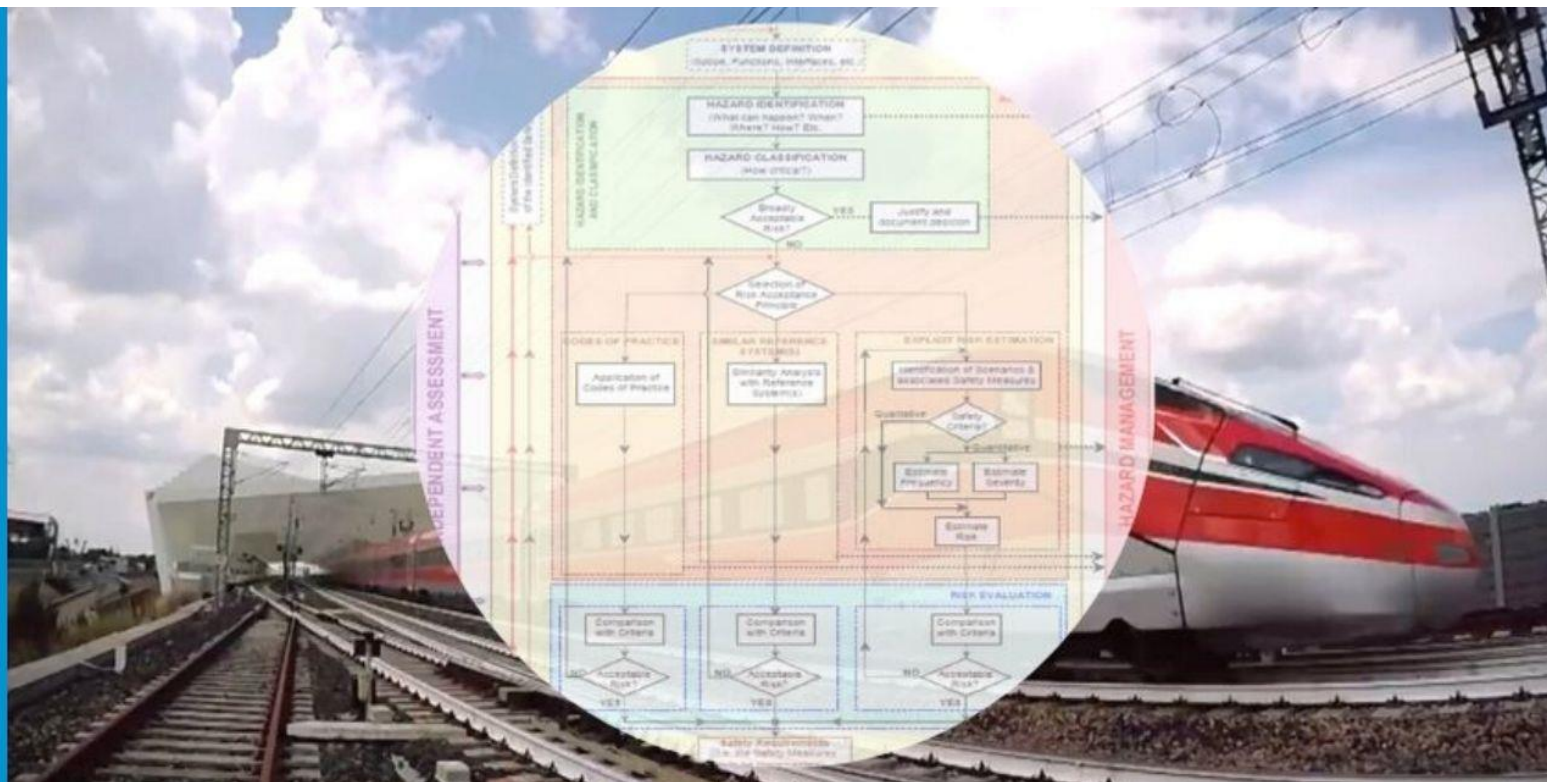




## 2.1 Technical Specifications of Interoperability – Rolling Stock



”

**ESPERTO  
VALUTAZIONE DEL RISCHIO E  
VERIFICA CE  
DEI SOTTOSISTEMI FERROVIARI**

*CORSO DI FORMAZIONE*

“

**ERA**  
*Pedro Mestre*

8 settembre 2020



# Background and legal framework

## Vehicle Authorisation (VA)

THE AGENCY ▾ ACTIVITIES ▾ **APPLICANTS ▾** LIBRARY ▾ EVENTS & NEWS ▾ REGISTERS ▾ CAN WE HELP YOU? ▾

ERA > Applicants > Applications for vehicle (type) authorisations

## Applications for vehicle (type) authorisations

[Share](#) [Tweet](#) [Share](#)

### APPLICANTS

Applications for single safety certificates

Applications for vehicle (type) authorisations

Applications for ERTMS approval

### Legal framework

[Commission Implementing Regulation \(EU\) 2018/545 of 4 April 2018 establishing practical arrangements for the railway vehicle authorisation and railway vehicle type authorisation process](#)

### Related guidance

[Practical arrangements for the vehicle authorisation process - Guidelines \(6Mb\)](#)

[Practical arrangements for the vehicle authorisation process - Examples \(174.3Kb\)](#)

### Related documents

[Overview of applicable legal framework \(158.5Kb\)](#)

### Related links

[ERATV database](#)

[ERADIS database](#)

[Technical Specifications for Interoperability](#)

[National rules](#)

[Conformity Assessment](#)

[FAQ](#)



## Directives & Regulations

- Agency regulation (2016/796)
- Interoperability Directive (2016/797) - IoD

## Commission Implementing Regulations

- Practical arrangements for VA (2018/545) – IA VA
- EC declaration of verification regulation (2019/250)
- Cross-acceptance (draft)
- Other (Fees & Charges, Board of Appeal)

## Guidance

- Guidelines for the practical arrangements for the vehicle authorisation process
- Catalogue of examples
- Guidance to the IA EC declaration of verification (draft)

## Agreements

- Cooperation agreements between Agency and NSAs
- Multilateral agreements

## TSIs

- **LOC&PAS, WAG, NOI, SRT, CCS, INF, ENE and PRM**

## Other legal texts

- **CSM RA Regulation (402/2013)**
- **Conformity assessment modules (2010/713)**

## Other

- **EVR specification (2018/1614)**
- **ERATV (2019/776)**
- **RINF (2019/777)**
- **RDD (2011/155/EU)**
- **National Rules**
- **Application guides (TSIs,Registers etc)**

## TSIs

- **LOC&PAS, WAG, NOI, SRT, CCS, INF, ENE and PRM**

## Other

- **National Rules**

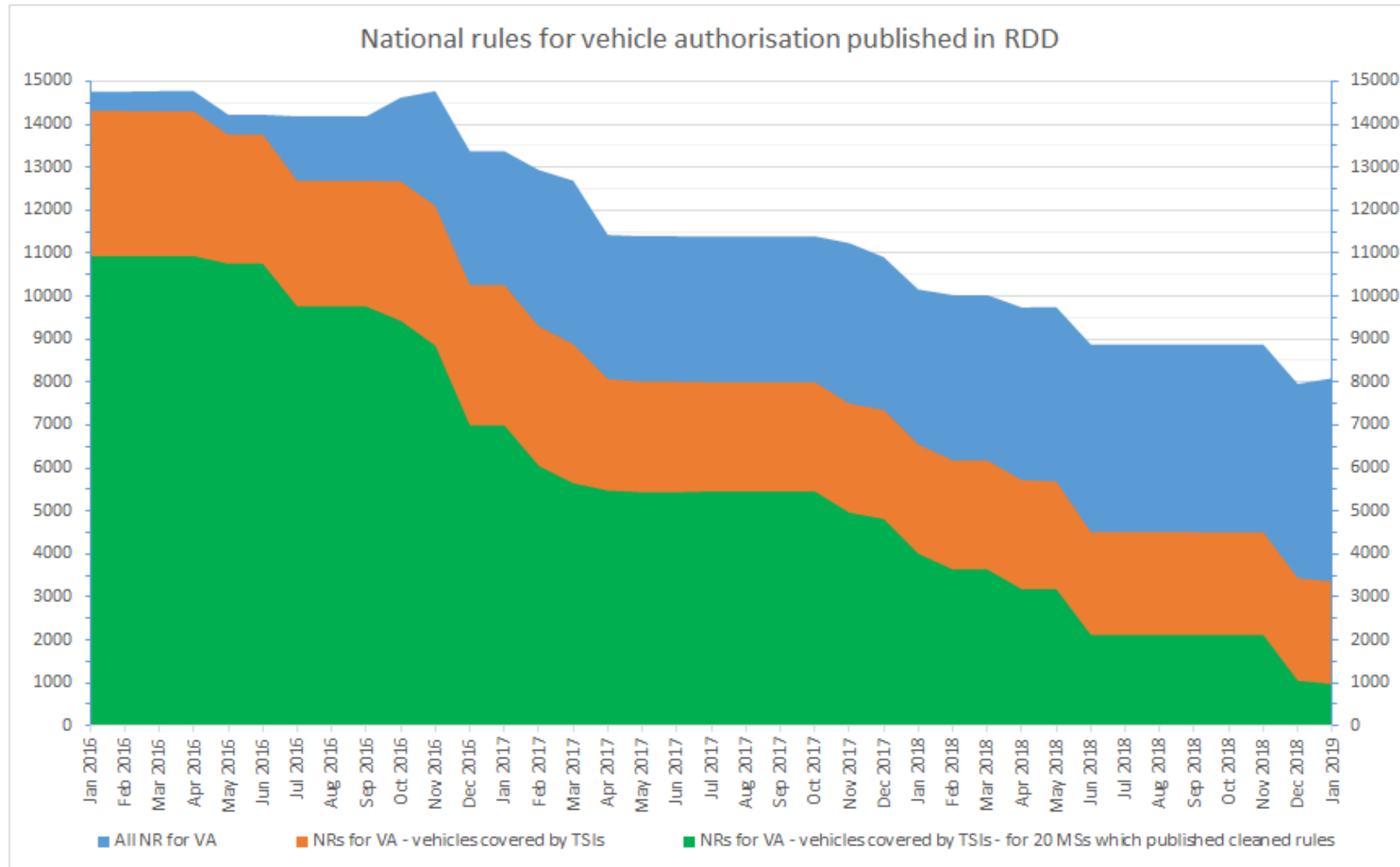
- New national rules may only be adopted in of the following cases (IoD article 14(4)):
  - when a TSI does not fully meet the essential requirements;
  - as an urgent preventive measure, in particular following an accident.
- Existing national rules (IoD article 13(2)) are limited to :
  - where the TSIs do not cover, or do not fully cover, certain aspects corresponding to the essential requirements, including **open points** as referred to in IoD Article 4(6). Case where non-application of one or more TSIs or parts of them has been notified under IoD article 7;
  - Specific cases listed but not described in TSIs;
  - Ensure technical compatibility with existing network not yet in compliance with TSIs;
  - Vehicles excluded from the scope of TSIs;
  - Urgent temporary preventive measure, in particular following an accident.

- The Agency made available in ERA website an assessment report covering the evaluation of NRs in addition to latest TSIs for all MSs;
- The Agency addressed to the relevant MSs, a technical opinion, when the evaluation of leads to a negative assessment;
- From 16 June 2019 and pending the SRD, RDD is the reference for applicants, NSAs and the Agency in terms of applicable NRs for VA.

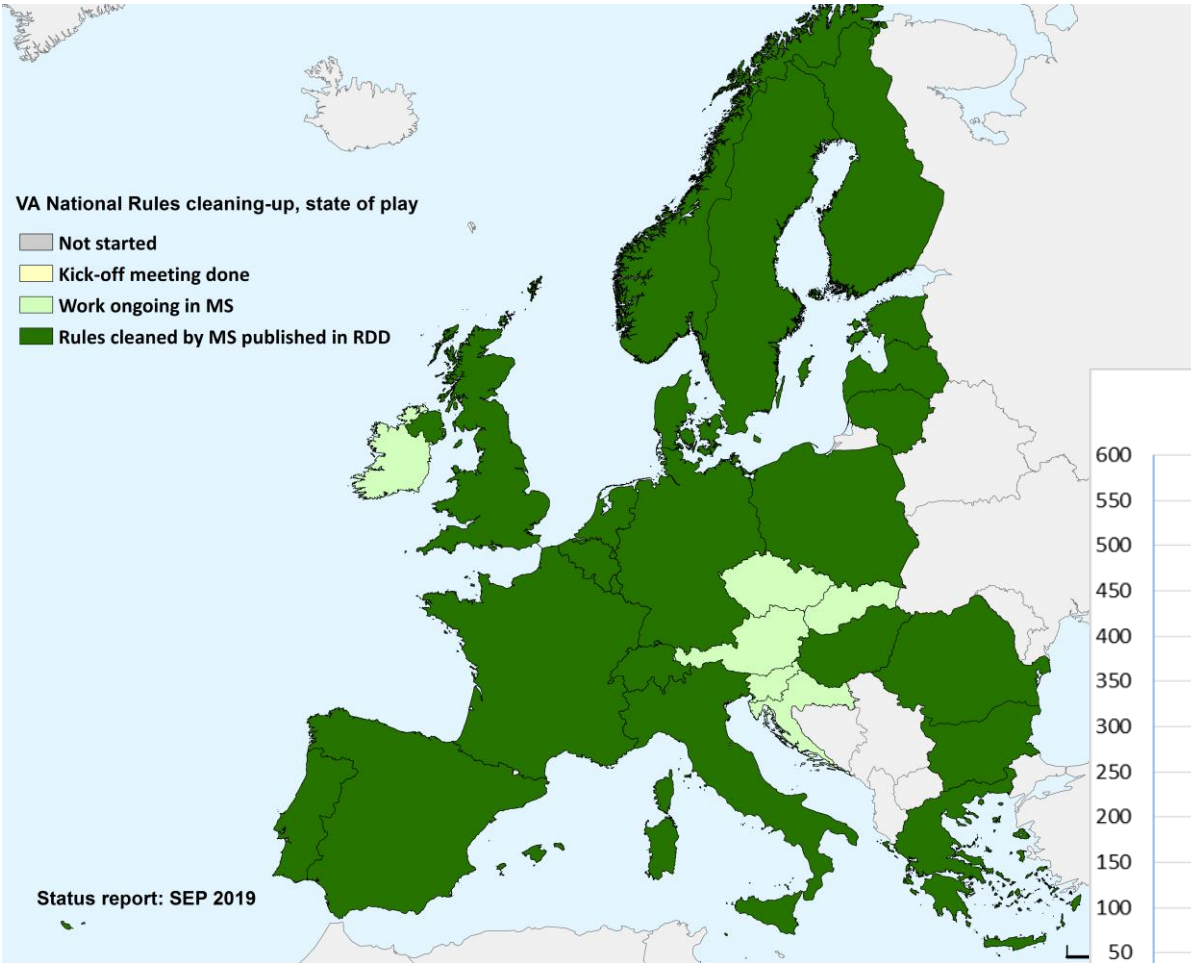




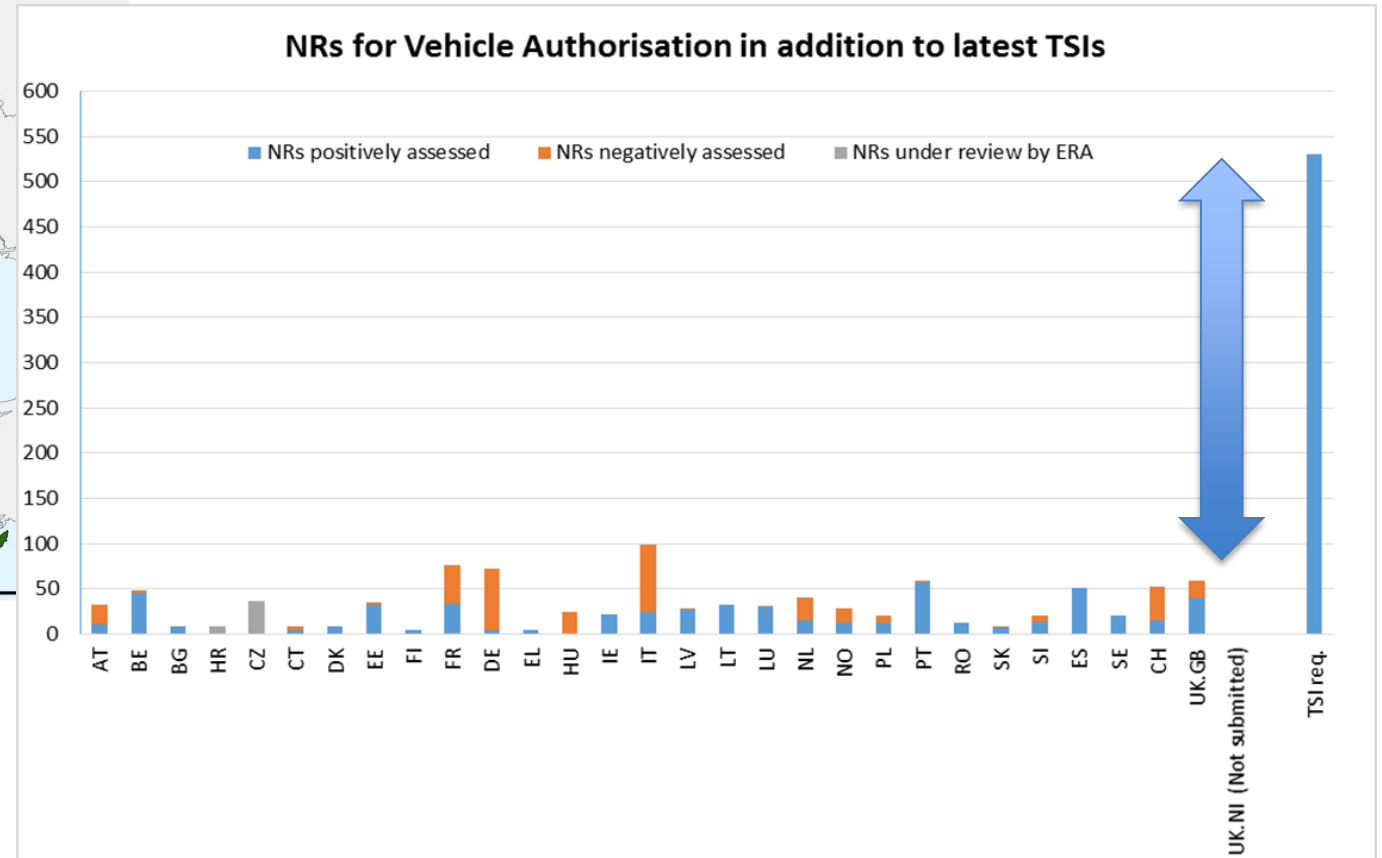
## National Rules Overview at EU level\*



\* Not updated. Only indicative.



## National Rules Overview at EU level\*



\* Not updated. Only indicative.

Other

- National Rules
- **RDD (2011/155/EU)**

- Contains national rules and acceptable national means of compliance;
- RDD also holds the classifications of rules agreed between MSs to facilitate cross acceptance;
- Management and publication of the content in RDD is the responsibility of the MSs;
- Publicly available: <http://rdd.era.europa.eu/rdd/>



The screenshot shows the homepage of the RDD SYSTEM V3.5.1. The header includes the European Union Agency for Railways logo and the title 'RDD SYSTEM V3.5.1'. A navigation menu contains links for Home, Part I - Application guide, Part II - NRD, Part III - NLF, Reports, Publication, and Help. The main content area features a 'Home' section with an 'Information (EU)' button. Below this, a welcome message states: 'Welcome to the reference document database (RDD)!' followed by a paragraph explaining the database's purpose. A link to the 'RDD User Manual' is provided. The section 'The Reference Document:' includes a link to 'Part I The Application Guide'. At the bottom, a note specifies that the Reference Document Application Guide v.3.0 refers to Commission Decision 2011/155/EU and is available in all European languages: BG, CS, DA, DE, EL, EN.



## Single Rules Database (SRD)

SRD

Existing Rules

Draft Rules

Acceptable  
National Means of  
Compliance

Classifications  
(VA NRs)

Record of  
rule  
notifications  
and  
evaluation



## TSIs

- **LOC&PAS, WAG, NOI, SRT, CCS, INF, ENE and PRM**

## Other legal texts

- **Conformity assessment modules (2010/713)**

## Other

- **National Rules**
- **RDD (2011/155/EU)**

- EC verification covers the compliance of the subsystem(s) to all essential requirements:
  - TSIs, National rules, Safety assessment report;
  - Other requirements needed.
- Applicant :
  - Performs the EC verification procedure for the subsystem(s);
  - Responsible for ensuring the subsystem(s) compliance with other applicable legal acts of the Union and any verifications by the assessment bodies required by the other rules;
  - Establish the EC Declaration of Verification;
  - EC Declarations of Verification including accompanying technical files are part of the application (Annex I 18.5 of 2018/545 – IA VA);
  - **No need for national declaration.**

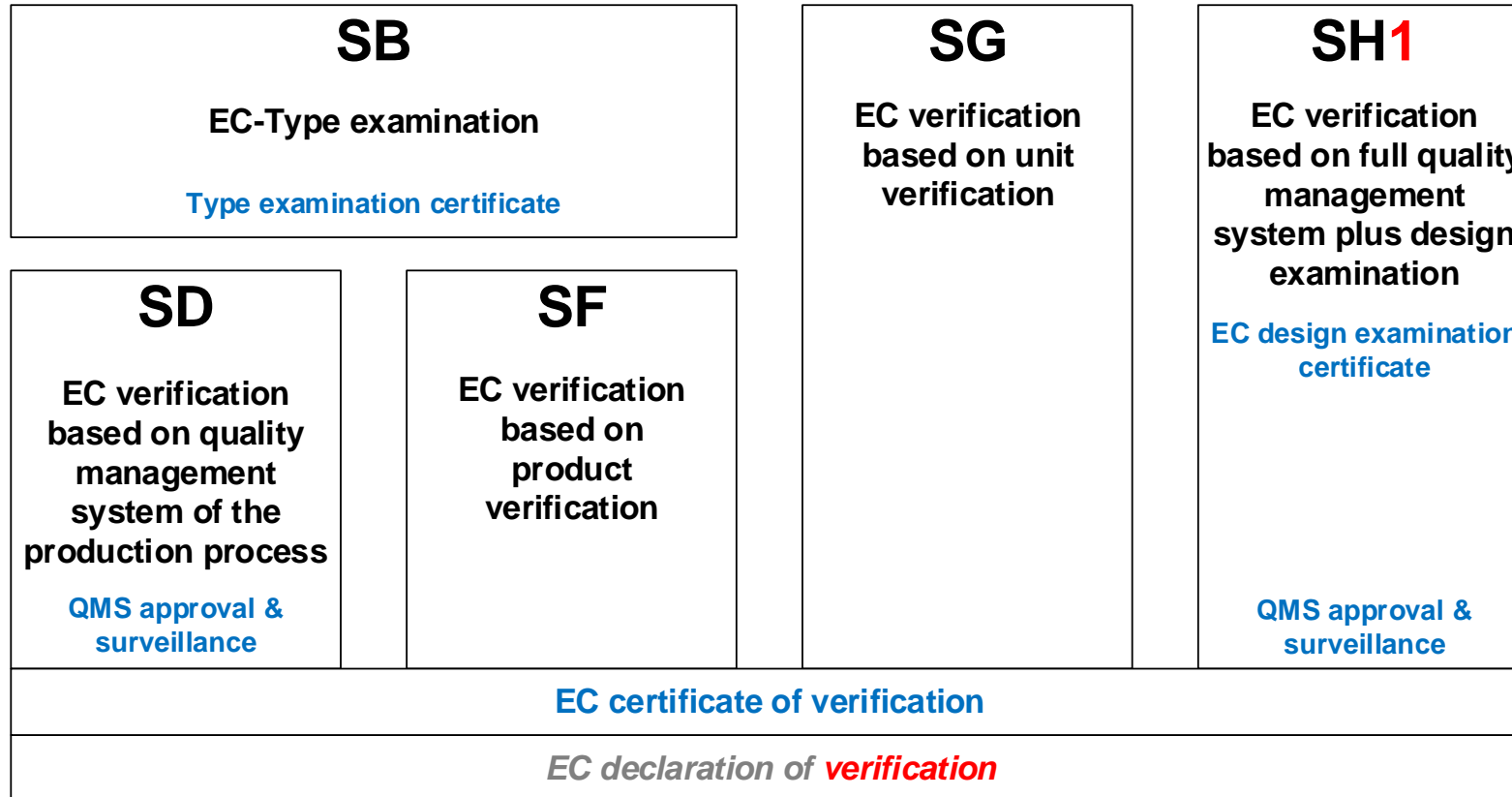


- EC Verification procedure is based on application of assessment Modules.
- Modules :
  - Are described in decision 2010/713/EC\*;
  - Cover procedures for conformity assessment (ICs) and EC verification (subsystems);
  - Define responsibilities of participants in the procedures: Manufacturer, applicant, notified body etc.
  - Specify documents necessary to attest conformity.

**\*Decision 2010/713/EC would be amended to apply to DeBo**







**Documents issued by notified bodies**

Documents issued by **applicant**  
(contracting entity or **manufacturer**)



- TSIs specify the application of modules in chapter 6;
- Some modules can be used only in combination with others;
- Modules may involve third party assessment (NoBo) or self-assessment (modules CA, CC).

Example:

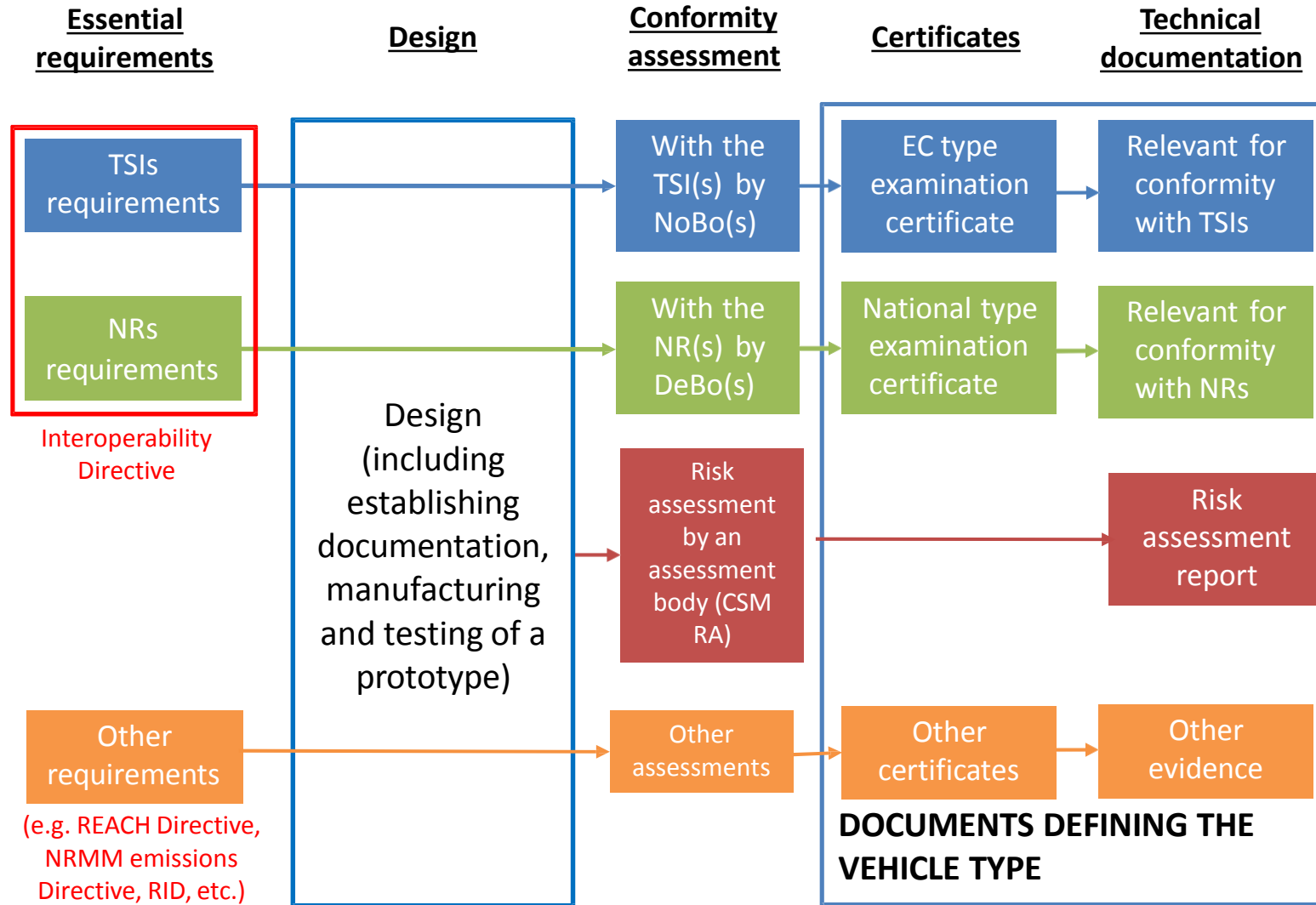
- TSI Loc&Pas 1302/2014 for ICs (Eg. For coupler):

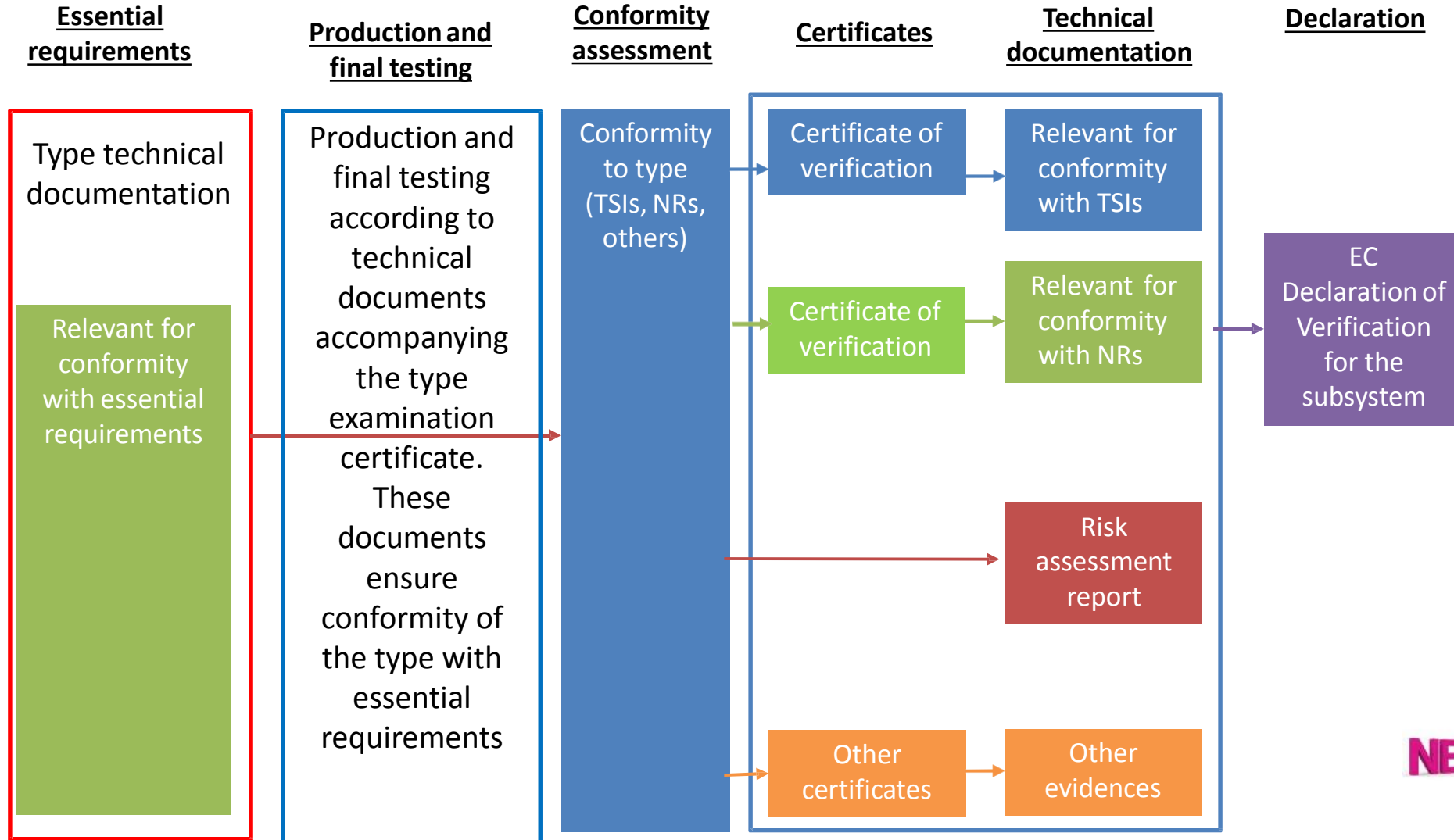
Point	Constituents to be assessed	Module CA	Module CA1 or CA2	Module CB + CC	Module CB + CD	Module CB + CF	Module CH	Module CH1
5.3.1	Automatic centre buffer coupler		X (*)		X	X	X (*)	X
5.3.2	Manual end coupling		X (*)		X	X	X (*)	X

- TSI Loc&Pas 1302/2014 for subsystem (RST):

Applicant chooses one combination of modules : (SB+SD) or (SB+SF) or (SH1). The assessment is done according to the combination of modules chosen.







## TSIs

- **LOC&PAS, WAG, NOI, SRT, CCS, INF, ENE and PRM**

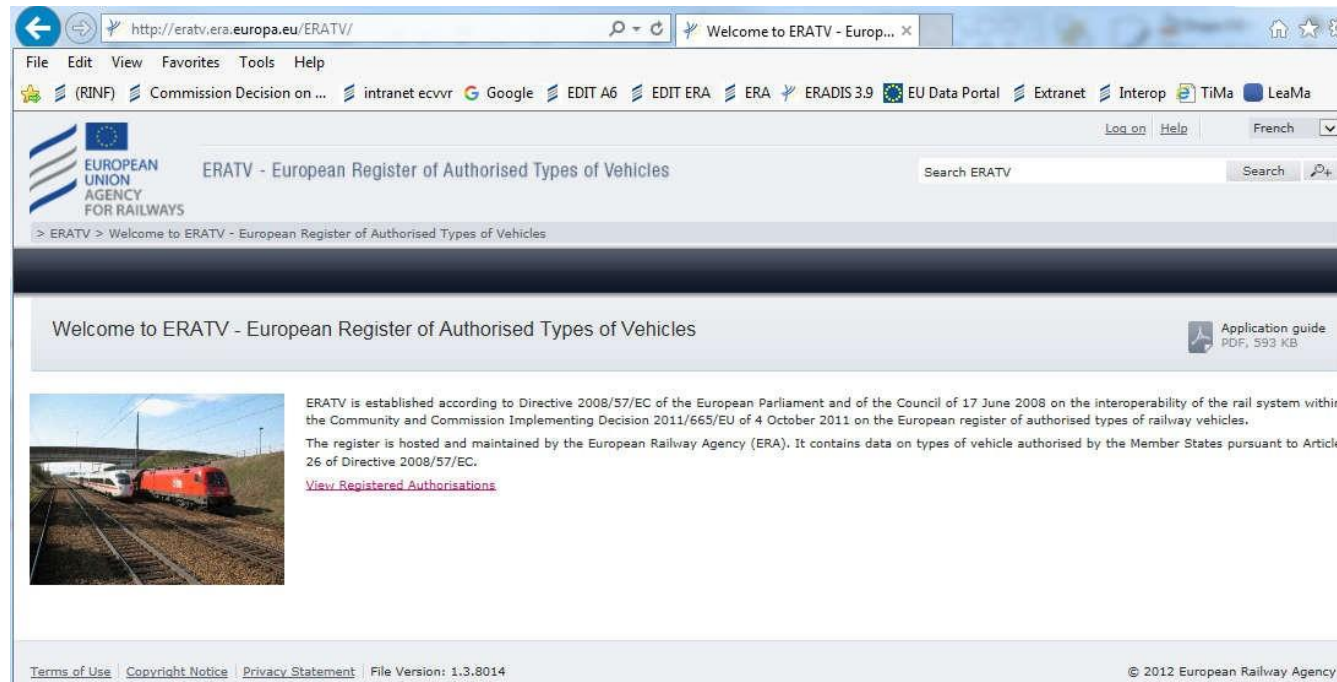
## Other legal texts

- **Conformity assessment modules (2010/713)**

## Other

- National Rules
- RDD (2011/155/EU)
- **ERATV (2019/776)**

- Contains authorised vehicle type;
- In operation since beginning of 2013;
- More than 500 type authorisations in ERATV as of today.
- Publicly available: <https://eratv.era.europa.eu/eratv>



The screenshot shows a web browser window displaying the ERATV website. The address bar shows the URL <http://eratv.era.europa.eu/ERATV/>. The page header includes the European Union Agency for Railways logo and the text "ERATV - European Register of Authorised Types of Vehicles". A search bar is visible with the text "Search ERATV". Below the header, there is a navigation menu with links for "Log on", "Help", and "French". The main content area features a welcome message and a link to an "Application guide PDF, 593 KB". A photograph of a train is shown on the left, and a text block on the right explains that ERATV is established according to Directive 2008/57/EC and contains data on types of vehicle authorised by Member States. A link "View Registered Authorisations" is provided. The footer contains links for "Terms of Use", "Copyright Notice", and "Privacy Statement", along with the file version "1.3.8014" and the copyright notice "© 2012 European Railway Agency".



- Applicant:
  - Responsible for the integrity of the data provided to the authorising entity;
  - Can fill-in part of the required data (technical data) on behalf of the authorising entity.
- Authorising entity:
  - Always issues a vehicle type authorisation even if the applicant has requested to have only a vehicle authorisation for placing on the market;
  - Responsibility for the data recorded in ERATV.



## TSIs

- **LOC&PAS, WAG, NOI, SRT, CCS, INF, ENE and PRM**

## Other legal texts

- **Conformity assessment modules (2010/713)**

## Other

- National Rules
- RDD (2011/155/EU)
- ERATV (2019/776)
- **RINF (2019/777)**



- Provides main features of the European Railway infrastructure;
- Publicly available: <http://rinf.era.europa.eu/RINF>;
- In particular, provides the value of the parameters to be used to check the compatibility between vehicle and route
- May be used for vehicle authorisation when RINF is referenced by TSIs (e.g. TSI Loc&Pas 4.2.8.2.9.4.2 on contact strip) or NRs



## RINF current state\*



\* Not updated. Only indicative.

## TSIs

- **LOC&PAS, WAG, NOI, SRT, CCS, INF, ENE and PRM**

## Other legal texts

- **Conformity assessment modules (2010/713)**

## Other

- **National Rules**
- **RDD (2011/155/EU)**
- **ERATV (2019/776)**
- **RINF (2019/777)**

## TSIs

- **LOC&PAS, WAG, NOI, SRT, CCS, INF, ENE and PRM**

## Other legal texts

- **Conformity assessment modules (2010/713)**

## Other

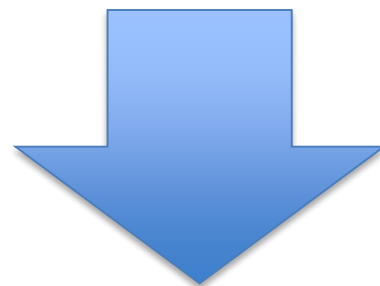
- **National Rules**
- **RDD (2011/155/EU)**
- **ERATV (2019/776)**
- **RINF (2019/777)**

## TSIs

- **LOC&PAS, WAG, NOI, SRT and PRM**

**TSIs**

- **LOC&PAS, WAG, NOI, SRT and PRM**



**TSIs applicable to  
Rolling stock (RST)**

# Rolling stock TSIs

## Structural and functional barriers

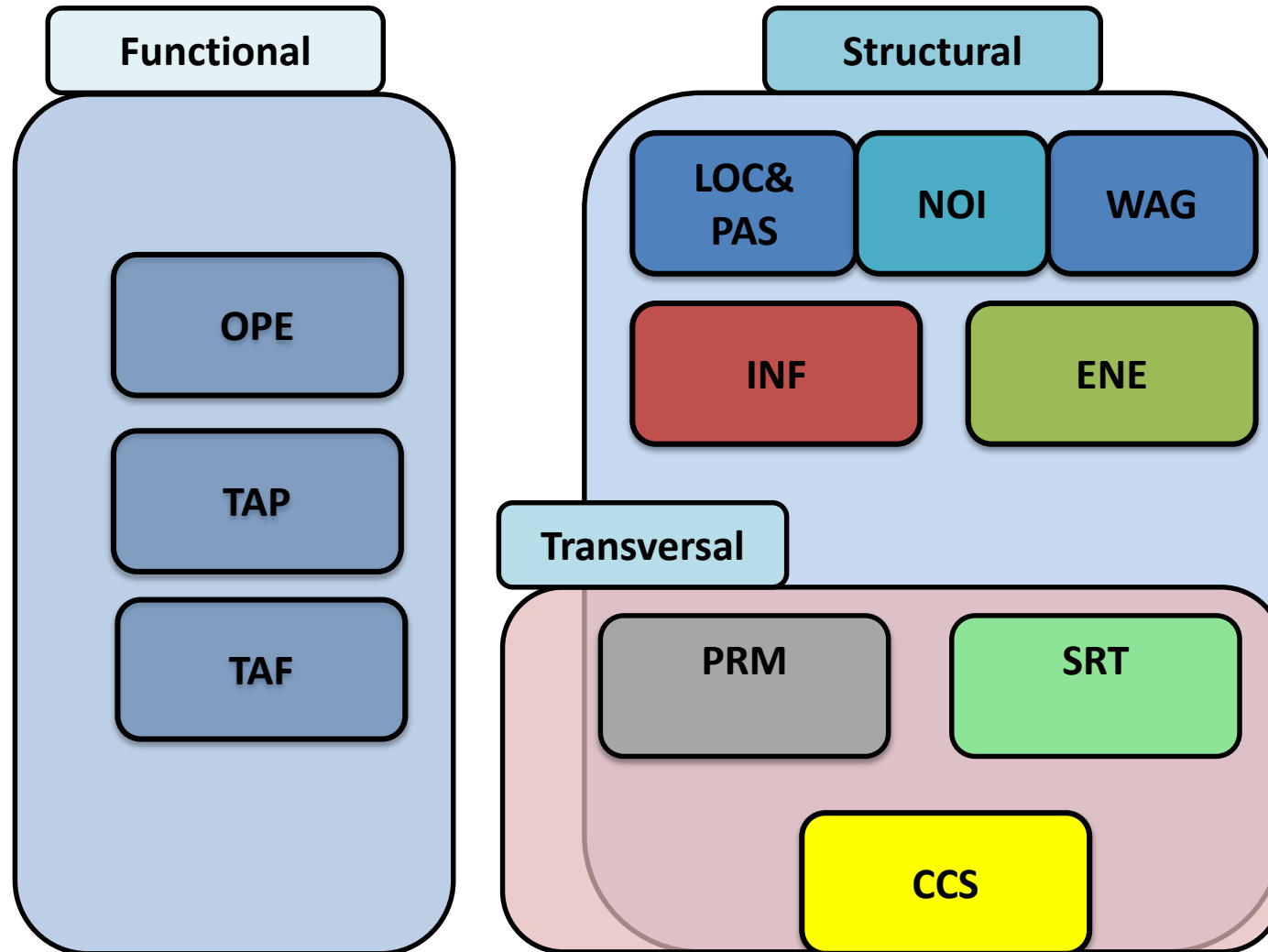
- Railways have greater or lesser interoperability depending on their conformity to standards of **track gauge, couplings, brakes, signalling, communications, loading gauge, operating rules**, etc.
- The **EU Technical Specifications for Interoperability (TSIs)** aim at removing these obstacles



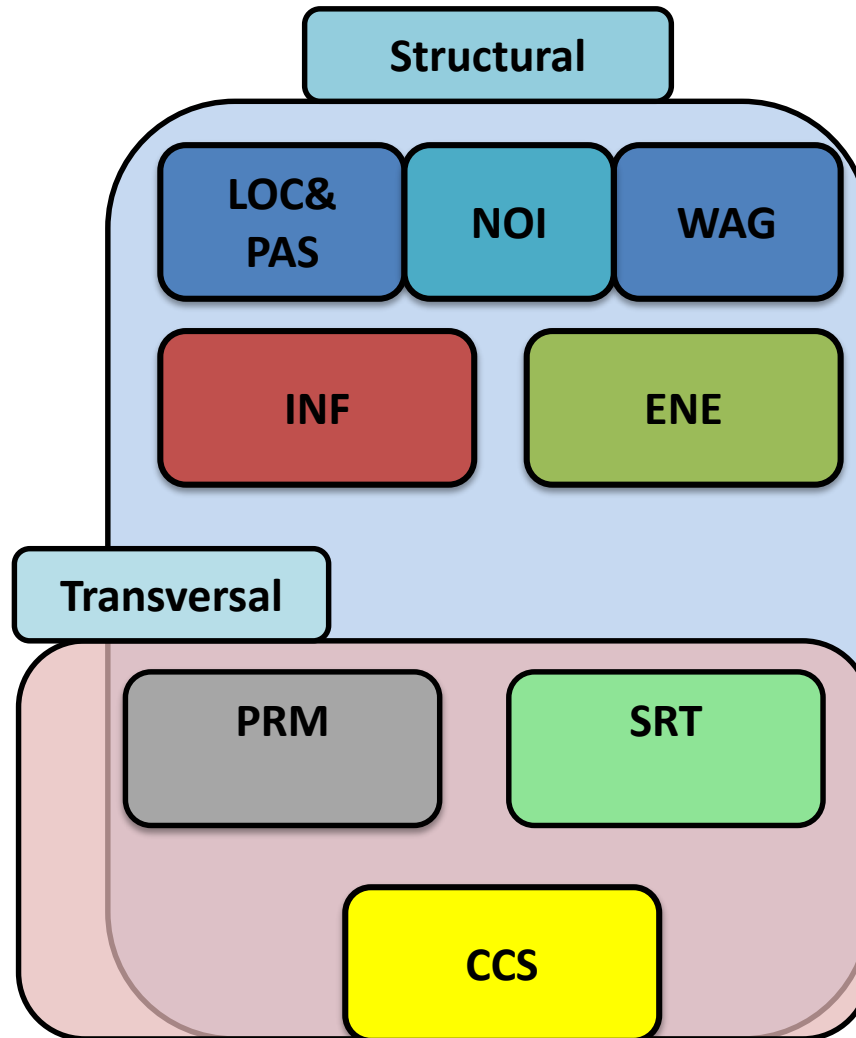
## Technical Specifications for Interoperability

- The TSIs are **EU Regulations**;
- The TSIs are **NOT a design manual**;
- The TSIs are as concise as possible, as extensive as necessary;
  - **only technical aspects critical for interoperability**
  - **only functional requirements, no specific technical solutions**
- TSIs may refer to (part of) EU standards, making them compulsory;
- The TSIs cover both structural and functional aspects of the railway system.

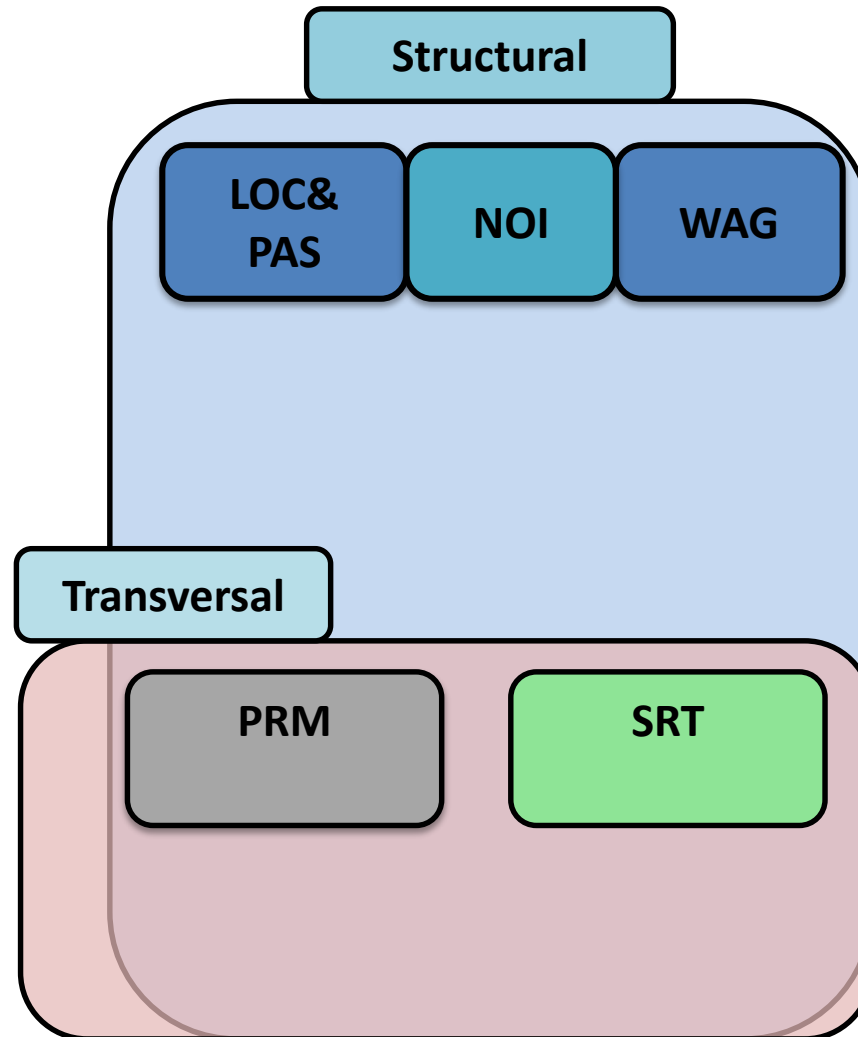
## Technical Specifications for Interoperability



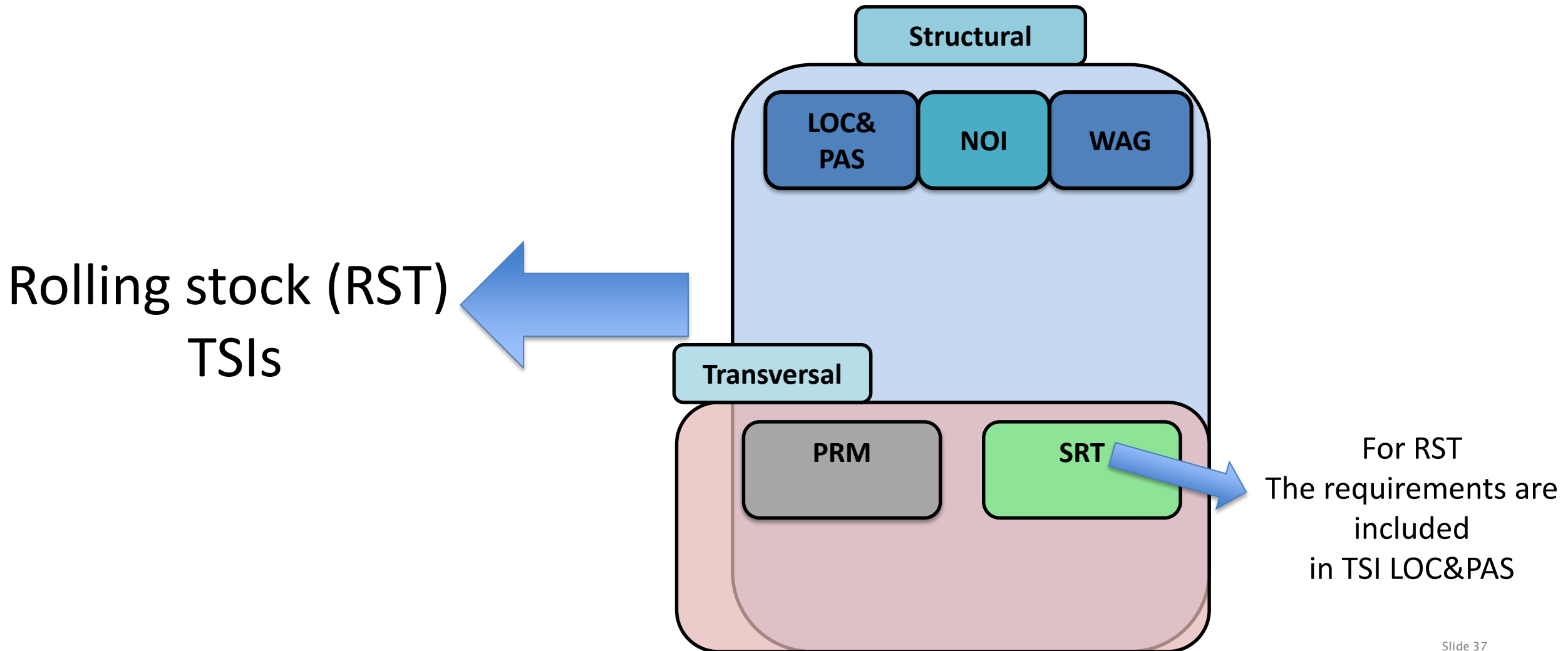
## Technical Specifications for Interoperability



# Technical Specifications for Interoperability



## Technical Specifications for Interoperability



- LOC&PAS TSI
- WAG TSI
- NOISE TSI
- PRM TSI



- Rolling stock in the scope of this TSI;
- Interfaces;
- Functional and technical specification of the subsystem;
- Interoperability Constituents;
- Assessment of conformity;
- Implementation;
- Appendices.

- **Types of rolling stock:**

- Self-propelling thermal and/or electric trains (fixed or pre-defined formation);
- Thermal and/or electric traction units (e.g. thermal or electric locomotives);
- Passenger carriages and other related cars, as luggage or postal vans;
- Mobile railway infrastructure construction and maintenance equipment (running on its own rail wheels and detected by a track based train detection).

- **Track gauge:**

Rolling stock intended to be operated on networks of track gauge:

- **1435** mm, **1520** mm and **1524** mm;
- **1600** mm and **1668** mm.

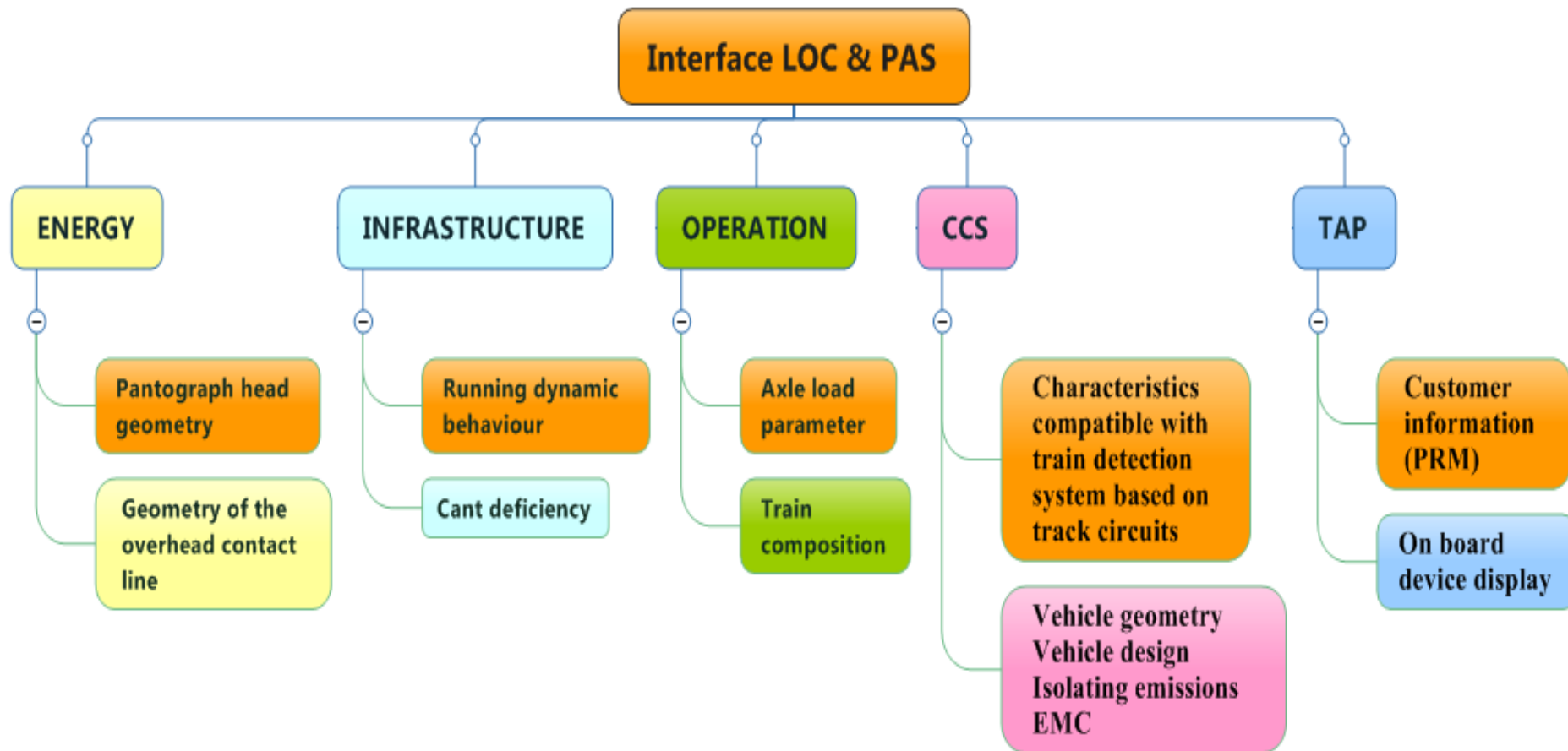
- **Maximum speed**

Maximum design speed  $\leq$  to **350 km/h**.



# TSI LOC&PAS: Interfaces with other subsystems (some examples)

In TSI LOC&PAS: Section 4.3: Functional and technical specification of the interfaces.



## In **TSI LOC&PAS: Section 4.2:** Functional and technical specification of the subsystem.

- Structures and mechanical parts.
- Track interaction and gauging.
- Braking.
- Passenger related items.
- Environmental conditions and aerodynamic effects.
- External lights & visible and audible warning devices.
- Traction and electrical equipment.
- Driver's cab and driver-machine interface.
- Fire safety and evacuation.
- Servicing.
- Documentation for operation and maintenance.

In **TSI LOC&PAS: Section 5: INTEROPERABILITY CONSTITUENTS.**

- **Definition (As in Article 2 (7) of IoD):**

*The interoperability constituents are ‘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 directly or indirectly.*

- **Note:** The concept of a ‘constituent’ covers both tangible objects and intangible objects such as software.

In **TSI LOC&PAS: Section 5.3**: Interoperability constituent specification.

- Automatic centre buffer coupler.
- Manual end coupling.
- Rescue couplers.
- Wheels.
- Automatic variable gauge systems.
- WSP (wheel slide protection system).
- Head lamps.
- Marker lamps.
- Tail lamps.
- Horns.
- Pantograph.
- Contact strips.
- Main circuit breaker.
- Driver's seat.
- Toilet discharge connection.
- Inlet connection for water tanks.

In **TSI LOC&PAS: Section 6: ASSESSMENT OF CONFORMITY OR SUITABILITY FOR USE AND 'EC' VERIFICATION.**

- **Section 6.1.: Interoperability constituents.**
- **Section 6.2.: Rolling stock subsystem.**
- **Section 6.3.: Subsystem containing Interoperability constituents not holding an EC declaration.**

### In TSI LOC&PAS: Section 7: IMPLEMENTATION

- **Section 7.1.: General rules for implementation** (including transition phase (7.1.1.2), application to special vehicles such as OTMs, transitional measures for: on-board energy measurement system requirement, fire safety requirement, passive safety requirement, etc).
- **Section 7.1.2.: Changes to an existing rolling stock or rolling stock type** (including rules to manage changes in rolling stock (basic design characteristics) and particular rules for existing rolling stock not covered by an EC declaration of verification with a first APIS before 1 January 2015).
- **Section 7.1.3.: Rules related to the EC type or design examination certificates:**
  - **7.1.3.1: Rolling stock subsystem** (including Phase A and Phase B);
  - **7.1.3.2: Interoperability constituents.**
- **Section 7.1.4.: Rules for the extension of the area of use for existing rolling stock having an authorisation in accordance with Directive 2008/57/EC or in operation before 19 July 2010.**
- **Section 7.2.: Compatibility with other subsystems.**
- **Section 7.3.: Specific cases.**
- **Section 7.4.: Specific environmental conditions.**
- **Section 7.5.: Aspects that have to be considered in the revision process or in other activities of the Agency.**

## In TSI LOC&PAS: APPENDICES

### Appendix I: Aspects for which the technical specification is not available (**Open Points**):

Open points that relate to technical compatibility between the vehicle and the network:

Element of the Rolling Stock sub-system	Clause of this TSI	Technical aspect not covered by this TSI	Comments
Compatibility with train detection systems	4.2.3.3.1	See specification referenced in Annex J-2, index 1.	Open points also identified in the TSI CCS.
Running dynamic behaviour for 1 520 mm track gauge system	4.2.3.4.2 4.2.3.4.3	Running dynamic behaviour. Equivalent conicity.	Normative documents referred to in the TSI are based on experience gained on the 1 435 mm system.
Braking system independent of adhesion conditions	4.2.4.8.3	Eddy current track brake	Equipment not mandatory. Electromagnetic compatibility with concerned network.
Aerodynamic effect on ballasted track for RST of design speed > 250 km/h	4.2.6.2.5	Limit value and conformity assessment in order to limit risks induced by the projection of ballast	On-going work within CEN. Open point also in TSI INF.

Open points that do not relate to technical compatibility between the vehicle and the network:

Element of the Rolling Stock sub-system	Clause of this TSI	Technical aspect not covered by this TSI	Comments
Fire Containment and Control Systems	4.2.10.3.4	Conformity assessment of FCCS other than full partitions.	Assessment procedure of efficiency for controlling fire and smoke developed by CEN according to a request for standard issued by ERA.

In TSI LOC&PAS: Appendix J: Technical specifications referred to in this TSI

**Appendix J.1: Standards or normative documents:** In TSI LOC&PAS all these references are quoted in the main text by the reference in this Appendix, e.g.:

In 4.2.3.1. Gauging:

(...)

*(5) For electric units, the pantograph gauge shall be verified by calculation according to the specification referenced in Appendix J-1, index 14, clause A.3.12 to ensure that the pantograph envelope complies with the mechanical kinematic pantograph gauge...'*

**In J.1 Standards or normative documents:**

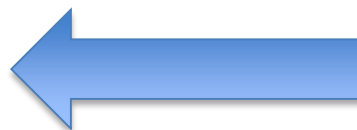
Index No	TSI		Normative document	
	Characteristics to be assessed	Point	Document No	Mandatory points
14	Gauging – method, reference contours	4.2.3.1	EN 15273-2:2013+A1:2016	relevant cl. (1)
	Gauging – method, reference contours verification of eddy current track brakes verification of pantograph gauge	4.2.4.8.3(3)		A.3.12
	Gauging – method, reference contours verification of eddy current track brakes verification of pantograph gauge	4.2.3.1		relevant cl. (1)



In TSI LOC&PAS: Appendix J: Technical specifications referred to in this TSI  
**Appendix J.2: Technical documents (available on ERA website):**

Index No	TSI		ERA technical document	
	Characteristics to be assessed	Point	Mandatory ref Document No	Points
1	Interface between control-command signalling trackside and other subsystems	4.2.3.3.1	ERA/ERTMS/033281 rev 4.0	3.1 & 3.2

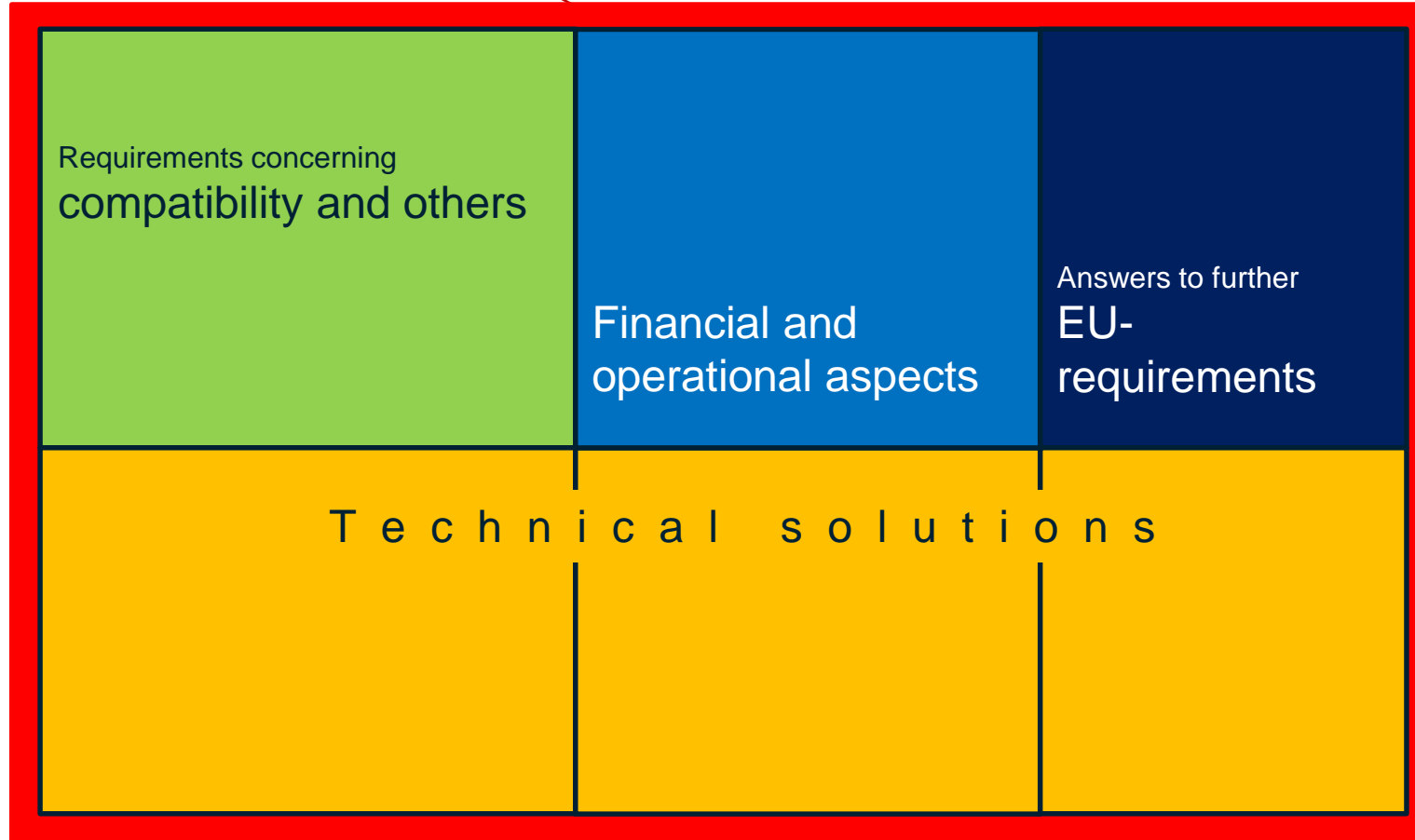
- LOC&PAS TSI
- WAG TSI
- NOISE TSI
- PRM TSI



- TSI WAG ‘evolution’;
- Rolling stock in the scope of this TSI;
- Functional and technical specification of the subsystem;
- Interoperability Constituents;
- Assessment of conformity;
- Implementation;

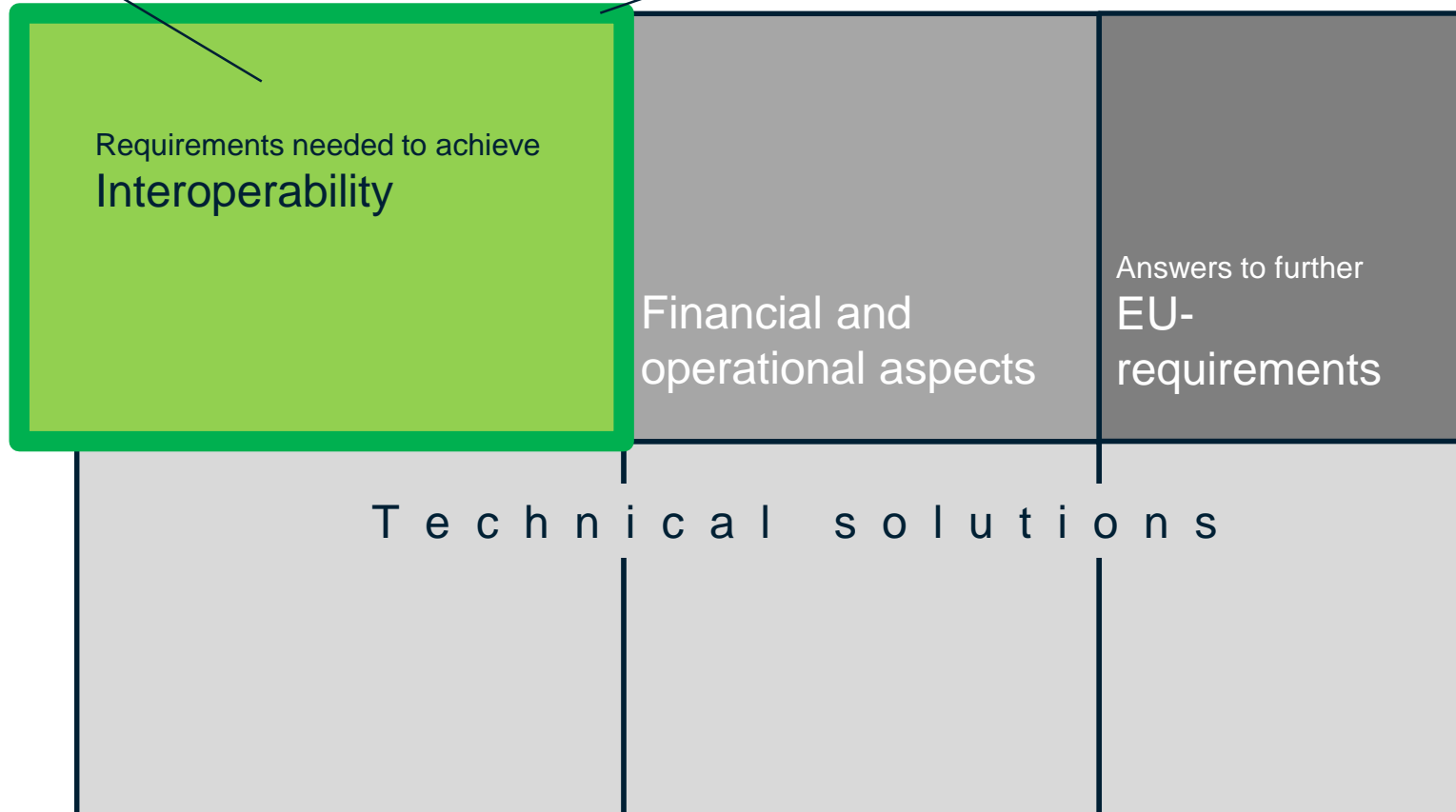
**\*Note: The basic structure and principles of TSI WAG is, to a certain extent, similar to the ones of TSI LOC&PAS, therefore the following slide will focus on the specific particular aspects covered by the TSI WAG.**

## WAG TSI 2006

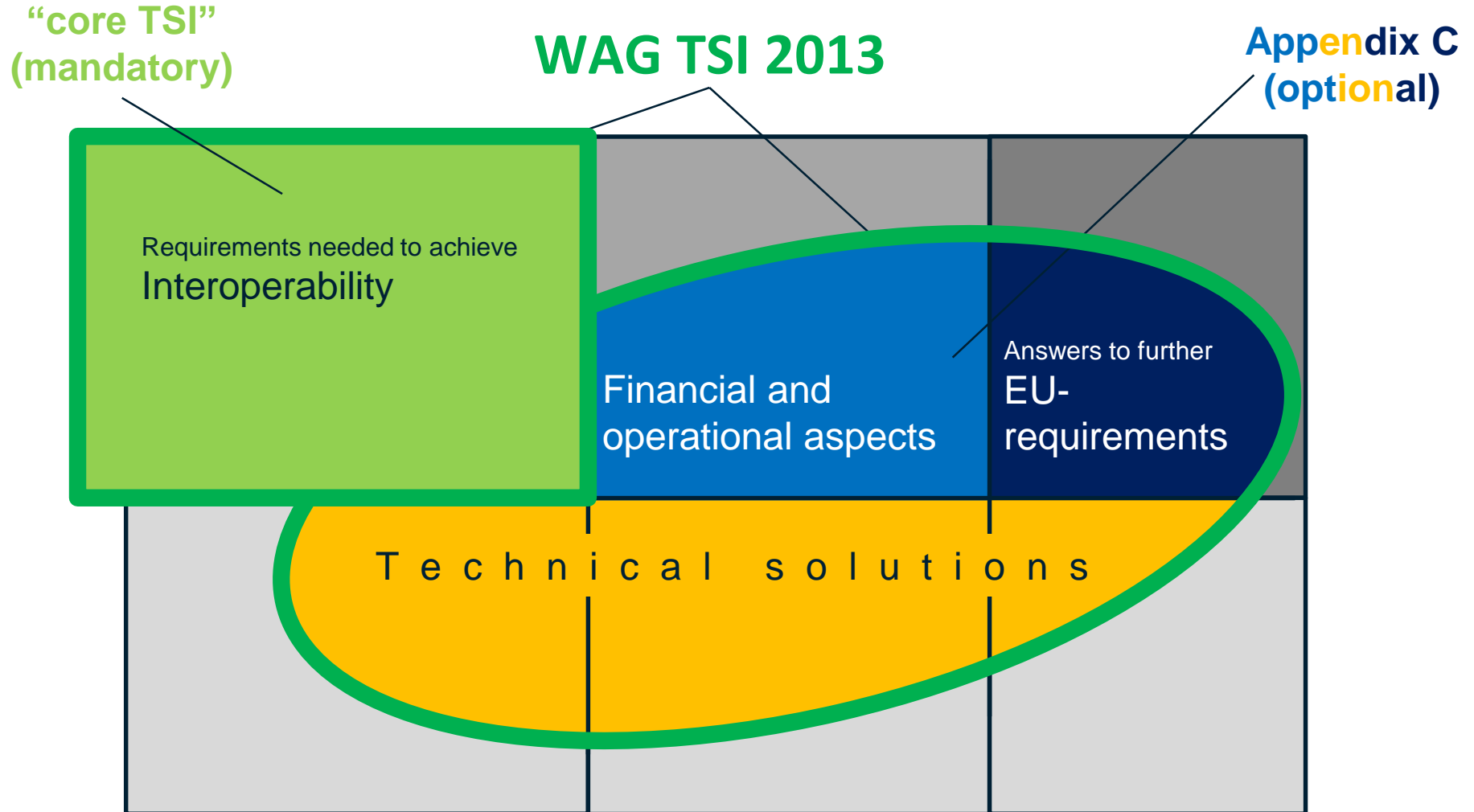


“core TSI”  
(mandatory)

WAG TSI 2013



# TSI WAG: Comparison: 'old' and 'new' WAG TSI



- **The TSI shall apply to freight wagons**, including low-deck vehicles designed for the entire network and vehicles designed to carry lorries:
  - with a maximum operating speed  $\leq 160$  km/h;
  - with a maximum axle load  $\leq 25$  t;
  - intended to be operated on one or more of the following nominal track gauges: 1435 mm, 1524 mm, 1600 mm, and 1668 mm.

The TSI shall not apply to freight wagons operating mainly on the 1520 mm track gauge, which may occasionally be operated on 1524 mm track gauge.

In **TSI WAG: Section 4.2:** Functional and technical specification of the subsystem.

- General.
- Structures and mechanical part.
- Gauging and track interaction.
- Brake.
- Environmental conditions.
- System Protection.



### In **TSI WAG: Section 5.3**: Interoperability constituent specification.

- Running gear.
- Wheelset.
- Wheel.
- Axle.
- Friction element for wheel tread brakes.
- Automatic variable gauge system.
- Rear-end signal.

The TSI WAG covers 3 different ‘levels’ of application/ authorisation:

- **(first level) TSI WAG compliance (‘core’):**  
in Section 7: IMPLEMENTATION – 7.1. Authorisation for placing on the market,  
Status: Mandatory  
In summary: mandatory sections fulfilled
- **(second level) fulfillment of section 7.1.2.**  
in Section 7: IMPLEMENTATION – 7.1.2. Mutual recognition of the first authorisation of  
placing on the market.  
Status: Optional (however compliance as in first level above is precondition)  
In summary: Provides the conditions for having an area of use not limited to particular national  
networks, this means: **‘Authorisation in all MSs’**.

- **(third level) Appendix C:**

in Appendix C: Additional optional conditions.

Status: Optional (however compliance with previous levels (core TSI and clause 7.1.2) is precondition)

In summary: Transition for operation of freight wagons, support for railway undertakings to operate wagons in a shared fleet.

Remarks:

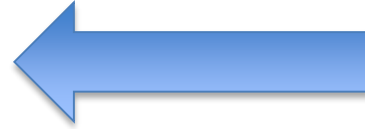
Technical solutions and conditions coming from the former UIC/RIV world (e.g. UIC footsteps and handrails).

**The NoBo assesses the fulfilment of Appendix C.** How the Appendix C wagons can be operated is completely with the responsibility of the RUs.

Marking may be affixed, depending on the level of compliance with the Appendix C points:

**GE CW**

- LOC&PAS TSI



- WAG TSI



- NOISE TSI

- PRM TSI

Both in **TSI LOC&PAS** as in **TSI WAG**: In **Section 4.9.:** Route compatibility checks before the use of authorised vehicles.

- The parameters of the subsystem ‘rolling stock — locomotives and passenger rolling stock and freight wagons’ to be used by the railway undertaking, for the purpose of route compatibility check, are described in Appendix D1 of TSI OPE (Commission Implementing Regulation (EU) 2019/773).

**Not part of the Vehicle Authorisation (VA) process.**



**Applicant** defines and demonstrates:

- Area of use** (e.g France, Belgium)
- Vehicle Technical compatibility with the Network(s) of the area of use** (e.g 3kV, 25kV, KVB, TBL1+, D4 etc.)
- Conditions for use and other restrictions** (e.g max speed 140km/h)

**Railway Undertaking** checks using its SMS process :

- Vehicle(s) is authorised and Registered
- Compatibility between Vehicle(s) and indented Route(s)
- Proper integration in the train composition

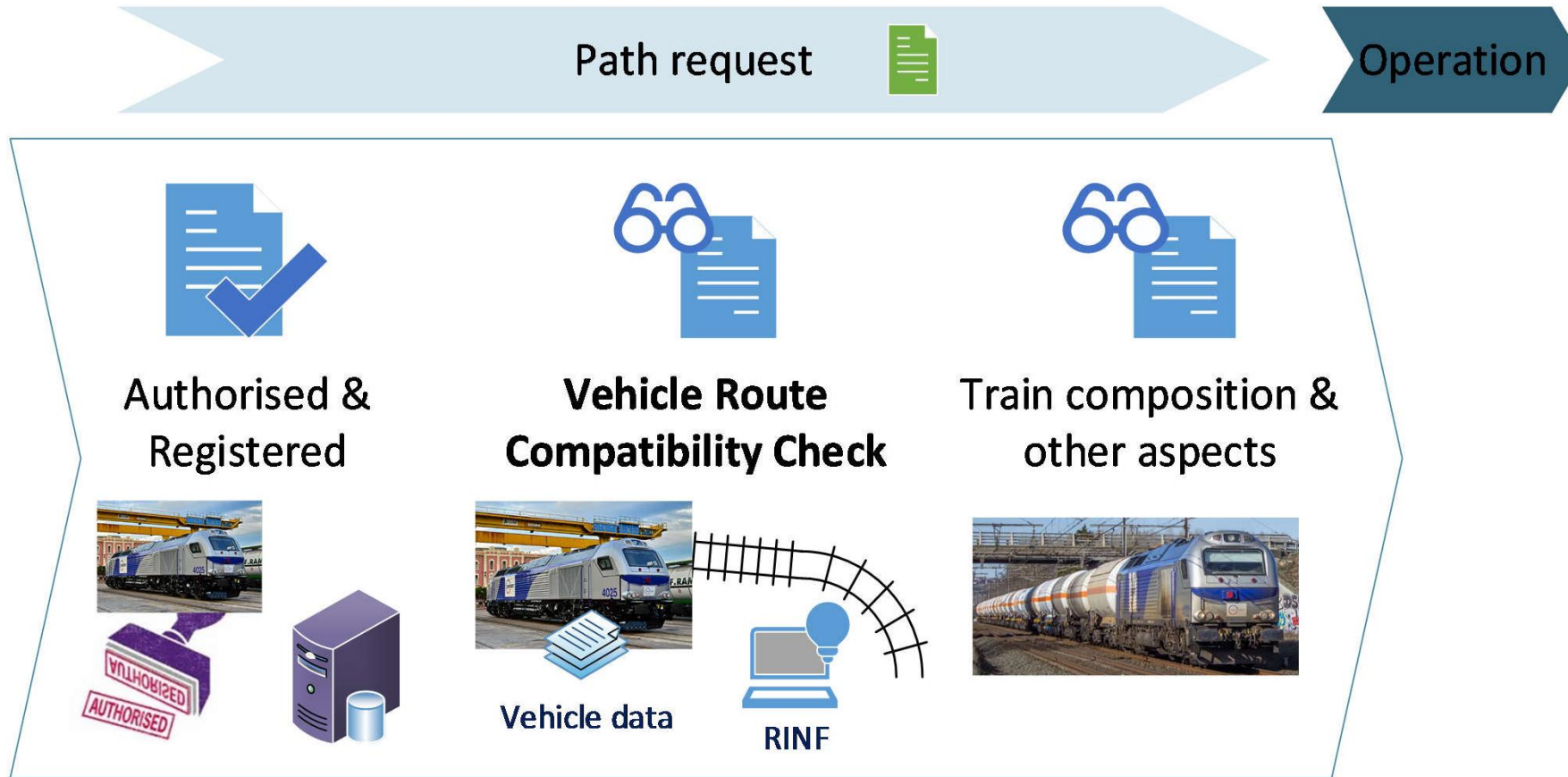
Vehicle authorisation for placing on the Market (IoD art 21)



Checks before the use of authorised vehicles (IoD art 23)



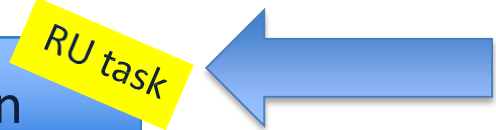
# TSI LOC&PAS and TSI WAG: VA & Checks before use of vehicles







Under Safety Management System



Most of the Route compatibility items require a simple comparison

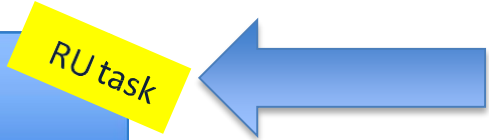


Interface	Vehicle data in ERATV and technical file		Route information available in RINF or provided by IM		Results
	ERATV	Value	RINF ref	Value	
Gauge	4.2.1	G1	1.1.1.1.3.1.1 1.2.1.0.3.4	G1	
Train detection systems	4.14.1	track circuits axle counters loops	1.1.1.3.7.1	track circuits axle counters	
Wheel set gauge	4.1.3	1435 mm	1.1.1.1.4.1 1.2.1.0.4.1	1435 mm	
Minimum in-service wheel diameter	4.8.2	991 mm	1.1.1.1.5.2	330 mm	


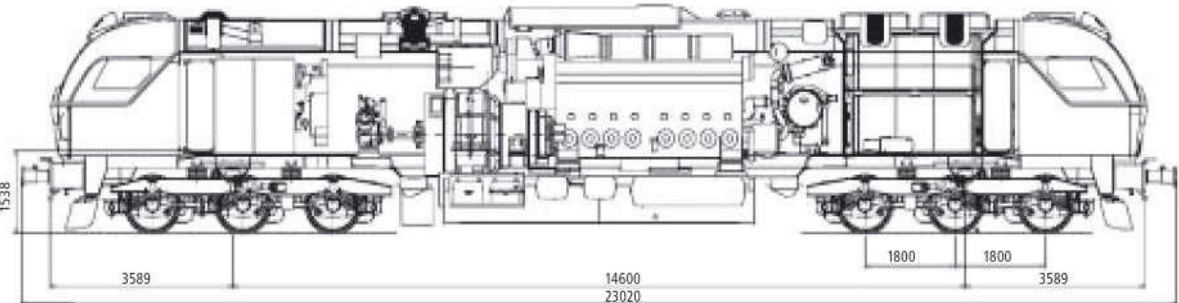




Some items to be checked need specific competencies  
(e.g Traffic loads and load carrying capacity of infrastructure)

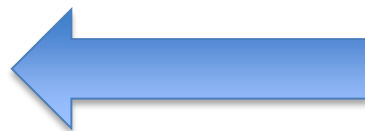


- RU performs static and dynamic compatibility checks with the IM procedures

Interface	Vehicle data in ERATV and technical file		Route information available in RINF or provided by IM		Results
	ERATV	Value	RINF ref	Value	
	<ul style="list-style-type: none"> <li>Design mass (working order, normal and exceptional payload), 4.5.2 : 121000 kg</li> <li>Static axle load (working order, normal and exceptional payload), 4.5.3: 20160 kg</li> <li>Maximum design speed , 4.1.2.1 : 120km/h</li> <li>Vehicle length, 4.8.1 : 23,02m</li> <li>Position of the axles along the unit (axle spacing):</li> </ul>				 Compatible with lines classified C4
					



- LOC&PAS TSI
- WAG TSI
- NOISE TSI
- PRM TSI



- **Technical scope**

Applies to all rolling stock within the scope of LOC&PAS TSI and WAG TSI.

- **Functional and technical specifications of the subsystems**

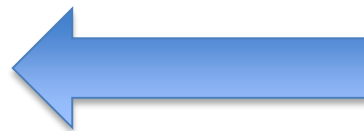
The following parameters have been identified as critical for the interoperability (basic parameters)

- (a) “**stationary** noise”,
- (b) “**starting** noise”,
- (c) “**pass-by** noise”,
- (d) “**driver’s cab** interior noise”.

Assessment by tests. A simplified evaluation procedure is available for pass by noise.

Note: All the limits for the basic parameters referred to in above (TSI NOI sections 4.2.1., 4.2.2., 4.2.3. and 4.2.4.) are linked to the essential requirement Environmental protection (see section 3 of TSI NOI).

- LOC&PAS TSI
- WAG TSI
- NOISE TSI
- PRM TSI



- **TSI PRM**: Technical specifications for interoperability relating to **accessibility of the Union's rail system for persons with disabilities and persons with reduced mobility**

- **Technical scope**

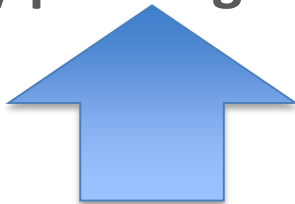
- **Scope related to Infrastructure subsystem**

This TSI applies to all the public areas of stations dedicated to the transport of passengers that are controlled by the RU or IM;

This includes the provision of information, the purchase of a ticket and its validation if needed, and the possibility to wait for the train.

- **Scope related to Rolling Stock subsystem**

**This TSI applies to Rolling Stock which is in the scope of the LOC&PAS TSI and which is intended to carry passengers.**



## Requirements applicable to rolling stock

- Seats
- Wheelchair spaces
- Doors
- Lighting
- Toilets
- Clearways
- Customer information
- Height changes
- Handrails
- Wheelchair accessible sleeping accommodation
- Step position for vehicle access and egress
- Boarding aids

- [EU Agency for Railways](#)
- [Technical Specifications for Interoperability](#)
- [TSIs chronology \(Table 1 Structural TSIs, Table 2 Functional TSIs\)](#)
- [Applications for vehicle \(type\) authorisations](#)



Thank You!



Making the railway system work better for society.

Follow us on  [ERA\\_railways](#)

Discover our job opportunities on [era.europa.eu](http://era.europa.eu)

