

# TSI Revision Package 2023: Key Changes

## Part I – Rolling stock and CCS

15 June 2023

12.00 [CEST]

***Welcome! Webinar to start soon!***

#ERAwebinars



Josef Doppelbauer

Executive Director | ERA



Antoine Defossez

Project Officer | ERA



Oscar Martos

Project Officer | ERA



Juan Hernández Fernández

Project Officer | ERA



# TSI package 2023 - status

Texts adopted by the Railway Interoperability and Safety Committee (RISC) on 30 March 2023 ([Comitology Register \(europa.eu\)](https://eur-lex.europa.eu/))

1. Commission Implementing Regulation **amending** Commission Regulations (EU):
  - No 321/2013 (**WAG TSI**),
  - No 1299/2014 (**INF TSI**),
  - No 1300/2014 (**PRM TSI**),
  - No 1301/2014 (**ENE TSI**),
  - No 1302/2014 (**LOC&PAS TSI**),
  - No 1304/2014 (**NOI TSI**)
  - and Commission Implementing Regulation (EU) 2019/777 (**RINF**)
2. Commission Implementing Regulation **amending** Implementing Regulation (EU) 2019/773 (**OPE TSI**)
3. Commission Implementing Regulation **repealing** Regulation (EU) 2016/919 (**CCS TSI**)
4. Commission Implementing Decision **amending** Implementing Decision 2011/665/EU (**ERATV**)

Translations ongoing - Publication and entry into force expected during summer 2023

Focus on some aspects of the TSI package for the subsystems rolling stock and CCS:

- Unique authorisation for passenger coaches;
- Derailment detection and prevention for freight wagons;
- Noise assessment of composite brake blocks at IC level;
- New transition regime for TSIs applicable to rolling stock and CCS;
- Framework to manage the specification changes;
- Enhancements (ATO, FRMCS and DAC readiness) and system versions;

# “Unique authorisation” for passenger coaches



## LOC&PAS TSI

- 7.1.1.5. Conditions for having a vehicle type authorisation and/or an authorisation for placing on the market of passenger coaches not limited to a particular area of use.
- 7.1.1.5.1 Conditions applicable to coaches intended to be used in **predefined formations**
- 7.1.1.5.2 Additional optional conditions applicable to coaches intended to be used in **general operation**

# What did we want to achieve?

Authorise a



in all



with a single



Authorisation delivered by ERA

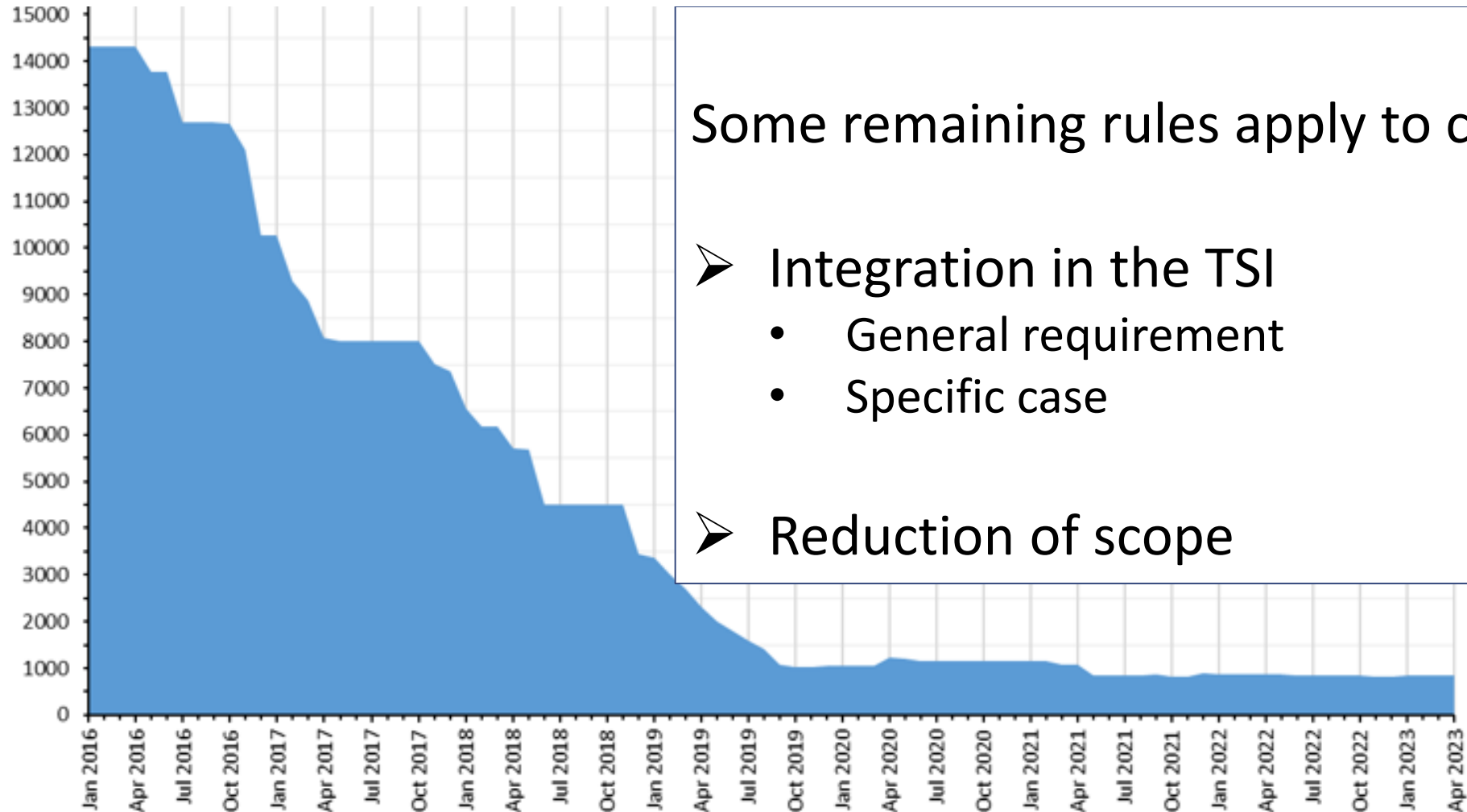
No National Safety Authority

No National rule

No Designated Body

# No national rule?

## Cleaning up national rules: process ongoing since 2016



Some remaining rules apply to coaches:

- Integration in the TSI
  - General requirement
  - Specific case
- Reduction of scope

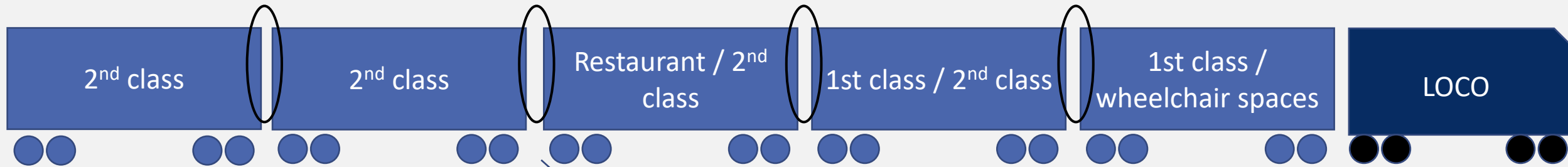


# Specific issue with national rules: Compatibility with train detection systems

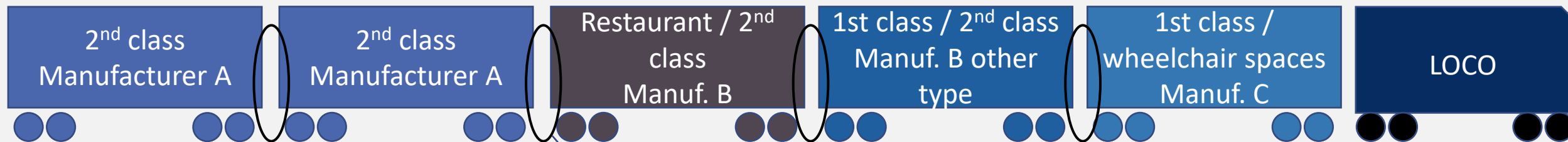
**Principle: to express the characteristics of the vehicles/trains and of the train detection systems in an harmonised way, i.e. the frequency management principle**

Pending the notification of specific cases referred to in Article 13 of CCS TSI, the notified national rules remain applicable

# Difference between coaches used in predefined formations and coaches for general operation



All coaches are from the same platform of Manufacturer A  
No Interfaces to specify – point 7.1.1.5.1



Coaches from different manufacturers  
Interfaces are to be specified in addition to the other reqs  
Point 7.1.1.5.2 **in addition to** 7.1.1.5.1

# Derailment detection and prevention for freight wagons



## LOC&PAS TSI

- 4.2.9.3.7 Derailment detection and prevention signal processing
- 4.2.9.3.7a On-board derailment detection and prevention function

## WAG TSI

- 4.2.3.5.3 Derailment detection and prevention function
  - 4.2.3.5.3.1 General requirements
  - 4.2.3.5.3.2 Derailment prevention function (DPF)
  - 4.2.3.5.3.3 Derailment detection function (DDF)
  - 4.2.3.5.3.4 Derailment detection and actuation function (DDAF)

# The different functions available (1)

Derailment  
Prevention  
DPF



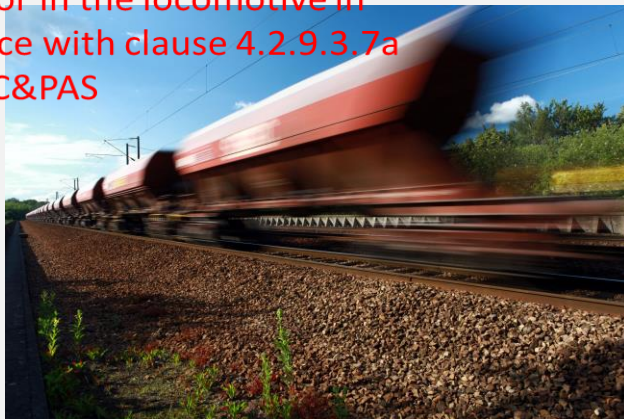
precursor to derailment  
detected



The DPF/DDF can be fitted in the freight wagon in accordance with clauses 4.2.3.5.3.2/4.2.3.5.3.3 of TSI WAG or in the locomotive in accordance with clause 4.2.9.3.7a of TSI LOC&PAS

In any case, the signal processing will be in accordance with point 4.2.9.3.7 of TSI LOC&PAS.

Derailment  
Detection  
DDF



derailment  
detected



## The different functions available (2)

Derailment  
Detection  
and  
Actuation  
DDAF



derailment detected

Application of brakes  
No driver override à  
The risk of false  
derailment  
detections shall be  
limited to  
an acceptable level.  
DDAF can be isolated  
directly in the wagon  
when stopped.

It is allowed to combine functions:

- DPF and DDF
- DPF and DDAF

# Acoustic assessment of composite brake blocks at IC level



## TSI NOI

- 4.2.3.a. Friction elements for wheel tread brakes
- 5. INTEROPERABILITY CONSTITUENTS
  - 5.2.1. Friction element for wheel tread brakes
- 6. CONFORMITY ASSESSMENT AND EC VERIFICATION
  - 6.1.2.1. Friction element for wheel tread brakes of freight wagons
- Appendix F - ASSESSMENT OF ACOUSTIC PERFORMANCE OF A BRAKE BLOCK



# A new (and existing) IC

IC 'friction element for wheel tread brake' (brake blocks) already had requirements in the TSI WAG (for braking performance)

In the revised TSI Noise, there are additional requirements for the acoustical certification. The same component needs to be assessed at IC level against both TSIs

The testing process (bench test) is very similar, so the economical cost is kept controlled. Existing exemptions for the TSI WAG are kept for the requirements of the TSI WAG only. New exemptions are defined in the TSI Noise for the requirements of the TSI Noise only.

**Important! The wagons must be assessed at subsystem level against the TSI Noise (pass-by Noise) in any case.**

# The new transition regime defined in TSIs LOC&PAS, WAG and CCS



## LOC&PAS TSI

- 7.1.1.1. Application to newly built rolling stock
- 7.1.1.2. Application to ongoing projects
- 7.1.3. Rules related to the EC type or design examination certificates.
- Appendix L - Changes of requirements and transition regimes

## WAG TSI

- 7.1 Authorisation for placing on the market
- 7.1.1 Application to ongoing projects
- 7.2.3. Rules related to the EC type or design examination certificates
- Appendix A - Changes of requirements and transition regimes

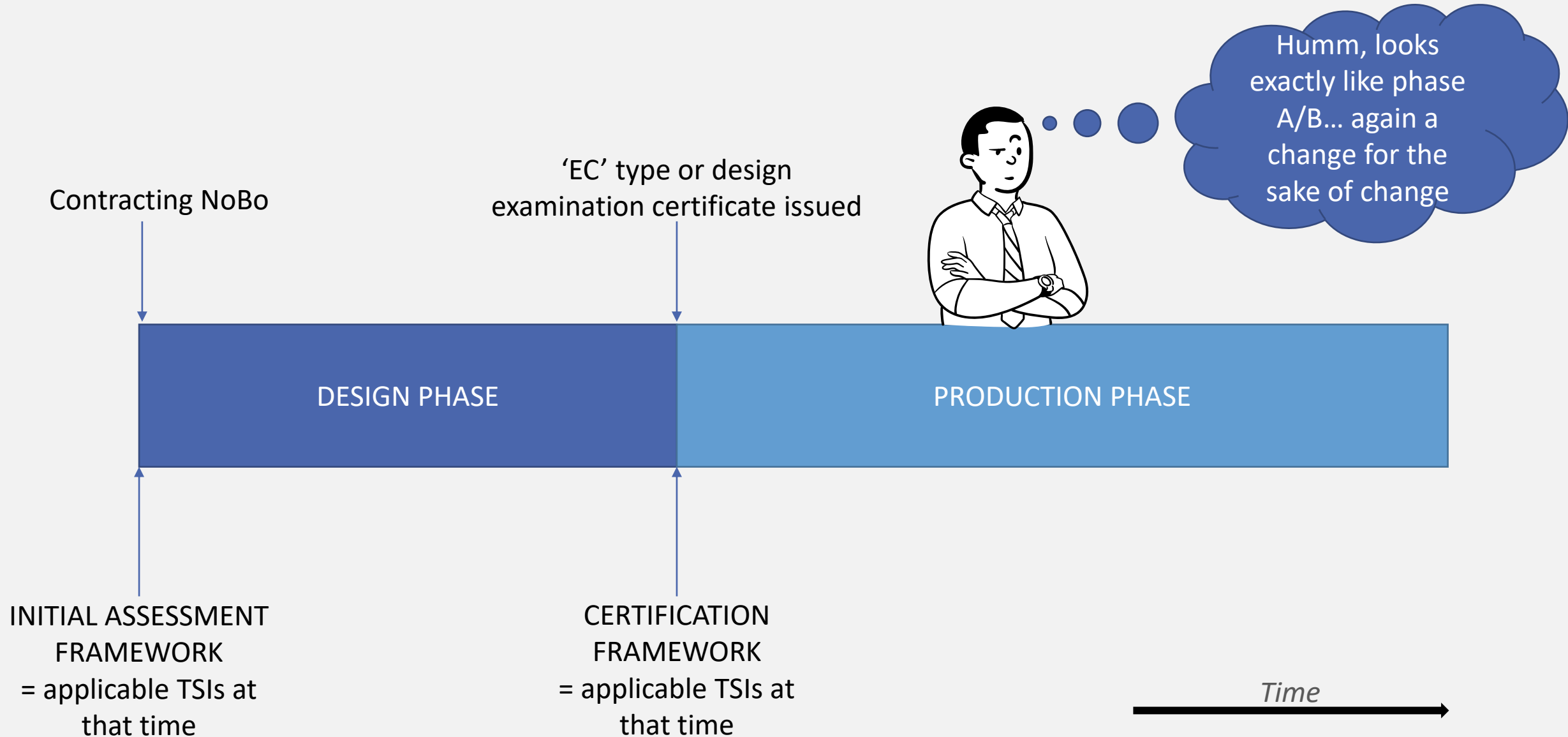
## CCS TSI

- 7.2.4. EC type or design examination certificates
- Appendix B - Changes of requirements and transition regimes

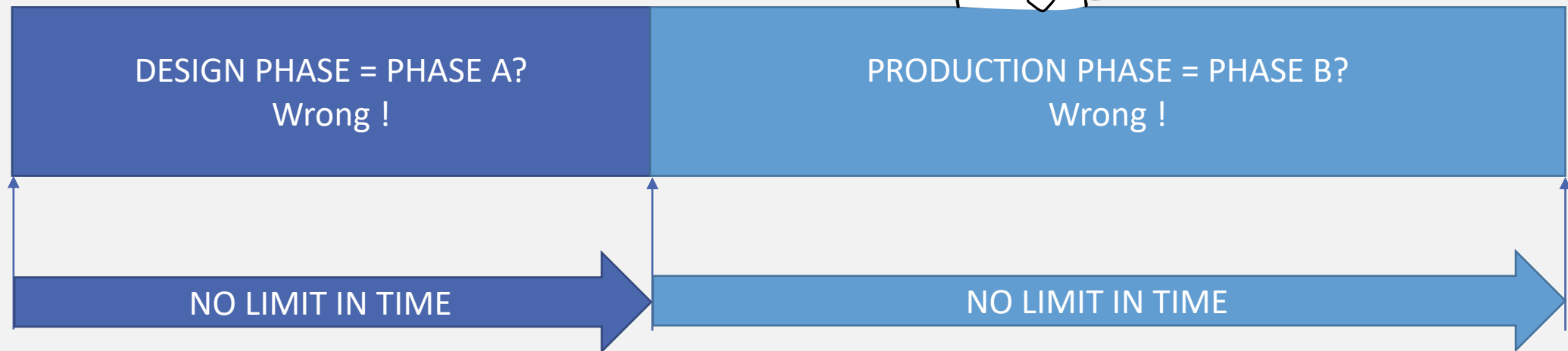
# Application to the Rolling Stock subsystem



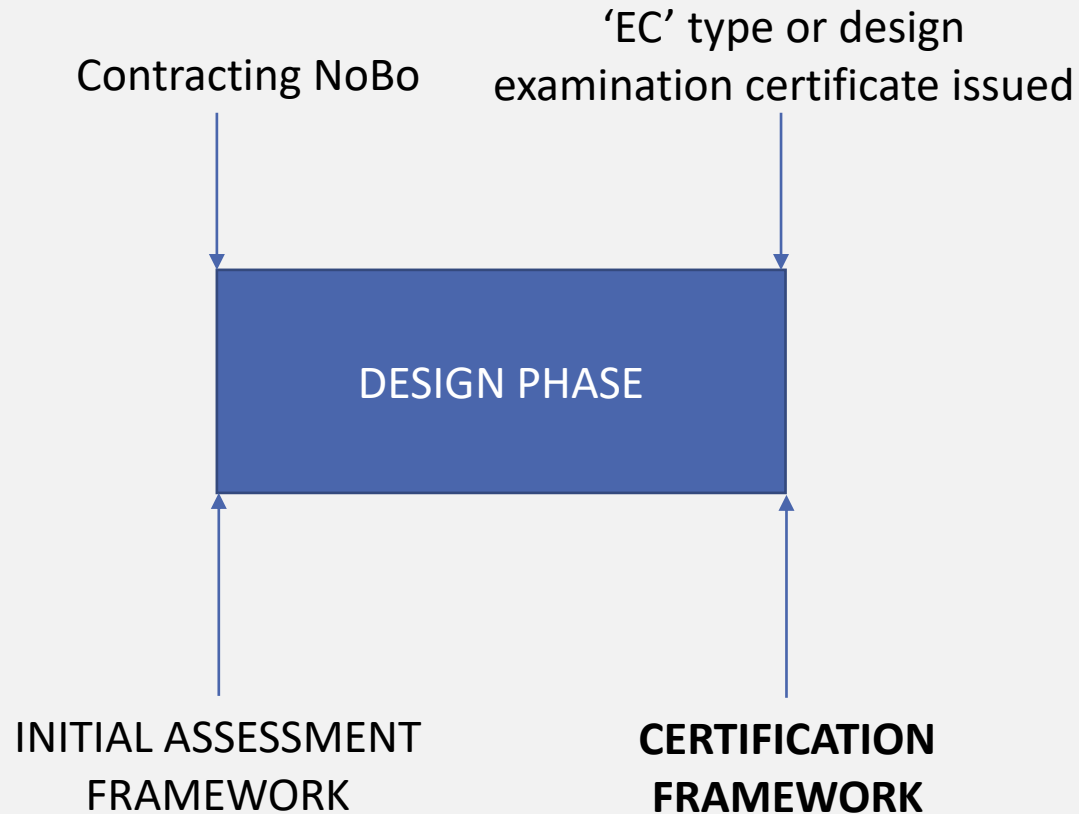
# Phases of a project



# Why introducing new terms ? 1st change compared to phase A / phase B



# Issuing the 'EC' type or design examination certificate 2nd change to the phase A/B principles



The notified body shall issue the **EC type or design examination certificate** referring to the **certification framework**

Assessment according to the certification framework requires categorisation of TSIs changes

Essential statement in the TSIs:

**Compliance with the “previous TSI” is deemed equivalent to compliance with this TSI, except for changes listed in Appendix\*.**

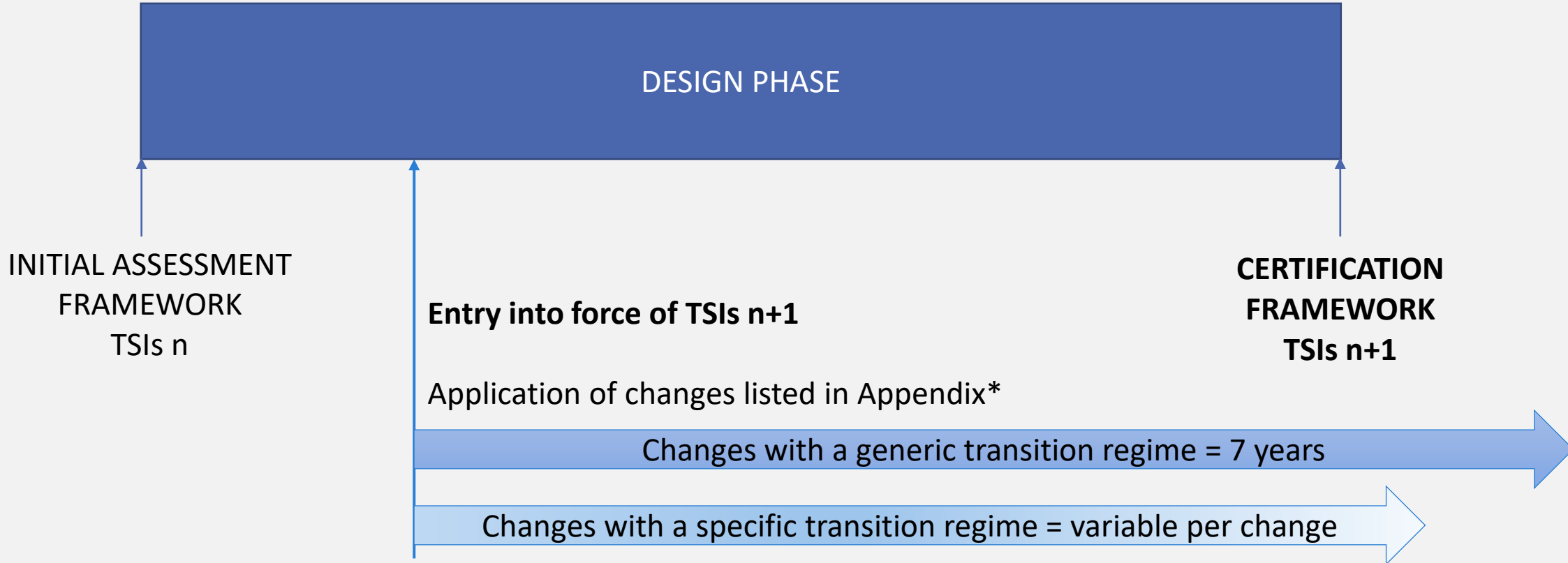
Appendix\* lists the changes made to the TSI and assigns a transition regime to each change:

- Changes with a **generic transition regime** of 7 years
- Changes with a **specific transition regime**

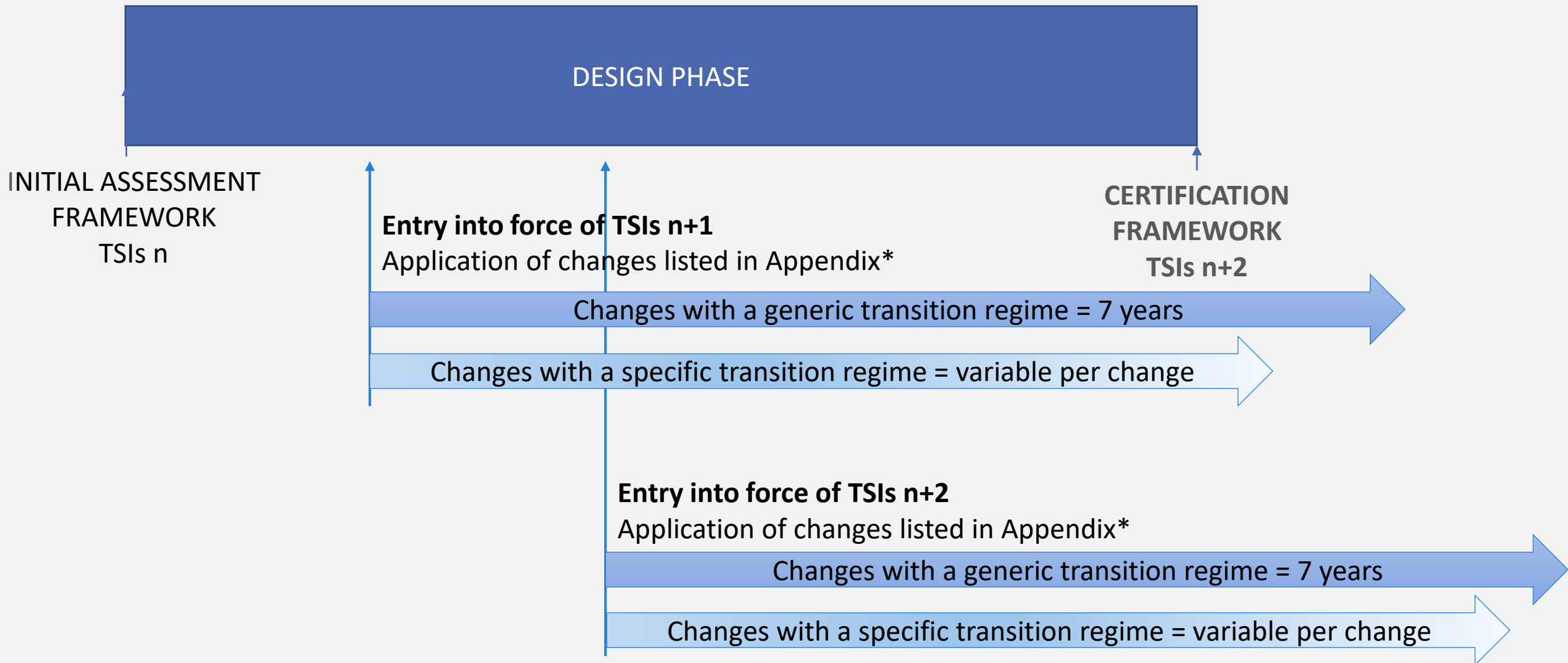
*\* Appendix A in WAG TSI, B in CCS, L in LOC&PAS, P in PRM, H in NOI*



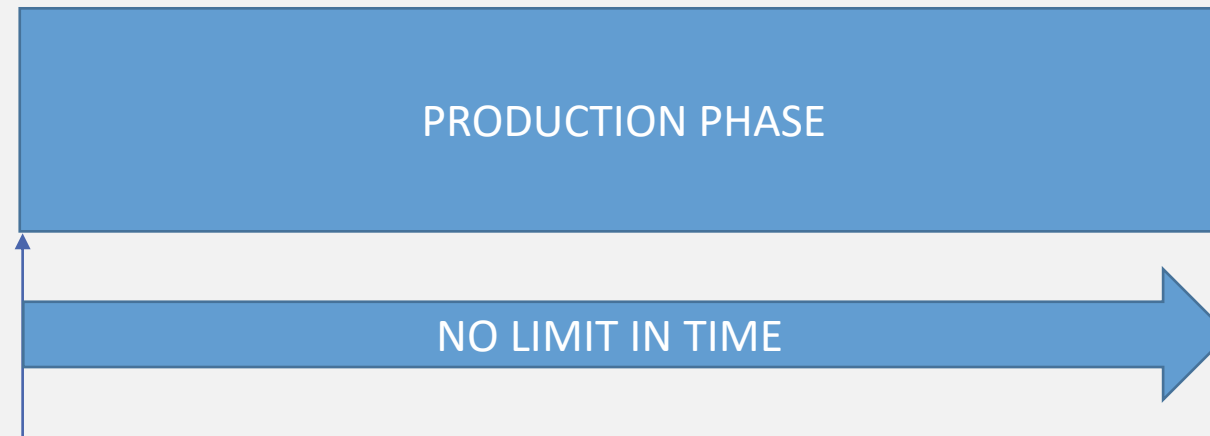
# What happens when new TSIs enter into force during the design phase?



# What happens when several new TSIs enter into force during the design phase?



# Validity of the EC type or design examination certificate



Only the changes to the TSIs with a specific transition regime can apply to Rolling Stock in production phase or to Rolling Stock in operation and make a type invalid

- A design phase can cover a type and one or several type variant(s) and type version(s).
- **For all type variant(s) and type version(s), the design phase is considered as starting at the same time as for the main type.**
  - This means that the Initial Assessment Framework of the variant/version is the same as for the main type (see next slide)

# Application to the CCS subsystems



# CCS Transition Regimes

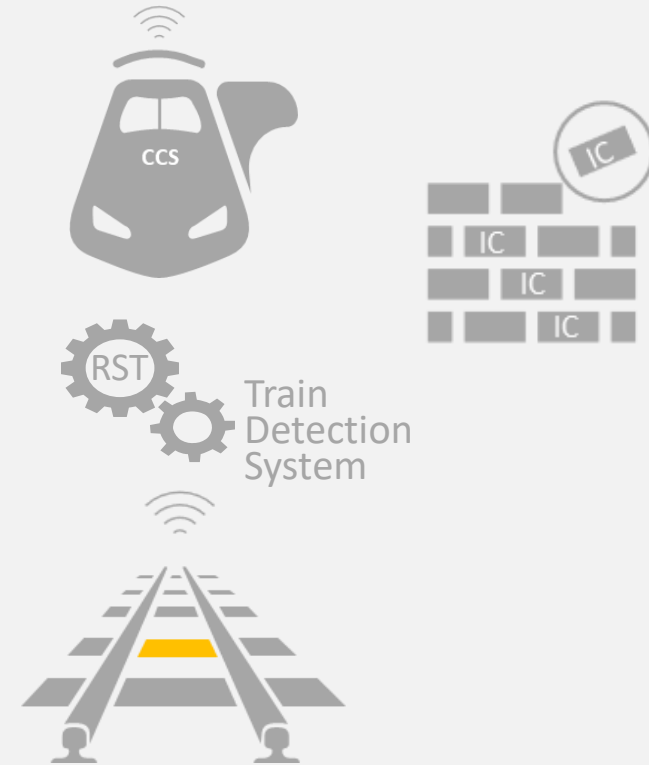
Introduced for the first time in the CCS TSI (Appendix B):

- 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

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

## Framework to manage the specification changes





# Main changes in the text of the CCS TSI

## Framework to manage the specification changes

- Error corrections / specification maintenance (Section 7.2.10)
- Single set of specifications in Appendix A
- Removal of partial fulfilment (Appendix G)



- Stronger and clearer obligations on ERTMS deployment
- Migration and Transition phases (Appendix B)



- Railway Mobile Radio (RMR) and FRMCS concept introduction
- Parts/Interoperability Constituents for new functionalities (ATO part, FRMCS ICs)

**RMR= GSM-R + FRMCS**



- Improvements in ESC/RSC sections



# 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)<sup>1</sup>
- 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*<sup>2</sup>.
- 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 vehicles<sup>2</sup> to identify **if it is necessary to implement the error correction**. If so implement the change on **the concerned vehicles**<sup>3</sup>.

7.2.10.2  
Suppliers

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

<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.

# Single 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 will be archived in the Agency website.

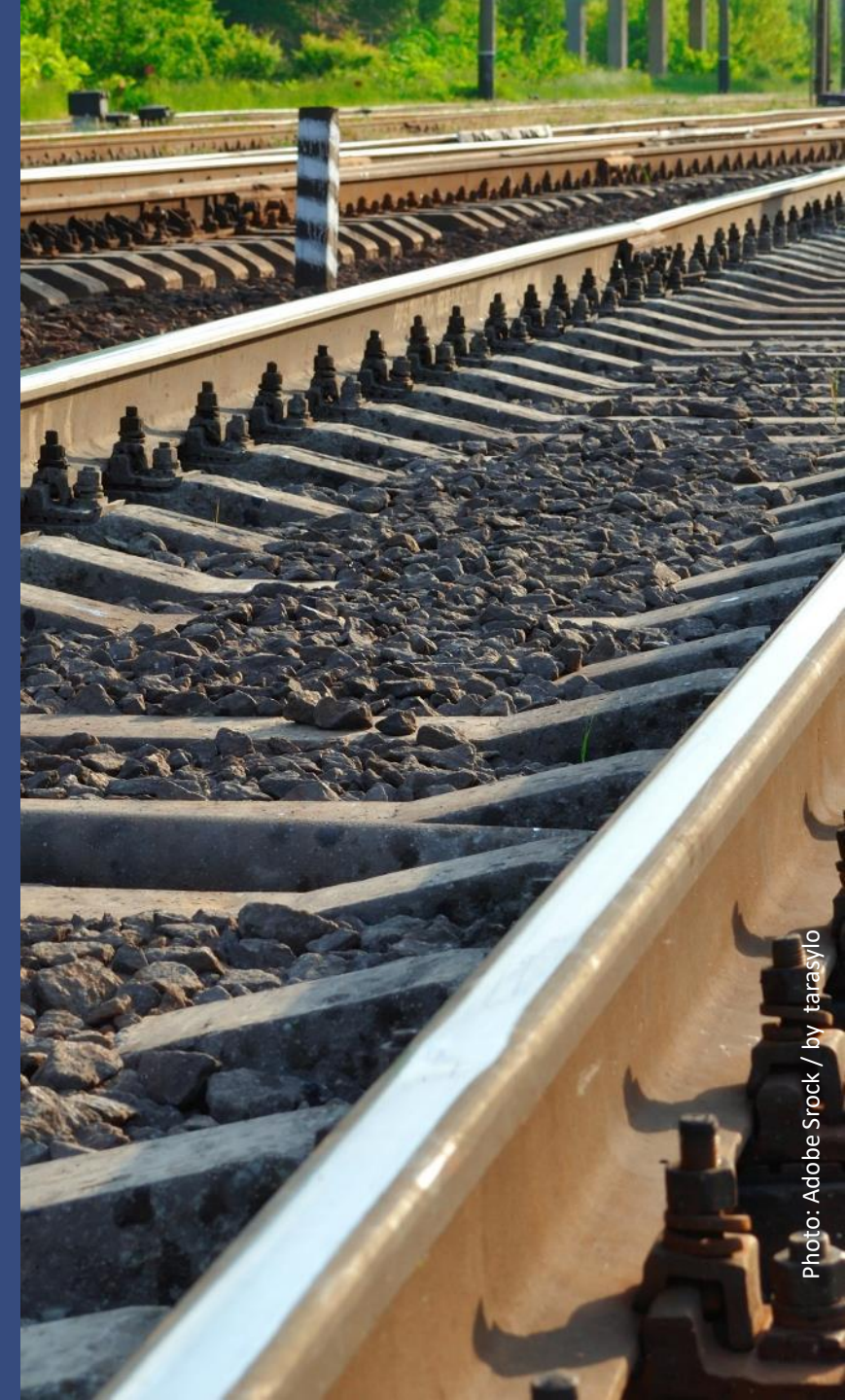
**On-Board:** Reduced envelope based on SS-153. Possibility to use baseline 3 sets of specifications #2 and #3 according to transition periods in table B1.1 (rows 9 and 10). It is required to **implement applicable error corrections**.

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

# 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 Enhancements and system versions



# New Features in Appendix A

## ATO

Introduction GoA 2



Modularity



Reduced envelope

**SS-153**

(Single set of specifications)\*



## FRMCS v1

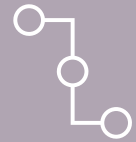
ETCS/ATO readiness for  
FRMCS



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). 

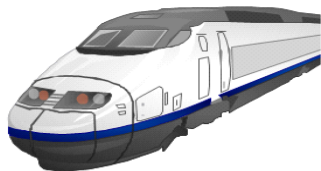
## *What it will bring?*

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

# 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:

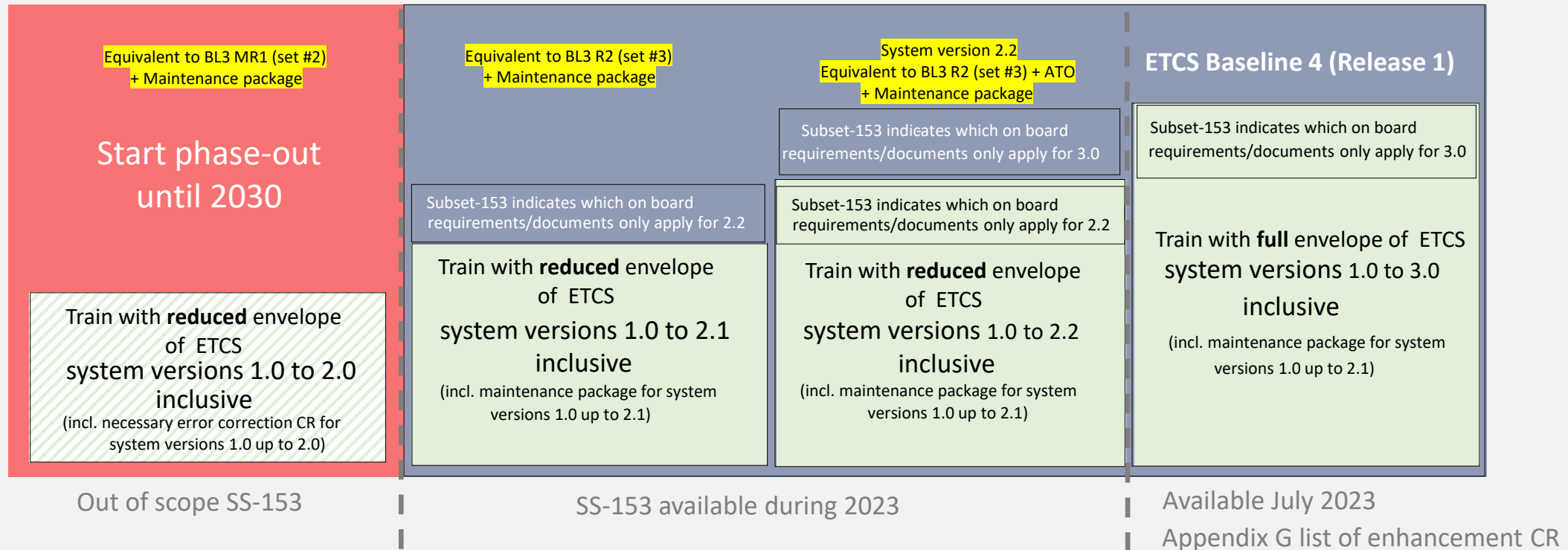
- As incompatible function (system version 3.0) when only FRMCS is available/no shunting signals.
- As compatible function (system version 2.3) when both GSM-R and FRMCS/shunting signals are available.





# Single 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



# Your Feedback



## Safety Leadership Training

19 June 2023, 09.00-17.00  
Valenciennes, France



# TSI Revision Package 2023 - Key Changes (Part II - Fixed Installations and Operation)

6 July 2023, 12.00-13.00



## ETCR Seminar

3-14 July 2023

Bruges, Brussels, Antwerp – Belgium



## European Rail Safety Days 2023

20-22 September 2023  
Tallinn, Estonia





ERA is migrating its OSS IT infrastructure to the Microsoft Azure cloud.

ERA has already contacted all the OSS Users, asking specific actions to finalise their account in OSS.

Read carefully all the communication sent to you by ERA and follow the indications provided.

**Your access to OSS could be withdrawn.**

If you have any issue in performing the actions provided on screen, contact us without any delay.





# THANK YOU

---

Moving Europe towards a sustainable and safe railway system without frontiers.

Follow us:

