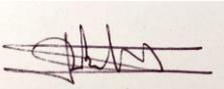


Moving Europe towards a sustainable and safe railway system without frontiers.

Report on the recommendation ERA 1175-1218

TSI revision package 2022 – Digital Rail and Green Freight

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1. Introduction

This accompanying report complements the recommendation ERA 1175-1218 of the European Union Agency for Railways on the amendment of the TSI revision package 2022 – Digital Rail and Green Freight.

It deals with the technical and organisational aspects, which lead to the text of the recommendation whereas another accompanying document to the recommendation - impact assessment - deals with the related economic aspects.

In January 2020, the European Commission published the list of priority topics that the European Union Agency for Railways (“Agency”) should cover for the TSI package 2022 which falls within the EU policy objectives of:

1. a European Green Deal,
2. an economy that works for people,
3. a Europe fit for the digital age and
4. a stronger Europe in the world.

Entitled ‘Digital Rail and Green Freight’, the TSI 2022 revision package includes a series of topics impacting the structural TSIs: CCS, ENE, INF, LOC&PAS, NOI, PRM, WAG and the OPE TSI.

In order to cover these topics, the Agency set up Working Parties and Working Groups and put in place a general change control management process. The present report is a summary of the activities of the Agency and of the discussions that took place during the meetings of these Working Groups and Working Parties.

Whereas this revision process took place almost entirely under the pandemic situation, restricting dramatically the possibility to have physical meetings and to get to know the experts involved in the working groups, most of the agreed Commission priorities have been processed and the recommendation, including proposals on the revision of TSIs and registers, was delivered to the commission on 30 June 2022.

2. Working method

2.1. Implementation of change control management

Change Control Management (CCM) is a set of standardised tools, methods and procedures that the Agency uses and will use further in order to control and manage the changes made to the TSIs.

The objectives of CCM are to ensure that:

- change requests (CR) are traced and duly documented,
- unnecessary changes are prevented,
- resources are used efficiently,
- stakeholders have an opportunity, in accordance to applicable rules, to initiate changes and participate in the control of changes,
- users are made aware of any changes that occur.

Change Control Management includes a sequence of steps involving several groups and actors. Those steps are consecutive to the submission of a change request via the user interface of a dedicated IT tool. Change Requests are classified as ‘Error’ or ‘Enhancement’ and can be covering the following topics (list not exhaustive):

- Alignment with newly available ENs,
- Correction of deficiencies,
- Closure of open points,
- Request for specific cases,

- Request to consider new topics/items not covered by TSIs.

CCM was already used for the CCS and TAP/TAF technical documents as well as for the revision of the TAP/TAF and CCS TSIs and was introduced for all other TSIs for the revision package 2022. For these other TSIs, the organisational structure was as shown in Figure 1, which outlines the main information flows and the interactions of the parties involved in the CCM.

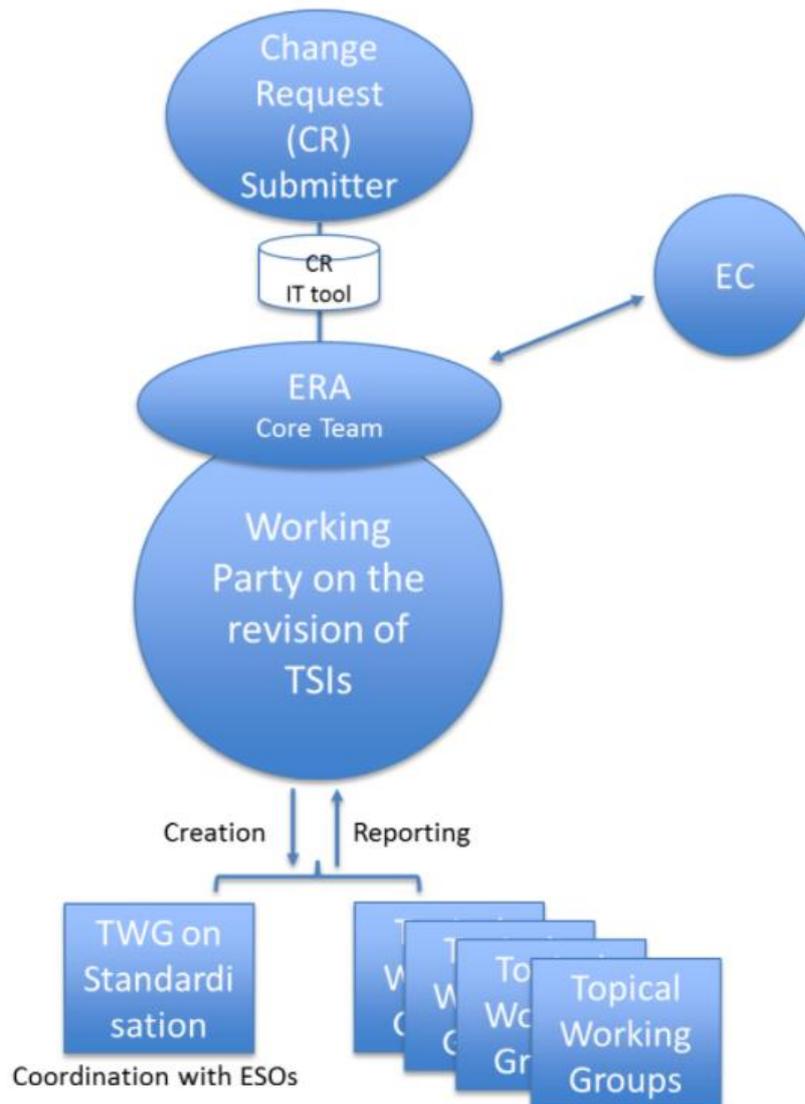


Figure 1 - organisational structure of the CCM applied to TSIS on fixed installations, rolling stock and operations and traffic management.

A procedure was elaborated together with the Working Party to establish the role of each entity of group and to describe the whole lifecycle of a Change Request, from its submission to its delivery to the European Commission.

2.2. Working Parties and Working Groups

2.2.1. Working Parties

In order to process the change requests submitted on the basis of the priorities listed by the Commission (see 3.1) and the change requests submitted by the stakeholders (see 3.2), a series of Working Parties and Working groups were established.

As per Article 5 of the Agency Regulation¹, “the Agency shall set up a limited number of working parties for the purpose of drawing up recommendations and, where relevant, guidelines, in particular relating to technical specifications for interoperability (‘TSIs’)”.

Accordingly, 5 Working Parties (WPs) were set up for the recommendation on the TSI package 2022:

1. AMOCs OPE: Working Party specific to the development of Acceptable Means of Compliance (AMOCs), relative to the OPE TSI requirements,
2. WP TSIs: Working Party in charge of the following TSIs:
 - Energy
 - Infrastructure
 - Locomotive and passenger units
 - Noise
 - Operation and traffic management
 - Accessibility for People with Reduced Mobility
 - Safety in Railway Tunnels
 - Freight wagons
3. WP CCS: Working Party in charge of Control Command and Signalling
4. WP TAP: Working Party in charge of Telematic Applications for Passengers
5. WP TAF: Working Party in charge of Telematic Applications for Freight

The activities of Working Parties 1, 4 and 5 and the related working groups aren't covered by this report.

2.2.2. Working groups

During the kick-off meeting of the WP TSIs, a series of topical working groups were established to develop proposals for the Working Party on specific topics. These topical working groups are intended to be small groups of representatives having a deep expertise in a specific field. The following topical working groups were created:

1. TWG on Train Modular Architecture, with the objectives to work on actions #21 to #31 of the Commission mandate entitled “Modular on-board architecture to deliver more flexible, robust and future proof system”.
2. Topical working group on Composite Brake Blocks, with the objective to define a procedure aimed at testing the acoustic performance of composite brake blocks (action #62) and to update the appendix G of WAG TSI (action #60),
3. Topical working group on facilitation of combined transport, with the objective to implement the solutions identified in the report on combined transport published by the Agency in September 2018 (priority #39)
4. Topical working group on the interfaces between rolling stock and fixed installations with the objective to deal with all change requests impacting those interfaces, in particular with actions:
 - a. #43: close open point on EN Line Category,
 - b. #51: harmonisation between LOC&PAS and ENE TSIs, including requirements for multiple unit operation with more than 2 pantographs at the same time,
 - c. #52: harmonisation between Rolling Stock (LOC&PAS + WAG) and INF TSIs,
 - d. #64: improve provisions when to apply the TSIs in case of upgrade/renewal.
5. Topical working group on freight with the objective to deal with actions:
 - a. #42: review the provisions on train rear end signals,

¹ Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016 on the European Union Agency for Railways and repealing Regulation (EC) No 881/2004 - OJ L 138, 26.5.2016, p. 1–43

- b. #45: interoperability requirements for automatic couplers for freight wagons including digital connection.
- c. #47: consider the inclusion of the derailment detection function.
- 6. Topical working group on standards with the objective to be the operational coordination group between ERA and ESOs, to support ERA and COM for a more efficient uptake of standards (action #70)
- 7. Topical working group on transition/migration, with the objective to review and streamline transitional provisions applying to the rolling stock and CCS TSIs (action #67).

These working groups come in addition to working groups already established to support the activities of Working Parties, such as the CCS WP. In order to solve some other change requests, the Agency also constituted ad’hoc groups; this was the case for instance on wagon parking brake, drinking water, special vehicles, etc.

An overview of all working groups involved in the TSI revision package 2022 is given in Figure 2.

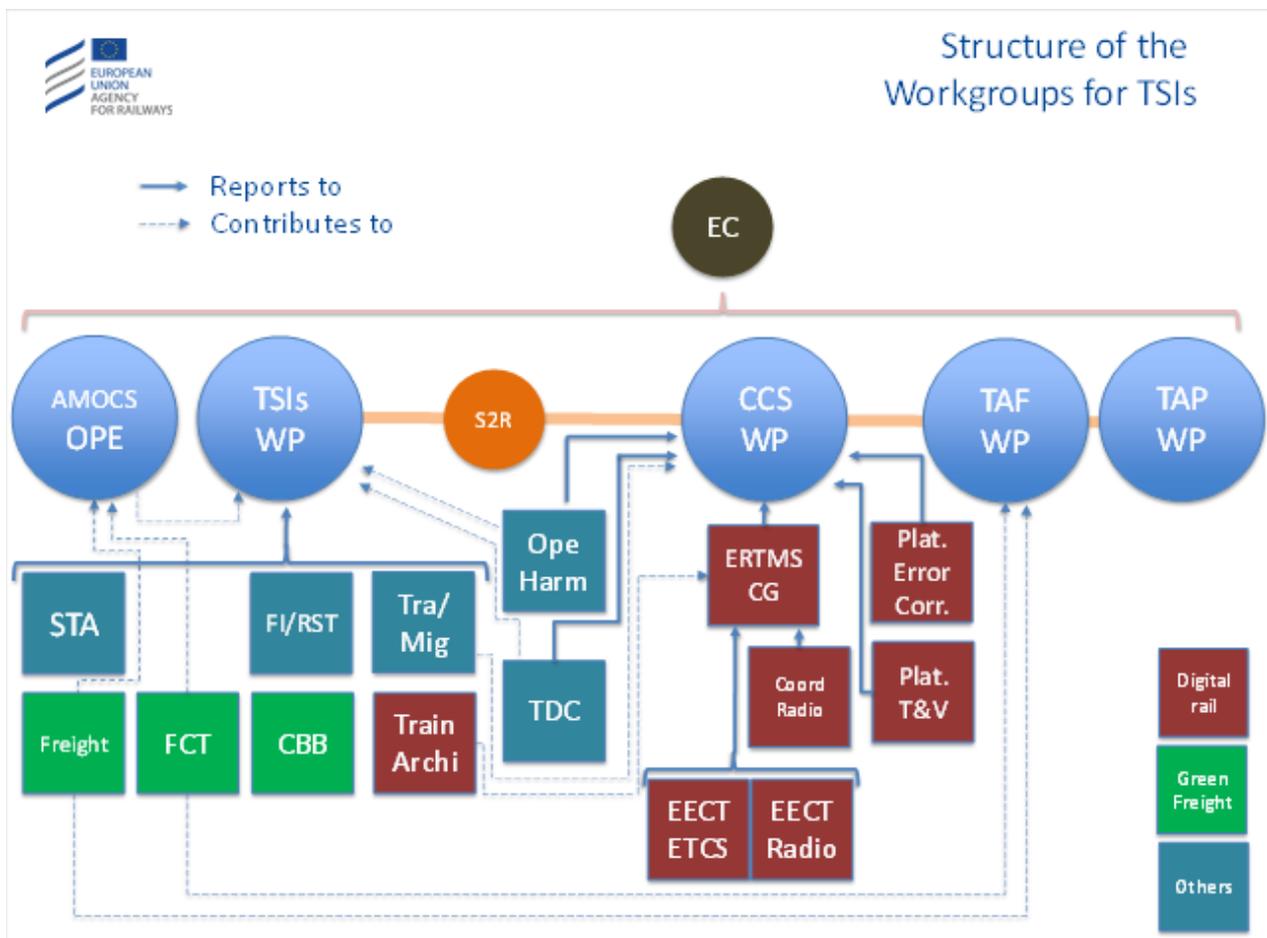


Figure 2 – Working Parties and Working Groups involved in the revision of the TSIs

3. Input data: EC priorities and change requests

3.1. EC priorities

As highlighted in the Commission document entitled “Digital rail and Green freight TSI revision package (2022 revision) Explanatory note – 22 January 2020”, “*the strategic objectives (for the TSI package 2022) are digital rail and green freight*”.

Accordingly, there are “*two main pillars for the 2022 revision*:

The prioritisation of topics proposed for 2022 were developed together with the Agency. They are guided by the implementation of key policy objectives for sustainable and multimodal transport.

(...)

Digital rail

The next revision must build on digitalisation and innovations and accompany the rail system transformation towards a significantly more efficient and cost-effective system, paving the way for automation and enhancing system capacity.

In particular, expanding CCS and related aspects of other TSIs in the 2022 revision must be in our focus:

- *Enhance ERTMS technical and operational interoperability, including through greater harmonisation of operational rules linked to ERTMS implementation;*
- *Incorporate the game changers, which are the heart of future digitalisation building on ERTMS and aim to achieve higher capacity and better performance. Game changers include ATO GoA 1/2, FRMCS, ERTMS level 3, train positioning, ETCS braking curves, and cybersecurity;*
- *Facilitate the introduction of digital technologies in rail and mitigate the complexity of change to the system through modularisation. It includes work primarily on changes linked to CCS onboard modular architecture with the aim to deliver a more flexible and robust system;*

Moreover, the basic framework for data exchange needs revisiting:

- *Enhance information flows for freight and passengers. It includes work on multimodal exchange of information and real time data and advanced communication to overcome language regimes.*

This will also involve changes to TSIs beyond CCS, TAP and TAF, for example, OPE TSI, and LOC&PAS for the train interface.

Green freight

In the 2011 White Paper on Transport, the EU set the objective to shift 30 % of long-distance road freight to more energy-efficient transport modes such as rail or inland waterways by 2030 and 50 % by 2050.

Despite the ambitious objectives set in the 2011 White Paper, the modal share of rail freight in all land transport has remained stagnant since the early 2000s at around 16–19 % while the share of road freight remains very high (76 %) (Eurostat).

Under the green freight objective, the 2022 revision must further remove barriers to freight and support uptake of more environmental friendly technologies. In particular, it must:

- *Support a more efficient freight, in particular to address barriers for rail freight identified in the ERA report on the Facilitation of Combined Transport and in the Issues logbook;*
- *Further simplify and improve requirements on rail vehicles with a particular focus on freight;*
- *Support the uptake of environmental friendly technologies relevant for freight.”*

In addition, “TSIs must remain fit for purpose as well as complete and unambiguous

Therefore, standing and recurrent tasks such as correcting deficiencies, updating standard and reviewing specific case are addressed in parallel to package revisions.”

These objectives were detailed in a table that lists and details the action to undertake for these objectives. This list gave rise to a series of change requests examined in priority by the Working Parties and Working Groups.

3.2. Other change requests

As indicated in 3.1, among the list of actions from the Commission a certain number cover recurrent and standing TSI maintenance tasks. This is the case, for instance of the following priorities:

- #63 Improve provision of TSIs on the basis of ERA ex-post analysis and return of experience from stakeholders (NSAs, RUs, IMs,...)
- #65 Review existing specific cases in view of phasing out national exceptions as well as general exemptions in TSIs
- #66 Revise table "link between basic parameters and essential requirements" in Chap 3
- #68 Complement TSIs when necessary to cover essential requirements. Improve transparency on aspects to be covered by specific cases (add explicit cases when appropriate using the result of the cleaning-up of national rules)
- #69 Improve definitions and add definitions when necessary
- #72 Remove multiple options for basic parameters wherever appropriate.
- #73 Add new ICs when appropriate (e.g. switches, crossings, slab tracks, Stop Marker Boards ...)

These actions weren't considered as specific actions to undertake, but rather as "headlines" that could give rise to more specific change requests. In this perspective, several change requests from stakeholders were processed. In total, 76 change requests have been processed until a solution was agreed. The details relative to these change requests are provided in Annex 5.

All change requests proposed by submitters haven't been processed until a solution was agreed. Here below are tables listing the change requests according to their status at the date of the recommendation.

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3.2.1. Rejected change requests

The change requests in the table below will not be processed. They have been rejected, either by ERA Core Team or by the Working Party.

CR reference	Headline	Submitter	Problem_Need_description	Rejected
527	Transition regime for referenced standards in the TSI	ERA	<p>in order to enhance the flexibility given to the applicant TWG STA proposes to allow the possibility to quote in the TSIs several versions of the same standard</p> <p>During the discussion on standard update in the Topical Working group Standardisation (TWG-STA) chaired by the ERA, the group have discovered that, very often, the standard update doesn't affect the TSI requirement, mainly because there is no modification in the chapters quoted by the TSI or only editorial changes that doesn't affect the TSI compliance.</p> <p>In order to give the maximum flexibility to the applicant, TWG-STA has proposed the following :</p> <p>If the modified standard doesn't affect at all the TSI compliance and if there is no need to update the TSI core text, then and the appendix listing the standards may quote the 2 versions.</p> <p>Exemple from TSI WAG :</p> <p>appendix C.9 : UIC Brake : EN 15807:2011 clauses 4, 5 Or EN 15807:2021 clauses 5, 6</p>	Rejected during WP14 on 10 Mar 2022 (see details in tab Justification/Discussion for solution)

			In such case this is the choice of the applicant to apply 2011 or 2021 version.	
495	Construction at railroad stations of changing facilities adapted for children and adults with reduced mobility	NSA PL	<p>Section 4.2.1.6 (2) of the PRM TSI states that where toilets are provided at a station, baby-changing facilities shall be provided which are accessible to both men and women. According to NSA PL, it follows from this provision that the PRM TSI does not provide for the possibility of adapting the changing facilities for adults with reduced mobility. As a result, where a toilet with a changing facility is provided at a station, it would not be possible for such an adult to use the toilet if necessary, as it would not be adapted to them.</p> <p>In Table 1 'Essential requirements of the infrastructure subsystem' of the PRM TSI in the context of clause 4.2.1.6 (2), reference is made to the requirements in Annex III to Directive 2016/797 regarding safety (clauses 1.1.5 and 2.1.1) and accessibility (clause 2.1.2).</p> <p>Pursuant to paragraph 1.1.5 of Annex III of Directive 2016 /797, any equipment intended to be operated by users must be so designed as not to impair the safe functioning of the equipment or the health or safety of users when used as intended, but not in a manner inconsistent with in accordance with the posted instructions.</p> <p>Section 2.1.1 of Annex III 2016 of Directive 2016/797 indicates that appropriate steps must be taken to prevent access or unwanted intrusions to the installation, to limit the risk to exposed persons, in particular when the train passes through the station. In addition, this paragraph also mentions, among other things, that the infrastructure accessible to the public must be designed and constructed in such a way as to limit any risk to human safety (stability, fire, access, evacuation, platforms, etc.).</p> <p>In the opinion of the NSA PL, the above requirements for changing facilities are formulated in a very broad manner that allows them to be adapted for use also by adults regardless of whether they are</p>	<p>The PRM TSI and the guide are clear enough:</p> <p>(1) If toilets are provided at a station, then a minimum of one unisex cubicle shall be wheelchair accessible.</p> <p>(2) If toilets are provided at a station, baby nappy changing facilities shall be provided which are accessible to both men and women.</p> <p>This covers all cases, the wheelchair accessible toilet being designed for adults.</p> <p>The application guide also adds in its clause 2.4.7: Baby nappy changing facilities have to be available to wheelchair users (both men and women).</p> <p>The PRM TSI is deliberately general as there is no reason to create railway specific requirements for the toilets in railway stations (see clause 2.3.1 of the application guide on the two categories of requirements)</p>

			able to use them independently or with the assistance of one or more tutors.	
483	Requirements for the design of collapsing coupler to be used on trains in blocked composition, to uncouple the vehicles in case of derailment	NSA IT	In case of train in fixed composition, it is necessary to find a technical solutions to minimize the number of (passengers) vehicles involved in a derailment accident event. The technical solution should avoid that, in case of big derailment events, where part of the train or a certain number of vehicles run out from track line direction, the remaining part of the train will be forced to follow the derailed vehicles. The requirement is to find technical solutions that allow to systematically prevent the involvement of the rear vehicles of a train composition if a in front vehicle of the same composition abruptly changes its running direction, triggering the brake of the train composition.	The problem description is not precise enough and there is no mature solution proposed. It seems to be a topic for research or standardisation more than a topic for the TSI
421	remove reference to standard that don't support interoperability in TSI WAG to be agreed by the Main working party and proceeded by TWG-STA for main package 2022.	ERA	the following standards don't support interoperability and are seen as creating a necessary burden for the sector or dealt with other regulation (simple pressure vessel are in the scope of directive 2014/29/EU EN 15085-1 Railway applications - Welding of railway vehicles and components - Part 1: General EN 15085-2 Railway applications - Welding of railway vehicles and components - Part 2: Quality requirements and certification of welding manufacturer EN 15085-3 Railway applications - Welding of railway vehicles and components - Part 3: Design requirements EN 15085-4 Railway applications - Welding of railway vehicles and components - Part 4: Production requirements EN 15085-5 Railway applications - Welding of railway vehicles and components - Part 5: Inspection, testing and documentation EN 50343 Railway applications - Rolling stock - Rules for installation of cabling	See the Tab 'Justification/Discussion for Solution'

			EN 50355 Railway applications - Railway rolling stock cables having special fire performance - Guide of use EN 286-3 EN 286-4	
406	Use of requirements management methods	CER	Currently, the text is written as a spoken language in its ordinary form, without metrical structure as normally used in system engineering principles, it is written as prose. It is not clearly divided between requirement, information, definition, or option.	TSIs are legal texts that need to be written as prose. They undergo the applicable procedure within the EC, in particular they are reviewed by several EC services including legal. In addition, using a clear language is a constant objective when drafting the TSI text and it shouldn't be considered a specific CR. CER comment on ERA Core Team Decision dated 24 Feb 2021: CER took note of ERA CT rejection, although the following statement "TSIs are legal texts that need to be written as prose" is questioned by CER. Issue to be reflected by ERA & EC for further revision of the TSIs after 2022.
405	Reduction of passive safety requirements in cases of increased operational safety	CER	The "collision points" are causing added weight, more energy consumption, and extra costs. Modern rolling stock, such as built according to the TSIs, is very safe in the case of a collision. These collisions typically occur on level crossings or are due to SPADs (Signals Passed At Danger). On some lines there are no level crossings present anymore and, when ERTMS is fully operative, the chance of a SPAD is heavily reduced.	The CR is unclear and mixes a lot of topics: "collision points" (wording that isn't defined in the LOC&PAS TSI), operational rules, ERTMS... Given that the CR isn't proposed for the TSI package 2022, it leaves time to prepare a clearer request with more specific changes.
404	Cross-wind with new reference CWC	CER	TSI LOC PAS 4.2.6.2.4. (2) on crosswind requires for vehicles with maximum design speed $140 \text{ km/h} < v_{tr} < 250 \text{ km/h}$ only the application of an assessment method (EN 14067-6:2010), but no common crosswind stability requirement is presently available.	There is no need to re-introduce an open point for this topic. The open point from the TSI LOC&PAS 2011 was closed in 2014 for the 1435mm track gauge. The open point was closed on the basis of discussions with experts in particular from the

			<p>At the national or network level, it shall be permitted, to establish below TSI LOC PAS a requirement to ensure technical compatibility. Such requirement may be essential for infrastructure managers to demonstrate safety as stated in TSI INF clause 4.2.10.2.</p>	<p>Aerotrain project, by referring to EN 14067-6 which proposes methods to assess rolling stock for their cross wind capabilities. This information is then used by the RU at operating level, as described in the application guide of the LOC&PAS TSI:</p> <p>"The resulting characteristic wind curves recorded in the technical documentation should be taken into account for the railway undertaking to define relevant operating rules also considering available information provided by the Infrastructure Manager on wind conditions for a given line (in particular, where these wind conditions are considered as critical)".</p> <p>This aspect has to be covered by the SMS of RU and SMS of IM, restrictions at operating level may be implemented by the IM, according to clause 4.2.10.2 of TSI INF.</p>
401	Unit traction force profiles	CER	<p>Current TSI text:</p> <p>Unit traction force profiles (force at wheel rim =F(speed)) shall be determined by calculation; the unit running resistance shall be determined by a calculation for the load case 'design mass under normal payload', as defined in clause 4.2.2.10.</p> <p>Problem description:</p> <p>It's unclear under which diameter conditions this should be calculated: maximum, minimum; or mean diameter.</p> <p>Calculations of the 'unit traction profile' and of the 'unit running resistance' are used to determine the time-table, see clause 4.2.8.1.1(5).</p>	<p>The 'design mass under normal payload' is defined in the standard EN 15663:2009 as 'design mass in working order' + normal design payload.</p> <p>'design mass in working order' is defined as 'dead mass + consumables + staff'</p> <p>In the definition of 'dead mass', a note explains that parts subject to wear should be considered in the "new state". Therefore there is no reason to add the proposed text, which would come in contradiction to the current TSI text</p>

			The time-table should represent the average performance of all units of a certain type, therefore, these calculations should be based on mean wheel diameter.	
396	Value of Cant for the 1668mm track gauge system	EIM	It has been agreed between Spain and Portugal a new maximum value of 185 mm for cant on non ballasted tracks and existing lines within the 1668 track gauge system. ERA INF WP on 11.09.2020: RfCO2 meeting #4 EIM-CER: Agreement to increase the limit to 185mm in the current INF TSI. No mention to renewed/new lines nor specific case is needed. NSA ES to validate this proposal with NSA PT.	CR rejected by both NSAs from Spain and Portugal (see "Justification/Discussion for solution" tab)
383	Location of acoustic warning device (Horn)	NSA BE	§4.2.7.2.3 of the annex of the TSI Loc & Pass (Commission Regulation (EU) 1302/2014 states that "Warning horns and their control systems shall be designed or protected, so far as is practicable, to maintain their function when impacted by airborne objects such as debris, dust, snow, hail or birds". Experience showed that in some projects, manufacturers have a very free interpretation of this condition.	The CR is well argued and the list of RST provided is impressive but ERA believes that the current TSI text is sufficient: by the way, in the report provided to describe the problem, it is clear that the solution proposed isn't compliant to the current TSI because where it is placed the horn isn't sufficiently protected against snow. Adding such a detailed requirement to the functional one would have consequences as it may penalize RST types that are currently compliant to the functional requirement but wouldn't be compliant to the detailed one. The application guide is probably a better place for this statement which is more in the category of 'best practices' than in the category of 'legal obligations'. The list of RST provided shows that this best practice is common practice already.
354	Marking CW on wagons	NSA LU	Appendix C 5. Marking of units	Core Team meeting 10/9/2020: it is the point 7.1.2 of the TSI and not the appendix C, the compliance

			<p>Units compliant with all requirements set out in Section 4.2, fulfilling all conditions in point 7.1.2 and the conditions set out in Appendix C but not those set out in Appendix C, Sections 3 and/or 6 and/or 7.b, may receive the marking 'CW'.</p> <p>With the 'CW' marking, there is a missing link to the Member States which can accept a CW wagon without further checks or not. So our proposal is to complete the 'CW' marking with a specific marking and where the keeper has the possibility to note all the MSs, accepting such a wagon without further checks because the wagon is fully compatible with the national network. Actually the sector is covering this lack by a multitude of variants of different markings but without any clear common approach and acceptance.</p>	with which determines if a wagon can be authorised in all MS
352	Wheelsets (chapter 5.3.2/6.1.2.2) and Wheels (chapter 5.3.3/6.1.2.3)	NSA LU	These chapters need to be reviewed to include the return of experience and the final output from the JNS panel "broken wheels".	Core Team Meeting 10/09/2020: according to the conclusions of the JNS, a CR is to be submitted by the GRB in the 2nd half of 2020. The CR will be more detailed in line with the outcomes of the JNS.
344	Remove the requirement of the hinged handrail symbol	EIM	Very specific requirement. As persons using a wheelchair accessible toilet are familiar with the facility.	The requirement to provide a pictogram showing the hinged handrail is present in the TSI since the first version in 2008 and didn't raise comments. In particular, associations of persons with disabilities never expressed the opinion that it was superfluous. No relevant reason to change is provided in the request.
342	Simple description for recipients of the regulation	EIM	<p>"The indicated entry is problematic for designers, also for certification companies: (furniture and free-standing devices) ""...should have rounded edges"".</p> <p>The above does not specify how much rounded they should be."</p>	The requirement is present in the TSI with the same wording since the first version in 2008. It didn't raise comments during the Working Party meetings that took place since then. It doesn't seem to be problematic for NoBos (no comment to ERA, no Logbook issue...). No sufficient reason to change the wording is provided in the request.

269	Design track gauge	EIM	There is only a requirement to establish a design track gauge for sleepers of plain track. Design track gauge does not apply for bearers of switches and crossings.	The text of the CR isn't sufficiently clear to really understand the problem/need
268	minimum radii of horizontal curves	EIM	It makes no sense to assess the design value of minimum radii of horizontal curves at assembly before putting into service. Construction tolerances do not have a significant impact on this parameter. Modification of radii entail a new line layout for which a new design is needed. Minimum radius of horizontal curve is a design parameter that should be assessed at design review only.	Missing information in the concerning the propose solution (Specific place in the TSI).
222	Inhibited operability to disconnect ETCS on-board unit	NSA CH	The isolation of an ETCS on-board unit is a safety critical operation. There is no requirement in the TSI that the Isolation Switch of ETCS on-board is installed in a way to prevent too easy resp. accidental operation.	The change request is linked to a national rule which was subject to a negative assessment. See the Technical opinion 2020-3 where the Agency has provided the following assessment : "In order to disable the ETCS it has to be first put in Isolation mode (chapter 4.4.3 of subset 026). In order to move the ETCS vehicle in No Power mode see chapter 4.4.4 of subset 026. ETCS brake command must be overridden by external means (chapter 4.4.4.3.3 of subset 026). Disconnecting of ETCS is a matter of safe integration of the ETCS on board unit in the vehicle and part of the SMS of the RU. The rule is not acceptable. The rule should be moved to parameter 12.2.5.8-Specification of condition of use where ETCS on-board does not implement all functions, interfaces and performances" Following further assessment, the Agency maintains its position and rejects the CR 222 with the following additional arguments:

				<p>- The risk described by the NTR corresponds to a particular technical solution for the isolation (manually activated switch) and we can't describe all possible technical solution in the CCS TSI or in TSI LOC&PAS. In addition, Subset 26 clause 4.4.3.1.2 indicates that "There shall be a clear indication to the driver that the ERTMS/ETCS on-board equipment is isolated." See also requirements in Subset 26 clause 4.4.3, 4.7.1 and clauses 5.6, 8.2.3 of the DMI specification 15560.</p> <p>- This is a matter of safe integration of the CCS subsystem into the vehicle and should be managed according to the CSM-RA regulation as required in CCS TSI Section 3.2.1, referencing on the correct application of the CSM-RA regulation.- In addition, the TSI CCS application guide provides a set of subsets (e.g 79, 80, 88) related to failure mode and safety analysis that should also be taken into account by the applicant.</p> <p>- Finally we remind the article 13 of regulation 2018/545 that requires the applicant to perform a requirements capture.</p>
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3.2.2. *Postponed change requests*

These change requests weren't processed in the package 2022 but should be processed for a future revision. They weren't processed either because out of the scope of the revision 2022 or because the resources required to process them were exceeding the available resources.

CR	Headline	Submitter	Problem_Need_description	Postponed
540	Expired transition period in	ERA	Clauses 6.3.1 and 6.3.2 (ENE) / 6.5.1 and 6.5.2 (INF) are obsolete since 1 June 2021 and need to be deleted.	Discussion during the WP15 on 25 Apr 2022 didn't permit to resolve the change request. As the

	section 6.3 (ENE) / 6.5 (INF)		<p>Clause 6.3.3 (ENE) / 6.5.3 (INF) needs to be reworded to take into account the deletion of the other clauses</p> <p>See CR463 with the same change for the TSI LOC&PAS where the same text was present</p>	resolution presents no urgency, the CR is postponed to a next TSI revision
520	Electrical safety: EN 50153 Warning labels	EIM	<p>L&P TSI 4.2.8.4 “Protection against electrical hazards” refers to EN 50153 for protection against electrical hazards:</p> <p>“Rolling stock and its electrically live components shall be designed such that direct or indirect contact with train staff and passenger is prevented, both in normal cases and in cases of equipment failure. Provisions described in the specification referenced in Appendix J-1, index 54 shall be applied in order to meet this requirement.”</p> <p>This text supported by RFU-RST-312 “Electrical hazards” indicates that protection arrangement is only required for electrically live components on the vehicle itself. EN 50153, however, in 5.5 paragraph 3 clearly requires warning labels on all elevated surfaces where electrically live components can be reached and specifically includes overhead contact line. This requirement in the standard is hence not included as mandatory in the L&P TSI. In WAG TSI 4.2.6.2.2 “Protective measures against direct contact” there is no such exclusion:</p> <p>“The electrical installations and equipment of a unit shall be designed so as to protect persons from electric shock.</p> <p>The unit shall be designed so that direct contact is prevented following the provisions set out in clause 5 of EN 50153:2014.”</p> <p>Experience is that accidents with persons climbing on rail vehicles and approaching live overhead contact line happens in European railway. This is managed in different ways in different member states on national level. Independent of that, the IOD article 18 and 21 for fixed installation and rolling stock subsystems respectively, requires safe integration of subsystems. There is no common practice in the regulations on how to manage this safety risk to</p>	See extract of MoM of WP16 of 13 Jun 2022 in tab 'Solution Proposal by Submitter'

			reach interoperability. L&P TSI excludes a requirement in a relevant European standard. Warning labels according to the standard is a reasonable mitigation.	
519	Fire reaction of building material	NSA CH	<p>The use of wooden sleepers in railway tunnels does not represent an elevated risk. It is not clear in the SRT TSI whether wooden sleepers are permitted in tunnels. Clarification is needed in this regard so that the numerous tunnels concerned can continue to be maintained and operated.</p> <p>SRT TSI requirements:</p> <p>According to SRT TSI, (Art. 4.2.1.3, a (2)), non-structural panels and other equipment fitted in tunnels shall fulfil the requirements of classification B in accordance with Regulation (EU) 2016/364.</p> <p>Materials that would not contribute significantly to a fire load shall be listed and could be exempted from the above provisions (according to Art. 4.2.1.3, b.) SRT TSI).</p> <p>Use of wooden sleepers in tunnels:</p> <p>Standard EN 13145 describes the requirements for wooden sleepers in terms of the essential requirements set out in the Interoperability Directive (EU) 2016/797. However, wooden sleepers that comply with this standard cannot meet the requirements of classification B according to Commission Regulation (EU) 2016/364. Therefore they cannot be installed in tunnels based on the provisions of Art. 4.2.1.3, a, (2) SRT TSI.</p> <p>However, wooden sleepers do not contribute significantly to fire load and may therefore be installed based on Art. 4.2.1.3, b) SRT TSI.</p> <p>The relevant fire scenarios in tunnels are based on fire originating in a vehicle. If the fire is not extinguished in time, it can spread to other vehicles and combustible parts of the infrastructure. Compared to the fire load of vehicles, however, the fire load of wooden sleepers is small. It can be further assumed that the self-rescue phase would</p>	Check with the submitter if this could be covered in the application guide, in which case the CR could be processed in 2nd half of 2022, otherwise for a later revision.

			have been completed before the sleepers catch fire. By that point, the temperature in the affected area of the tunnel would be so high that people would have no chance of survival.	
502	Contradiction between level access and level between step board and vestibule floor level	CER	<p>The TSI defines in 2.3 level access with a maximum horizontal gap of 50 mm between platform and vehicle doorway.</p> <p>In 4.2.2.11.2. (6) for step boards as an extension of a door sill outside the vehicle, if there is no change in level between the step board and the floor of the vehicle, the following is allowed:</p> <p>A minimal drop in level, with a maximum of 60 mm, between the floor surface at the door sill and that of the exterior of the vehicle, used to guide and seal the door is also permissible and shall not be considered as a step.</p>	Postponed to after 2022 due to the short time available and lack of resources
493	Inclusion of switches as interoperability constituents in the INF TSI	NSA PL	According to the current rules on the interoperability of the rail system in the European Union, switches are not considered as interoperability constituents. At the same time, according to the European Union Railway Agency, the application of national technical rules to switches installed on railroad networks which are subject to mandatory application of TSIs is unacceptable. This jeopardises the creation of a single market for railroad products, the provision of interoperability and the fulfilment of essential requirements by the railroad system.	The available resources and the end of the activity of the TWG FI/RST interfaces won't permit to process this CR in the course of the revision package 2022
491	Improvement of the reflective plates	NSA FR	<p>In order to harmonise throughout Europe the rear end devices of freight trains, the latest version of the OPE TSI states that the rear end signal of a freight trains consists of 2 reflective plates at the same height above buffer on the transversal axis. These plates shall comply with Appendix E to Wagon TSI. This provision is to be applicable from 2022 on the RFC and from 2026 on the whole European railway network.</p> <p>In France, the greatest part of the network (60%) is equipped with an automatic block system. This block system is, by construction, a permissive system. As it is the result of a long-term technological</p>	Postponement in line with the postponement of CR 167 on the same topic

			<p>choice, the related infrastructure has been designed regarding this block system. For example, the entry of each block section is protected by a permissive signal and the driver is authorised to enter in presumed occupied block section without any communication with the signalman; the BAL signals are not equipped with lineside phones and, much more, the signalman has no clue to determine if the block section is clear, occupied or out of order. The redaction of the current TSI which allows the current plates (on the RFC from 2022 and on the whole European network from 2026) is a real problem in France regarding this permissive block system. The visibility of the plates is too low compared to the visibility of the steady lights which are mandatory in France for the moment.</p> <p>European Commission and ERA are aware of these difficulties since they have modified in 2019 the front-end lights requirements: as to be able to run on a permissive line, the existing traction units must comply with a part of the Rolling Stock TSI. But this requirement is far to be reachable; most of the rolling stock do not comply with its, and a program to comply with will be costly and cannot be reached before 2033.</p>	
475	Contact strip width (for vehicles operated in Poland)	NSA PL	<p>Contact strips are interoperability constituents, which, in principle, should not be subject to further checking beyond the requirements specified in the TSI. Nevertheless, Polish national technical rules (NTR) - List of the President of the Railway Transport Office, introduce the obligation to use contact strip with a width of more than 60 mm. This requirement is verified as part of technical compatibility of the vehicle with the network, it was consulted with the European Union Agency for Railways and approved in the RDD. The above requirement has been justified by the current operation and railway occurrence in which the reason for breaking the overhead contact line was that the contact strip fell between the corners of the section insulator, causing the insulator part to be pulled along with the overhead contact line.</p>	The NTR remains valid until review of the CR and possible inclusion in the TSI

			<p>The problem is not the width of the pantograph head (as in point 4, clause 4.2.8.2.9.2. TSI LOC & PAS - defined as 0.65 m - according to PN-EN 50206-1, fig. 1, item 7), but the width of the contact strip.</p> <p>The section insulators used by the Infrastructure Manager are described by the width of the air gap with dimensions from 49 to 80 mm. When using contact strip with a width of less than 60 mm (e.g. 42 mm), risk of jamming the contact strip in air gap appears and, in the worst case, breaking the overhead contact line.</p> <p>Considering the nature of the problem, the initial proposal for a solution is to introduce an open point for Poland. IM will successively eliminate air gaps of greater width and they will be replaced with newer solutions enabling the use of all certified interoperability constituents. Once existing air gaps of greater width eliminated, open point for Poland can be closed.</p>	
464	Clarification on the platform height for trains which are outside the scope of the LOC&PAS TSI	ERA	<p>According to the Article 4 (4) of Directive (EU) 2016/797, “Each TSI shall be drawn up on the basis of an examination of an existing subsystem and indicate a target subsystem that may be obtained gradually within a reasonable timescale”. Accordingly, the content of the INF TSI should indicate the target Infrastructure subsystem that may be obtained gradually. The target Infrastructure subsystem is closely interfaced with the target Rolling Stock subsystem.</p> <p>As a consequence, the target Infrastructure subsystem described in the INF TSI shall only take account of Rolling Stock in the scope of the LOC&PAS TSI. Rolling Stock out of the scope of the LOC&PAS TSI may also be considered, but only as far as necessary for describing how to gradually migrate to the target subsystem within a reasonable timescale.</p> <p>The clause 4.2.9.2 (3) doesn’t indicate a target for the specific parameter of platform height. It should be deleted.</p> <p>The gradual migration to the target subsystem is covered by the clause 4.2.9(2):</p>	<p>Extract of MoM of WP10 on 7 Sep 2021:</p> <p>ERA explains the background for this CR: it originates from a NB-Rail request for a TO in 2019 that wasn’t published yet due to unclear legal aspects. Also, users’ organisations keep complaining to the Commission about the non-harmonisation of platform heights in the EU. ERA and EC see this CR as a first step to collect more specific cases if needed (e.g. airport express trains, tram-trains...). This would give a detailed picture of the current situation before trying to harmonise (however not for the 2022 package).</p> <p>CER adds that the current situation in tight curved station remains problematic and recommends working on clauses 4.2.9.2 (1) and (2), not only (3). NSA CH mentions that removal of the clause</p>

			"For the requirements of this point it is permissible to design platforms required for the current service requirement provided provision is made for the reasonably foreseeable future service requirements. When specifying the interfaces with trains intended to stop at the platform, consideration shall be given to both the current service requirements and the reasonably foreseeable service requirements at least 10 years following the bringing into service of the platform."	4.2.9.2(3) could be a conflict with PRM legislation in CH. ERA concludes that the point is open for WP members to comment. Decision ERA CT Nov 2021: This CR should be processed in the context of a more general revision relative to the platform - train interface which isn't in the mandate for the TSI package 2022
456	Lights alignment assessment	NSA ES	In order to guarantee visibility, it is considered important to request an assessment of the correct alignment of marker lights and tail lights. Reference to clauses 5.4.5 and 5.5.5 shall be introduced in TSI and evaluation must be done at subsystem level.	The NTR remains valid until review of the CR and possible inclusion in the TSI
455	Headlamps luminous intensity levels	NSA ES	The clause 4.2.7.1.1 (5) of Loc&Pas TSI 1302/2014 refers to luminous intensity of headlamps measured only along the optical axis. In order to guarantee better visibility in curves, in conjunction with reflective plates as rear end signals in freight trains, it is considered that values of luminous intensity within 50 on both sides of the optical axis in the horizontal plane shall respect the minimum values requested in clause 5.3.4, table 2, 2nd line of EN 15153-1.	The NTR remains valid until review of the CR and possible inclusion in the TSI
454	Main circuit breaker assessment procedure	NSA ES	TSI evaluates circuit breakers as an interoperability constituent (clause 5.3.12) , but it does not establish requirements nor methodology on "how" it has to be assessed. A faulty circuit breaker has an impact on safety. Therefore, as long as there is a standard that establishes a methodology, seems to be logical to use it. In order to guarantee a common assessment procedure for circuit breakers, NSA ES requests to include EN 60077-3 and EN 60077-4 as mandatory assessment procedures in the Loc. & Pas. TSI.	No more activities of the TWG FI/RST and lack of internal resources to handle by the Core Team

453	Geometric characteristics of wheelsets	NSA ES	Neither clause 6.2.3.7 of L&P TSI nor reference 3.2.1 of EN 13260-1 defines a specific method to check compliance of clause 4.2.3.5.2.1(6) 'geometrical dimensions of wheelsets'.	The NTR remains valid until review of the CR and possible inclusion in the TSI
452	Fixing of equipment under the carbody structure	NSA ES	Clause 4.2.2.7(3) refers to chapter 6.5.2 of EN 12663-1. However, clause 6.7.3 of the EN 12663-1 covers fatigue effects to be considered for fixing of devices. Current version of Loc. & Pas. TSI does not cover this safety aspect. This aspect shall be included in TSI in order to take into account long term fatigue loads when fixing elements under the carbody structure.	Valid NTR until discussion of the proposed CR
434	Isolation of the passenger alarm system	CER	<p>Summary and justification:</p> <p>The current clause 4.2.5.3.6 of the TSI mentions 'degraded mode' and 'isolated' as various states in which the passenger alarm system and emergency braking system can be. This CR is aimed at providing clarity by distinguishing 'degraded mode' at the driver's side of the system in case of technical malfunctions and 'isolated mode' isolating the passenger interface from the emergency braking system in case of extraordinary operational circumstances.</p> <p>4.2.5.3.6 (1)+(2) require</p> <p>"(1) Units fitted with a driver's cab shall be fitted with a device which allows authorised staff to isolate the passenger alarm system.</p> <p>(2) If the passenger alarm system is not functioning, either after intentional isolation by staff, due to a technical failure, or by coupling the unit with a non-compatible unit, this shall be permanently indicated to the driver in the active driver's cab, and application of the passenger alarm shall result in a direct application of brakes."</p> <p>In 4.2.5.3.6 (1) is stated that it must be possible to isolate the passenger alarm.</p> <p>We made the interpretation that it must be possible to override all alarm devices (e.g. this function is also useful in the case of</p>	Postponed to after 2022 due to short timing and lack of resources

			<p>permanent misused such as transporting football hooligan). According to 4.2.5.3.6 (2) however, when the alarm is isolated, activating of an alarm device must lead to a direct emergency brake of the train. This seems to be in contradiction to 4.2.5.3.6 (1).</p> <p>It is not clear if either this clause is about deactivating of the alarm devices, or about the deactivating of the overriding function. Both possibilities are needed.</p> <p>Additionally, the isolation switch should allow having three possible modes:</p> <ul style="list-style-type: none"> - Normal operation - Degraded mode: an activation of a passenger alarm must lead to an automatic immediate activation of an emergency brake - Isolated mode: Every emergency brake initiated by the passenger alarm system must be repealed <p>E.g.: If the override device for the driver is out of order the isolation should not mandatorily lead to a direct brake application.</p> <p>In shunting mode an immediate brake application should be possible.</p> <p>In case the situation in a coach is supervised by staff (hooligan situation) a direct brake application is also not necessary.</p>	
413	Interchangeable spare parts: improvement of technical documentation	CER	<p>To reduce obsolescence and monopolies, detailed technical information on spare parts to enable the replacement of components is needed. However, this should not encompass all spare parts as this would create an unnecessary administrative burden.</p> <p>For “commercially available components”, e.g. screws, bolts, etc., necessary information to determine a substitute will already be available in the market.</p>	Lack of resources and time for this CR for which discussions are expected

			<p>The proposal is to limit a requirement for detailed technical information on spare parts to custom-made spare parts.</p> <p>To remain attractive and competitive to other means of transport, normally after about 15 years, a mid-life upgrade and modernization of rolling stock will take place. For this work, normally a tender is taking place, according to competition rules of the EU.</p> <p>For such a tender, essential information of source codes of systems, calculations of strength, maximum allowable tolerances, etc., need to be available for the entity carrying out the work.</p> <p>However, this information is normally not (completely) available and this gives the original manufacturer of the train an unwanted competition advantage. Or, even worse, due to the end of business or bankruptcy of the supplier, if the information isn't available anymore, the work can't be done at all.</p> <p>In practice, it is very difficult or even impossible to get this information via the original purchase contract of the rolling stock.</p> <p>For this reason, it would help the overall RU community very much if the TSI would have regulations about the obligation of providing for this information by the supplier, so it will be part of the information to be checked by the NoBo.</p> <p>Furthermore, the TSI requires for safety-critical components that servicing/maintenance traceability requirements shall be in the list of SCC. A serialisation of these components is a necessary condition for traceability.</p>	
412	Changes concerning drivers presence required in TSI L&P to enable ATO	CER	<p>A lot of requirements in the L&P TSI assume that there is a driver and a drivers cab in a train.</p> <p>If there is no driver (ATO) this requirement does not make sense and could lead to problems with NoBos and/or authorizing entities.</p>	Postponed to after 2022. ATO GoA 1 & 2 still require the presence of a driver in the cabin

	Inputs to CR 255			
411	Loss of door interlock	CER	<p>The Loc & Pas TSI clause 4.2.5.5.7 already describes the door-traction interlock and the requirement to prevent traction power from being applied in the event that not all doors are closed and locked. From the wording that is used in the current TSI text of the requirement, this actually only covers the scenario of a train leaving the station and does not cover the scenario of a door opening when the train is away from any station and at speed.</p> <p>It has been interpreted by train builders that if a train is away from a station and at speed, the scenario of a door becoming open at this time, e.g. as a result of a technical failure, only results in the loss of traction power, which the driver is able to override, nevertheless, even if the driver does not override the loss of traction, the train continues at speed because it is not required to brake.</p> <p>By the time the driver becomes aware of the reason for the loss of traction and goes through the decision process of what he needs to do, the door could be in an unsafe state for a relatively long period of time, increasing the risk of harm to passengers and crew.</p> <p>In order to bring the level of risk to the minimum possible for such a scenario, a loss of door interlock, or the detection of a door no longer being closed and locked when the train is in motion, should result in an immediate application of the emergency brake.</p> <p>There have been a number of recent incidents on trains from several train builders of the nature described here.</p>	No sufficient consensus, given the available resources, to include this CR in the revision package 2022
409	Safety requirements for doors	CER	<p>L&P TSI clause 4.2.5.5.8 requires:</p> <p>"For the scenario one door is unlocked ... or released or opened... — single fatality and/or severe injury' for units in which passengers are not supposed to stay in standing position in the door area (long distance), or to</p>	No sufficient consensus, given the available resources, to include this CR in the revision package 2022

			<p>— ‘single fatality and/or severe injury’ for units in which some passengers stay in standing position in the door area in normal operation.</p> <p>For the scenario several doors are unlocked ... or released or opened...</p> <p>— ‘fatality and/or severe injury’ for units in which passengers are not supposed to stay in standing position in the door area (long distance), or to</p> <p>— ‘fatalities and/or severe injuries’ for units in which some passengers stay in standing position in the door area in normal operation.</p> <p>Problem with the current TSI text:</p> <p>The safety requirements are not related to the parameter mostly related to the hazard which is the movement of the train. The number of doors and the intention of standing near to the door is less influencing compared to the movement and could be summarised.</p>	
408	Classification and categorisation of rolling stock in TSI L&P	CER	<p>Clauses 1.1, 2.2, 2.3, and 4.1 are all containing a kind of classification or categorization of rolling stock. That makes the application unnecessarily difficult.</p> <p>They should also be aligned with the category of the vehicle at the ECM level allowing a better interface between IOD & Safety Directive.</p> <p>They should also consider the improvement on SPECIAL VEHICLES definitions and wording consistency.</p>	As indicated by the submitter, this CR being not in scope of the TSI revision package 2022 will be processed at a later stage.
391	Tank wagons - load cases improvement §4.2.2.2	NSA BE	<ul style="list-style-type: none"> • § 5.2 of standard EN 12663-2: 2010 defines: <ul style="list-style-type: none"> o load cases which are longitudinal in nature (compression at the height of the buffer and traction (compression) at the coupling; o vertical load cases and lifting 	The revision of EN 12663-2 planned for 2022 will only consist in a revision of annex ZA. The update of EN 12663-2 to include the relevant load cases

			<ul style="list-style-type: none"> • § 7 of standard EN 12663-2: 2010 gives validation criteria for specific associated equipment but does not deal with the case of tank wagons. In addition, the TSI WAG does not refer to the said paragraph. • In addition, EN 14025 takes up the calculations and design criteria for pressure tanks for the transport of dangerous goods but only makes a general connection with the railway aspect (§6.5) and only deals with the tank-frame fixing. • In general, the basic principles of standard EN 12663-2 determine load cases while standard EN 14025 rather determines a method for calculating the minimum thickness of the tank wall and is clearly related to the sections and subsections of the RID. 	will be done later. The CR is therefore postponed until the standard is revised
350	Battery charging for traction purpose	EIM	<p>"Trains that have batteries for traction is already in use on the EU railway network and is expected in the future to increase in use. How these new type of trains shall be able to charge the batteries, and what kind of requirements that leads to on the infrastructure of power supply and on the trains, is a subject that need answers.</p> <p>Examples of questions:</p> <ul style="list-style-type: none"> • For traffic with battery-powered trains, it can be sufficient to have the railway lines partially electrified. Huge savings in the infrastructure could then be possible. Fewer kilometre of OCL on open line, in tunnels, on (tilting) bridges... can reduce costs significantly. The present TSI ENE does not allow that. • Reduction of capacity/robustness margins on electrified lines could be possible as the trains have stored energy in for example batteries or hydrogen. • How and where shall charging be possible? (Limits for charging. Easy quality assessment...) • The power that the battery train should be able to charge with at stand still or low speed needs to be established/determined. If the 	Postponed due to the lack of resources for the package 2022

			<p>charging is done from the OCL it can be necessary to have reinforced OCL solutions at the positions where charging at stand still is allowed and on other locations restrictions could be necessary on the allowed charging. There is a need for new and/or revised standards together with changes in TSI ENE and TSI LOC&PAS for this.</p> <ul style="list-style-type: none"> • Do we need other/changed interfaces then the present ones for charging of trains with batteries for traction? • Stationary supply is today in TSI INF. This is an opportunity to move that to TSI ENE. • Appropriate operational and technical electrical and mechanical interface requirements on charging seems to be missing both in the TSIs/RINF and the corresponding European standards. • Today's framework seems to focus on continuous and instantaneous power transfer for traction, not battery charging. Cenelec is currently finalizing EN 50546 for shore supply, which may include battery charging, and has launched a new work item proposal on "Requirements for charging stations for accumulator electric traction units based on separate contact line sections". 	
345	Exclude facilities explicitly	EIM	<p>" There is no guide and specification in the application of tactile walking surface indicators in order to provide a specified route. In order to maintain overview and accessibility and prevent getting lost. Instead of having guided lines to all the facilities at the station.</p> <p>We are not sure how much information is helpful for blind people and we received different feedback from blind people organisations and are not sure what is the best for the customer."</p>	The rules on where and how to install tactile walking surface indicators shouldn't be different in a railway station than in other public buildings (apart for platforms). It may be necessary to reconsider the requirement in light of the evolution of standards on accessibility to the built environment, but not within the TSI revision package 2022 due to the lack of resources within ERA.
339	Rewrite requirement, same	EIM	4.2.1.15(4) is only the reversal formulation of 4.2.1.15(3) and does not give any additional value.	Postponed as not a priority

	requirement return 3 times, but in different wording.			
306	Take into account the development of new on-board sources of energy	EC	Research on the railway system of the future already considers technical solutions for promoting on-board energy storage (either as batteries, supercapacities or fuel cells) and mixed solutions involving on-board and infrastructure. The impact of these developments on the TSI needs to be evaluated, in particular for mixed solution with interfaces between fixed installations and rolling stock	Awaiting inputs from S2R projects and FCH project - No direct legislative impact currently identified. ERA to follow up developments for potential impacts.
305	Take into account the development of active suspension/boogie steering	EC	The TSI refers, for what concerns running dynamics, to a standard that is not adapted to the case of vehicles with active suspension components, given the necessity for extensive testing. Alternatives based on simulations and/or risk assessment may be developed that may require an evolution of the TSI on that aspect.	Awaiting inputs from S2R projects - ERA role limited to taking over evolutions of EN 14363 standard while pushing for inclusion of new solutions in the standard.
304	Review TSIs to take into account the introduction of new materials	EC	The introduction of new composite materials, in particular for some structural parts of a rolling stock, may reveal the existence of discrepancies between the current mandatory standards and the intrinsic properties of these materials (e.g. fire & smoke, mechanical characteristics, etc). To resolve this, evolutions of TSIs may be necessary depending on the evolution of standards.	Awaiting inputs from S2R projects - ERA role limited to taking over evolutions of related mandatory standards while pushing for inclusion of new solutions in the standards.
302	Harmonise terminology and methodology requirements on virtual certification	EC	Virtual Certification is a transversal topic currently covering various processes used to validate a design, each having its specific terminology and methodology. In order to promote the use of simulations, some harmonisation is required. Prerequisite: Inputs from S2R (PLASA-2)	Awaiting inputs from S2R project PLASA-2

279	REQUIREMENTS RELATED TO GAUGE CHANGEOVER FACILITIES	NSA ES	There is a lack in INF TSI of requirements and conformity assessment procedures for gauge changeover facilities. These requirements are necessary to ensure technical compatibility with Rolling stock with variable running gear.	Core Team meeting 17/09: whereas the CR is considered relevant, the issue isn't included in the list of priorities for the Main TSI Package 2022 and will be processed during a later revision.
250	Revise the table "link between basic parameters and essential requirements" in Chap 3 of the TSIs	EC	The tables of the TSIs listing the links between the basic parameters and the essential requirements set out in Annex III of Directive (EU) 2016/797, as well as the interfaces between subsystems, should be updated in order to ensure a coherent approach among all TSIs.	No action launched on this request until November 2021 - postponed to a next revision
248	Harmonized operational rules linked to wider CCS technical standardization	EC	Subject to overall harmonized signalling (interlocking) principles to be developed and agreed by the sector, as well as to the sector's input on the set of (voluntary) agreed and non-agreed harmonized operational rules (open points), ERTMS OH group will attempt to harmonize additional operational rules.	The CCS TSI workplan for the package 2022 does not include any "harmonised signalling (interlocking) principles". External input required, for instance from the System Pillar activities of Europe's Rail Joint Undertaking.
246	Streamline requirements on route knowledge making use of new technologies	EC	Consider reviewing route knowledge requirements based on ERTMS developments, link with the train driver Directive and with Shift2Rail project on live translation tool. The resolution of the CR depends on various outputs, in particular from ERTMS developments and from S2R project Translate4Rail ending in November 2021	The resolution of the CR depends on various outputs, in particular from ERTMS developments and from S2R project Translate4Rail ending in November 2021
242	Review clause LOC&PAS TSI 4.2.1.3 (4) to streamline management	EC	TSIs should take into account the need to achieve the right balance between a rule-based approach and a risk-based approach, which allows to facilitate technical progress and innovative solutions, in particular when specifying functions and performances.	Postponed due to the lack of resources

	of changes impacting software while maintaining the safety of the rail system			
237	Improve definitions and add definitions when necessary	EC	All TSIs define some important terms and there are cases where the same term is defined differently in different TSIs (for instance a 'train' is defined differently in the LOC&PAS TSI and in the OPE TSI). An analysis should be done to ensure that there is no contradiction in the definitions and, if possible to provide a single definition for a term.	Not processed during the TSI package 2022 except for the definition of special vehicles (CR 384)
200	Improve the existing provisions of the TSI on the basis of the return of experience from stakeholders	CER	The INF TSI needs to be maintained or corrected on the basis of the experience of the stakeholders that apply it. Stakeholders having now many years of experience with the INF TSI, and consolidated suggestions for improvement of the TSI. In the light of the pasts WPs preparing the Commission Implementing Regulation (EU) 2019/776 amending Commission Regulations (EU) No 1299/2014, a list of Change Requests was discussed and documented in 2018 within the ERA WPs in order to improve the INF TSI on the basis of return of experience of stakeholders.	Specific CRs have been created to cover urgent points - other points will be treated in a next revision
185	Consider the provision of specification for interoperable tools for the recording of the driving and rest times for train drivers	EC	Locomotive drivers working for several companies and the increased use of temporary workers make it difficult to know the exact working time/rest time of drivers. Proper monitoring would require the implementation of a specific tool. Prerequisite: Needs clarification and best practices from the sector (ETF/ALE/ERFA/CER).	Clarifications are expected on the needs behind the request, and the analysis of the possible regulatory channel to answer those needs (e.g. Train Drivers Directive, TSIs - LOC&PAS? OPE?) ERA proposes a trilateral meeting with ALE and ETF

180	Review noise level limit for EMU, DMU, coaches and locomotives	EC	Consider reviewing L&P TSI clauses 2.1/1.4.4/7.1.1.6 and NOI TSI adding a new clause 4.2.5 "Noise value limits of parked trains". In "sleeping mode" the parked EMU, DMU, Coach or Locomotive shall save energy and decrease noise. In "sleeping" mode the noise sources shall be turned off or the activity shall be minimised to minimise noise emissions. In the "sleeping mode", the maximum sound pressure LpAeq,T relevant for emission of continuous and intermitten noise source shall not exceed 50 dB(A) during the time interval the EMU, DMU coach or locomotive is parked in "sleeping mode".	Clarification is expected from the sector on the needs behind the request and the expected impact.
176	Include provisions on Automatic Identification and Data Capture (AIDC) technologies on freight wagons	EC	In the context of the development of the TSI revision package on Digital Rail, the objective is to remove obstacles to digitalisation and to allow for the digital exchange of information.	Postponed as agreed with DG MOVE - possible link with the DAC
173	Automatic brake application function to clean up the brake blocks	EC	The function of automatic cleaning of brake blocks is available as an option in point 4.2.4.4.2 of the LOC&PAS TSI. However, this is limited to the locomotive and doesn't apply to wagons in the case of freight trains. The need is to define technical and functional requirements to enable this function also on wagons coupled with a locomotive equipped with a service brake in which this function is available.	No possibility to proceed this CR for the TSI package 2022 due to the late availability of the DAC specifications.
168	Improved protection of train drivers in terms of	EC	For drivers' H&S, but also in view of the shortage of staff and drivers in the sector, the provision of toilets in freight locomotives should be considered. The feasibility within the available space to be	Postponed as agreed with DG MOVE

	health and safety at work		confirmed (size and functionalities) and a transition period provided. Prerequisite: 1. Needs clarification and best practices from sector. 2. Feasibility/Impact assessment study, including other possible solutions for promoting inclusion of female drivers.	
167	Review the provisions on rear end signals	EC	If appropriate and based on the findings in the reports delivered by Member States, the provisions on train rear end signals should be reviewed to extend the use of reflective plates. Prerequisite: delivery of report by 30/09/2020 acc.to OPE TSI § 4.2.2.1.3.2	The Agency submitted, on 29 June 2021, the recommendation 'REC TSI OPE 422132' proposing the amendment of point 4.2.2.1.3.2 of the Annex to Regulation (EU) 2019/773. The Commission, on the basis of this recommendation and taking into account the findings in the reports delivered by Member States, reviewed the dates of harmonisation of reflective plates in the Union. The technical discussion on the rear end signals to extend the use of reflective plates will take place after the TSI package 2022.

3.2.3. Submitted and valid change requests

This list contains change request which are submitted in Clearquest, validated or not by the ERA Core Team, for which the change control management process hasn't entered yet in the resolution phase. Valid change requests are already accepted from a completeness and clarity perspective, while submitted change requests can be rejected by ERA Core Team for being unclear or incomplete.

CR	Headline	State	Submitter	Problem_Need_description
578	update reference to EN15528 in TSI WAG	Valid	ERA	reference to EN 15228 was updated to 2021 version in TSI INF and OPE by TWG rolling stock and fixed installations interface. This standard is also quoted by TSI WAG. Proposal is to update TSI WAS chapter 4.2.3.2 with a reference to EN 15228:2021 clauses 6.1 and 6.2, instead of EN 15528:2016 clauses 6.1 and 6.2
573	Fundamental principles for safety of operation	Valid	NSA IT	NSA IT believes that the fundamental principles for safety of operation on the European Union railway system should be established in a separate document of

				<p>higher level than the TSIs, in order to obtain a coherent and comprehensive text relating to safety principles.</p> <p>Common operating rules should follow as a consequence of those principles.</p> <p>The set of principles should be applicable regardless of the layout of the railway system established by the European regulatory framework and the type of organization that each subject decides to implement by its SMS. Therefore, in our proposal the involved bodies are never explicitly indicated, such as IMs, RUs.</p> <p>A proposal based on the Italian experience can be found In Annex; it is also related to shuntings because we consider necessary to harmonize this kind of movements too. We are conscious that in some points the proposal can be considered too detailed, but we believe that it can be a good starting point for changing perspective. The improvement work on the proposal is always in progress.</p> <p>Anyway, if the current structure of the OPE TSI is to be maintained in the present revision exercise, NSA IT can propose few CRs with comments and amendments in referenced points of the OPE TSI to enhance the text, unfortunately not covering by now all the desired aspects. More time would be necessary to send other specific CRs to give the Agency and the Commission the complete set of proposals.</p>
566	update of EN 16839 and linked standards(EN 15551, EN 15566 and EN 16116-2) references in TSI and update	Valid	ERA	Wrong definition of free space above draw hook in EN 16839: 2017, which is referenced in the amendments (2019/776 and 2020/387) of the TSI LOC&PAS.
562	Brake blocks / brake pads TSI LOC & PAS — Amendment to point 4.2.4.3 (3)	Valid	NSA DE	Friction elements are an essential part of interoperability (thermal performance, friction value for brake calculation as a precondition to ensure the expected deceleration, behavior under wet or degraded conditions, noise, track clear detection, emissions, stress on the wheels). Only Clause 5.4 of EN14198 is currently mentioned in TSI LOC&PAS for units designed and assessed to be operated in general operation. The functional behavior is independent of the type of the vehicle and the control architecture (UIC brake system or other system). There is no requirement on the type of brake system for units (trainsets or vehicles) assessed in fixed or predefined formation. This is a gap in TSI LOC&PAS.

561	Recording performance of the recording device: TSI LOC & PAS — Amendment to point 4.2.9.6 (3)	Valid	NSA DE	<p>In accordance with point 4.2.9.6 (3) of the LOC&PAS TSI, the functional requirements set out in clauses 4.2.1, 4.2.2, 4.2.3 and 4.2.4 of the specification (EN/IEC 62625-1:2013) as set out in Appendix J-1, index 57, shall be met;</p> <p>Section 4.2.1 of this specification describes the recording of train data by the driving data recorder. Section 4.2.3 describes ensuring the query of / access to recorded data.</p> <p>However, the requirements set out in these sections are not sufficient for the users of the recorded data to be able to access this data without disproportionate effort and without elaborated special technical equipment or proprietary solutions of manufacturers. Such requirements are already included in various national regulations, e.g. in Germany in the regulations “Technical Regulation ETCS — Annex 2 — Juridical Recording Unit (JRU)” and have been technically implemented in existing systems.</p>
560	JRU storage capacity, TSI LOC & PAS — Amendment to point 4.2.9.6 (3)	Valid	NSA DE	<p>JRU storage capacity, requirements in EN 62625 are not sufficient for practical needs.</p> <p>In accordance with point 4.2.9.6(3) of the LOC&PAS TSI, the functional requirements set out in clauses 4.2.1, 4.2.2, 4.2.3 and 4.2.4 of the specification (EN/IEC 62625-1:2013) as set out in Appendix J-1, index 57, shall be met; Section 4.2.1 of this specification describes the recording of train data of the driving data recorder. According to this section, the system may not overwrite data until at least 8 days after the recording of this data has passed.</p> <p>This is not sufficient from the point of view of the railway undertakings, the Federal Railway Authority (Eisenbahn-Bundesamt) and the Federal Authority for Railway Accident Investigation (Bundesstelle für Eisenbahnunfalluntersuchung) , as Germany is a transit country and it can happen after dangerous irregularities that the vehicle involved has already left the country again. This may take several weeks to identify and locate the vehicle involved. Especially in the case of cross-border traffic, it can be difficult to position the trains involved in a dangerous irregularity to read out the recording device.</p> <p>The occasions for an evaluation of the journey can be of various kinds (e.g. reporting of injuries of travellers, e.g. after forced braking). Often with such an occasion one</p>

			<p>can not immediately recognise that, for further clarification, an evaluation of the journey is required. The occasion itself often becomes apparent only with a considerable delay for the safety authorities and/or railway undertakings, so that the required route data still has to be available over this entire time range.</p> <p>A recording period of 8 days is not sufficient to be able to secure all relevant events before deletion, because the risk potential is not immediately known when an event is reported. It is often recognised only later in the analysis of disturbances that these dangerous causes can be assigned and that an evaluation of the journey history is required for further clarification.</p> <p>To this end, we point out the following exemplary procedure:</p> <ul style="list-style-type: none"> • Day 1 Notification of failure from operation in the fault detection system; • Working days 2-5 analysis of the disturbances, after which realisation that trajectory recording is required. • Working day 6 Identification of the railway undertaking and request for data analysis; • Working Day 7 Determination of the vehicle concerned and the planning of the data transfer; • Working days 8-15 waiting time for the vehicle to arrive at a suitable location where data can be read; • Working day 16 Read out the dates. • Since weekends and public holidays are also added to the above working days, the procedure described gives rise to a recording period of 30 days. <p>Even if the data is continuously read and secured, a recording period of 30 days is required due to the rotation times of a vehicle on the European railway network and the achievement of a maintenance site suitable for reading out of the respective railway undertaking. Shorter periods would require the establishment of additional maintenance sites which, in the sense of a cost-effective organisation of operations, cannot be expected by railway undertakings (competitiveness of the railway sector).</p>
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555	replace the reference to EN15892 in TSI noise by a reference to ISO3381:2021	Valid	ERA	to replace the reference to EN15892 in TSI noise by a reference to ISO3381:2021 there is a need of a specific discussion to define whether the ISO is equivalent to the EN or not and to define the limit values for cab noise; the change category and the clauses of the ISO to be quoted in TSI.
550	Ergonomics of the "Driver's activity control function"	Valid	NSA IT	<p>the question of the ergonomics of the "Driver's activity control function" device and the effects on the health of the worker should be posed at a European level, providing an uniform approach for the realization and use of devices that shall consider the ergonomics and the human factor.</p> <p>Following this aim the proposal point to providing further specific requirements to the driver's activity control function, defined by point 4.2.9.3.1. of the TSI Loc & Pas, so that it has to be designed, built and used in compliance with the principles of the Council Directive, of 12 June 1989, on the introduction of measures to encourage improvements in the safety and health of workers. Furthermore, in relation to the degree of technological evolution, the designers, manufacturers and railway undertakings, each for their own competence, must seek and implement ergonomically suitable solutions to reduce monotonous and repetitive work and the their related risks.</p>
538	Additional risk scenario for emergency braking command	Valid	NSA IT	<p>To date there is no explicit requirement in the TSIs that the command generated by the on-board CCS subsystem is actually transferred to the braking system. In fact, the table in section 4.2.4.2.2 (safety requirement 1, Table 3) of the Loc&Pas TSI does not include this risk scenario.</p> <p>This scenario, as well as those already covered by the aforementioned table, are essential in order to identify the hazards and define the mitigations (redundancies, periodic checks, etc.) to ensure the safety of the complete vehicle.</p>
537	braking system risk scenarios	Valid	NSA IT	<p>The driver's activity control function, as well as the braking system, ensures compliance with the "essential requirement Safety" (tab 1.3.1 TSI LOC&Pas).</p> <p>To date, while the safety requirements and risk scenarios to be taken into account are made explicit for the braking system (Table 3 in section 4.2.4.2.2), the same cannot be said for the driver's activity control function, also considering that some risk scenarios are of comparable magnitude to those defined for the braking system.</p>

				These scenarios, as well as those already contemplated for the braking system, are essential in order to identify hazards and define mitigations (redundancies, periodic checks, etc.) to ensure the safety of the complete vehicle.
531	Space available in or near the driver's cab where to store On-board tools and portable equipment	Valid	NSA IT	<p>The LOC & PAS TSI clause 4.2.9.4 requires the availability of space in or near the driver's cab for portable tools and equipment in case they are needed by the driver in emergency situation.</p> <p>However, it is considered essential to insist on the fact that the space envisaged by the loc & Pas TSI, in the event that it is not placed at the head of the vehicle, must be accessible from both sides of the vehicle; this for obvious security reasons.</p>
530	Marking of railway vehicles	Valid	NSA IT	<p>The absence of a marking scheme that is not uniquely defined can lead to a late and, sometimes incorrect, recognition of the vehicle in the scope of TSI loc&Pas during all the activities foreseen in its life cycle. Furthermore, in the event of an accident, the identification and recovery of the various parts of the vehicle / freight wagons bearing this information can be particularly difficult. At today there is the best standard used in the whole Europe concerning the marking of vehicles in the scope of TSI loc&Pas. in fact the standard EN 15877-2 is the best standard concerning the markings of railway vehicles, in particular the external markings on coaches, motive power units, locomotives and on track machines. In the last version of TSI Loc&pas the only reference to the EN 15877-2 is for the marking concerning "Lifting and jacking" but this is not enough. It is necessary to refer to all marking managed in the EN 15877-2 or at least to extend the reference to the other part of TSI Loc&Pas than "Lifting and jacking". We think that only for the TSI Loc&Pas we should add the provision previewed at today in the TSI wagon Paragraph 7.1.2 "Mutual</p>
529	Wheelsets traceability	Valid	NSA IT	<p>The WAG TSI is missing of a direct reference to the traceability of wheelsets, as indicated in standard EN 15313, where the EWT protocol for traceability is provided. A reference to the EN 15313 is foreseen in the guideline, but can not be considered sufficient and/or enough legally binding. So a specific reference in the WAG TSI has to be inserted in regards of maintenance of wheelsets in operation and out of work. This proposal come out following the Viareggio accident experiences, so that the ECM may check the history and carry out the proper maintenance of wheelsets mounted on the vehicles under its responsibility.</p>

				To ensure the traceability of in-service vehicle axles, it is necessary that the wheelset manufacturer provides all the data required by the standard EN 15313 (4.2.4.2, 4.2.4.3.2 and Annex A) already during the vehicle authorization phase and become part of the vehicle Technical file.
528	Wheelsets traceability	Valid	NSA IT	<p>The LOC & PAS TSI is missing of a direct reference to the traceability of wheelsets, as indicated in standard EN 15313, where the EWT protocol for traceability is provided. A reference to the EN 15313 is foreseen in the guideline, but can not be considered sufficient and/or enough legally binding. So a specific reference in the LOC & PAS TSI has to be inserted in regards of maintenance of wheelsets in operation and out of work. This proposal come out following the Viareggio accident experiences, so that the ECM may check the history and carry out the proper maintenance of wheelsets mounted on the vehicles under its responsibility.</p> <p>To ensure the traceability of in-service vehicle axles, it is necessary that the wheelset manufacturer provides all the data required by the standard EN 15313 (4.2.4.2, 4.2.4.3.3 and Annex B) already during the vehicle authorization phase and become part of the vehicle Technical file.</p>
490	Functional requirement of braking application	Valid	NSA IT	<p>The lost, during the train services, of brake blocks is a dangerous situation. The toss of a piece of metal while the train is running may be cause unexpected dangerous situation like the injury of persons while the train is passing, or derailment of a train if the fallen brake or the pad may interfere with a shift.</p> <p>In the TSI loc&Pas there are no functional requirements concerning the brake block holder/brake pads holder and the brake pads. It should be very important to insert a functional requirement to avoid the loss of a brake block or brake pad while the train run. It is also furthermore necessary to define the test to admit braking pads, in compliance with the UIC standard fiche UIC 541-3</p>
489	Brake discs requirements	Valid	NSA IT	<p>In the TSI Loc&Pas 6.2.3.7 should be amended to introduce requirements for demonstrating compliance of brake discs to quality checks as similar already done for axle wheel, axle bearing and axle boxes.</p> <p>The lack of references for brake discs, has to be considered a severe lack of safety while other elements are deeply described. It is essential to provide a reference to the compliance with the standards available today by all manufacturers for the</p>

				construction of brake discs, namely the EN 14535-1 standards and EN 14535-2. We share the decision to not foreseen standards related to the design and production of brake discs, but only the references to demonstrate the mechanical and thermal characteristics of them (EN 14535-3).
488	Joining techniques in Structural design of bogie frame	Valid	NSA IT	<p>In the Chapter 4.2.3.6.1. “Structural design of bogie frame” there is no reference to joining techniques. This has to be considered as a serious lack in the TSI. This chapter should be like the chapter 4.2.2.2 concerning the “Strength of unit”. All welding joining carried out, on the bogie frame, should be made according to an harmonized procedures, at list in compliance with standards EN 15085.</p> <p>The manufacturer is free to adopt alternative methods but in this case the EN Standards 15085 can be used as reference for the quality check system to demonstrate through experience and risk assessment that adopted procedures fulfil the essential requirements during the production phase.</p>
487	Joining techniques in Structural design of bogie frame	Valid	NSA IT	<p>In the Chapter 4.2.3.5.1. “Structural design of bogie frame” there is no reference to joining techniques. This has to be considered as a serious lack in the TSI. This chapter should similar to the chapter 4.2.2.4 (8) concerning “Strength of vehicle structure”. All welding joining carried out, on the bogie frame, should be made according to an harmonized procedures, at list in compliance with standards EN 15085.</p> <p>The manufacturer is free to adopt alternative methods but in this case the EN Standards 15085 can be used as reference for the quality check system to demonstrate through experience and risk assessment that adopted procedures fulfil the essential requirements during the production phase.</p>
482	Minimum vertical curve capability and assessment methods	Valid	CER	<ul style="list-style-type: none"> - ERATV 4.8.4-4.8.6 require registering the minimal horizontal and vertical curve radii capability - OPE TSI Appendix D1 requires a route compatibility check for the vertical and horizontal curve radii. <p>But the L&P TSI is quiet about the minimum vertical curve radius</p>
337	Enhancing Cybersecurity of the Railway System	Submitted	EC	The TSIs should take into consideration cybersecurity in line with the conclusions of the first Conference on Transport Cybersecurity organised by the European Union Agency for Network and Information Security (ENISA):

				<p>- Our transport system should be able to deter attacks and show resilience if they occur.</p> <p>- The Directive on Security of Network and Information Systems (NIS Directive) lays a solid foundation to enhance cybersecurity and resilience in the transport sector. Where appropriate, specific rules may be needed in certain transport modes.</p>
331	Specific objectives which should be considered during the revision of TSIs	Submitted	EC	<p>To improve interoperability and contribute to the completion of the single European railway area and the progressive achievement of the internal market, TSI revisions should include the following objectives:</p> <p>Complement TSIs when necessary to cover essential requirements. Improve transparency on aspects to be covered by specific cases (add explicit cases when appropriate using the result of the cleaning-up of national rules)</p> <p>FOR VALIDATION, A PREREQUISITE IS A CLEAR AND SHARED UNDERSTANDING OF THE EXTENT OF THE COVERAGE OF ESSENTIAL REQUIREMENTS IN THE TSIs</p>
329	Specific objectives which should be considered during the revision of TSIs	Valid	EC	<p>To improve interoperability and contribute to the completion of the single European railway area and the progressive achievement of the internal market, TSI revisions should include the following objectives:</p> <p>- Remove multiple options for basic parameters wherever appropriate.</p>
328	Specific objectives which should be considered during the revision of TSIs	Valid	EC	<p>To improve interoperability and contribute to the completion of the single European railway area and the progressive achievement of the internal market, TSI revisions should include the following objectives:</p> <p>- Review existing specific cases in view of phasing out national exceptions as well as general exemptions in TSIs</p> <p>- Remove multiple options for basic parameters wherever appropriate.</p>
324	Specific objectives which should be considered during the revision of TSIs	Valid	EC	<p>To improve interoperability and contribute to the completion of the single European railway area and the progressive achievement of the internal market, TSI revisions should include the following objectives:</p> <p>- Review existing specific cases in view of phasing out national exceptions as well as general exemptions in TSIs</p>

				<ul style="list-style-type: none"> - Remove multiple options for basic parameters wherever appropriate. - Add new ICs when appropriate (e.g. switches, crossings, slab tracks, Stop Marker Boards ...)
321	Specific objectives which should be considered during the revision of TSIs	Valid	EC	<p>To improve interoperability and contribute to the completion of the single European railway area and the progressive achievement of the internal market, TSI revisions should include the following objectives:</p> <ul style="list-style-type: none"> - Review existing specific cases in view of phasing out national exceptions as well as general exemptions in TSIs - Remove multiple options for basic parameters wherever appropriate.
319	Specific objectives which should be considered during the revision of TSIs	Valid	EC	<p>To improve interoperability and contribute to the completion of the single European railway area and the progressive achievement of the internal market, TSI revisions should include the following objectives:</p> <ul style="list-style-type: none"> - Review existing specific cases in view of phasing out national exceptions as well as general exemptions in TSIs - Remove multiple options for basic parameters wherever appropriate.
318	Specific objectives which should be considered during the revision of TSIs	Valid	EC	<p>To improve interoperability and contribute to the completion of the single European railway area and the progressive achievement of the internal market, TSI revisions should include the following objectives:</p> <ul style="list-style-type: none"> - Review existing specific cases in view of phasing out national exceptions as well as general exemptions in TSIs - Remove multiple options for basic parameters wherever appropriate.
315	Specific objectives which should be considered during the revision of TSIs	Valid	EC	<p>To improve interoperability and contribute to the completion of the single European railway area and the progressive achievement of the internal market, TSI revisions should include the following objectives:</p> <ul style="list-style-type: none"> - Review existing specific cases in view of phasing out national exceptions as well as general exemptions in TSIs - Remove multiple options for basic parameters wherever appropriate.

301	Improve provision of TSIs on the basis of return of experience from vehicle authorisations	Valid	EC	TSIs should be amended on the basis of the return of experience of authorising entities with the authorisations of placing on the market. A report on the subject is planned for the end 2021.
188	Improve the existing provisions of the TSI on the basis of the return of experience from stakeholders	Valid	ERA	The TSI needs to be maintained or corrected on the basis of the experience of the stakeholders that apply it.
186	Improve the existing provisions of the TSI on the basis of the return of experience from stakeholders	Valid	ERA	The TSI needs to be maintained or corrected on the basis of the experience of the stakeholders that apply it.
184	Improve the existing provisions of the TSI on the basis of the return of experience from stakeholders	Valid	ERA	The TSI needs to be maintained or corrected on the basis of the experience of the stakeholders that apply it.

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4. Activities and outputs of working group

4.1. Topical working group on composite brake blocks

This Topical working group is specifically dealing with a procedure for the acoustic certification of composite brake blocks as interoperability constituents for closing the open point of the TSI Noise.

The working group was created during the Working Party meeting N°1 on 17 Feb 2020. It is composed of experts from the following organisations: CER, EIM, UIP, UIRR, UNIFE and of the NSAs from DE, FR, NO. Also participating were representatives of FEMFM (Federation of European Manufacturers of Friction Materials) acting as experts in the field concerned.

The group held 9 meetings between the 23 Apr 2020 and the 23 Feb 2022, all in remote mode.

The main output of the working group is a detailed assessment methodology specified in new the appendix F of the NOI TSI, which enables the assessment of composite brake blocks via bench tests. A transition period is defined in order to progressively introduce this new methodology.

4.2. Topical working group on facilitation of combined transport

4.2.1. Description and objectives of the group

The Topical Working Group was established during the Working Party meeting N°1 on 17 Feb 2020, with the task to implement in the TSIs the conclusions of the report on the facilitation of combined transport published by the Agency in September 2018. The activities of the TWG are based on the findings from the individual areas identified in chapters 8, 9 and 10 of the report

The TWG is composed of experts from the following organisations: CER, EIM, ERFA, UIP, UIRR and UNIFE as well as OTIF and UIC, and from the NSAs DK, FR, IT and LU. It held 14 meetings between the 16 Apr 2020 and the 6 May 2022, all in remote mode. The sector organisations participating to the Topical Working Group organised a parallel Joint Sector Group, which provided the inputs discussed during the working group meetings.

Facilitating combined transport is the general objective of the group. This general objective covers specific ones for codification of the three 'subsystems' involved in combined transport (i.e. the line, the wagon and the intermodal loading unit - ILU), and for the operation:

- For the codification of lines, promoting methodologies that permit the determination of the best possible line profile so as to convey bigger ILUs. These methodologies should also be progressively harmonised and the resulting CT line profile should be made available to Railway Undertakings and Wagon Keepers in the register of Infrastructure.
- For the codification of freight wagons, providing transparent rules for the calculation of the correction digit or at least providing clear information on how to have the digit calculated for a given network.
- For the codification of ILUs, clarifying the rules for the allocation of the Technical Number and the competences required from the conformity assessment bodies in charge of this task.
- For operation, determining common harmonised rules on the basis of the result of the route compatibility check involving the loaded wagon on one side and the line on the other side.

4.2.2. *Intermediate outputs*

The group proposed to work on a single document and to decide at a later stage how to distribute the content of that document in one or several TSIs. That document gathers all aspects mentioned above about the codification and its impact on operational rules. It was, during a time, considered to make a specific TSI with that document, but this possibility was finally rejected. The document on combined transport will eventually be a guidance with information and clarifications on requirements distributed in several regulatory documents as follows:

- WAG TSI: rule for codification of wagons, general requirement on devices for securing the intermodal loading unit,
- INF TSI: reference to the codification system for combined transport,
- OPE TSI: rules for the route compatibility check and resulting operational rule (normal transport, specific combined transport, exceptional transport)
- RINF: requirements to codify lines belonging to the freight TEN-T for 4 categories of ILUs, and to codify other lines upon request.

4.2.3. *Outputs for the Recommendation*

Two change requests were submitted and approved by the Working Party, amending the TSIs OPE, INF and WAG:

- CR 525: Amend the TSI INF and the TSI WAG according to the discussions in the Topical Working Group on Combined Transport,
- CR 544: Amend the TSI OPE according to the discussions in the Topical Working Group on Combined Transport

In addition, amendments to the RINF were proposed in the Recommendation.

The Topical Working Group remains active on the finalisation of the specific guide gathering all clarification and acceptable means of compliance to the new requirements resulting from the amendments of the TSIs and of the RINF.

4.3. **Topical working group on freight**

The topical working group was established during the Working Party meeting N°1 on 17 Feb 2020, with the task to solve the following Change Requests:

1. Consider the inclusion of the derailment detection function
2. Based on the available technical solutions, define the interoperability requirements for automatic couplers for freight wagons (if necessary including digital connection).
3. Review the provisions on train rear end signals based on the findings in the reports delivered by Member States
4. Improve provisions to allow for the use of Automatic Identification and Data Capture (AIDC) technologies in order to remove physical markings on freight wagons
5. Examine requirements for an improved protection of train drivers, such as availability of toilets in freight locomotives

The Topical Working group focussed in the first two change requests. Due to the different profiles of the experts required for participation in both change requests, the TWG split in two from the very beginning:

- TWG Freight@DDD, for derailment detection function and
- TWG Freight@DAC, for automatic freight coupler for freight wagons

4.3.1. Topical Working Group Freight@DDD

The TWG is composed of experts from the following organisations: CER, EIM, UNIFE, NB-Rail and UIP and from the NSAs BE, CH, DE, FI, FR and IT. OTIF, UIC and S2R were also participating as observers. The working group held 8 meeting days between May and September 2021, all in remote mode.

The main outputs of this Topical Working Group are the introduction of requirements in the WAG TSI and in the LOC&PAS TSI, intended to prevent derailments or to mitigate the consequences of a derailment of a unit.

To that end, several functions are identified and implemented in both TSIs, aiming at either detect a derailment or conditions which are a precursor to a derailment. These functions are:

- Derailment prevention function (DPF), to detect conditions which are precursor to a derailment
- Derailment detection function (DDF), to detect a derailment once it just occurred and shall send a signal to the driver's cab
- Derailment detection and actuation function (DDAF), to detect a derailment once it just occurred, and to automatically activate a brake application when the derailment is detected without possibility of overriding by the driver.

4.3.2. Topical Working Group Freight@DAC

The TWG is composed of experts from the following organisations: S2R, S2R/EDDP, ALE, CER, EIM, ERFA, UNIFE, NB-Rail, UIC, CEN, OTIF Secretariat, UIRR and from the NSAs BE, CH, DE, FI, FR, IT, LU. It held 14 meeting days between April 2020 and April 2022, all in remote mode.

This topical working group is expected to amend the TSI WAG and the TSI LOC&PAS with technical requirements for a standardised digital automatic coupling system for freight wagons and freight locomotives.

The digital automatic coupling for freight wagons and freight locomotives should at least cover the following functions:

- Transmission of mechanical forces between freight wagons
- Transmission of braking energy (pneumatical)
- Transmission of electric power to feed applications such as sensors, actuators, buffer batteries, etc.
- Transmission of communication such as train composition, train integrity, brake tests, etc.

In order to facilitate the transition period, a hybrid coupling system for freight locomotives will be specified. This hybrid coupling system must be compatible with DAC and UIC manual coupling system.

The TSI WAG and TSI LOC&PAS shall contain requirements regarding to the mandatory retrofitting of existing freight wagons and freight locomotives with DAC (or hybrid coupling systems in case of freight locomotives). These TSIs shall contain also deadlines preventing or limiting the use of other coupling systems than DAC and provisions in order to facilitate the migration phase.

The basis for the work of this TWG Freight@DAC is the European DAC Delivery Programme, under the leadership of Shift2Rail (S2R/EDDP). This programme is the European platform to develop a technical specification and implementation of DAC. It is a cooperation network of railway undertakings, infrastructure managers and wagon keepers, as well as the rail supply industry, entities in charge of maintenance, concerned sector organisations, rail research centres and national and European political institutions.

S2R/EDDP deliverables are essential to the intended TSI amendments. In order to ensure a good coordination between the S2R/EDDP research project and the topical working group led by the Agency, S2R/EDDP is

participating actively in the topical working group meetings. Bilateral meetings are organised to cover detailed issues (e.g. running safety aspects, authorisation aspects for the migration, etc)

Due to the complexity of the project and the discussions in the TWG, it was not possible to deliver a recommendation to the WP. Therefore, the TWG will continue its activities with the objective of delivering a recommendation no later than 2025. This will be reflected in dedicated clauses of the TSI WAG and TSI LOC&PAS.

4.4. Topical working group on interfaces between rolling stock and fixed installations

4.4.1. Description and objectives of the group

The Topical Working Group was established during the Working Party meeting N°1 on 17 Feb 2020, with the task to solve the following Change Requests:

- TSIC00000171 - “Improve provisions when to apply the TSIs in case of upgrade/renewal”
- TSIC00000169 – “Harmonise the structure of interface requirements between ENE and LOC&PAS TSIs”
- TSIC00000172 – “Harmonisation Rolling Stock and INF TSIs, including requirements on traffic loads and load carrying capacity of infrastructure”
- TSIC00000170 – “Requirements for the design of the OCL and the pantograph distribution in case of multiple pantograph operation (more than 2)”
- TSIC00000179 – “Close the open point relative to the EN Line Category in Appendix E, Tables 38 and 39”

The TWG is composed of experts from the following organisations: CER, EIM, UNIFE, NB-Rail and from the NSAs AT, CH, DE, ES, FI, FR, IT, LU, NO, SE, SI and LU. It held 15 meeting days between the 12 May 2020 and the 31 March 2022, all in remote mode. In order to tackle the CRs above the TWG has decided to cluster the CRs in the following Task Forces, lead by the sector:

- Task Force ENE – RST to deal with CR 169 and CR 170 (18 meetings held)
- Task Force INF – RST to deal with CR 172 and CR 179 (16 meetings held)

The Task Force meetings were composed by TWG members and by external experts, in the specific related areas (e.g. bridges and load and carrying capacity of infrastructure, OCL and pantograph).

As the CR 171 relates to the TSI INF and TSI ENE implementation, it was decided to be managed directly by the TWG, without dedicated Task Force.

4.4.2. Outputs of the Topical Working Group

Task Force INF – RST CR 172 / CR 179:

The main topics on the related CRs are clustered as following:

1. Full introduction of line categorisation of rolling stock acc. EN 15528:2021 into TSI INF, TSI LOC&PAS and TSI OPE.
2. In TSI INF: description of traffic codes, including 17t/20t criterion – coherent axle load values, better explanation => description of a target system.
3. In TSI INF Appendix E: revision, including closure of open points.
4. Other improvements/amendments: section 4 and 6 in TSI INF and Appendix K; TSI LOC&PAS inclusion of operational masses and EN line categories as basic design characteristic.

Notes:

- a. Specific cases and specific provisions for the United Kingdom of Great Britain and Northern Ireland networks remain, as a consolidate approach will be taken later for all the TSIs and other related regulations/documents.
- b. Open points for 1520 mm track gauge networks remain due to the lack of inputs for such networks.

Task Force ENE – RST CR 169 / CR 170:

CR169: Harmonisation/amendment of TSI ENE and TSI LOC&PAS based on the findings of inconsistencies and necessary adjustments.

CR170:

- Analysis of existing rules in different countries for common implementation in TSI.
- Adjustment in the actual texts for consistent usability regarding multi-pantograph operation:
 - TSI ENE: 4.2.12; 4.2.13;
 - TSI LOC&PAS: 4.2.8.2.9.7; 6.2.3.21;
- Analysis of results from measurements and simulations to develop rules based on parameter sets;
- Check of actual TSIs regarding necessary improvements for implementation of adjustments;
- First proposals for possible adjustments of TSI based on observations from measurements and Simulations;
- Definition of necessary research steps for general use of proposed rules.

Notes:

Provisions in relation to current at standstill for both TSI ENE and TSI LOC&PAS still under discussion in the framework of CR 350.

TWG RST FI - CR 171

The proposal was still under discussion during the consultation on the draft TSIs, due to the introduction of policy objectives. The CR171 is relative to the rules to follow when applying the TSI ENE or the TSI INF to existing installations. It is about the revision of the chapter 7 of both TSIs. For both TSIs, a performance parameter is defined to determine the type of action that can be considered as an upgrade:

- ENE TSI: “Upgrading” is a major modification work of an existing energy subsystem resulting in an increase of the line speed of more than 30km/h or fall in the cases that are included in 7.2 (3).
- INF TSI: “Upgrading” is a major modification work of an existing infrastructure subsystem resulting in at least compliance with one additional traffic code or a change in the declared combination of traffic codes (Table 2 and Table 3 of 4.2.1) or fall in the cases that are included in 7.2 (3).

It is then clarified that, for the upgraded subsystem, the application of the relevant TSI shall be compulsory, and applied fully to the upgraded subsystem within the geographical coverage of the upgrading.

This final proposal wasn't fully supported by all members of the Working Party. In particular, several NSAs (DK, ES, FI) expressed concerns, as well as representative bodies (EIM).

4.5. Topical working group on standards

4.5.1. Introduction

Topical Working group on standardisation (TWG-STA) was created in 2020 with the objectives to be the operational coordination group between ERA and European Standardisation Organisations (ESOs) to :

- Ensure alignment of standards covered by the Standardisation Request with regulation (mainly TSI Annexes listing the mandatory standards (for instance Appendix J in TSI loc&Pas (EU) 1302/2014 and [list of harmonised standard](#) published in the Official Journal Of the European Union (OJEU)
- Ensure coherence between references of standards in the TSIs, mentioned in the ERA Application guides and listed in the OJEU
- Liaise with the other TWG and the Working Party on the evolution of the standards referenced in the TSIs and the need for new or amended standards, for instance due to innovation
- Report progress on ERA assessment on new standards before publication by the standardisation bodies or before publication in the official journal, in close cooperation with the HAS consultants and COM. Support ERA and COM for a more efficient uptake of standards:
- Follow-up and further develop standardisation requests
- Propose criteria for standards or parts of standards to be mandatory (referred to in regulation) or to provide presumption of conformity (through listing in the OJEU) and make proposals for the reduction of mandatory references to standards in TSIs.
- Make proposals on the use of standards in the TSIs: · How to integrate references to standards and to other technical documents evolving regularly in a way which allows their updating in a timely manner.

TWG-STA aims to be a <<permanent>> Topical working group, not only focussed on 2022 TSI package but also dedicated to a constant follow up of standardisation activities and to a regular review and update of the standards references quoted in TSIs.

4.5.2. *Activities of the Topical working group for TSI package 2022.*

14 meetings of the TWG-STA have been held so far. The firsts meetings was aiming to defining a procedure to deal with the backlog of standards creations and updates to be reviewed and eventually integrated in the TSIs.

A global tracking file was created as a tool to handle all the standards references in all the TSIs.

The scope of the TWG-STA regarding standards references in TSI was defined:

- Identify the standards references to be update following a new publication (new version or new standard)
- Identify the Standard reference to be modified following a specific request (Sector, COM...).
- Ensure a precise identification of the standard clauses made mandatory in the TSI by replacing the vague statements (e.g : all the standard or relevant clauses of the standard) by precise references to standard clauses.
- Identify the standard reference to be removed from the TSI for simplification purpose.
- Propose update of the TSIs for all standards identified above.
- Analyse the TSI structure to propose a structure facilitating the timely updates.

This analysis results in a list of 133 standard to be reviewed among the 162 standards quoted in all the TSIs.

Two main categories of updates were identified, in one hand updates of standards with low impact on the TSI essential requirement that can be managed directly by the TWG-STA, in the other hand standards updates that may impact the TSI requirements and that require a review by experts in order to propose a resolution.

For the second category TWG-STA creates several change requests to follow the activities. (CR/ 417, CR/ 418, CR/ 419, CR/ 420, CR/ 422, CR/ 423, CR/ 425, CR/ 426) and proposed to the Working party.

Some CR was declared as postponed by the WP party due to the low availability of ERA project officer (CR/ 418, CR/ 419, CR/ 422, CR/ 423, CR/ 426)

The Sector Forum Rail (SFR) has proposed to handle the postponed CR and coordinate the sector to review the request and make a proposal to the TWG-STA.

These proposals have been provided to the TWG-STA in March 2022 and have been reviewed before a proposal to the WP for a total of 36 standard references.

CR/ 526 was created and accepted by the WP to create for all TSIs annexes listing the mandatory standards : remove the standard references from the TSI core text and call an specific annex to the TSI listing the standard references as well as the mandatory clauses of the standard.

CR/ 517 was created to create a specific transition regime for standards and enhance the flexibility given to the applicant.

During the discussion on standard update in the Topical Working group Standardisation (TWG-STA) chaired by the ERA, the group have discovered that, very often, the standard update doesn't affect the TSI requirement, mainly because there is no modification in the chapters quoted by the TSI or only editorial changes that doesn't affect the TSI compliance.

In order to give the maximum flexibility to the applicant, TWG-STA has proposed that if the modified standard doesn't affect at all the TSI compliance and if there is no need to update the TSI core text, then and the appendix listing the standards may quote the 2 versions.

This change request was rejected during WP14. UNIFE remains strongly opposed to only refer to one version of a standard in the TSI and expresses its disappointment that after 2 years working on this subject this CR is taken off the table without further discussion.

4.5.3. *list of change requests relevant for TWG-STA*

See annex 5 for details about the CR 191, CR 417, CR 418, CR 419, CR 420, CR 422, CR 423, CR 425, CR 426, CR 517, CR 526, CR 527, CR 546, CR 554, CR 555, CR 566, CR 567, CR 568, CR 572, CR 578.

4.5.4. *Output for the recommendation.*

Because the standardisation landscape is evolving permanently, the scope of the TWG STA is regularly updated to catch the latest release.

The current status at the date of issuing the recommendation is:

- 3 standards updates are under review by TWG STA with the aim to include the new references in the TSI package 2022:
 - EN 14067-5:2021 : ad hock meeting to be held early September.
 - ISO 15892 : proposal to be received by sector organisation.
 - EN 15528 : update in TSI WAG to be presented to WP in September 2022.
- 11 new standards to be release before November 2022 are defined as important standards are still to be included in the final text depending on the standard release date and the content of the standards. These standards are :
 - EN16839:2022 (this update will trigger the updates of linked standards: EN 15551,EN 15566 and EN 16116-2) => CR 566
 - EN 50122-1:2022 , EN 50388-1:2022, 50367:2020/A1:2022, EN 50317:2012/A1:2022; EN 50367:2020/A1:2022 and EN 50163 A3:2022 : proposal to be received by SFR => CR 568
 - EN 14363:2018+A1:2022.
- All the other standards have been analysed by TWG-STA proposed to the WP and included in the recommendation.

4.6. **Topical working group on train architecture**

The Topical Working Group "Train Architecture" has been set up in 2020 to manage the following aspects:

- Incorporation of the game changers, which are the heart of future digitalisation building on ERTMS and aim to achieve higher capacity and better performance. The Game changers are ATO GoA1/2, FRMCS, ERTMS level 3, train positioning, ETCS braking curves and cybersecurity.
- Facilitation of the introduction of digital technologies in rail and mitigate the complexity of change to the system through modularisation. It includes work primarily on changes linked to CCS onboard modular architecture with the aim to deliver a more flexible and robust system.
- Interface between ETCS onboard and RST

The Topical Working Group was formed by representative organisations and representative of the National Safety Authorities and ERA Members.

The invited representatives' organisations were:

CER: -Two experts in on- board CCS system (One from CCS/OCORA and one CCS system architecture)
-Two on-board Rolling stock experts;

NB-Rail: One expert from the NoBo with experience of ERTMS on-board certification

UNIFE/RST: Two RST experts (S2R CONNECTA + TSILOC&PAS system expert);

UNISIG: Two CCS on-board system architecture experts;

UNITEL: One expert in Radio FRMCS System architecture;

EIM: One expert in system architecture.

The invited representatives of the National Safety Authorities were:

NSA CH, NSA DE, NSA FR, NSA FI and NSA LU with experience on system architecture issues linked to modularity and with awareness/knowledge of RCA/OCORA/CONNECTA initiative.

To facilitate the management of the different actions requested in the Mandate received from the European Commission MOVE.DDG2.C, the activities have been split in Change Requests (CR) and uploaded in the Data Base "TSI_C" of the Register of change requests belonging to the Change Control management process of the Agency. The related CRs are: 175, 193, 194, 195, 196, 197, 198, 199, 234, 272, 424, 220, 221 and 224.

11 meetings have been organized, due the COVID 19 pandemic all the meetings were held remotely by in teleconference by TEAMS. The agendas and the minutes of meetings have been uploaded in the Extranet workspace "WP-TSIs-TWG-train-architecture" ([link](#)).

List of The TWG Meetings:

Meetings	Chairman	Dates
TWG ARCHI 01	W. MALFAIT	26 th May 2020
TWG ARCHI 02	W. MALFAIT	25 th June 2020
TWG ARCHI 03	W. MALFAIT	08 th September 2020
TWG ARCHI 04	W. MALFAIT	12 th November 2020
TWG ARCHI 05	W. MALFAIT	18 th February 2021
TWG ARCHI 06	W. MALFAIT	15 th April 2021
TWG ARCHI 07	W. MALFAIT	03 rd June 2021
TWG ARCHI 08	F. FERRARI	16 September 2021

TWG ARCHI 09	F. FERRARI	18 th November 2021
TWG ARCHI 10	F. FERRARI	20 th January 2022
TWG ARCHI 11	F. FERRARI	24 th March 2022

Topical group train architecture – Game changers and modularity:

In relation to following change requests: 175, 193, 194, 195, 196, 197, 198, 199, 234 and 272.

The outcomes of the work have been handled to the EECT and are pending the final review: SUBST-119, SUBST-120, SUBST-121, and SUBST-147. The SUBST-130 has been agreed and closed at the EECT.

The Standard on-board interface between TIMS and the ETCS on-board has been postponed being associated with the work related to the Digital Automatic Coupler (DAC).

Regarding the online monitoring system (CR 234), it has been agreed to postponed for this TSI revision and considered for the CCS TSI application guide or future TSI revisions.

Topical group train architecture - Interface between ETCS onboard and RST:

In relation to following change requests: 424, 220, 221 and 224

Train interfaces between **Rolling Stock and ETCS on-board** were reviewed taking into account following elements: Existing national rules, change requests, LOC&PAS TSI, SUBST-034, SUBST-026 and DMI specification.

The scope of the review has covered:

- Prefitment requirements to new RST / new RST Type **when ETCS is not installed**,
- Vehicles and vehicle Types (including New design, Existing design) when ETCS is installed,

The outputs of the work are:

- TSI LOC&PAS amended to include:
 - References to relevant train interface functions of Subset-034 (see chapter 4 and table 9)
 - Pre-fitment requirements when ETCS is not yet installed (see clauses 7.1.6, and 4.2.12.2)
 - Clarification on which NoBo (RST, CCS) does what (see chapter 6 EC verification for new rolling stock/rolling stock type or existing rolling stock/rolling stock type when ETCS onboard is installed)
- Subset-034 amended to include a new chapter 3 that clarify the conditions (mandatory or optional) for the application of the Train Interface functions by the rolling stock subsystem covering:
 - Newly developed vehicle designs' requiring a first authorisation,
 - All other vehicle types and rolling stock in operation.

Both TSI LOC&PAS and Subset 34 are under finalisation for adoption by the working party.

Other topics that are ongoing and may impact RST TSI: Time synchronisation, diagnose

4.7. Topical working group on transition and migration

4.7.1.1. Introduction

The Task Force on Migration and Transition (TF M&T) was set up early 2020 by the Economic Steering Group (ESG) and was recognised as a topical working group (TWG) for the TSI 2022 revision. The TF's objectives were to:

For Migration:

- Set up a coherent framework to assess the new/updated optional and mandatory vehicle requirements
- Recommend a balancing framework in case of unbalanced distributions of costs and benefits within the different concerned railway stakeholders
- Analyse if and how a balancing framework can be legally binding so that it provides sufficient guarantees for investors

For Transition:

- Propose a coherent single framework for the transition phase for all vehicle related TSIs

This report informs the ESG on the achievements of the TF.

4.7.1.2. Migration

The TF's subgroup on migration convened three times. It focused specifically on innovations or TSI requirements where a cost imbalance between different railway stakeholders (e.g. railway undertaking and infrastructure manager) would impede or delay the uptake. This in turn would negatively impact the competitiveness of the railway sector as a whole.

The subgroup members identified existing cost balancing mechanisms (CBMs) and discussed several upcoming TSI changes¹ that could be implemented faster by using such mechanisms.

The subgroup commenced with analysing how CBMs are used in other modes of transport. Several examples are provided in the table.

Mode	Examples
Road	Regulation (EU) 2019/631 defines a bonus-malus system; an excess emissions premium for car manufacturers, while offering the possibility to offset penalties through eco-innovations.
Aviation	Airports impose surcharges on noisy airplanes while airplanes (incl. retrofits) equipped with noise abatement technology receive a discount per landing.
Maritime	Port tariff discounts are commonplace to support green innovations. e.g. Port of Rotterdam provides 15% discount to tankers with Green Award Certificate.
Inland Waterway	The 'Reserve fund' ((EC) 718/1999) created to reduce European fleet capacity was amended ((EC) 546/2014) so that funds can be used to promote innovation uptake.

In railways the possibilities to introduce CBMs seem more restrictive. Notable exceptions concern differentiated track access charges (TAC) for vehicles equipped with ETCS or silent brake blocks (see (EU) 2015/429). The uptake of differentiated TAC is limited, however. Countries that wish to promote ERTMS and silent rail freight more frequently do so through direct subsidies, within the boundaries set by the guidelines on State aid for railway undertakings (2008/C 184/07).

Nevertheless, there are some CBMs particularly worth mentioning. A first CBM concerns a differentiated TAC system for trains equipped with low track force bogies ([details here](#)) in the UK. While the cost of the equipment is covered by the railway undertakings (RU), it does reduce rolling contact fatigue that affects not

only wheels, but also rails. The differentiated TAC enables the public infrastructure manager (IM) to compensate private RUs for the costs made that reduce infrastructure maintenance costs. Hence, the CBM leads to overall lower costs for the railway system.

A second UK example concerns a CBM as set out in the network code ([details here in Part G](#)). It defines the rules for RUs to be compensated for network changes that *inter alia* have a material effect on the trains operated on the network. Detailed examples on how IM-RU disputes are financially resolved can be retrieved from the Network Rail website ([here](#)).

On top of these CBMs, it was noted that some countries provided incentives for Energy Measurement Systems through billing conditions ([as described here](#)).

Notwithstanding the above, the subgroup agreed that the extent to which CBMs are used in the railway sector remains limited.

Starting from this understanding, the subgroup assessed 1) whether other CBMs would be possible and/or desirable, 2) which innovations could be promoted through them, 3) and whether changes should be made to the legal framework to facilitate them.

The subgroup quickly identified that the TSIs offer limited possibilities to mandate the usage of an existing CBM, nor do the TSIs allow for the development of new CBM. The subgroup's scope for developing and/or propagating CBM was therefore limited. Moreover, questions were raised on the legal restrictions imposed by the current State aid framework that would limit the introduction of new CBMs.

Therefore, the subgroup aimed to highlight potential use cases for CBMs and make their relevance clearer to various stakeholders.

In Q2 2021 the subgroup went through all change requests (CR) being considered for the TSI 2022 Revision. A number of CRs were identified for which a cost imbalance would likely occur and where a CBM could lead to a faster uptake of an innovation.

Subsequently, DG MOVE unit C3 was informed on the subgroup's findings and was asked to look into the legal framework around Track Access Charges to consider a review, so that the instrument can be used to promote a larger array of TSI changes than is the case today.

Likewise, several subgroup members appealed to the Commission to embrace other CBMs as well, including network code and billing provisions as those mentioned before. Again, it was found that this may require changes to the State Aid framework.

As no further actions were within the remit of the subgroup, its activities were ceased. The final recommendations were to:

- Acknowledge the relevance of CBMs to promote the uptake of innovations and the TSIs in particular
- Review the legislation on track access charges to widen its scope
- Continue any discussions on CBMs with stakeholders from the Commission (C3 / C4 / DG COMP) as the remit of the Agency in this field is too limited

4.7.1.3. Transition

Vehicle – transition framework

A total of 11 subgroup meetings on transition took place. The main aim was to come to a single coherent framework for transition in TSI LOC&PAS, WAG, PRM, NOI, and CCS.

Various proposals were discussed by the subgroup, culminating in a framework that categorizes three types of TSI changes, each with different transition regimes. The proposed framework is shown in the table below.

	Transition regime (stage at which a project/vehicle is when the revised TSI enters into force)
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TSI Change Category	Design phase not yet started	Design phase	Production phase	Vehicle in operation
C1	Applicable	Directly applicable with no impact on existing projects.	Not concerned	Not concerned
C2	Applicable	Applicable 7 years after entry into force of TSI	Not concerned	Not concerned
C3	To define: possible to delay the application of a C3 change after the entry into force of the TSI	To define: possible to require application of a C3 change to projects at design phase earlier than the generic application	To define: possible to require application of a C3 change to all new rolling stock delivered after a certain date	To define: possible to require the upgrade/renewal of existing rolling stock according to the C3 change under certain conditions

TSI change C1: a change is categorised C1 when it concerns a TSI clause or requirement for which the conformity with the previous version of that TSI ensures in all cases the conformity with the new version. For changes of category C1, there is no transition period from a version of a TSI to the next version.

TSI change C2: a change is categorised C2 when it concerns a TSI clause or requirement for which the conformity with the previous version of that TSI does not lead to conformity with the new version. For changes of category C2, a generic transition regime from a version of a TSI to the next version is defined in each TSI.

TSI change C3: a change is categorised C3 when it concerns a TSI clause or requirement for which the conformity with the previous version of that TSI does not ensure the conformity with the new version and for which a specific transition regime is defined in order to promote a swift implementation.

For each change of category C3, a specific transition regime is defined and needs to be duly justified by substantive criteria established along the CCM process.

A change shall be C3 where:

- › It fixes a critical issue in the TSI concerning safety or technical compatibility
- › It addresses a policy objective in a proportionate manner

Unlike the TSI changes C1 and C2, TSI changes C3 can affect rolling stock during their complete lifecycle. In practice, a C2 change implies a generic transition regime whereas a C3 change imposes a specific transition regime for a single TSI change.

The transition framework itself reflects a project view considering the lifecycle of the vehicle. It can cover the development of a new type and new rolling stock or the modification of rolling stock in operation or of an existing rolling stock type.

The following phases are defined for a project:

Design phase: the design phase is the period starting once a notified body, which is responsible for EC verification, is contracted by the applicant and ending when the EC type or design examination certificate is issued.

A design phase can cover a type and one or several type variant(s) and type version(s).

Production phase: the production phase is the period during which rolling stock subsystems may be placed on the market on the basis of an EC declaration of verification referring to a valid EC type or design examination certificate.

Rolling stock in operation: Rolling stock is in operation when it is registered with 'Valid' registration code '00', in the National Vehicle Register in accordance with Commission Decision 2007/756/EC or in the European Vehicle Register in accordance with Commission Implementing Decision (EU) 2018/1614 and maintained in a safe state of running in accordance with Commission Implementing Regulation (EU) 2019/779.

On top of the change in the transition framework, the subgroup advanced that:

- › The EC type or design examination certificate for the subsystem remains valid unless it is required to be revised according to the specific transition regime of a TSI change.
- › The same logic applies for the certificate at IC level. The certificate remains valid unless it is required to be revised according to the specific transition regime of a TSI change.
- › All variants and versions of a type can use the same initial assessment framework as for the main type.

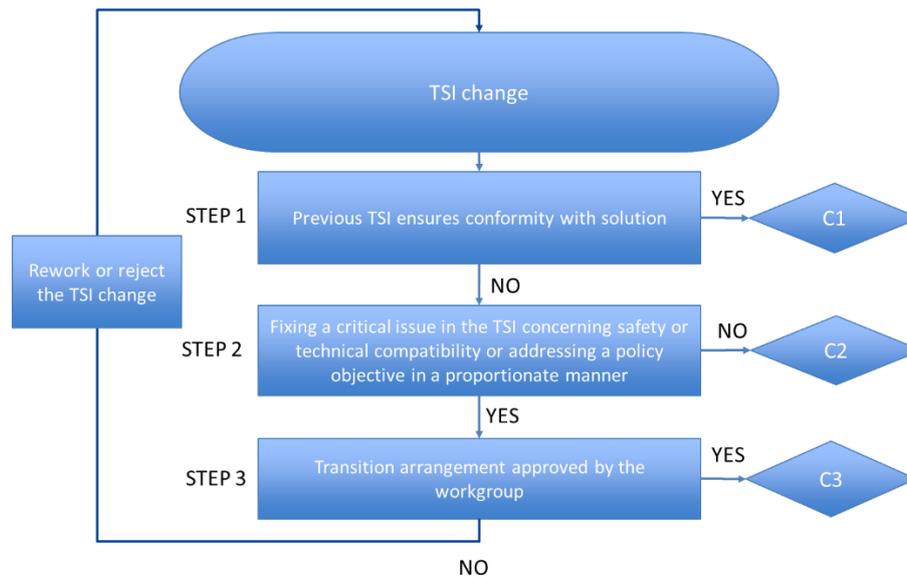
The subgroup reviewed all transition clauses within the TSIs and updated the text to be aligned with the new transition framework. The final results of the work can be found here:

- [LOC&PAS](#)
- [WAG](#)
- [PRM](#)
- [NOI](#)

CCM procedure

The proposed amendments to the CCM procedure make that the transition categorisation shall be discussed as an integral part of a CR. On multiple levels and stages, sector stakeholders shall be involved in the categorisation of the change category and, when required, a full impact assessment shall be conducted on those CRs that would have substantial impacts on the railway sector.

The CCM procedure also provides guidance to submitters of a CR and Topical Workgroup (TWG) members to assign a TSI Change Category to a CR, as depicted below.



Some subgroup members asked that the criteria for introducing a specific transition regime (i.e. a C3 change) are defined in the TSI itself. ERA emphasized on multiple occasions that such additions on process go beyond the scope of the TSI.

A main discussion point in the subgroup was whether there are sufficient checks and balances put in place to ensure that C3 changes are rare and only accepted after broad and careful deliberation. The reason being that C3 changes can impact rolling stock in operation, potentially leading to costly retrofit actions. The subgroup, in conjunction with the TSI Revision Working Party worked on an adaptation of the Change Control Management (CCM) procedure to address those concerns. Moreover, the subgroup was reminded that in the transition framework that currently exists, there is already the possibility to introduce 'C3 changes' (e.g. TSI LOC&PAS 7.1.3.1 (7)) without the provisions that are mentioned in this document.

The CCM document as discussed by the TSI Revision Working Party can be found on the Extranet ([HERE](#)). It shall be reviewed by the end of 2022 to take the return on experience into account.

Specificities for the CCS subsystem

The subgroup had several discussions on the application of the framework as presented above to TSI CSS. In line with the TF's objective, the aim is to align the transition framework between CCS and the other vehicle related TSIs to the largest extend possible. This will be the case, while a few CCS specific points are taken into consideration. Notably:

- Rather than assigning change categories to a specific CR, they are assigned to clusters of changes (e.g. ETCS/GSM-R/ATO/On-board modularity).
- The TF concluded that for ETCS trackside, only requirements concerning notification need to be specified. There is no need to cluster changes and assign them to the trackside life cycle phases.
- ERA explained how the transition framework will be considered in the CCS CCM procedure. Moreover, ERA indicated that there will be one unique CCM procedure for all changes (applicable to all TSIs) in which the transition framework will be reflected, including on the categorization of changes and the link with impact assessments.

4.7.1.4. Conclusion

The TWGs that are responsible for managing the CRs have quickly adopted the framework to assign change categories to the upcoming TSI changes. The subgroup on Transition shall revise the Application Guide in 2022 to account for the new transition framework.

Note: UNIFE position on the new transition regime. That position was expressed during several occasions, and summarised as follows during the recommendation:

"UNIFE expressed clearly within the Working Party on TSIs that the European rail supply industry cannot support the proposed chapter 7 modifications to the TSIs. This is notably due to the current wording for "Changes with a specific transition regime" (C3 changes) without a clear justification for these being established. C3 changes being potentially subject to immediate implementation on running projects and contracts, in design and in production phase and even on rolling stock already in commercial operation, create unnecessary and unpredictable risks for the rail sector as a whole.

UNIFE has requested C3 requirements to be connected to a full quantitative impact assessment which demonstrates a positive cost/benefit assessment for the rail sector considering the impact on all sector stakeholders and end users. This impact assessment shall contain a detailed implementation plan supported by all impacted stakeholders considering the impact on new and existing projects/assets, the availability of EU funding/compensation mechanisms, the technology readiness level of the proposed change or new requirement, and the supply and integration capacity of the sector.

UNIFE calls for the ERA Working Party Change Control Management (CCM) document to be embedded in the regulation in order to secure the pre-requisite of a clear cost-benefit assessment and justification process for all changes with a specific transition regime. The same principle should apply to the TSI CCS."

4.8. Other working groups

4.8.1. Working group on operational harmonisation

The ERTMS Operational Harmonisation (OH) working group of ERA was active in two main workstreams, in line with the EC Mandate of 2020:

[A] Harmonised operational rules linked to ETCS level 2 and ETCS Level 3 radio based operation without overlay of Class B and lineside signalling.

In this context, OH was requested to harmonize as many as possible of the remaining currently non-harmonized operational rules for ERTMS (radio based) L2/L3 lines (out of Annex C of OPE TSI Appendix A), primarily focusing on those involving driver-signaller interaction. The work should not consider any Class B-systems as fall-back in case of ERTMS failures. Justification should be provided when a rule could not be harmonized. Operational rules for ATO GoA2 over ETCS should also be considered.

The processing started by identifying three priorities:

1. Harmonisation of currently non-harmonised rules for ERTMS-only operation
2. Operational rules for ATO
3. Operational rules for Level 3

[1] Two batches of non-harmonised operational rules were identified:

- Those with higher harmonisation potential
- Those with lower harmonisation potential

A process (including basic assumptions) was agreed on how to elaborate a possible harmonisation of rules in either category. This process was then applied to the rules of both categories.

[2] Following a extensive presentation of the ATO technical concept to the group, a set of new operational rules and complements to existing ones were proposed accordingly. After processing, these rules were validated.

A number of additional minor improvements to the draft OPE App. A were also introduced.

[3] Following a presentation of the Hybrid Level 3 concept, a set of new operational rules and complements to existing ones were proposed accordingly.

After four complete review rounds, OPE TSI Appendix A has reached ver. 5.11 where all changes introduced so far have been validated.

This latest version also integrates:

- The reflection of revised EN 16494 on the existing OPE TSI App. A operational rules (see under [B] below for the conditions of use)
- The effect of some ETCS CRs concluded in EECT, which introduce changes to the technical subsystems that impact operational rules (e.g. the merger of ETCS Level 2 & Level 3 into the new Level R(adio)).

[B] Interface between CCS TSI and OPE TSI including the review interface with OPE TSI (Appendix A) and marker boards requirements

In this context, OH was requested to help revise EN 16494 and expand its scope to cover further operational situations. EN 16494 should be moved from a normative reference under OPE TSI to a mandatory standard under CCS TSI. The additional harmonized marker boards should be integrated in the relevant operational rules of Appendix A to OPE TSI.

This task was broken down in the following sub-tasks:

1. Starting from the existing EN 16494:2015, OH established a list of additional marker boards (MBs) candidate for harmonisation taking into account the ETCS track conditions as well as additional sector requests and assigned their elaboration to CEN. This included amending the existing ones under CR 1339; and collaborating with CEN SC3 WG9 on optimising the additional MBs.
2. EN 16494 is introduced as a mandatory specification, replacing document EEIG 06E068 (Stop Marker definition) at index 38 of CCS TSI Annex C, in combination with classifying the harmonised MBs as Interoperability Constituents (ICs). Specific migration provisions have been developed and agreed at the level of OH to be included in the CCS TSI. Due to an anticipated delay in the delivery of the revised EN 16494 by CEN, the current (2015) version thereof will be referenced instead. All affected parts of CCS and OPE TSI will be adapted to this arrangement accordingly. The revised EN 16494 will be referenced in a future TSI revision, once it is published.
3. A comprehensive set of engineering rules was developed jointly with the Engineering Support Group of the ERTMS Users' Group (EUG/ESG), to align the deployment of the harmonised MBs under the revised EN 16494.
4. The additional harmonised MBs were reflected into the relevant operational rules of OPE TSI Appendix A with place-holders where MBs are not yet defined.
5. Further changes to the core text as well as to the Appendices B, C and D of OPE TSI were introduced to address additional operational needs. These were:
 - Introduction of a clarification reflecting the liberty of RUs to select the brake settings on their trains.
 - Conversion of Appendix A rule 6.31 into a new generic common operational rule 18 under Appendix B2 and amendment of Appendix B2 rule 14.
 - Amendments to Appendix C2, both in the core text and in the harmonised European Instructions to reflect the needs of the sector.
 - Addition of two more items into Appendix D2 and introduction of a new Appendix D3 with information on the ERTMS trackside engineering that has an effect on operation. This information shall be

made available by the IM to all RUs operating in its network. Appendix D2 will be further complemented with information on ATO infrastructure along a route once the relevant amendment is done in RINF.

- Minor editorial changes resulting from the above as well as from the introduction of the harmonised marker boards as interoperability constituents.

4.8.2. Working group on train detection compatibility

The objective of the ERA WG on train detection compatibility is to close the remaining open points in the CCS TSI interface document 033281 in the field of train detection. The new version of the interface document V5.0 reflects the following changes:

- A reference to prEN 50782 is included specifying a harmonised vehicle test method to demonstrate compliance with the frequency management for track circuits.
- The open point concerning vehicle impedance is closed, as values for the impedance including frequency range are specified.

These two points will allow the demonstration of compatibility of the vehicle with TSI-compliant track circuits. In addition, NTRs referring to existing non-TSI-compliant train detection systems could be revised in such way, that interference current/field limits including the evaluation method (bandpass filter, FFT) for them are specified in analogy to the TSI-compliant train detection systems in the interface document. The harmonised vehicle test methods (for fields and for currents) in the interface document can be applied to proof compliance of the vehicle with these limit values.

- A number of existing parameters are revised (e.g. sanding, sanding and sand quality, provisions for spoked wheels, minimum axle load) taking into account concerns and comments from stakeholders when applying the previous version of the interface document.
- The conclusions from ERA Technical Opinions (e.g. metal free space in the context of magnetic brakes) are included in the interface document.
- Specific provisions concerning the conformity assessment of axle counter systems at subsystem level are added to the interface document.
- Clarifications related to the use of an axle counter as IC

5. Activities and outputs of working parties

5.1. Working Party on TSIs

5.1.1. Composition and activities

The Working Party on TSIs (WP TSIs) is as specified in Art. 5 of the Agency Regulation. Accordingly, it is composed of:

- Representatives nominated by the competent national authorities,
- Professionals from the railway sector selected by the Agency from the lists presented by representative bodies,
- (If necessary, independent experts and representatives of international organisations recognised as competent in the field concerned).

The Working Party held 17 meetings between 17 February 2020 and 27 June 2022. The first meeting only was a physical meeting, all others took place remotely.

The following representative bodies participated to the meetings (list of the organisations that participated at least to one meeting):

AERRL	ALE	CER	EIM
EPTTOLA	ERFA	ETF	FEDECRAIL
NB-Rail	UIP	UIRR	UITP
UNIFE			

The following NSAs participated to the meetings (list of the organisations that participated at least to one meeting):

NSA AT	NSA BE	NSA CH	NSA DE
NSA DK	NSA EE	NSA ES	NSA FI
NSA FR	NSA IE	NSA IT	NSA LU
NSA NL	NSA NO	NSA PL	NSA PT
NSA SE	NSA SI		

The following organisations participated as observers:

OTIF	Shift2Rail Undertaking	Joint	
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The Working Party ensures the steering of the activities in coherence with the overall system planning, the resources and the priorities. Based on the information introduced by the ERA Core Team in the CCM tool, the Working Party endorses, modifies, or rejects the methodology proposed to close each Change Request, including the creation and composition of the Topical Working Groups. The Working Party participates in the closure of the Change Requests.

The Working Party on TSIs eventually approves all Change Request resolutions. Before the approval of the Working Party, the process of elaborating a CR resolution can be divided in three main workflows:

1. The change request is processed by ERA Core Team and directly submitted to the Working Party; this is the case for simple change requests that don't require a specific expertise (e.g. error corrections, editorial changes).
2. The change request is processed by ERA Core Team with a small group of experts during a few meetings, and the solution elaborated is submitted to the Working Party; this is the case for simple change requests requiring a specific expertise (e.g. on the introduction of simulations instead of tests, on the definition of special vehicles).
3. The change request is processed by a topical working group and the solution elaborated by the working group is submitted to the Working Party; this is the case for specific complex change requests (e.g. digital automatic coupler, transition regimes)

5.1.2. Outputs of the Working Party - TSIs

The change requests that have been processed cover all TSIs with the exception of the SRT TSI. The following tables list which TSI clauses are impacted by each of the 76 change requests processed. For details about the change request, please refer to Annex 5.

5.1.2.1. ENE TSI

Change Request (CR)	WP of CR approval	TSI clause affected by the change
379	WP7	4.2.1, 4.2.3, 4.2.4, 6.2.4.1, 6.2.4.1a
414	WP11	4.3.4(2) & (3)

169/170	WP14	3, 4.2.2, 4.2.5, 4.2.8, 4.2.12, 4.2.13, 4.2.15.1, 4.2.16.2, 4.3.2, 5.2.1.6, 6.1.4.1, 6.1.4.2, Appendix A, Appendix B, Appendix E
527	WP14	4.2.4, 4.2.5, 4.2.7, 4.2.8, 4.2.9.1, 4.2.11, 4.2.12, 4.2.14, 4.2.15.1, 4.2.15.2, 4.2.15.3, 4.2.16.1, 4.2.16.2, 4.2.17, 4.2.18, 6.1.4.1, 6.1.4.2, 6.2.4.1a, 6.2.4.2, 6.2.4.3, 6.2.4.4, 6.2.4.5, Appendix E
521	n.a.	4.2.3, 4.2.9.1, 4.2.9.2, 6.1.4.1, Appendix A, Appendix B and many points/clauses/sections
579	n.a.	Cleaning UK cases...
171	WP17	4.2.3, 4.2.9, 7.1, 7.2, 7.3
419	WP17	4.2.9.2, 4.2.10, 4.2.13, Appendix D, Appendix E

5.1.2.2. INF TSI

Change Request (CR)	WP of CR approval	TSI clause affected by the change
359	WP7	5.3.3(2), 6.1.5.2
361	WP9	6.2.4.4 (3)
392	WP10	4.2.12.4 (2), 4.3.1
362	WP5	Appendix C.2
504	WP12	6.4
510	WP13	7.7.8
172/179	WP14	4.2.1, 4.2.7.1, 4.2.7.2, 4.2.7.4, 6.2.4.10, Appendix E , Appendix K, Appendix S, Appendix T
525	WP14	Section 2.6 added
517	WP14	4.2.4.5, 7.7.10, 4.2.8.3, Appendix T, 4.2.6.1, 4.2.6.3, Appendix S
282	WP15	4.2.3.4, Appendix I Appendix I, Appendix T Appendix T
526	WP14	Many including appendices but not specific cases
423	WP16	4.2.8.3, 6.1.5.1 ,Appendix T
521	n.a.	4.2.1, 6.2.4.10, Appendix K
579	n.a.	UK cases cleaning
171	WP17	6.3, 7.1, 7.2, 7.3, 7.4, 7.5, 7.6
267	WP17	4.2.7.2, Appendix T
554	WP17	Appendix T index [5]

5.1.2.3. LOC&PAS TSI

Change Request (CR)	WP of CR approval	TSI clause affected by the change
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152	WP4	Table in 3.1, 4.2.8.3, table H1 in Appendix H
392	WP10	Table in 3.1, 4.2.5.1 (1) & (2), 4.2.11.4, 4.2.11.5, Table 7 in 4.3.2, table H1 in Appendix H
457	WP9	4.2.3.1(3)
435	WP9	4.2.3.3.1.2 (4)
369	WP9	4.2.4.8.2 (3), Appendix K
360	WP6	4.2.4.10(5), 4.2.6.2.1 (3), 4.2.6.2.3 (2), 4.2.8.2.8.1 (4) & (7), 6.2.3.15 (3) & (4)
394	WP6	4.2.5.4(7), 4.2.12.2(17), Appendix L
403	WP8	4.2.8.2.3 (2)
379	WP7	4.2.8.2.5 (2), Appendix J1 Index 123
395	WP9	4.2.10.2.1 (3)
245	WP4	4.2.10.5.1 (12)
436	WP9	6.2.6(1)
458	WP9	7.1.1.4
459	WP9	7.1.1.5
460	WP9	7.1.1.6
462	WP9	7.1.1.7
461	WP9	7.1.1.8
463	WP9	6.3
164	WP11	Table in 3.1, 4.2.9.3.7, 4.2.9.3.7a, 4.2.12.2(18), Appendix L
236	WP11	7.1.1, 7.1.2, 7.1.3, 7.1.4, Appendix L
425	WP12	4.2.6.2.4 (3), Appendix J-1, index 37, 7.1.1.7, 7.5.1.2, Appendix L
497	WP13	7.5.3.2
427	WP13	4.2.8.2.8.2, 4.2.12.2 point (14)
400	WP13	4.2.5.3.2(4a)
351	WP14	4.2.7.1.4, 4.2.12.2, 7.3.2.8.a
172/179	WP14	4.2.2.10, 4.2.3.2.1, 4.2.12.2, 6.2.3.1, 7.1.2, 7.5.1.1, Appendix J, Appendix L
169/170	WP14	3.1, 4.2.8.2.4, 4.2.8.2.5, 4.2.8.2.7, 4.2.8.2.9, 4.2.11.6, 4.2.12.2, 4.3.1, 5.3.10, 5.3.11, 6.1.3.7, 6.2.3.20, 6.2.3.21, 7.1.2, Appendix H, Appendix J, Appendix L
417	WP14	Appendix J
517	WP14	4.2.5.5.3, 6.2.3.7, Appendix J
407	WP15	4.2.4.5.2– Point (5)

		4.2.4.9 – Point (1)
543	WP15	2.4.13
165	WP15	7.5.2.4
384	WP15	2.2.2, 2.3.1, 4.1.3, 7.1.1.3
546	WP15	Appendix J
424	WP15	4.2.3.3.1, 4.2.4.3, 4.2.4.4.1, 4.2.4.4.2, 4.2.4.4.4, 4.2.4.8.2, 4.2.4.8.3, 4.2.5.3.4, 4.2.5.5.6, 4.2.8.1.2, 4.2.8.2.4, 4.2.8.2.9, 4.2.9.1.6, 4.2.9.3.6, 4.2.9.3.8, 4.2.9.3.9, 4.2.10.4.2, 4.2.12.2, 4.3.4, 6.2.10, 7.1.5, Appendix I, Appendix J
526	WP14	4.2.2.2.3, 4.2.2.4, 4.2.2.5, 4.2.2.6, 4.2.3.1, 4.2.4.5.2, 4.2.4.6.2, 4.2.6.2.1, 4.2.6.2.2, 4.2.7.1.1, 4.2.7.1.2, 4.2.7.1.3, 4.2.8.2.8, 4.2.8.2.9, 4.2.9.2.1, 4.2.9.2.2, 4.2.9.6, 6.1.3.1, 6.1.3.2, 6.1.3.3, 6.1.3.4, 6.1.3.5, 6.1.3.6, 6.2.3.4, 6.2.3.13, 6.2.3.14, 6.2.3.19, Appendix J
420	WP16	7.1.1.4, Appendix J.1, Appendix L
418	WP16	Appendix J.1
426	WP16	Appendix E, Appendix F, Appendix J.1
559	WP16	4.2.8.2.5, 4.2.12.2, 7.1.2
424 (complement)	WP16	4.2.3.4.2, 4.3.4, 6.2.10, 7.1.5, Appendix L
558	WP16	4.2.13, 4.3.4, 6.2.11, Appendix L
521	n.a.	Many 7.1.2 table 17a (parameter 4.2.8.2.5)
147	WP17	6.2.7a, 7.1.1.5, 7.1.1.6, Appendix J-1
427 complement	WP17	6.2.3.19a
410	WP17	7.5.1, 7.5.2
553	WP17	4.2.3.3.1, 7.1.1.5, 7.1.2.2, Appendix J.2
567	WP17	Appendix J index [28], Appendix L
572	WP17	Appendix J index [17],
384 complement	WP17	Appendix C.4
554	WP17	4.2.2.5, 4.2.3.7 Appendix J index [3], Appendix L
422	WP17	Appendix J, Appendix L
579	n.a.	UK cases cleaning
419	WP17	Appendix J
424 (reformat)	n.a.	All clauses referring to Index 7, 4.3.4, Appendix J.2
169 complement	WP17	4.2.8.2.2

5.1.2.4. NOI TSI

Change Request (CR)	WP of CR approval	TSI clause affected by the change
CR 236		7.1, 7.2, 7.2.1, Appendix H
CR 163	WP14	4.2.3a, 5, 6.1, 6.2.3, 7.2.2, Appendix A, Appendix F, Appendix G
CR 384	WP15	2, 7.1
CR 526	WP14	4.2.3, 6.2.2.1, 6.2.2.2, 6.2.2.3, 6.2.2.4, 6.2.3, Appendix B, Appendix F
CR 521	n.a.	2, 4.3, 4.4, Appendix C, Appendix H etc...
CR579	n.a.	UK cases cleaning
521 complement	n.a.	6.2.2.2, Appendix F 2)

5.1.2.5. OPE TSI

Change Request (CR)	WP of approval	TSI clause affected by the change
172/179	WP14	<u>Appendix D1</u>
544	WP15	<u>4.2.2.5.1, Appendix D1, Appendix I, Appendix J</u>
552	WP16	4.2.2.1.2
247	WP17	Appendix A
249	WP17	Many
570	WP17	2.1, 4.2.1.1

5.1.2.6. PRM TSI

Change Request (CR)	WP of approval	TSI clause affected by the change
Recommendation ERA-REC 128-2 from June 2020	No approval from WP TSIs	Many
CR 503		5.1, 6.1.1, 6.2.1, 6.2.5
CR 236		7.1.2, 7.2.3, Appendix P:
CR 500		Appendix P:
CR 517	WP14	Appendix A
CR 521	n.a.	7.1.1 and others
CR 526	WP15	Appendix A
CR 579	n.a.	UK cleaning cases

CR 572	WP17	Appendix A
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5.1.2.7. WAG TS

Change Request (CR)	WP of approval	CRTSI clause affected by the change
471	WP10	1, 1.3, 3, 4.1
472	WP11	6.1.2.1
164	WP11	3, 4.2.3.5.3, 4.8, table 11a in clause 7.2.2.2, Appendix A
437	WP12 WP15	4.2.4.3.2., 4.8, 7.1.2
236	WP12	7.1, 7.1.1, 7.2.1, 7.2.2, 7.2.2.1, 7.2.2.2, 7.2.3.1, 7.2.3.2, Appendix A
353	WP14	Appendix C 9 (I)
525	WP14 WP15	4.2.2.3, 4.2.3.1, Appendix A Appendix h
417	WP14	6.2.2.4, Appendix D
163	WP14	Articles 9a and 10, Appendix G
517	WP14	4.2.2.2, 4.2.3.1, 4.2.3.5.3, 6.1.2.1, 6.1.2.4, 6.2.2.1, 6.2.2.8.2, 6.2.2.8.3, 7.1.2, Appendix A, Appendix C, Appendix D
526	WP14	Many
165	WP15	7.1.2, 7.6.2
543	WP15	4.2.3.3
545	WP15	7.3.2.5a
515	WP15	Appendix C
384	WP15	2.1
546	WP15	Appendix D
420	WP16	Appendix A (clause 6.2.2.8.1), Appendix D
418	WP16	6.1.2.3, Appendix C (C.15), Appendix D
521	n.a.	7.2.2.2 (table 11a)
579	n.a.	UK cleaning cases
422	WP17	4.2.4.3.2.1, Appendix C, Appendix D, Appendix A
437 complement	WP17	Appendix A
410	WP17	7.6.1
553	WP17	4.3.3, 7.1.2, Appendix C, Appendix A

5.1.3. Outputs of the Working Party - Registers

In some cases, the discussions led to the proposal of updates of the registers as follows:

5.1.3.1. Update of RINF

The table 1 of the annex to the Register of Infrastructure is updated to incorporate additional information, notably the addition of parameters for combined transport and the extension to the complete network, as well as parameters about the current at standstill.

5.1.3.2. Update of ERATV

The annexes II and III of the decision 2011/665 related to the vehicle type data to be registered in ERATV is amended:

- **Annex II Section 4 - Technical characteristics of the vehicle:**

The section 4 is updated with revised Basic design characteristics as proposed in the recommendations amending chapter 7 set out in the LOC&PAS TSI, TSI WAG and TSI CCS. The revised parameters are identified in track changes.

- **Annex III Structure of type number:**

The subcategory of vehicles defined in the table have been aligned with the type of rolling stock defined in TSI LOC&PAS and TSI WAG.

5.2. Working Party CCS

5.2.1. Composition and activities

The Working Party on CCS TSI revision (CCS TSI WP) is as specified in Art. 5 of the Agency Regulation. Accordingly, it is composed of:

- Representatives nominated by the competent national authorities,
- Professionals from the railway sector selected by the Agency from the lists presented by representative bodies,
- (If necessary, independent experts and representatives of international organisations recognised as competent in the field concerned).

The Working Party held 12 meetings between 12th February 2020 and 18th May 2022. Only the first meeting was a physical meeting, all others took place remotely.

The following representative bodies participated to the meetings (list of the organisations that participated at least to one meeting):

AERRL	AEL	CER	DG MOVE
EIM	NB RAIL	UIC	UNISIG
UNITEL			

The following NSAs participated to the meetings (list of the organisations that participated at least to one meeting):

NSA AT	NSA BE	NSA CH	NSA DE
NSA DK	NSA ES	NSA FI	NSA FR
NSA IT	NSA LU	NSA NL	NSA NO

NSA PL	NSA SE	NSA SI	
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The Working Party ensures the steering of the activities in coherence with the overall system planning, resources and priorities. The main information exchange with the Working Party members was done through the ERA extranet ([link](#)) and the Clearquest tool.

5.2.2. CCS TSI related CR

The following table reflect the status of the CR processed in relation with the CCS TSI revision. Where there is no indication on the status, the CR is included in the recommendation and the status it is being updated in the Clearquest tool.

CR Id	Mandate or internal reference	Headline	State
TSI_C00000083	CCS #011	Stop Marker Board as Interoperability Constituent	
TSI_C00000129	CCS #012	Amending TSI OPE - TSI Loc & Pass and TSI CCS (EIRENE FRS 8.0.0) For DSD triggered GSM-R alarm.	Postponed
TSI_C00000175	#21	Modular on-board architecture - standard on-board interface between on-board CCS and train [TIU] (revised subset 119)	
TSI_C00000191	#70	Review the use of standards (mandatory vs harmonised, number of standards to be referenced,...), update references to standards, incorporate new standards as appropriate	
TSI_C00000193	#22	Modular on-board architecture - common standardised TCN (train communication network), based on Ethernet bus/IP and data interfaces	
TSI_C00000194	#23	Modular on-board architecture - Standard on-board interfaces between ETCS DMI and ETCS EVC (subset 121)	Postponed
TSI_C00000195	#24	Modular on-board architecture - Standard on-board interface between TIMS (ETCS L3) and ETCS EVC	Postponed
TSI_C00000196	#25	Modular on-board architecture - Standard on-board interface specification between ETCS and ATO, based on Ethernet bus/IP (revised subset 130)	
TSI_C00000197	#26	Modular on-board architecture - Standard on-board interface specification between ATO and TCMS based on Ethernet/IP	
TSI_C00000198	#27	Modular on-board architecture - Standard on-board interface specification between CCS-applications (ETCS/ATO) and FRMCS, based on Ethernet bus/IP	
TSI_C00000199	#28	Modular on-board architecture - Next generation communication system	
TSI_C00000234	E437	Trackside malfunction reporting	Postponed
TSI_C00000236	#67	Review and streamline transitional provisions	
TSI_C00000237	#69	Improve definitions and add definitions when necessary	Postponed

CR Id	Mandate or internal reference	Headline	State
TSI_C00000246	#45	Streamline requirements on route knowledge making use of new technologies	Postponed
TSI_C00000247	#10	Harmonised operational rules linked to ETCS level 2 and ETCS Level 3 radio based operation without overlay of Class B and lineside signalling	
TSI_C00000248	#11	Harmonized operational rules linked to wider CCS technical standardization	Postponed
TSI_C00000249	#12	Interface between CCS TSI and OPE TSI including the review interface with OPE TSI (Appendix A) and marker boards requirements.	
TSI_C00000252	#01	ETCS Baseline 2 to be withdrawn	
TSI_C00000253	#02	ETCS L1 specific functionalities to be frozen	Closed
TSI_C00000254	#03	New baseline: Radio baseline 2 release 1	
TSI_C00000255	#04	New baseline: ATO baseline 1 release 1	
TSI_C00000256	#05 15 16 17 18 19 20	ETCS update (preferably as a release)	
TSI_C00000257	#06	Return from experience of the SW error correction procedure introduced in the revised CCS TSI 2019	
TSI_C00000258	#07	Return from experience and consolidation of the ESC/RSC technical compatibility.	
TSI_C00000259	#08	Provisions related to protections for RUs related to introduction of new functionalities trackside	
TSI_C00000260	#09	Close open point on reliability/ availability of onboard system, number of hours between failures (MTBF)	Postponed
TSI_C00000261	#13	Closure of open point linked to train detection systems	
TSI_C00000262	#14	ERTMS deployment requirements	
TSI_C00000263	#29	Product roadmap and migration compatibility provisions in CCS TSI	
TSI_C00000272	#30	Modular safety	
TSI_C00000273	#63	Improve the existing provisions of the TSI on the basis of the return of experience from stakeholders	
TSI_C00000275	#64	Improve provisions when to apply the TSIs in case of upgrade/renewal	
TSI_C00000276	#66	Revise the table "link between basic parameters and essential requirements" in Chap 3 of the TSIs	
TSI_C00000301	#63b	Improve provision of TSIs on the basis of return of experience from vehicle authorisations	

CR Id	Mandate or internal reference	Headline	State
TSI_C00000307	#65	Review existing specific cases in view of phasing out national exceptions as well as general exemptions in TSIs	
TSI_C00000330	#72, #73	Specific objectives which should be considered during the revision of TSIs	
TSI_C00000333	#74	Take into account open source and open data architecture requirements	
TSI_C00000424		Define the interoperability requirements applicable at the interface between the Control-Command and Signalling Subsystem and other subsystems (mainly, but not exclusively, rolling stock).	
TSI_C00000428	CCS 01	Moving and amending requirements from CCS TSI Section 4.5 to a new Section 4.2.18 "Documentation for Operation and Maintenance"	
TSI_C00000547	STR01	circumstance to apply specific cases.	Assigned
TSI_C00000553		Harmonised requirements related to electromagnetic compatibility expressed by means of "frequency management"	Assigned

5.2.3. Consolidation phase for technical document in CCS TSI appendix A

Due to the high number of CR's to be processed at the EECT and the associated workload to process them, the deadline for the completion of the technical work on the resolution of the Appendix A documents CR needs to be extended until October 2022. This means that a consolidation phase is necessary for integrating the agreed CR solution into the technical documents.

Therefore at the time of providing this Recommendation, there will be some pending task to be performed, and that it is planned to be delivered in advance of the final discussions in the RISC meetings.

In any case the Appendix A Table A 2 is provided with the final version number of the documents to be updated.

The main actions to be performed during this process are:

- Integration of the agreed CR solutions at EECT into the final version of the relevant subsets (e.g. SS-026, SS-040, SS-091, ...)
- Integration of the principles of single set of specification methodology into SS-104 in relation with the enhancement CR (M_VERSION 2.2 and 3.0)
- Complete the Backwards Compatibility Analysis (BCA) with the previous baselines of ETCS and GSM-R.

Some of the technical documents won't be completed during the consolidation phase, due to the late finalisation of some precedent documents that are necessary inputs for those tasks or for the late availability of some of the relevant standards. For the update of the reference to standards, it needs to be considered the TWG STA proposal on future updates of the TSIs to include new standards.

The list of uncomplete documents and the proposed way forward from the Agency is:

- CENELEC standards that are in progress:

- EN 16494 for Marker Boards: The reference to the current version 2015 is included in the Appendix A Table A 2. Once the new version is available, the table should be updated, through an Agency Opinion or an amendment to the TSI.
- EN 50167-1 Track Circuits: The experts in the TDC workgroup have accepted to include a reference to the current prEN16207:2021 version.
- Test technical documents not available:
 - The ETCS on-board test specifications (SS-076) will be completed with the inclusion of the necessary adaptations coming from the final version of the agreed technical solutions and corrections in SS-026. The Appendix A Table A 2 makes a reference to a version to be published in the Agency webpage, so the document will be applicable when finished, without the need of an amendment of the TSI. The current SS-076 specifications for former set of specifications #2 and #3 will be used for products with system version 2.0 and 2.1, while the update specifications are not available.
 - ATO test specifications for Appendix A Table A 2 Index 98 will be delivered by Shift2Rail Specific Contract 6 and published in the Agency webpage to be applicable without the need of an amendment of the TSI.

5.2.4. Framework to manage specification change

Over the coming years, many more kilometres of trackside ERTMS will be implemented, both within and between Member States, and many more ERTMS vehicles will be in operation.

With this broader ERTMS deployment, and the creation of large ERTMS networks across the EU, the impact of errors in the technical specifications and their resolution will need to be managed not only at project level but also at system level to ensure the objectives of interoperability and safety are achieved.

Further, new functionalities will be introduced to improve performance, and this must also be managed to ensure correct implementation at line, network and system level. This also requires a consideration of business cases of the operators, infrastructure managers and suppliers to achieve a coherent implementation.

Thus, there must be robust processes to maintain the specifications, including in implemented projects, and also a need to develop a sustainable framework to introduce new functionalities to enable greater performance from the system.

Whilst the two processes (error corrections and new functionalities) have previously been considered together in specification updates, it is considered that there is significant benefit in separating the distinct processes to enable better management of the specifications overall and system implementation.

It is proposed that there will be distinct specification update processes for error corrections (see CCS TSI – section 7.2.7) and for new functions and enhancements. These processes will be underpinned by a proposal to maintain a single set of specifications within the CCS TSI.

This will allow to tackle current issues:

- There is no clear framework for the correction of newly identified errors.
 - Specification framework in the CCS TSI: Older versions of the specifications at this moment are not error corrected, but can still be implemented causing the potential issue of not implementing known errors corrections into new projects;
 - Implementation framework in the CCS TSI: the non-implementation of identified errors can cause a reduction in system performance and/or the implementation of mitigation measures at trackside without any guaranteed framework on when these mitigation measures can be removed.
- There is no clear framework for the implementation of new functionalities.

- Specification framework in the CCS TSI: new functionalities are introduced according to the [ERTMS Change Control Management Procedure](#);
- Implementation framework in the CCS TSI: the CCS TSI will specify in chapter 7 of the CCS TSI transition and migration requirements for balancing the needs from IM and RUs linked to the implementation of these new functionalities. This transition and migration scheme aims to provide a balance between the need for stability and the need for innovation (see section 5.2.10 of this report);

5.2.5. *Specification maintenance and error corrections*

The sector commonly agrees on the following problem description:

- Stability of ERTMS specifications is desirable.
- Nonetheless there is a necessity to monitor and update the specifications to address identified errors.
- Additionally, the impact of error corrections and their handling needs to be considered in current and future deployments, both on-board and trackside.
- Currently the Change Control Management process is mainly focussed on addressing errors in the specifications but there is a gap in actual implementations on how such error corrections are handled in the rail network and on trains.
- At present, Technical Opinions issued by the agency set out error corrections and mitigations based on a comprehensive and thorough process but can only make recommendations for implementation and are not legally binding.
- Detailing the process of managing the error correction linked changes in the specification and their implementation is necessary to achieve technical compatibility and maintain interoperability.

The revised process set out aims to achieve a coherent approach to specification management, based on a commonly agreed process while maintaining interoperability. To achieve this, the proposed changes in the CCS TSI detail the process of specification maintenance. The process, including the responsibilities and implementation requirements, are defined in the CCS TSI (section 4.2.20 'Technical documentation for maintenance' and section 7.2.7 'specifications maintenance (error corrections)'). The implementation requirements for error corrections in Appendix B distinguish between existing projects and new projects. These implementation requirements will require that some suppliers and integrators have to adapt their 'software maintenance' processes. There is a 2 steps approach foreseen in the CCS TSI (step 1 for releases issued before 01st January 2025 and step 2 for releases issued after 01st January 2025) in order to provide sufficient time to organisations for adapting their software maintenance processes. In a first phase, only the errors being identified in its particular area of use shall be considered for existing projects, while in a second phase it is requested that, in case of requiring the implementation of one or more errors for the concerned area of use, all known errors in the maintenance release shall be implemented. This second phase focuses on further strengthening the EU policy objective of moving towards a standardised OBU independent of its area of use.

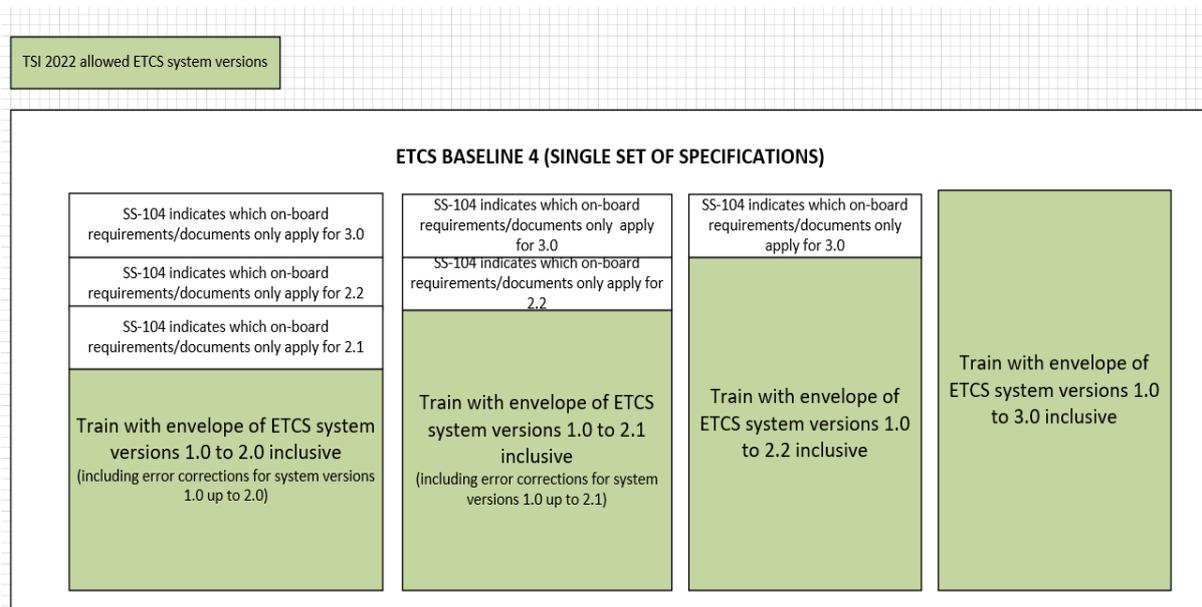
Based on the experience, a new maintenance release will be produced approximately every 18 months to 2 years replacing the previous release including all identified errors, the compatibility analysis, definition of corrections, applicability to on-board or trackside subsystem, and requirements for tests and where applicable, possible mitigation measure. This is not directly reflected in the CCS TSI proposal, and it will be considered in the enacting part of the recommendation.

5.2.6. Single set of specifications

In the current TSI in force, there are currently 3 sets of specifications in which only the latest set of specifications include all known error corrections. This method was applied in the past as there was no distinction made between errors and enhancements within a new set of specifications. Some RUs or vehicle owners do not need their OBUs to implement the new enhancements introduced in the latest set of specifications because these new enhancements were not requested or implemented on its network. If the older sets of specifications are referenced into the CCS TSI, it allows applicants to continue to implement a product in which the error corrections are not solved in new projects.

Therefore, the proposed new TSI aims to achieve both implementation objectives (specifications without errors in the CCS TSI and not mandating directly new enhancements if not required for the area of use. Therefore, the Agency proposes to update a single set of specifications, however this single set of specifications shall allow the OBUs to support a defined subset of the envelope of the legally operated system versions. This will allow to optimise the maintenance effort of specifications and to allow applicants to implement an older OBU-system version including all the known error corrections.

New ETCS enhancements included in the CCS TSI 2022 and assessed as compatible shall be packaged as a set of new ETCS functions inducing a new ETCS system version 2.2. New ETCS enhancements included in the CCS TSI 2022 and assessed as incompatible shall be packaged as a set of new ETCS functions inducing a new ETCS system version 3.0. The subset 104 (ETCS system version management) will clearly indicate which functions belong to which ETCS system version. This will lead to following set of envelopes within the single set of specifications:



The enhancements which justify a new envelope of ETCS system versions 2.2 and 3.0 are elaborated in section 5.2.15 of this report.

5.2.7. Removal of set of specifications #1

B3 deployment according to the latest set of specifications, which includes all agreed error correction for the identified issues, should be default for all future ETCS trackside implementations. Exceptions can be envisaged in those cases where extensive B2 deployment is already in service, considering the experience of

the IM and the NSA in managing compatibility, and considering the possible impact on deployment plans, more specifically by impacting the existing trackside engineering rules, or specific measures in place to ensure compatibility with the existing B2 fleet, without impact the compatibility with the B3 fleet.

Therefore, in order to fulfil the overarching objective and providing a manageable, effective reference for ETCS, the following main steps should be taken:

1. Remove set #1 (Table A.2 1) from Annex A, proposing an exceptional transition phase to continue deploying B2 on those networks that justify the necessity.
2. Archive the set of documents to a “former versions” part of the Agency Web Page where previous TSIs versions specifications and documents can be found for reference.
3. The preferred solution is to deploy X=1 trackside functionality according to the latest Chapter 6 of the SS-026 SRS (including all error corrections).
4. System version 1.0 to be kept inside the envelope of legally operating versions.
5. BCA analysis will continue to consider the existing set#1 infrastructures in its scope.
6. If there are some possible issues with B3 X=1 chapter 6, these needs to be sent to the CCM procedure to be fixed. Possible issues are not a justification for staying in the old specifications.

This revised CCS TSI includes those provisions in section 7.4.1.2.

5.2.8. *Removal of partial fulfilment*

Based on the feedback received from vehicles authorising entities (NSAs and the Agency) it was agreed that a proposal how to deal the high number of deviations that are currently present in the vehicles. The result of the high number of deviations is that it is not possible to ensure a general technical compatibility between the vehicles and the networks and a specific and detailed technical analysis between the functionalities deployed in each specific trackside and each specific vehicle is needed. This is against the principle of interoperability.

The proposal shall be considered in the context of the full CCS TSI 2022 revision proposal by the Agency. In particular: the error correction procedure, single set of specifications, introduction of new functionalities, migration and transition.

The main principles considered by the Agency are:

- Target to have full compliant products (no exclusion of functionalities from on-board design). Break the vicious circle: allowing partial implementation is preventing to get full implementations.
- Avoid having exported constraints between subsystems or tailored compatible vehicles which are not fully interoperable with the rail system in the European Union. Restrictions and deviations need to be reassessed when extending the Area of Use.
- Transparency, all deviations and error shall be properly recorded in the technical file, to allow the proper assessment and the final acceptance of the proposed restriction or SRAC by the authorising entity, in a homogenous way.
- Non-conformities to be handled as proposed in the Art. 27 of Regulation (EU) 2018/545 and the general proposal in Clarification Note ERA 1209/115.
- It is not the role of the NoBo to assess the acceptance of a deviation, but to identify and record them.

The proposal is mainly:

- Do not allow intentional deviations excluding functionalities from the defined envelope of system version defined in the single set of specs: The products shall be design according to the defined options in the TSI.
- No intermediate implementation in between the defined ones is allowed (unless non-application is granted by MS and EC).
- Certification by the NoBo it is still possible with errors, but not with intentional exclusions of mandatory functions.
- A transition period is proposed in Appendix B, with no impact for vehicles in operation or in production, 7 years in case the design phase is already started and directly applicable for new designs.

5.2.9. Adding new functionalities & enhancements

New functionalities, including as identified in the report "[ERTMS longer term perspective](#)", are planned to be introduced for the improvement of performance of the system.

The impact on interoperability and compatibility must be managed. A consideration of the business cases of the operators, infrastructure managers and suppliers to achieve a coherent implementation is necessary. A balance must be struck between allowing the introduction of new functions and improving performance, and the impact on existing investments, in particular where there are impacts on interoperability.

A balanced framework between Infrastructure Managers and Operators is included in the CCS TSI. The implementation framework for new enhancements can be categorised into 3 types of implementation frameworks.

1. Compatible enhancements (mainly ATO and associated ETCS system version 2.2). The CCS TSI includes mandatory on-board requirements only for vehicles with a design phase if an IMs has notified that ATO will be implemented on trackside. The CCS TSI does not include any mandatory on-board requirements for vehicles in production phase or in operation. The implementation of ATO on existing vehicles or on trackside shall be part of the national implementation plan where the IM and RU expressed needs are balanced.
2. Incompatible enhancements (mainly FRMCS and associated ETCS system version 3.0). The CCS TSI includes a minimum timeframe before incompatible enhancements can lead to mandatory on-board implementation requirements for new and existing vehicles. The minimum compatibility timeframe for existing vehicles is based on 2 conditions, a minimum timeframe of 7 years after the TSI enters into force and a minimum notification time of 5 years if the national implementation plan intends to mandate FRMCS or ETCS system version 3.0. It is considered that the process defined in the implementation plan will lead to the notification of ETCS system version 3.0 according to the timelines of the FRMCS or DAC implementation framework. It is expected that ETCS system version 3.0 will not be triggered by other incompatible enhancements (other than FRMCS or DAC) within the ETCS system version 3.0 package which further optimise some functions.
3. On-Board modularity. The CCS TSI includes some mandatory implementation requirements which are only applicable for newly built vehicle types requiring a first authorisation. This allows suppliers to gradually upgrade their products and integrate them mainly in newly built vehicle types for these on-board modular specifications.

5.2.10. Transition and Migration requirements (Appendix B)

The relevant transition and migration requirements for the changes in this TSI CCS compared to the previous TSI will be done according to the transition concept being developed by the Agency. This transition concept will be applied across the TSIs and should facilitate the traceability of the implementation of the TSI changes

for applicants, NoBos and authorising entities during the vehicle authorisation and the trackside authorisation process.

In order to apply this generic transition concept for the CCS TSI, a new Appendix B (Table B.1 for CCS On-Board Subsystem, Table B.2 for CCS Trackside Subsystem and Table B.3 for Interoperability Constituents) will be added for the main changes in the TSI CCS (compared to the previous TSI).

The Agency has internally produced some examples to illustrate some of the transition phases, to be considered in the future revision of the CCS TSI application guide. It is included as Annex 6 to this report.

5.2.11. Deployment requirements

The CCS TSI will set out the deployment requirements to support the overall system change to ERTMS, providing the regulatory element of ERTMS deployment across the EU.

The main change in ETCS trackside deployment requirement is linked to the update of the TEN-T regulation. This updated regulation will extend the ETCS trackside deployment requirements, focusing on the target of ETCS deployment by 2030 on the Core Network and on the target of ETCS deployment by 2040 on the Comprehensive network.

Based on these updated ETCS trackside deployment requirements, the ETCS on-board requirements are updated as well removing the current exemptions provided of not installing ETCS on newly built vehicles and extending the requirements of installing ETCS on existing vehicles being modified.

5.2.12. National Implementation Plans (NIP)

In addition of the summarising report on NIP with the content information, an analysis was realised regarding the quality and comprehensiveness of the NIPs received. The general conclusions are:

- Most of the countries did not include the complete network in the NIP
- The answers for ETCS are more complete than for the communications
- They generally do not provide enough level of detail:
- The answers for ETCS are more complete than for the co
 - regarding class B systems or
 - the dates when existing cross border traffic will fully benefit from operation with 'ETCS only equipped on-board'

The main changes to the CCS TSI text include:

- Addition of request for information on ATO, FRMCS and TSI compliant train detection systems
- Increase information on cooperation and coordination of MS to IM and RU
- Information on the phase out of specific cases

The proposed deadline for submission of the updated NIPs is 15th December 2023

A template for providing the information requested in the NIP will be included in the CCS TSI Application Guide. The current version is attached as Annex 3 of this report.

5.2.13. Class B deployment and interface

Based on feedback and information received from interviews with manufacturers of ETCS on-board and Class B systems, the main changes in the TSI text are:

- To clarify the definition of different types of Class B solutions allowed according to CCS TSI.
- To ensure that Integrated solution is not the only available Class B solution in a network.

- To make available the specifications that allow the integration of the available Class B product with any Class A onboard system.
- To define compatibility assessment in Class B specifications.

The updated version of the Agency Technical Document “List of Class B systems” can be found as Annex 1 of this report.

5.2.14. ETCS System Compatibility (ESC)/Radio System Compatibility (RSC) return of experience

In accordance with Article 11a.1 of Commission Implementing Regulation (EU) 2019/776 of 16 May 2019 amending Commission Regulation (EU) 2016/919, the Agency has issued a report on the implementation of ETCS system compatibility (ESC) and radio system compatibility (RSC) checks, which can be found in the [link](#).

The report contains the analysis of the information received by the Agency up to the 25/05/2020, which is reflected in the ESC/RSC Technical Document version 4.0. The report also includes some proposed actions to be considered in the on-going revision of the Technical Specification for Interoperability relating to the Control-Command and Signalling subsystems envisaged for 2022. These actions were discussed in the ERTMS Stakeholders Testing and Validation subgroup and later on the CCS TSI WP.

Also the return from experience from ESC/RSC checks execution, the vehicle authorisation applications and ESC/RSC technical document updates have been considered in this proposal. Also many of the point agreed in CCS TSI application guide version 7 have been transferred to the CCS TSI text.

The main elements in this proposal are:

- The conditions for new authorisation in the Basic Design Characteristics table are not directly linked to number of ESC but to the impact in the existing conditions for use, like, for example, the change of operation between Class B and Class A. This way the authorising entity may include conditions for use that may require new vehicle authorisation in case future ESC/RSC types have an impact of the demonstration of technical compatibility (e.g. moving from B2 lines to B3 lines).
- The more detailed definition in the CCS TSI of the possibility to demonstrate the technical compatibility at Interoperability Constituent level, allowing to reuse the result on several subsystem if the results are equivalent.
- The IM shall declare if there is any equivalence of the ESC/RSC with previous national procedure (complete, partial, none), in order to avoid unnecessary repetition of the same checks.
- In order to complete the migration from the previous national procedures to the ESC/RSC checks, a deadline for the definition of the applicable ESC/RSC on the existing infrastructure is defined for the 16th June 2023. From that date, the previous national procedure shall be withdrawn.
- Templates for the ESC/RSC Statements are provided in CCS TSI Appendix C.
- When the IM submits or updates the definition of the ESC/RSC checks, a reasonable transition period should be defined and agreed with the Agency.
- NoBo assessment of the trackside definition of new or modified ESC/RSC types, to ensure that only are addressing TSI requirements.
- The removal of the clauses on partial fulfilment it also linked to this point, since the lack of fully compliant products is one of the reasons of different behaviours and lack of technical interoperability.

It was agreed at the CCS TSI WP that some future actions will be still need in the future to reach the objective of reducing or eliminating the ESC/RSC:

- The root cause of the need for ESC/RSC must be analysed, in order to understand why this kind of errors has not been detected in an earlier step in the validation and verification procedures. ESC/RSC are not the problem, but the evidence that there is a problem.

- Some IMs are already working on a simplification and reduction of the number of ESC/RSC. Possibility to analyse common checks among different IMs.
- Feedback from execution of the ESC/RSC checks performed shall be delivered by the sector, in particular the ones with non-passed results, allowing to identify which ESC/RSC have revealed interoperability issues.

5.2.15. *Technical changes, game changers and enhancements*

The list of CR considered in the EECT meetings to be included in the CCS TSI revision 2022 can be found in Annex 2 of this report, with the status of each CR.

The main new ETCS functions and changes considered for the revised TSI which justify an ETCS system version 2.2 or 3.0 are:

5.2.15.1. *ATO GoA1/2*

The Automatic Train Operation is added as 3rd part of ERTMS within the CCS TSI. The ATO part is considered as a compatible enhancement not preventing a normal service as the onboard without ATO functionality can still operate a normal service on trackside with ATO functionality. Therefore, the ETCS on-board modifications required for ATO will be classified as part of ETCS system version 2.2. ATO is considered as the main enhancement which justifies ETCS system version 2.2

5.2.15.2. *FRMCS readiness*

The CCS TSI is prepared for the introduction of a new radio communication system FRMCS as GSM-R is expected to become obsolete between 2035-2040. The FRMCS will be based on 5G technology and the ETCS specifications shall be prepared for interfacing with this new radio system ('FRMCS readiness'). The introduction of FRMCS and its impact on ETCS is considered to be an incompatible enhancement as GSM-R will be decommissioned after a certain timeframe, therefore requiring that all existing vehicles shall be upgraded before the GSM-R radio system is decommissioned and replaced by FRMCS as radio bearer. Therefore, it is considered that FRMCS is the main enhancement leading to ETCS system version 3.0.

5.2.15.3. *Level R and DAC readiness*

The potential differences between ETCS Level 2 and Level 3 have been analysed by S2R and EUG. The main conclusion of this analysis is that a merge of ETCS Level 2 and level 3 to level 'R' (radio) would be important to allow a trackside ETCS Level R implementation based on hybrid train detection which is reported by EIM/CER as the most realistic implementation scenario. This trackside implementation is based on trackside with virtual sub-sectioning, using train integrity and safe train length operation. This merge of ETCS level 2 and level 3 will further simplify the trackside engineering (avoiding unnecessary transition orders between level 2 and level 3), simplify the train-drivers' rules (no differences between ETCS Level 2 and level 3 train-drivers' rules) and simplify the ETCS on-board products (no difference in software on-board behaviour for ETCS Level 2 and level 3). In addition to this merge, the subset 091 will include on-board safety requirements for the on-board train integrity and safe train length information provided to ETCS on-board.

ETCS specifications will also include a new concept 'supervised manoeuvres' enabling the reduction of trackside assets (avoiding the installation of shunting signals and/or allowing the decommissioning of shunting signals) while improving the safety and performance (time gain) of these shunting operations. In order to allow the reduction of shunting signals, all vehicles will need to have implemented this ETCS on-board functionality and freight trains will be required to provide dynamically the safe train length. Therefore, this change request is indicated as being an incompatible change as part of system version 3.0 and will also require that Digital Automatic Couplers will be required to provide this safe train length information ('DAC readiness').

5.2.15.4. *On-board modularity*

The Annex A specifications will also include a set of interface specifications between the RST and ETCS part and between the different CCS-parts. The different CCS-parts will be integrated on the base of a common Ethernet bus for which the subset 147 will define the 3 lower OSI layers. The list of CR considered in the EECT meetings to be included in the CCS TSI revision 2022 can be found in Annex 2 of this report, with the status of each CR.

5.2.16. *Recurrent and standing TSI maintenance tasks*

The discussion on the open point Reliability was considered as a lower priority, and only to be discussed in CCS TSI 2022 revision if the other relevant CR are completed before. Since this has not been the case this action has been postponed.

5.2.16.1. *Review Specific Cases*

The CCS TSI specific cases section 7.6 has been reviewed with the update information for the relevant specific cases. But as indicated in the introduction, the specific cases has not been discussed in the working party meetings. A big part of them are related to the train detection compatibility, and those have been classified as “applicable on vehicles”, meaning that it requires specific characteristics on electromagnetic compatibility of the RST subsystem, and if also classified as “applicable on infrastructure” meaning the non-TSI-complaint track detections system are still being deployed in the infrastructure.

The specific case to cover the case of level 1 euroloop and radio in-fill mandatory requirements have been introduced.

The temporary limit for the CCS TSI specific cases has been defined by the Agency until 2040, but this should be also discussed and agreed between the RISC members.

5.2.16.2. *Basic parameters/essential requirements*

Chapter 3 section has been reorganised and a table with the relation between basic parameters and essential requirements has been introduced, indicating which essential requirements are directly covered by basic parameters defined in the CCS TSI.

5.2.16.3. *General editorial improvements*

General editorial improvements, correcting errors, increasing the understanding of the clauses and aligning the structure and wording among the TSIs have been introduced in the CCS TSI.

5.2.16.4. *Open points*

After the revision of the CCS TSI Appendix A Table A 2 Index 77 interface document and the removal of set #1 from Appendix A, there is only one remaining open point for the CCS TSI in relation with the “Reliability/availability requirements”.

5.2.17. *Stakeholders position*

5.2.17.1. *EIM*

EIM provide a document with its position and comments which is included as Annex 7 to this report.

5.2.17.2. *AERRL, CER UNIFE and UNISIG*

AERRL, CER, UNIFE and UNISIG provide a joint working paper which is included as Annex 8 to this report.

5.2.17.3. *Other stakeholders*

Other stakeholders, like some NSAs, provide comments and opinion through the public consultation.

6. Economic evaluation

The economic evaluation of the recommendation is reported in two separate documents, one for the CCS TSI and another for the rest of TSIs. Those documents present the impact assessment (IA) on the total package of change request solutions. In some cases, separate IAs are provided for change requests with an important economic dimension, notably CR236 on transition and CR164 on derailment detection.

7. Outputs of the consultation

According to the regulatory provisions, the Agency invited associations and bodies representing users as well as social partners to comment the draft proposal. In this respect, the Agency made available for consultation the preliminary draft of the revision of the TSIs and the necessary amendments to the ERATV and RINF decisions from the 18th March 2022 until the 17th June 2022.

The answer to comments received during the consultation will be aggregated in a specific report that will form part of the recommendation. It will be delivered before the 14th of July 2022.

8. Conclusions and recommendations

For the CCS TSI this revision is a step into the future evolution of the system, but the decoupling of the error corrections from enhancements, which will allow the proper management of the system and the specifications into the scenario of European interconnected networks with vehicle operating in an interoperable way through many of them.

The Agency looked to have a balanced implementation approach for the conflicting economic interests between RU and IMs both for new enhancements and errors, and this requires from suppliers a disciplined approach for error corrections and avoid partial fulfilment.

It is also important to highlight the fact that the inclusion of FRMCS is made on the basis of a pre-baseline (FRMCS Baseline 0) which currently does not allow for on-board FRMCS procurement, but the definition of necessary interfaces with the on-board applications (ETCS and ATO).

For the TSIs relative to the fixed installations, rolling stock and operation subsystems, the revision leading to the delivery of the TSI package 2022 is important for two reasons:

- First, it is the first revision performed according to the new methodology combining the use of Clearquest and the work in topical groups/ERA core team providing inputs to a single working party,
- Second, it is a revision for which the importance of having a system approach becomes obvious: the topics discussed were transversal, and the detailed review of interfaces between subsystems showed deficiencies in TSIs on this aspect.

On the first point, the new methodology proved to be effective and efficient, even if improvements are necessary, for instance on the use of Clearquest as a tool for recording all contributions from workgroup members, or on the processing of non-transversal (or TSI-specific) changes, when no TSI-specific workgroup exists. The Agency will perform a return of experience analysis to improve the methodology but will not revert to the previous silo approach.

On the second point, the Agency will reflect on how to further improve the transversal approach, to ensure that interfaces between subsystems are considered from the very beginning of the work for each future topic discussed by workgroups. In parallel, the way to deal with TSI-specific points will also be considered.

In order to address the topics that couldn't be fully covered in the package 2022 such as the digital automatic coupler for freight wagons, and other topics that will emerge from research and innovations such as fuel cells or battery powered trains, we recommend keeping the Working Party and several working groups active, and to ensure that sufficient resources are allocated to the revision of TSIs, which should be considered a permanent activity of the Agency.

Annex 1 Agency Technical Document TD2011/11 “List of CCS Class B Systems” version 4.9

Final version 5.0 will be produced after the review from the RISC members.

Annex 2 List of ERTMS EECT CR considered for the CCS TSI 2022 revision

List with ERTMS EECT CRs for CCS TSI Appendix A documents considered for this revision.

Annex 3 CCS Template for the National Implementation Plans information version 1.1

This document will be published as part of the CCS TSI Application Guide review.

Annex 4 Template for description of conditions, restrictions and added functions is provided v0.4.

This document will be published in the Agency web page after revision with the sector organisations.

Annex 5 Details of the change requests included in the Recommendation for the TSI package 2022 (TSIs ENE, INF, LOC&PAS, NOI, OPE, PRM, WAG)

Annex 6 CCS TSI draft application guide text on the Appendix B.

This document is a draft example prepared by the Agency to illustrate some cases of transitions phases defined in CCS TSI Appendix B.

Annex 7 EIM findings for the TSI CCS in the context of the Digital Rail and Green Freight TSI revision package 2022

Annex 8 Joint CER, UNISIG, AERRL working paper on the TSI CCS (TSI 2022 Revision Package)