

# CCS TSI (EU) 2023/1695

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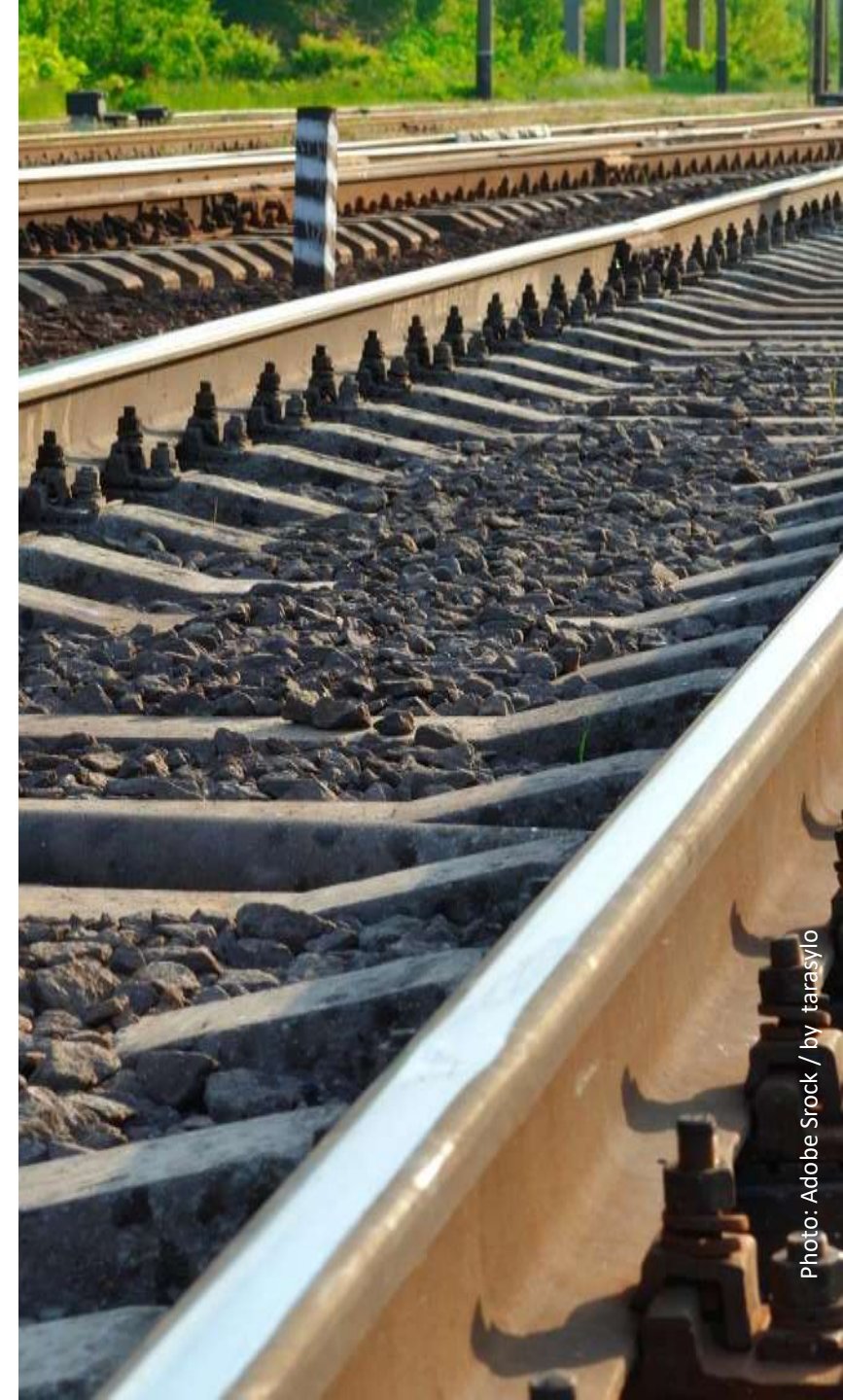
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EUROPEAN  
UNION  
AGENCY  
FOR RAILWAYS

# Agenda

- Introduction and main changes
- Appendix B transition regimes
- Framework to manage the specification changes
- Enhancements and system versions
- Future evolution



# 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)
- Stronger deployment requirements
- 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 - Merged)
- 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



- Published in the official journal on the **08/09/2023** ([EUR-Lex link](#))
- Entry into force 20 days after (28/09/2023)
- Appendix A documents ([link](#)).

# CCS TSI 2024 amendment

## Is CCS TSI 2023/1695 complete?



99%

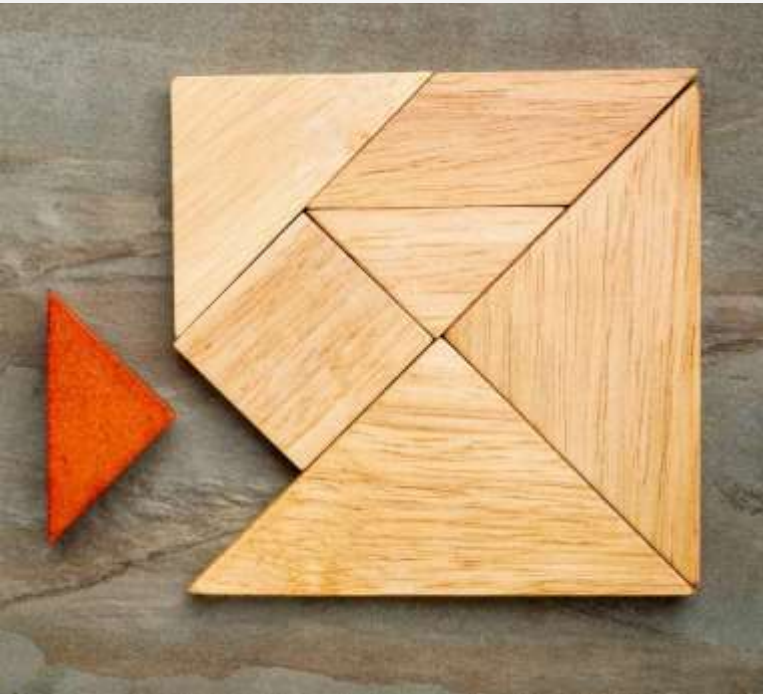
- 3 groups of documents postponed
    - **SS-153** Reduced envelopes
    - **SS-076/94** ETCS OB IC test specs
    - **SS-151** ATO TS/OB test specs
- ↪ Expected to be delivered **end 2024**



# CCS TSI 2024 amendment

## Return form experience on CCS TSI

- **Corrigendum:** Editorial and translation errors
- **Appendix B** transition tables
- **Error correction** dates and events
- **Editorial** amendments
- Other **adjustments** and **clarifications**



# CCS TSI Evolution



2016/  
919

**B3R2 set #3**  
OPI-2017-2 error corrections  
OPI-2020-2 error corrections

2023/  
1695

**TSI Package recast**  
Framework to manage  
specifications changes  
Appendix B transition regime  
ETCS B4R1 (one set specs)  
ATO B1 (GoA 1-2)  
RMR FRMCS B0

2027  
TSI

**EC request  
ERA REC 2026**  
Expected date for  
FRMCS/DAC  
introduction  
Cybersecurity

2012/  
88

**B2 2.3.0d set #1  
B3 MR1 set #2 (2015)**  
Introduced in several  
amendments

2019/  
776

**4<sup>th</sup> RP Alignment**  
BDC Table  
ESC/RSC  
B2 phase-out start  
**2020/387**: Extension  
area of use  
**2020/420**: German  
language correction

2025  
amend

**Expected amendment  
for completion**  
SS-153  
SS-151  
SS-076/SS-094  
Other clarification CR

2029  
TSI

**EC request  
ERA REC 2028**  
System Pillar  
deliverables

# CCS TSI (EU) 2023/1695 Framework to manage the specification changes



# B4R1 set of specifications

1. Not keeping specifications with known errors in the legal framework.
2. Decouple the error correction from introduction of new functionalities.

Former **sets #1, #2 and #3** removed from Appendix A and are **archived** in the Agency website.

**On-Board:** Reduced envelope based on SS-153.

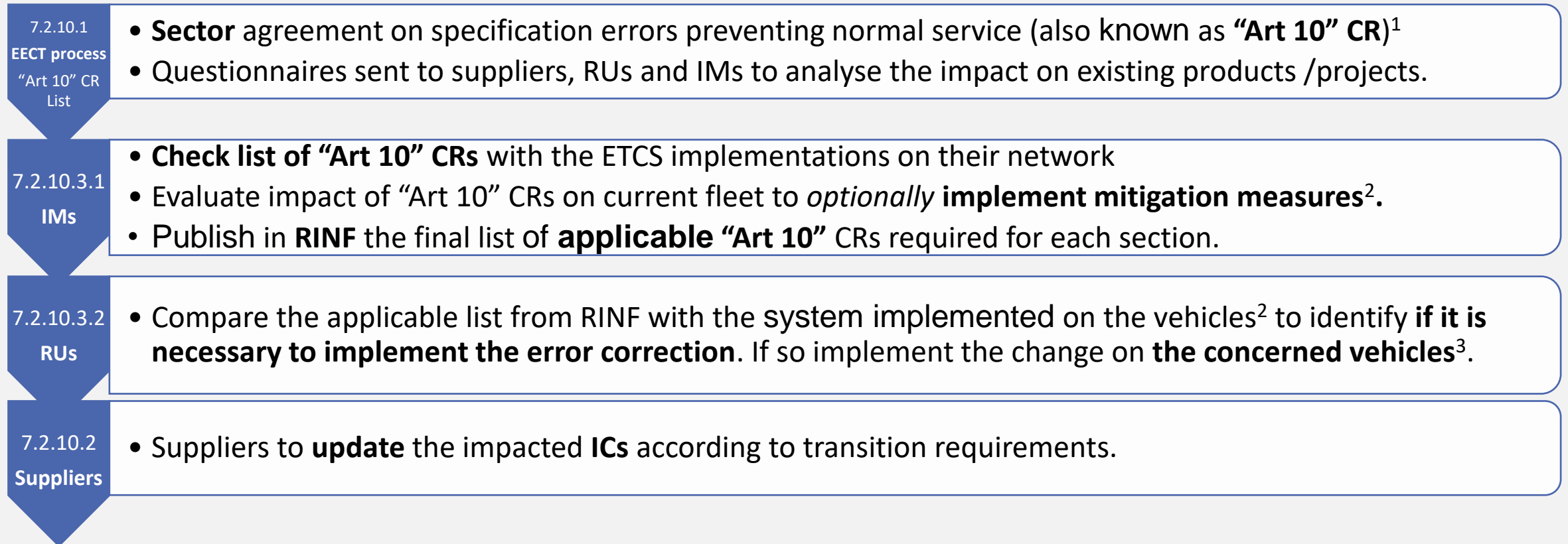
Possibility to use baseline 3 sets of specifications #2 and #3 according to transition periods in table B1.1 (rows 9 and 10). It is required to **implement applicable error corrections**.

**Trackside:** Can be deployed based on all previous system versions based on SRS Chapter 6.

# Evolution of Appendix A sets of specs



# Specifications error corrections workflow



<sup>1</sup> 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” .

<sup>2</sup> 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

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

# CCS TSI Amendment 2024 (CR 644)

## Error correction

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:**

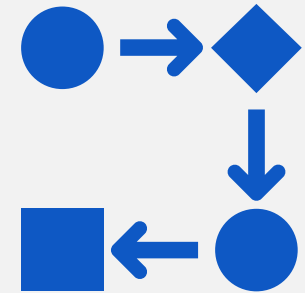
- 6 months from the start conditions.
- Next events follows This registration.

### 7.2.10.3.1. Infrastructure Manager responsibilities

The Infrastructure Manager shall register in the related RINF<sup>1</sup> parameter which error corrections are applicable (i.e. the errors preventing normal service in the network) for the on-board. This shall be registered at the latest ~~12~~ 6 months after the ~~lastest date between the~~ entry into force of the ~~is~~ TSI and the ~~Baseline Compatilty Analysis (BCA) including the answers to the questionnaires is published by the Agency.~~ This shall be also registered in case of new or upgrade trackside implementation within its network.

- **Remove Appendix B references to “IM Decision”:**

- Table B2 row 1 and Table B3 rows 1 and 3 to remove the term "publication of IM decision" by "registration in RINF of the applicable CR".



# 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

## 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 TSI Amendment 2024 (CR 643)

## Appendix B phases cascading principle

- Based on multiple comments on examples, cascading principle shall be better reflected in Appendix B, and not only in the application guide (see example 'yellow' > add 'applicable **if design phase starts...**' or applicable **if design phase ends...**').
- Add 1 sentence in Table B1.1 to explain that if a 'vehicle in production phase' has a certain implementation requirement, this should be considered during the vehicles in design phase. (see example below > even if vehicle design phase has ended before 01<sup>st</sup> January 2030, newly built vehicles being placed on the market after 01<sup>st</sup> January 2030 must be based on a vehicle type with the use of ETCS B3R2 or ETCS B4R1, so the vehicle type has a **time limitation** until 01<sup>st</sup> January 2030 for newly built vehicles being placed on the market).
- Merge row 5 and 8 (minimum ETCS OBU up to system version 2.1) into row 9 (use of former set 2 of specifications)

| Former sets of specifications #2 and #3 |                           |  |  |   |   |   |  |
|---|---------------------------|--|--|---|---|---|--|
| 9                                       | Appendix A<br>- Table A 2 | Appendix A -<br>Table A 2 2 -<br>Set of<br>specification #2.<br><u>The minimum<br/>reduced on-<br/>board envelope<br/>is the envelope<br/>up to ETCS<br/>system version<br/>2.0.</u> | The<br>specifications in<br>Appendix A -<br>Table A 2 does<br>not include<br>ETCS system<br>version 2.0,<br>since the<br>minimum<br>reduced on-<br>board envelope<br>is the envelope<br>up to ETCS<br>system version<br>2.1. | Applicable<br><br><u>- if design<br/>phase starts<br/>after 28th<br/>September<br/>2026 3-years<br/>after entry<br/>into force of<br/>the TSI</u><br><br><u>or</u><br><br><u>- if design<br/>phase ends<br/>after 01st<br/>January 2030</u> | Applicable <del>from</del> <u>if<br/>design phase ends</u><br><u>after</u> 01 <sup>st</sup> January<br>2030<br><br>In any case the error<br>correction provisions<br>in point 7.2.10 shall<br>be respected with its<br>corresponding<br>transition period.<br><br>No constraint shall be<br>exported to the other<br>subsystem. | Applicable on<br>newly built<br>vehicles <u>placed<br/>on the market<br/>from</u> <u>after</u> 1 <sup>st</sup><br>January 2030<br><br>In any case the<br>error correction<br>provisions in<br>point 7.2.10<br>shall be<br>respected with<br>its<br>corresponding<br>transition<br>period. | Not applicable<br><br>In any case the<br>error correction<br>provisions in<br>point 7.2.10 shall<br>be respected with<br>its corresponding<br>transition period.<br><br>No constraint<br>shall be exported<br>to the other<br>subsystem. |

# New Vehicle-Type vs Conformity to Type

Phases defined in section 7.2.4

| No         | TSI point(s)                        | TSI point(s) in previous version | Explanation on TSI change | Transition regime  |  |   |                      |
|------------|-------------------------------------|----------------------------------|---------------------------|--|--|---|----------------------|
|            |                                     |                                  |                           | Design phase started after TSI enters into force                                     | Design phase started before TSI enters into force  | Production phase  | Vehicle in operation |
| <u>CMD</u> |                                     |                                  |                           |  |  |   |                      |
| 11         | 4.2.2 (b) – Cold Movement Detection | CMD Optional                     | CMD Mandatory             | Directly applicable when ETCS is installed for the first time into a vehicle design. | Applicable from 01 <sup>st</sup> January 2028 when ETCS is installed for the first time into a vehicle design. | Applicable on newly built vehicles placed on the market from 01 <sup>st</sup> January 2030. | Not applicable       |

# CCS TSI (EU) 2023/1695 Enhancements and system versions



# 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

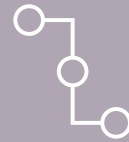


Train Detection  
Compatibility

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

## Level 2

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



ETCS DAC readiness

\*SS-153 still Reserved



# 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 it will bring?***

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

**“Baseline Light”** Agency ERA/OPI/2024-3 ([Link](#))

# ETCS system versions

## New ETCS system versions introduced:

ETCS up to system  
version 1.0  
(introduced in Baseline 2)



ETCS up to system  
version 2.0

(introduced in Baseline 3MR1)



Trackside system version 1.1

ETCS up to system  
version 2.1

(introduced in Baseline 3R2)

- GPRS
- Online key management



New:  
ETCS up to system  
version 2.2

(introduced as part of Baseline 4)

- ATO GoA2



New:  
ETCS up to system  
version 3.0

(introduced as part of Baseline 4)

- readiness for:
- FRMCS
  - Supervised manoeuvres (SM)



Trackside system version 2.3  
FRMCS + GSM R  
SM with shunting signal

ATO introduced in ETCS system version 2.2 as compatible function (backwards and forwards).

### FRMCS/DAC (Supervised manoeuvres) readiness:

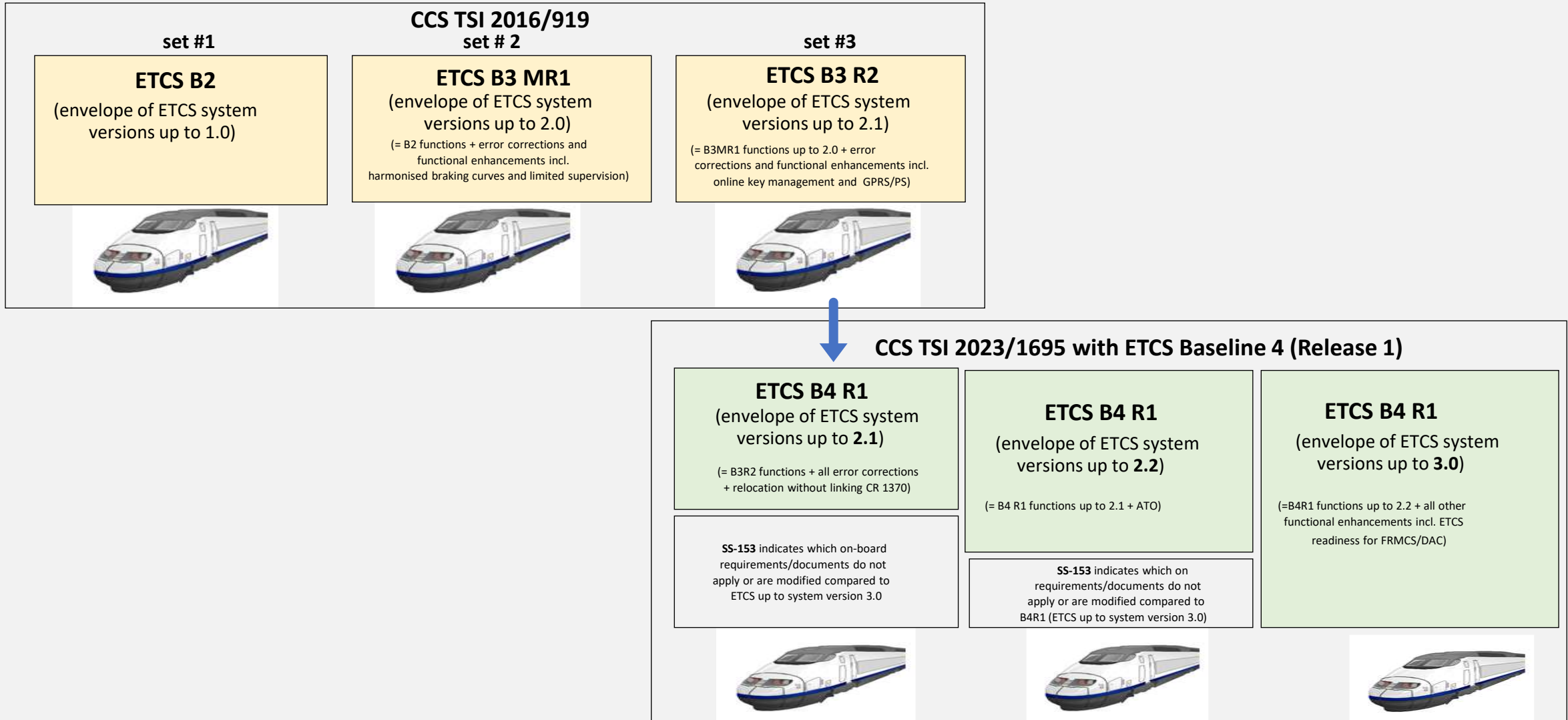
For on-board: introduced as part of ETCS system version 3.0 (backwards compatible).

For trackside:

- As incompatible function (system version 3.0) when only FRMCS is available/no shunting signals.
- As compatible function (system version 2.3) when both GSM-R and FRMCS/shunting signals are available.

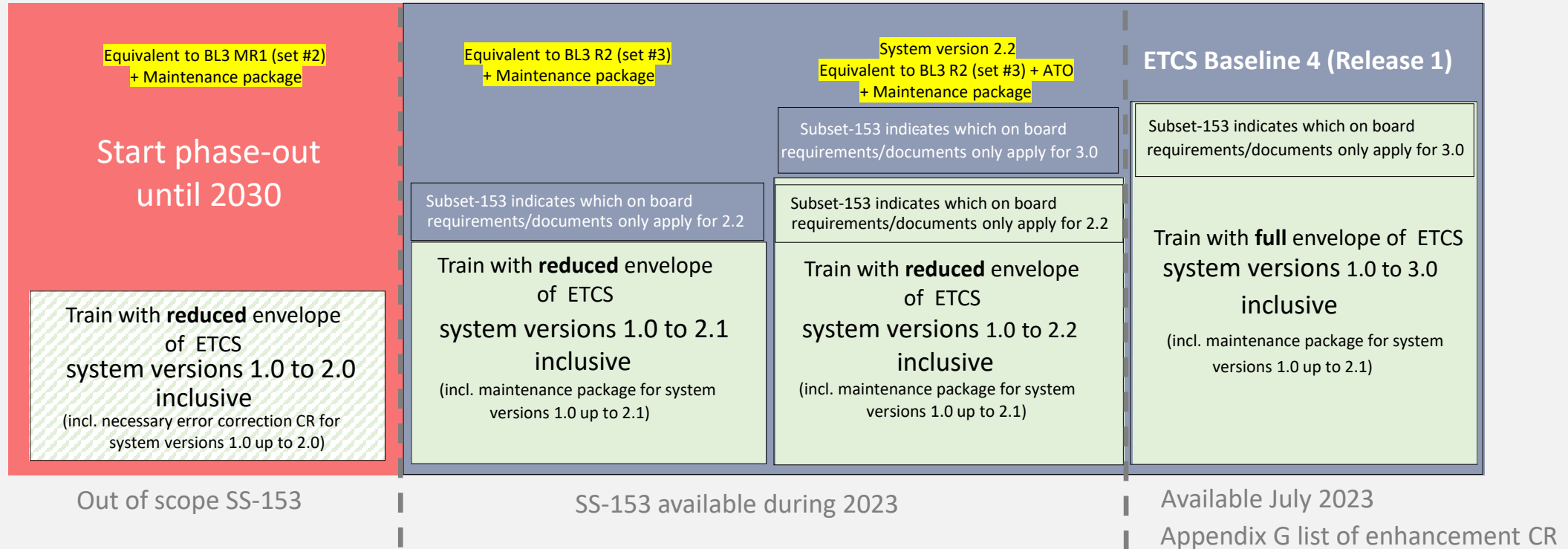


# ERTMS Specifications – Evolution of ETCS Baselines/ETCS System versions



# B4R1 set of specifications

## On-board reduced envelope and 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 will be ready during **2023**.

Until then, on-board envelopes 2.1 and 2.2 can be based on the full on-board envelope 3.0 minus the **individual enhancement CR solutions listed in Appendix G**.

# Questions & Answers



# CCS TSI (EU) 2023/1695

## Future evolution



# CCS TSI 2023 Application Guide



## Planning

- ✓ **1st step – Q2 2024** - Published 18/06/2024 ([link](#))  
Appendixes B (Transition Regime) & G (Partial fulfilment – System Versions)  
Error corrections examples  
First editorial review (new document from template)

- 🚧 **2nd step – Q4 2024** ([Draft v1.1](#) delivered to CCS TSI WP #71)  
ATO (informative subsets)  
FRMCS guideline  
Updated subsets (based on UNISIG proposal)

**Following steps –2025**  
(To be detailed)

**Train Detection Compatibility** Application Guide will be extracted to an independent document



# CCS TSI (EU) 2023/1695 Reports



- **Art 6** ETCS, ATO, FRMCS product availability
- **Art 12** ESC/RSC
- **Art 13** TDC specific cases
- **Agency Opinions**
  - ☒ CTO council Baseline light ERA/OPI/2024-3 ([Link](#))
  - FRMCS v2 (End 2024)
  - Error corrections and special vehicles

# CCS TSI future evolution

- **EC request** letter received on 21/08/2024
  - REC by end 2026: FRMCS, DAC, Cybersecurity
  - REC by end 2028: ETCS SV 3.1 compatible
  - After 2030
- **System Pillar - STIP**
  - Pre-assessment of CR bundles
  - Linked with EC request topics



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