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CCS TSI 2023.

CCS TSI

David Cuesta, Prague, January 2026



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Agenda

- Main changes in the CCS TSI 2023/1695
- Framework. Baselines Vs System Versions
- Appendix B. Transition Regimes
- Enhancements
- Error corrections
- Partial Fulfillment
- Application Guide

Main changes in the CCS TSI (EU) 2023/1695

CCS TSI Text Recast

- Framework to manage the specification changes
 - Error Corrections (Section 7.2.10)
 - B4R1 set of specs in Appendix A
 - Removal of partial fulfilment (Appendix G)
- Transition regimes (Appendix B) and notification from IM (in RINF)

Appendix A – Technical changes

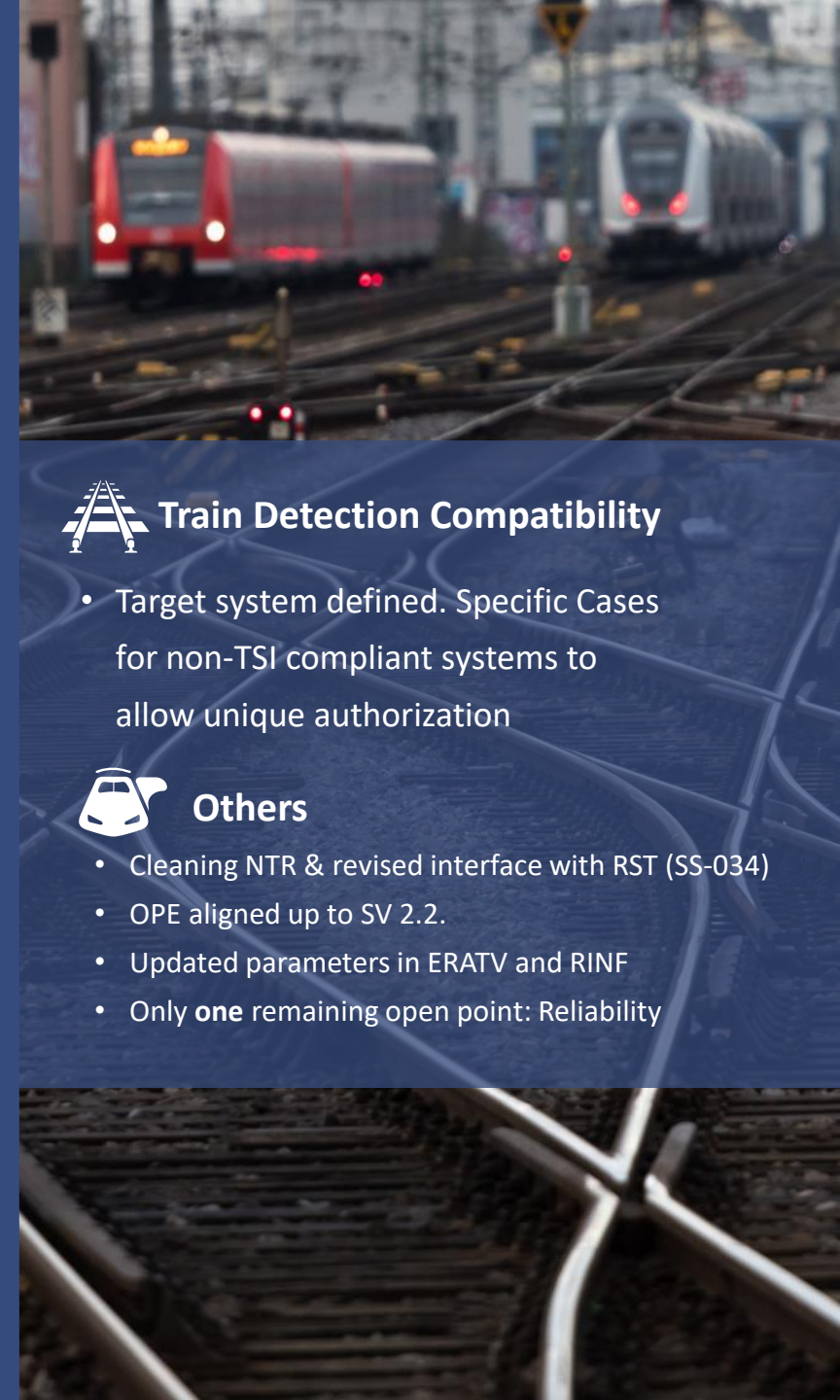
- ATO up to GoA2 (As a new optional part)
- First complete Level 2 + train integrity specifications (Former Level 3)
- ETCS readiness for FRMCS and DAC (the interface and needed functionality as far as possible)
- System versions 2.2, 2.3 (Trackside) and 3.0

Train Detection Compatibility

- Target system defined. Specific Cases for non-TSI compliant systems to allow unique authorization

Others

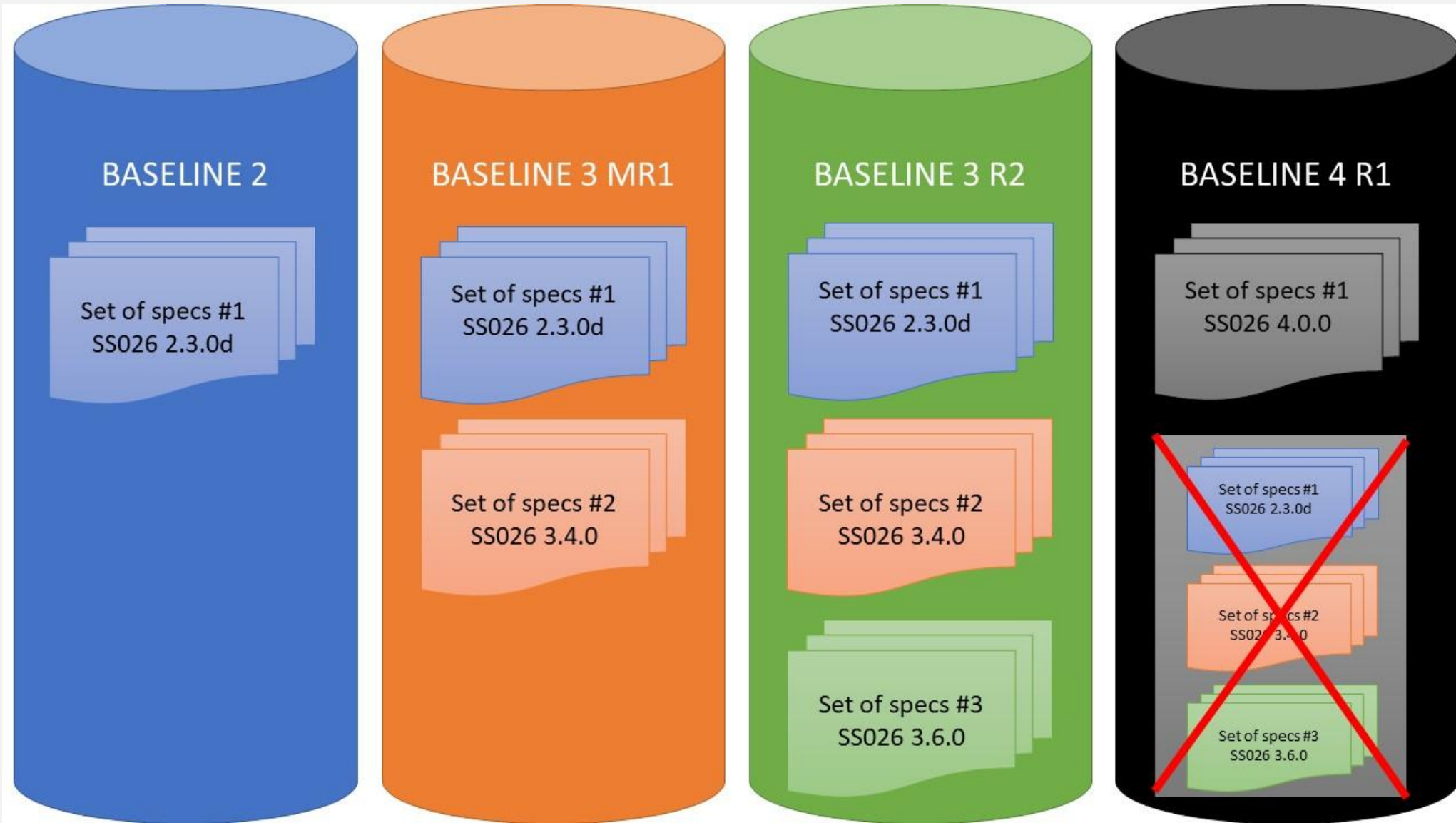
- Cleaning NTR & revised interface with RST (SS-034)
- OPE aligned up to SV 2.2.
- Updated parameters in ERATV and RINF
- Only **one** remaining open point: Reliability



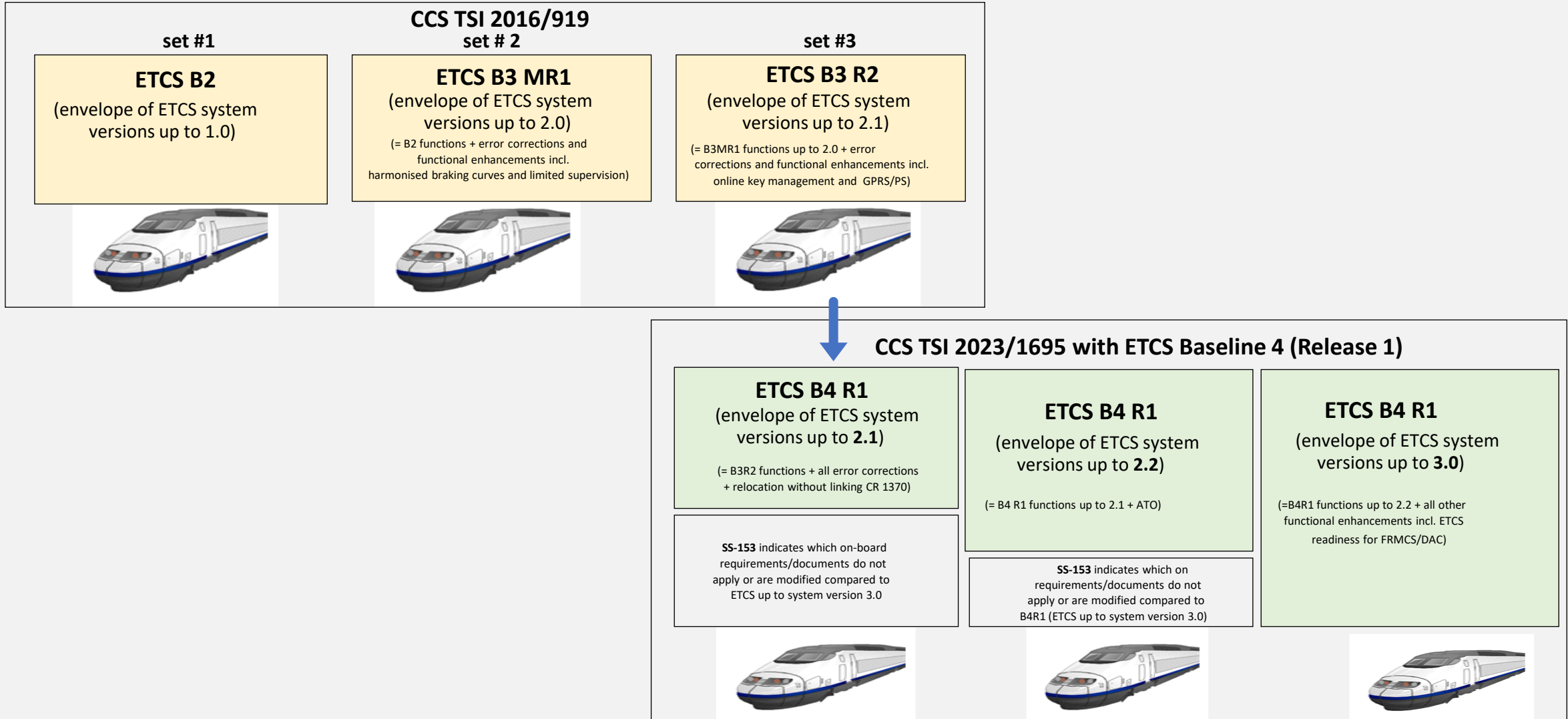
CCS TSI (EU) 2023/1695 Framework. Baselines Vs and System Versions



Baseline Approach

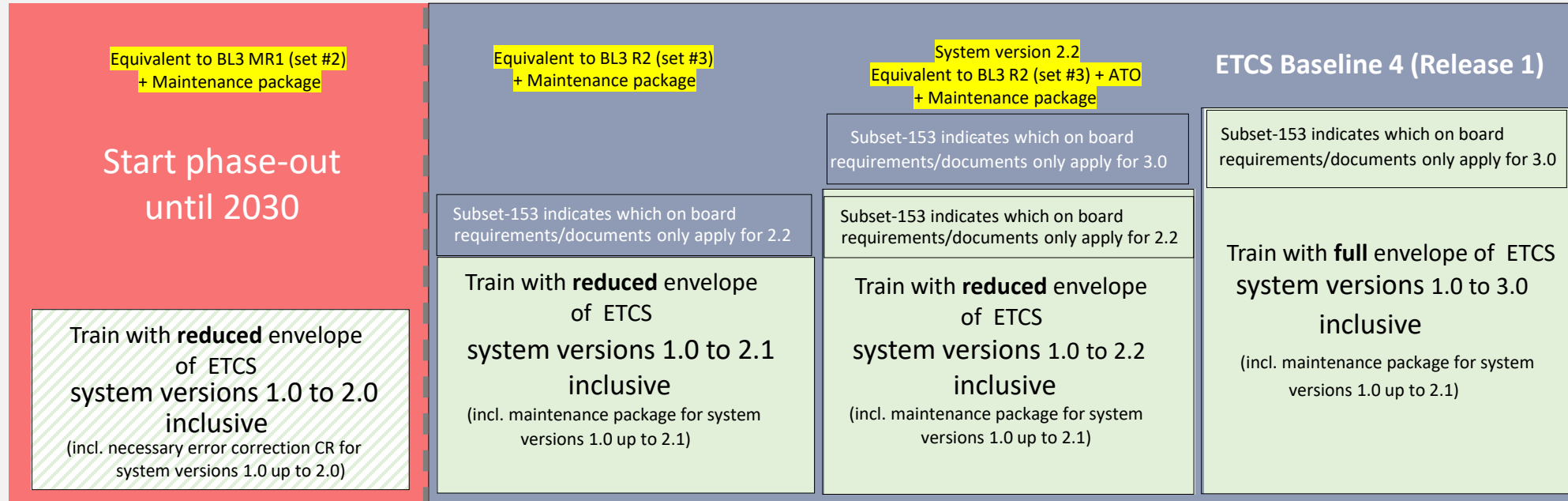


ERTMS Specifications – Evolution of ETCS Baselines/ETCS System versions



B4R1 set of specifications

On-board reduced envelope and SS-153



Out of scope SS-153

Consolidated specifications (SS-153) for the reduced **on-board** defining the not applicable clauses for envelopes up to 2.1 and 2.2.

ERTMS Specifications – Evolution of ETCS Baselines/ETCS System versions **on-board**

Translation table between System Version and Baseline/SRS/Set of specs

System Version	Baseline	SRS versión	Set of specs
1.0	B2	2.3.0d	#1
2.0	B3MR1	3.4.0	#2
2.1	B3R2	3.6.0	#3
2.1	B4R1	4.0.0 + SS-153	TSI 2023/1695
2.2	B4R1	4.0.0 + SS-153	TSI 2023/1695
3.0	B4R1	4.0.0	TSI 2023/1695

The difference between SV 2.1 B3R2 and SV 2.1 B4R1 are the error corrections.

CCS TSI (EU) 2023/1695

Appendix B. Transition regimes



CCS TSI Transition Regimes

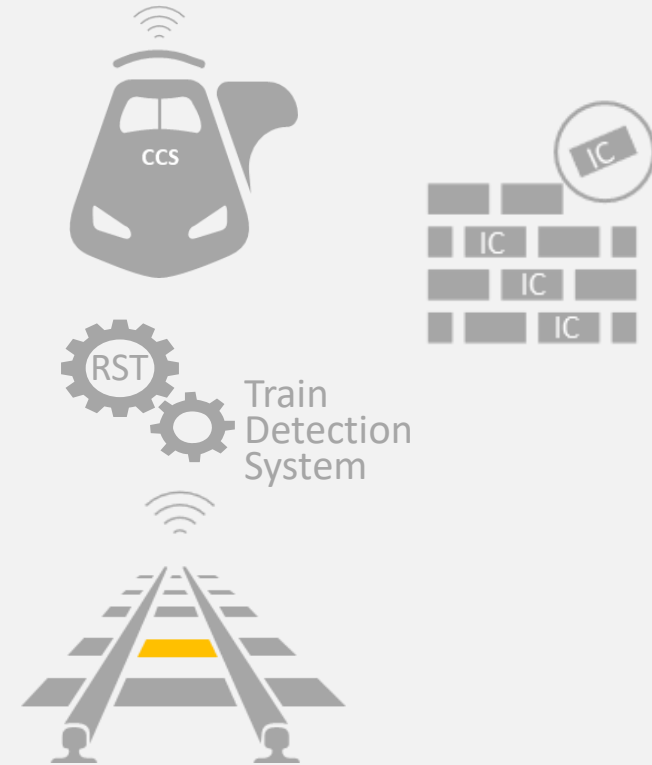
Introduced for the first time in the CCS TSI (Appendix B):

- Synchronised approach for the vehicle.
- Cascade principle.

Specific requirements for:

- CCS On-board Subsystems (Table B1.1).
- RST Subsystem (TDC) (Table B1.2).
- CCS Trackside Subsystems (Table B2).
- CCS Interoperability Constituents (Table B3*).

*CCS Subsystem transition periods apply unless specified in this table.



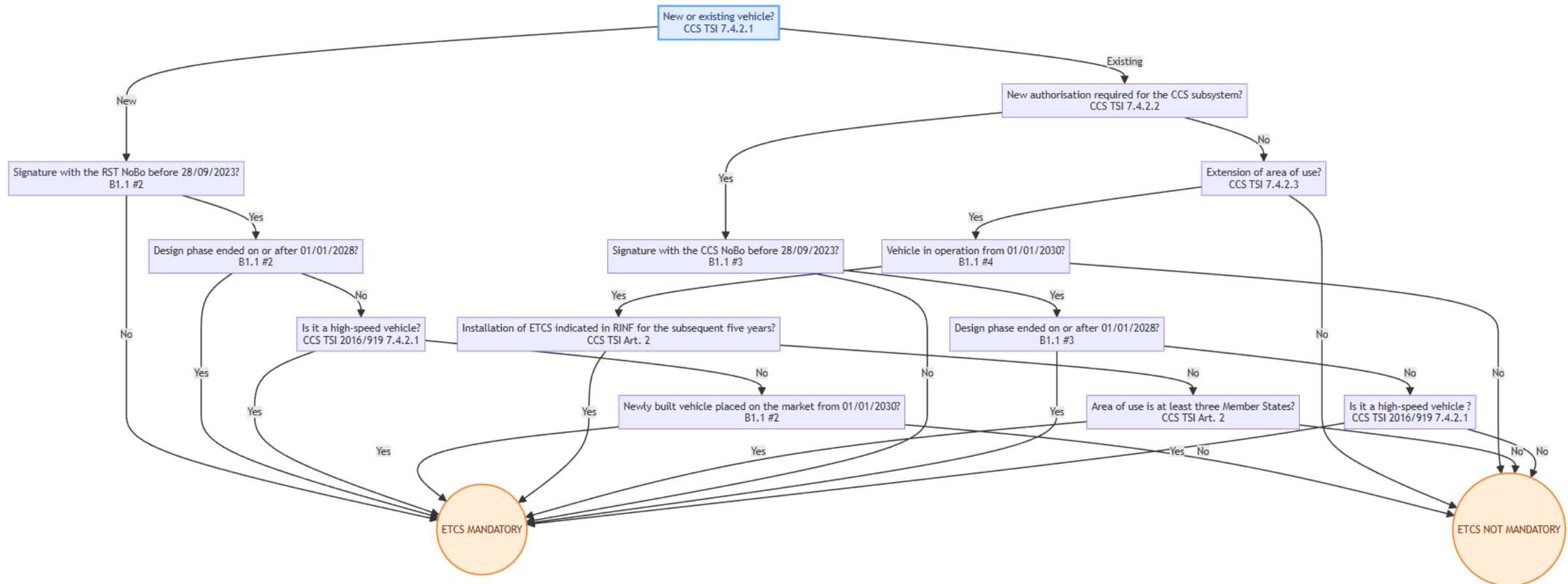
CCS On-board example

CCS TSI 2023/1695
(amended)

Table B1.1 row 2
ETCS On-Board
implementation

No	TSI point(s)	TSI point(s) in previous version established by Regulation (EU) 2016/919	Explanation on CCS TSI change introduced by this Regulation	Transition regime			
				Design phase started after 28 September 2023	Design phase started before 28 September 2023	Production phase	Vehicle in operation
2	Points 7.4.2.1, and 7.4.3	7.4.2.1.2. and 7.4.3(2) grants exemptions for new vehicles to be equipped with ETCS	7.4.2.1.2. and point 7.4.3(2) deleted. All newly built vehicles shall be equipped with ETCS.	Directly applicable <i>Note:</i> Design phase started after TSI enters into force here relates to 'RST design phase' for any vehicles without ETCS. For special vehicles applicable from 1 January 2026 unless Member States have issued decisions in accordance with 7.4.3.2.	Applicable if design phase ends on or after 1 January 2028 <i>Note:</i> Design phase started before TSI enters into force here relates to 'RST design phase' for any vehicles without ETCS. For special vehicles applicable if design phase ends on or after 1 January 2030 unless Member States have issued decisions in accordance with 7.4.3.2.	Applicable for newly built vehicles placed on the market on or after 1 January 2030 For special vehicles applicable for newly built vehicles placed on the market on or after 1 January 2030 unless Member States have issued decisions in accordance with 7.4.3.2.	Not applicable

CCS On-board example. Transition regime Flowchart. ETCS implementation



Note: Web tool developed with the Application Guide

CCS TSI (EU) 2023/1695 Enhancements



New Features in Appendix A

ATO

Introduction GoA 2



Modularity



Reduced envelope

SS-153

(B4R1 set of specifications)



FRMCS v1

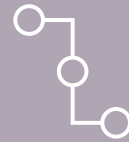
ETCS/ATO readiness for
FRMCS



Train Detection
Compatibility
updated to V5.0
(closing all related
open points)

Level 2

with/without train
integrity
(merge level 2 and 3)



ETCS DAC readiness

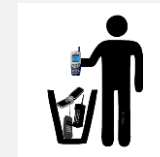


ETCS system version 3.0



Why?

- **Obsolescence of GSM-R /** introduction of FRMCS.
- New functionalities (enhancements) requested by the sector (e.g. supervised manoeuvres).



What will it bring?

- Possibility to optimise investment when equipping ETCS for first time.
- Opportunity to decouple railway applications from telecom transport layers in the future. (easy update for 6G,7G,8G,...)

CCS TSI (EU) 2023/1695 Error Corrections



Specifications error corrections workflow

7.2.10.1
EECT process
“Art 10” CR
List

- **Sector** agreement on specification errors preventing normal service (also known as “**Art 10**” CR)¹
- Questionnaires sent to suppliers, RUs and IMs to analyse the impact on existing products /projects.

7.2.10.3.1
IMs

- **Check list of “Art 10” CRs** with the ETCS implementations on their network
- Evaluate impact of “Art 10” CRs on current fleet to *optionally implement mitigation measures*².
- Publish in **RINF** the final list of **applicable “Art 10” CRs** required for each section.

7.2.10.3.2
RUs

- Compare the applicable list from RINF with the system implemented on the vehicles² to identify **if it is necessary to implement the error correction**. If so implement the change on **the concerned vehicles**³.

7.2.10.2
Suppliers

- Suppliers to **update** the impacted **ICs** according to transition requirements.

¹ This is the current process already followed since 2016 for the Agency OPI 2017-02 and 2020-02. In the revised CCS TSI the old “Article 10” about error corrections is now “Article 9” .

² The evaluation is done on the basis of information provided in the questionnaires. Mitigation measures can be implemented on a voluntary basis by the IMs

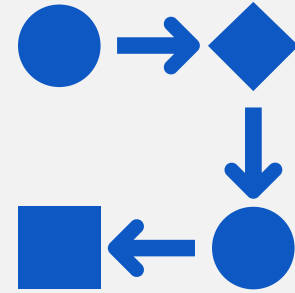
³ The change shall be evaluated according with the BDCs if requiring or not a new authorisation.

ERTMS Specifications – Error corrections – Transition Regime (7.2.10)

A sequence of events if needed to define a proper process

- **2 conditions to start the process:**

1. Entry into force of the TSI **AND**
2. Publication of BCA and answers to the questionnaires



- **Updated deadline for IM registering the CR in RINF:**

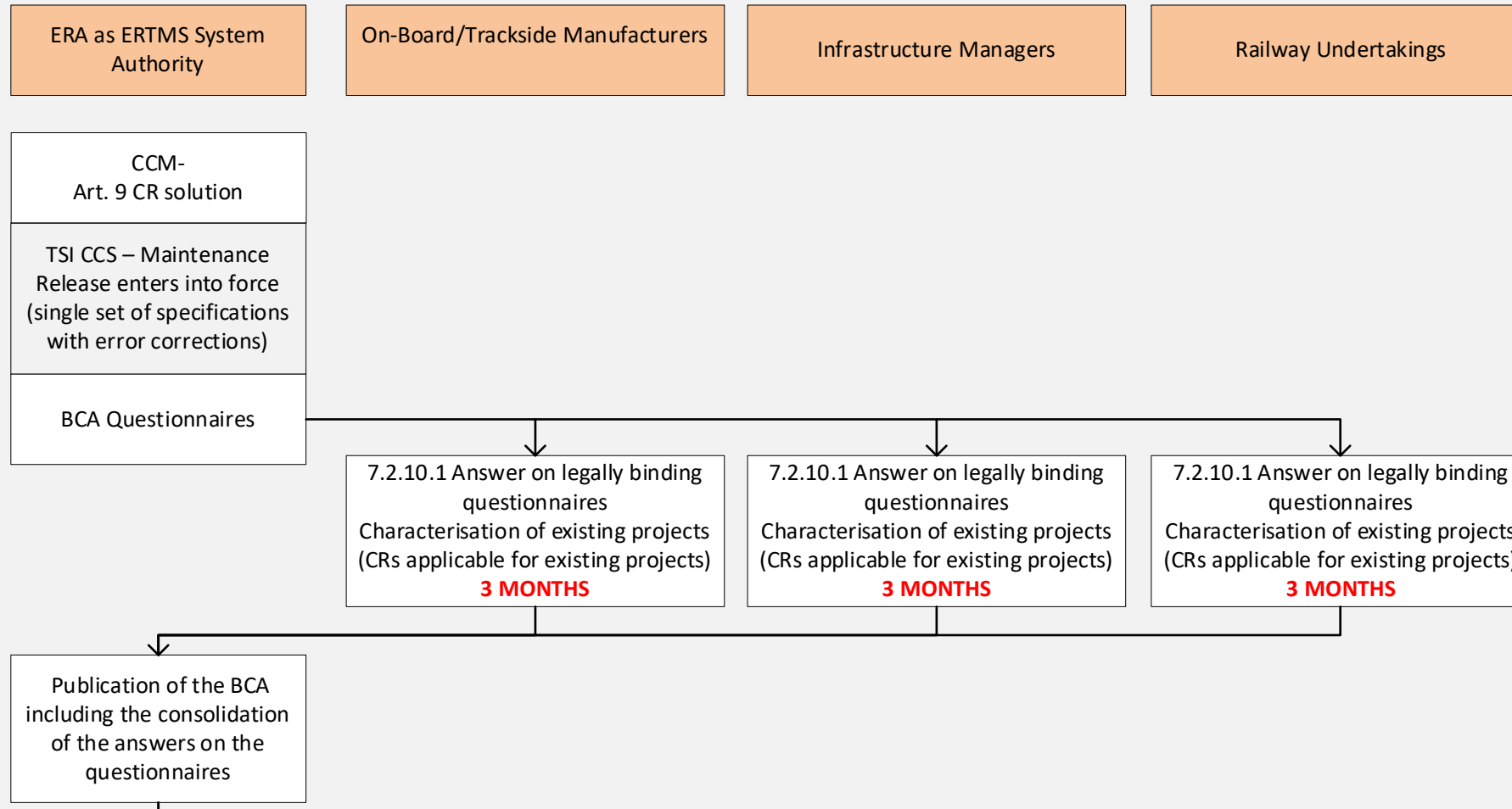
- 6 months from the start conditions.
- Next events follows This registration.

CCS TSI 2023/1695 (Amended). 7.2.10.3.1

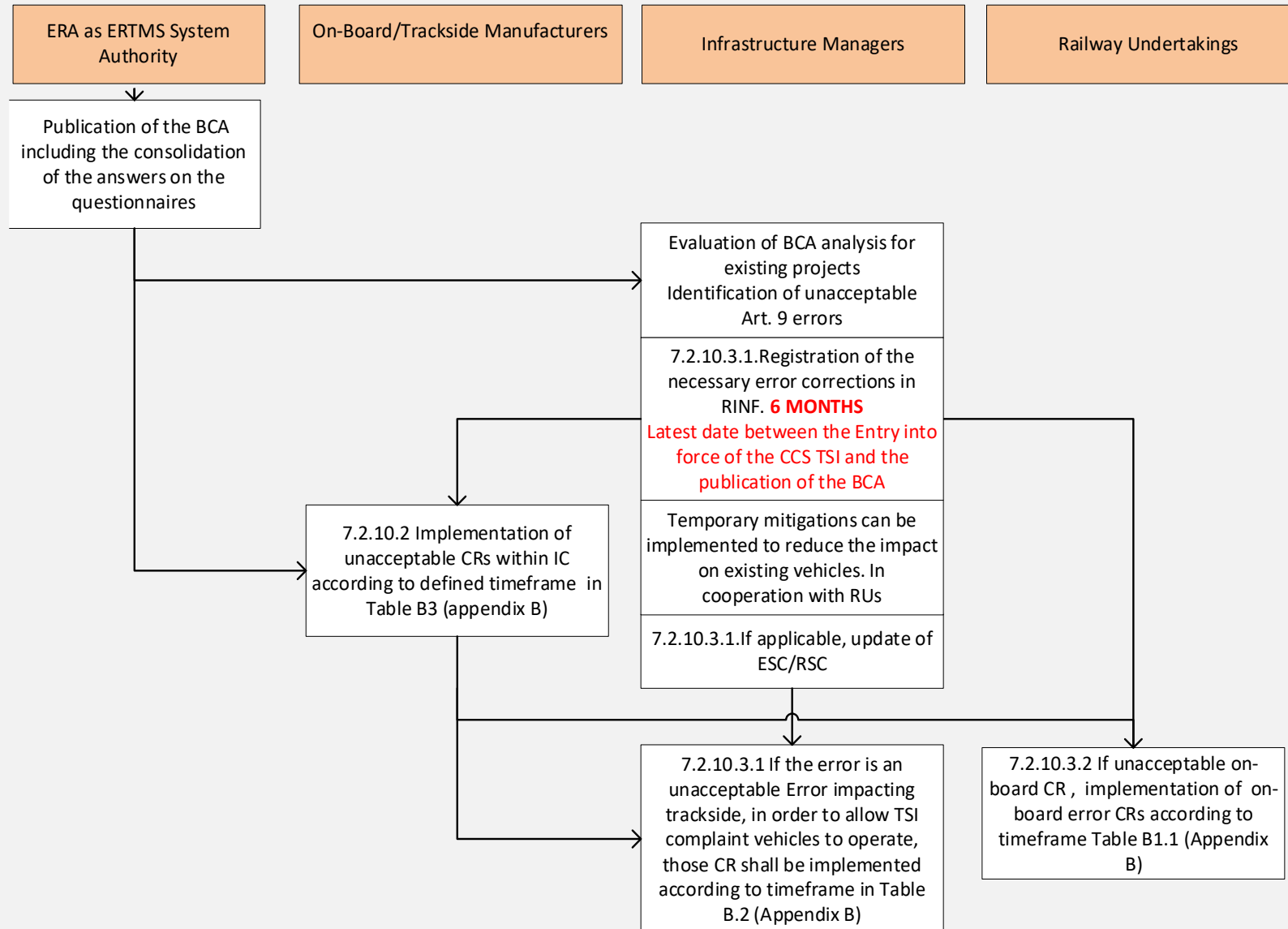
The Infrastructure Manager shall register in the related RINF (*) parameter which error corrections are applicable (i.e. the errors preventing normal service in the network) for the on-board. Error corrections shall be registered: for the first time no later than 6 months after the publication by the Agency of the Baseline Compatibility Analysis (BCA) including the answers to the questionnaires; and whenever there is a change in the applicable error corrections due to new or upgrade trackside implementation within the infrastructure manager's network.

*The Network Statement can be used as tool in case RINF is not upgraded yet to notify this change.

ERTMS Specifications – Error corrections – Transition Regime (7.2.10)



ERTMS Specifications – Error corrections – Transition Regime (7.2.10)



CCS TSI (EU) 2023/1695

Removal of partial fulfillment



Removal of partial fulfilment

Obtain a **better alignment** between the products and the specifications.

- In case **new errors** are detected (mostly for newly introduced functionality) proprietary solutions are allowed until an harmonised solution is agreed, based on validation of the CR - Point 6.5 (2).
- “**Overspecification**”: Create a CR to amend the specifications.
- **Exceptional cases**: Appendix G
 - DMI SIL-0 in case of B2 fleet upgrade.
 - Functions for on-board SV 2.1 and 2.2.
 - SS-034 options at IC (catenary independent engines).
- Trigger events for the update.



CCS TSI (EU) 2023/1695 Application Guide



CCS TSI Application Guide



Done

1st step – Q1 2024

Appendixes B (Transition Regime) & G (Partial fulfilment – System Versions)
Error corrections examples
First editorial review (new document from template)

2nd step – Q2 2024

ATO (informative subsets)
FRMCS guideline
Updated subsets (based on UNISIG proposal)

3rd step – January 2026

Items valid from previous application guide
Clarification on the transition regime. Alignment with CCS TSI amendment 2025
Editorial review



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