to be passed at danger under special conditions, without specific permission from the signalman.
PERMITTED SPEED	The speed limit at which a train is allowed to proceed without ERTMS/ETCS warning and / or intervention.
POINT	A section of track equipped so that train routes may converge or diverge.
POSSESSION, OF SIGNALLING EQUIPMENT	The disconnection or restriction of use of signalling equipment agreed between maintenance and operations staff to enable work to be carried out on the equipment.
POST TRIP MODE	ERTMS/ETCS on-board equipment mode that is entered after a train trip when the train has been brought to a stand and the driver has acknowledged the situation.
PROCEED ASPECT	Any signal aspect which permits the driver to pass the signal.

PROTECTED WRONG SIDE FAILURE	A wrong side failure where another part of the signalling system provides an acceptable level of protection.
PUBLIC KEY INFRASTRUCTURE (PKI)	Set of hardware, software, people, policies, and procedures needed to create, manage, distribute, use, store, and revoke digital certificates and manage public key encryption with the purpose to facilitate the secure transfer of information for a range of network activities.
RADIO BLOCK CENTRE	A centralised safety unit that receives train position information via radio and sends movement authorities via radio to trains.
RADIO HOLE	A known area where it is not possible to establish or maintain a reliable radio connection.
RADIO INFILL UNIT	A unit which provides a semi-continuous infill function via GSM-R.
RADIO NETWORK TYPE, ETCS	The radio communication network(s) (FRMCS, FRMCS+GSM-R, GSM-R) with which the trackside is equipped for bi-directional data communication between the ETCS on-board equipment and RBCs.
RBC AREA	Trackside area which is supervised by one RBC.
RBC/RBC BORDER	The border location between two areas supervised by two different RBCs.
RBC/RBC HANDOVER	The process of passing the supervision of a train between two Radio Block Centres.
RBC/RBC TRANSITION	Alternative term to RBC/RBC handover
RECOMMENDED	Not fulfilling the requirement will not have any impact on the technical interoperability of the equipment or of the system but it could be fulfilled to facilitate implementation or to enhance performances.
REDUNDANCY	The provision of one or more additional elements to achieve or maintain availability of a functionality if one or more of those elements “malfunctions”.
REFERENCE LOCATION	A location on the track (e.g. balise group reference location) used as a reference for the information sent from trackside or for the train position
RELEASE SPEED	A speed value to allow a train to approach the EOA. Needed for intermittent transmission to enable the train to approach a signal that has cleared in order to reach the information point at the signal.
RELIABILITY	The probability that an item can perform a required function under given conditions for a given time interval. (3) Definitions for other reliability related terms are defined in reference 3.

RELOCATION	Modification of the reference balise group of location based information, which is accompanied by the adjustment of the distance(s) counted from its former reference balise group.
REVERSING MODE	ERTMS/ETCS on-board equipment mode that allows the driver to change the direction of movement of the train whilst controlling the train from the same cab.
REVERSE MOVEMENT	A train movement in which the driver is situated in the leading engine but the train is moved in the opposite direction to the train orientation.
REVOCATION OF MOVEMENT AUTHORITY	Cancellation of a previously given permission to move a train to a given location.
RIGHT SIDE FAILURE	A failure that does not result in the level of protection normally provided by the signalling system being reduced.
RISK	The combination of the frequency, probability, and the consequence of a specified hazardous event.
ROLL AWAY	An unintended and non-powered movement of the train in a direction, which conflicts with the current position of the direction controller in the active desk.
ROUTE	The particular section or sections of track, from a starting point to a point of destination, prepared for train operation
ROUTE RELEASE	The release of route locking.
ROUTE SUITABILITY DATA	Data transmitted to the ERTMS/ETCS on-board equipment to allow it to check its ability to run on the track as indicated by the movement authority. It includes data related to loading gauge, traction system and axle load category.

SAFE CONSIST LENGTH, ETCS	Information about the set of vehicles in rear of and (if any) in front of the engine, taking into account the side of the active cab which defines the front of the engine. The safe consist length information is composed of the six following values: a) The nominal, min safe and max safe consist lengths in front of the engine, counted from the front end of the engine b) The nominal, min safe and max safe consist lengths in rear of the engine, counted from the front end of the engine Note: The difference between the min and max safe consist length is related to what is called coupling play and/or to any other uncertainties in the consist length information. It allows to deduce the overall length between the two extremities of a train whose movements can be supervised by the ERTMS/ETCS on-board equipment: a) In SM mode, regardless whether there are vehicles in front of the engine b) In modes where availability of valid Train Data is necessary, in case there is no vehicle in front of the engine
SAFE DECELERATION	The deceleration the train is assumed to achieve with a certain confidence level
SAFE STATE	A condition which continues to preserve safety.
SAFETY	Freedom from an unacceptable risk of harm. (3) Definitions for other safety related terms are given in reference 3.
SAFETY ACCEPTANCE	The safety acceptance process and the associated terms are given in reference 4.
SAFETY LIFE CYCLE	The safety life cycle is defined in reference 4.
SECTION	A part of the movement authority.
SECTION TIMER	The timer associated with a section as part of the movement authority. When the timer reaches a value defined by the trackside equipment the section is no longer available and the movement authority for the train is reduced accordingly.
SECURITY	The protection resulting from all measures, also administrative ones, to prevent accidental or malicious modification or disclosure of data; for key management, the protection generally guarantees confidentiality, authenticity and integrity of keys.

SEMI-CONTINUOUS TRANSMISSION	Transmission taking place over a defined distance.
SERVICE BRAKE COMMAND, ETCS	The ERTMS/ETCS service brake command results in the train applying the full service braking effort.
SERVICE BRAKING	Application of an adjustable brake force in order to control the speed of the train, including stop and temporary immobilisation.
SESSION, COMMUNICATION	The process of initiating and terminating an applicative dialogue between trackside and on-board via radio.
SET SPEED	This is an input received from a function external to ETCS for display to the driver. It represents the speed value to which the train speed is regulated by an external device (e.g. by a cruise control system).
SHALL	Is mandatory.
SHOULD	Is recommended.
SHUNTING MODE	ERTMS/ETCS on-board equipment operating mode which allows the train to move in shunting, without available train data.
SHUNTING MOVEMENT	The movement of trains or vehicles other than normal passage along running lines. When vehicles are moved without train data available.
SHUNTING SIGNAL	A signal provided for shunting movements only. A fixed signal intended for shunting movements. In some cases Shunting signals at danger are valid also for train movements.
SIGNAL	A visual display device that conveys instructions or provides advance warning of instructions regarding the driver’s authority to proceed.
SIGNAL LOCATION	The geographical location of a signal.
SIGNALLING SYSTEM	Particular kind of system used on a railway to control and protect the operation of trains.
SINGLE ON-BOARD LOCATION REFERENCE	The SOLR is the balise group used by ERTMS/ETCS on-board as unique location reference to supervise all location items against the train position.
SLAVE ENGINE	Any engine that is not the leading Rolling Stock unit of a train or shunting consist. The ERTMS/ETCS on-board equipment of the slave engine runs in one of the modes in which it is not controlling the movement of the train/shunting consist (non leading mode, sleeping mode, passive shunting mode).
SLEEPING MODE	ERTMS/ETCS on-board equipment mode that is used for the on-board equipment in slave engines controlled by a leading engine.

SPECIFIC TRANSMISSION MODULE	Device allowing the ERTMS/ETCS on-board equipment to be interfaced with the on-board part of an existing National Train Control system. It allows smooth transitions from/to the National System and gives access to some ERTMS/ETCS on-board resources (e.g. DMI).
SPEED CONFIDENCE INTERVAL	The interval within which the ERTMS/ETCS on-board assumes the actual train speed with a defined probability.
SPOT TRANSMISSION	Transmission between trackside and on-board that takes place at discrete locations.
STAFF RESPONSIBLE MODE	ERTMS/ETCS on-board equipment mode that allows a driver to take full responsibility for the movement of a train in an equipped area. The ERTMS/ETCS on-board equipment will impose a speed limit in this mode.
STANDBY MODE	ERTMS/ETCS on-board equipment mode that is a default mode when the on-board equipment is powered up or that is entered when shunting or non-leading mode is left or when the active cab is closed.
STANDSTILL, ETCS	A state which is entered when the ERTMS/ETCS on-board equipment determines that the train is not moving, and which is left when the ERTMS/ETCS on-board equipment determines that the train is moving. Important note: The criteria for determining standstill are not harmonised. An ERTMS/ETCS on-board reporting “standstill” does not guarantee that there is no train movement at all.
STATIC SPEED PROFILE	The description of the fixed speed restrictions of a given line. The speed restrictions can be related to such items as maximum line speed, curves, points, tunnel profiles, bridges.
STATION	A place where trains stop, or where loading and unloading occurs, and where assistance may be available. Where there can be points (facing or trailing) that makes it possible for the train to use different routes.
STOP SIGNAL	Any main signal capable of showing a stop danger aspect or indication. Position, from where no movement authority is given to a train. It is not necessarily a fixed signal.
SUB-SYSTEM	A combination of equipment, units, assemblies, etc., which performs an operational function and is a major subdivision of the system.
SUPERVISED MANOEUVRE MODE	ERTMS/ETCS on-board equipment operating mode which allows a shunting consist to be supervised with a Movement Authority, while the engine and its active cab can be located anywhere in the consist.

SUPPORTED SYSTEM VERSION	A system version supported by the on-board equipment is one of the system versions the on-board equipment is able to operate. By definition, within one of its supported system version numbers X, the on-board equipment always operates one single system version number Y, which is the highest defined in the release of the ETCS specifications the on-board equipment is compliant with. Important note: if within a system version number X at least two values of Y have been defined, the fact that the on-board always operates/supports the highest value Y does not mean that it is not able to handle trackside information using a lower value of Y.
SYSTEM	A composite of equipment, skills, and techniques capable of performing or supporting an operational role, or both. A complete system includes all equipment, related facilities, material, software, services and personnel required for its operation and support to the degree that it can be considered a self-sufficient unit in its intended operational environment.
SYSTEM FAILURE MODE	ERTMS/ETCS on-board equipment mode entered when a fatal failure which could affect safety is found.
SYSTEM LIFE-CYCLE	The system lifecycle and associated terms are defined in reference 3.
SYSTEM VERSION	The system version defines the ERTMS/ETCS mandatory functions that ensure technical interoperability between ERTMS/ETCS on-board equipment and trackside.
SYSTEMATIC FAULT	An inherent fault in the specification, design, construction, installation, operation or maintenance of a system, sub-system or equipment affecting multiple pieces of equipment under identical circumstances.
TANDEM	Two or more traction units mechanically but not electrically coupled together, used in the same train. Each traction unit requires a separate driver. Only one unit is designated as leading, the other units are therefore classed as non-leading.
TARGET	Location where the train speed should be below the given target speed
TELEGRAM	A balise telegram contains one header and an identified and coherent set of packets. A balise group message maybe comprised of one or several telegrams.
TEMPORARY SPEED RESTRICTION	A planned speed restriction imposed for temporary conditions such as track maintenance.

TRACK CONDITION	Information transmitted to the ERTMS/ETCS on-board equipment to inform the driver and/or the train of conditions ahead. This information is dedicated to other functions than the speed and distance monitoring.
TRACK DESCRIPTION	Information complementing the Movement Authority and providing as a minimum the, static speed profile and gradient profile. Optionally, it can contain axle load profile, track conditions, route suitability data, areas where shunting is permitted, etc.
TRACK FREE	A route being detected clear of obstacles such that permission may be given for a train to enter that route.
TRACK GEOMETRY	The physical arrangement of the track in terms of curvature, gradient and cant.
TRACK OCCUPIED	An object in a route that prevents that route being offered to a train.
TRACKSIDE EQUIPMENT	The equipment with the aim of exchanging information with the vehicle for safely supervising train circulation. The information exchanged between track and trains can be either continuous or intermittent according to the ERTMS/ETCS level of application and to the nature of the information itself.
TRACK-TO-TRAIN TRANSMISSION	The transmission of ERTMS/ETCS messages from trackside equipment to the train via balise, loop or radio. Using intermittent transmission (balise or loop or radio infill) the information can only be transmitted to a train passing the transmission unit.
TRACTION UNIT	A powered vehicle able to move itself and other vehicles to which it may be coupled.
TRAIN	One or more railway vehicles hauled by one or more traction units, or one traction unit travelling alone, running under a given operational number from an initial fixed point to a terminal fixed point.
TRAIN DATA	Defined set of data which gives information about the train. Data that characterises a train and which is acquired by ERTMS/ETCS in order to perform a mission.
TRAIN DETECTION	The proof of the presence or absence of trains on a defined section of line.
TRAIN INTEGRITY	The level of belief in the train being complete and not having left coaches or wagons behind.
TRAIN INTERFACE UNIT	The unit, inside the ERTMS/ETCS on-board equipment, that provides the interface between the ERTMS/ETCS on-board equipment and the train.
TRAIN MOVEMENT	When vehicles are moved with train data available, as a rule from station to station, and as a rule under the authority of proceed aspects from main signals, or similar procedures.

TRAIN ORIENTATION, ETCS	If there is an active cab, this one defines the orientation of the train, i.e. the side of the active cab is considered as determining the front of the train. If no cab is active, the train orientation is defined by the last active cab. Exception: from the time the first Supervised Manoeuvre authorisation is received to the time the mission is either ended or continued in Non Leading mode, the train orientation is determined by the direction of the Movement Authority in the last received Supervised Manoeuvre authorisation, regardless of the position of the engine in the shunting consist and of which of its cab(s) is active.
TRAIN POSITION CONFIDENCE INTERVAL	The distance interval within which the ERTMS/ETCS on-board assumes the actual train position is, with a defined probability. It comprises the odometer over-reading and under-reading amounts, plus twice the location accuracy of the reference balise group.
TRAIN RUNNING NUMBER	A number under which the train is operated.
TRAIN TRIP	Initiated when a train passes an EOA/LOA, excluding any occasion when a suppress facility is used, and causes an immediate application of the emergency brake.
TRAIN-TO-TRACK TRANSMISSION	The transmission of ERTMS/ETCS messages from the train to trackside equipment via radio.
TRANSITION BUFFER	In case of level transition or RBC/RBC handover, it refers to the on-board storage containing trackside information not used immediately and that is evaluated at the time the level transition is performed or at the time the Accepting RBC becomes the supervising one, respectively.
TRANSITIONS	The controlled changes between operating modes and / or levels
TRANSPONDER	See Balise and Eurobalise
TRIP MODE	ERTMS/ETCSERTMS/ETCS on-board equipment mode (e.g. entered when passing an EOA), resulting in an application of the emergency brake that can only be revoked at standstill and with additional precautions.
UNCOMMISSIONED AREA	Piece of track where ERTMS/ETCS is being installed but has not yet been commissioned and shall thus not be taken into account.
UNDER-READING AMOUNT	The distance the train may have travelled further than the estimated position. The distance is estimated by the ERTMS/ETCS-on-board equipment taking into account the odometer inaccuracy plus the error for the detection of a balise location, as defined in the Eurobalise specifications.
UNFITTED AREA	See NON-EQUIPPED LINE

UNFITTED MODE	ERTMS/ETCS on-board equipment mode allowing a fitted train to run in an unfitted area.
UNPROTECTED WRONG SIDE FAILURE	A wrong side failure where no other part of the signalling system provides protection.
VALIDATION	Confirmation by examination and provision of objective evidence that the particular requirements for a specific intended use have been fulfilled.
VALIDATOR	The person or agent appointed to carry out validation.
VARIABLE	A set of bits which are given a unique identity and meaning.
VERIFICATION	Confirmation, by examination and provision of objective evidence, that the specified requirements for the lifecycle phase have been fulfilled.
VERIFIER	The person or agent appointed to carry out verification.
VIRTUAL BALISE COVER	A specific marker in balise telegrams, that allows substituting the physical cover plates in lines under construction.
VITAL	A description applied to equipment whose correct operation is essential to the integrity of the signalling system. Most vital equipment is designed to fail-safe principles - a wrong side failure of vital equipment could directly endanger rail traffic.
WARNING	Audible and/or visual indication to alert the driver to a condition which requires a positive action by the driver.
WHEELSLIDE	When a braked wheel loses adhesion with the rails and under rotates.
WHEELSLIP	When a traction-driven wheel loses adhesion with the rails and over rotates
WRONG SIDE FAILURE	An equipment failure tending to cause danger to rail traffic.

5. ABBREVIATIONS

ACK	Acknowledgement
AD	Automatic Driving mode
ALE	Adaptation & redundancy management Layer Entity
APN	Access Point Name
ASP	Axle Load speed Profile
ATC	Automatic Train Control
ATO	Automatic Train Operation
ATP	Automatic Train Protection
BCD	Binary Coded Decimal
BIU	Brake Interface Unit, used with regards to STM
BTM	Balise Transmission Module
CEN	Comité Européen de Normalisation
CENELEC	European Committee for Electrotechnical Standardisation (Comité Européen de Normalisation Electrotechnique)
CER	Community of European Railways
CRC	Cyclic Redundancy Code
CSM	Ceiling Speed Monitoring
DMI	Driver Machine Interface
DNS	Domain Name Server
DP	Danger Point
DV	Difference Value between the Permitted Speed to e.g. DV_EBI_{min} Emergency Brake Intervention speed (minimum) DV_EBI_{max} Emergency Brake Intervention speed (maximum)
EB	Emergency Braking
EBCL	Emergency Brake Confidence Level
EBD	Emergency Brake Deceleration Curve
EBI	Emergency Brake Intervention supervision limit
EC	European Commission
EEIG	European Economic Interest Group.
EIRENE	European Integrated Radio Enhanced Network
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EN	European Norm
EOA	End of Authority

EOLM	End-of-Loop-Marker
Ep	Electro-pneumatic
ERA	European Railway Agency
ERTMS	European Rail Traffic Management System
ERTMS/ETCS	The ETCS part of ERTMS
ERTMS/FRMCS	The FRMCS part of ERTMS
ERTMS/GSM-R	The GSM-R part of ERTMS
ERTMS/ATO	The ATO part of ERTMS
ETCS	European Train Control System
ETCS ID	ETCS Identity
ETSI	European Telecommunications Standards Institute
EU	European Union
EVC	European Vital Computer
FFFIS	Form-Fit Functional Interface Specification
FFFS	Form-Fit Functional Specification
FIS	Functional Interface Specification
FMEA	Failure Mode and Effects Analysis
FMECA	Failure Mode, Effect and Criticality Analysis
FRMCS	Future Railway Mobile Communication System
FRS	Functional Requirements Specification
FS	Full Supervision mode
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
GSM-R	Global System for Mobile Communications – Railways
GUI	Guidance curve
I	Indication supervision limit
I&A	Identification and Authentication
IEC	International Electro-technical Commission
IP	Internet Protocol
IS	Isolation mode
ISO	International Standardisation Organisation
KER	KVB, Ebicab, RSDD
KM	Key Management
KMAC	Authentication Key
KMC	Key Management Centre
KMS	Key Management System
KTRANS	Transport Key

LEU	Line side Electronic Unit
LOA	Limit of Authority
LRBG	Last Relevant Balise Group
LS	Limited Supervision mode
LSSMA	Lowest Supervised Speed within the Movement Authority
LTM	Loop Transmission Module
LUC	Line Under Construction
LX	Level crossing
MA	Movement Authority
MAC	Message Authentication Code
MRDT	Most Relevant Displayed Target
MRSP	Most Restrictive Speed Profile
MORANE	Mobile Radio for Railway Networks in Europe
MTBF	Mean Time Between Failure
NL	Non Leading mode
NP	No Power mode
NTC	National Train Control
OBU	On-Board Unit
OL	Overlap
ORBG	Other Reference Balise Group
OS	On Sight mode
P	Permitted speed supervision limit
PBD SR	Permitted Braking Distance Speed Restriction
PKI	Public Key Infrastructure
PS	Passive Shunting mode
PT	Post Trip mode
RAM(S)	Reliability, Availability, Maintainability, (Safety)
RAP	Roll Away Protection
RBC	Radio Block Centre
RIU	Radio In-fill Unit
RSM	Release Speed Monitoring
RU	Railway Undertaking
RV	Reversing mode
SB	Service Brake or in the context of modes, Stand By mode
SBD	Service Brake Deceleration Curve
SBI	Service Brake Intervention supervision limit

SF	System Failure mode
SH	Shunting mode
SIL	Safety Integrity Level
SL	Sleeping mode
SM	Supervised Manoeuvre mode
SN	System National mode
SOLR	Single On-board Location Reference
SoM	Start of Mission
SR	Staff Responsible mode
SRS	System Requirements Specification
SSP	Static Speed Profile
STM	Specific Transmission Module
TCO	Traction Cut Off
TCP	Transmission Control Protocol
TTI	Time to Indication
SvL	Supervised Location
TI	Train Interface
TIU	Train Interface Unit
TR	Trip mode
TRK	Trackside
TSM	Target Speed Monitoring
TSR	Temporary Speed Restriction
UDMP	Unauthorised Direction Movement Protection
UIC	Union Internationale des Chemins de Fer
UN	Unfitted mode
UNISIG	UNIFE ETCS Working group
UTC	Universal Time Co-ordinated
V&V	Verification and Validation
VBC	Virtual Balise Cover
W	Warning supervision limit
WSF	Wrong Side Failure