SYSTEM PILLAR

EU-RAIL and Harmonisation

Version 1

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SYSTEM PILLAR

EU Rail and harmonisation

Version 1

Contents

Abbreviations and Acronyms

Abbreviation and Acronyms	Description
CCM	Change Control Management (ERA)
CCS	Control, Command and Signalling (TSI)
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
CR	Change Request to TSI
ETSI	European Telecommunications Standards Institute
IP	Innovation Pillar
LOC&PAS	Locomotives and passenger rolling stock (TSI)
OPE	Operation and Traffic Management (TSI)
SP-CG	System Pillar Core Group
SP-STG	System Pillar Steering Group
RASCOP	Rail Standardisation Coordination Platform for Europe
SFR	Sector Forum Rail
SP	System Pillar
STIP	Standardisation and TSI Input Plan
TSI	Technical Specifications for Interoperability
TSI WG	TSI Working Group
TWG	Topical Working Group

1 Background

The EU Green Deal and the Sustainable and Smart Mobility Strategy promote railways as the main pillar of a sustainable mobility in Europe. The aim is to increase the modal share of railways and to create a Single European Railway Area.

The transfer of R&I results of EU-RAIL to the EU standardisation and regulation process is a crucial goal for EU-RAIL. Such harmonisation plays a crucial role in providing a future oriented legal framework and in ensuring a consistent standardisation system especially by the introduction of innovations into European rail, thus further supporting interoperability and safety as well as competitiveness.

In the Innovation Pillar (IP), the research and development work is performed in the Flagship Projects thanks to the collaboration of all relevant stakeholders in the railway domain including operators, Infrastructure managers, rolling stock manufacturers, suppliers and academic research.

The System Pillar (SP) has the responsibility to provide guidance, resources, and outputs to support a consistent and coordinated approach to the evolution of the rail system according to the EU policy goals. The fields of activity and the working arrangements can be found in the System Pillar Governance and working arrangements.[1] It considers the properties of the integrated railway system by developing a system view, based on a system architecture approach to speed up standardisation, innovation and deployment when economically and environmentally justified. The System Pillar brings several rail sector representatives under a coordination body.

As described in the EU Rail Governance and Process Handbook, an important task of the System Pillar is to promote the harmonization process and removal of national rules.[2]

The System Pillar will coordinate the harmonisation outputs and needs from the EU-RAIL programme in the Standardisation and TSI Input Plan (STIP), and support the interaction of the related activities of EU-RAIL with ERA and the standardisation bodies (incl. the Sector Forum Rail (SFR) and RASCOP).

The process aims to support the delivery of mature input to harmonisation channels respecting existing processes, their ownership, and legal status.

[1] See (EU-RAIL, Governance organsaition and working arrangement of The System Pillar, 2022)
[2] See (EU-RAIL, Europe's Rail Joint Undertaking - Governance and Process Handbook, Version 2.5, 2022)

In general, the following main harmonisation channels are foreseen (Figure 1)[3]:

- Technical Specifications for Interoperability (TSIs) and associated documents, for example subsets, Application Guides
- European Standardisation
- System Pillar documents

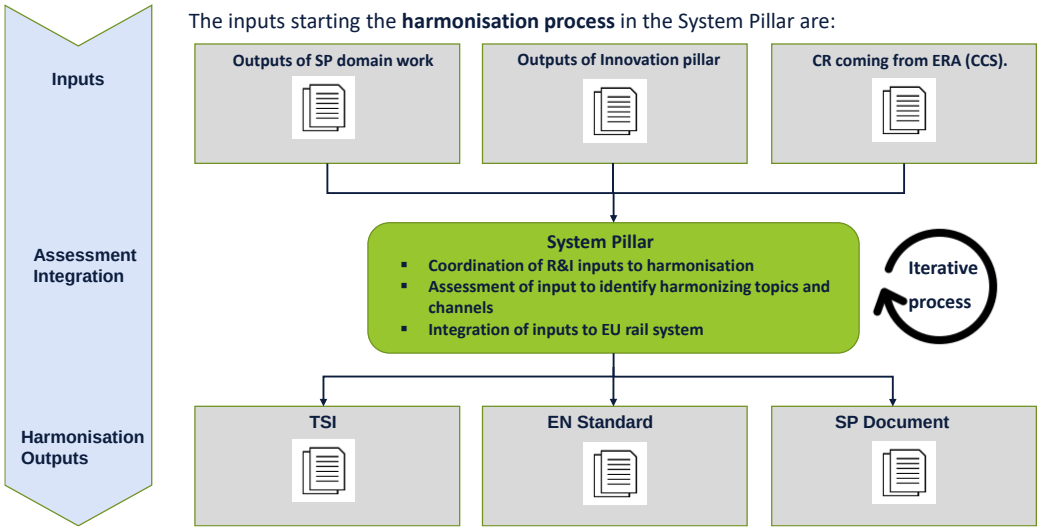

Figure 1: Process for harmonization of standardisation and regulation activities driven by innovations (© EU-RAIL)

The specific harmonisation topics for EU-RAIL as a whole will be integrated and delivered in the Standardisation and TSI Input Plan.

In addition, it is proposed that the System Pillar will support ERA in its role as ERTMS System Authority through an assessment of CCS TSI CRs external to EU-RAIL. The support is delivered case-by-case within the availability of resources of the SP and does not replace the responsibility of ERA for the CCM process.

Through the approval of the Standardisation and TSI Input Plan by the System Pillar Steering Group,[4] a validated and complete view of the harmonisation outputs linked to EU-RAIL will be provided, endorsed by the European Commission, ERA, the European Standardisation bodies and the sector as a whole. This should enable a more strategic

[3] Exceptional harmonisation channels can be considered if requested

[4] The Steering Group is composed of representatives of the Commission, representatives of the rail and mobility sector and of relevant organisations, the Executive Director of the Europe's Rail Joint Undertaking, the chairperson of the states' representatives group and representatives of the European Union Agency for Railways and of the ERRAC

alignment of the outputs of EU-RAIL with the TSI revision process and the European standardisation process, and associated Commission request.

This document sets out in more detail the principles and process for the production and maintenance of the EU-RAIL Standardisation and TSI Input Plan.

Chapter 2 describes the proposed harmonisation channels. Chapter 3 describes the Standardisation and TSI Input plan. The specific processes for the TSIs, the European standardisation and SP Documents respectively are described in the chapters 4, 5 and 6.

The integration of EU-RAIL outputs, interfaces and assessment processes in to the TSI and standardisation processes are aligned to existing DG MOVE, ERA and SFR/RASCOP processes.[5]

[5] To note, a revision of the CCM process by ERA is expected, and the processes outlined will feed into this revision process, and once concluded may be adapted based on the final agreed CCM process

2 Harmonization channels

2.1 Regulation by TSIs

The Technical Specifications for Interoperability (TSIs) define the technical and operational rules which must be met by each subsystem or parts of a subsystem in order to meet the overall essential requirements and ensure the interoperability of the railway system of the European Union.[6] This will imply the reduction and removal of national rules. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1519999459620&uri=CELEX:32016L0797Directive (EU) 2016/797 defines the subsystems, either structural or functional, forming part of the railway system of the European Union.[7]

For each of those subsystems, the essential requirements are specified and the technical specifications determined, particularly in respect of constituents and interfaces, in order to meet those essential requirements. The essential requirements can be summarised as safety, reliability and availability, health, environmental protection, technical compatibility, accessibility. Additional requirements are interoperability and security (including cybersecurity).

Significant amendments to the TSIs are expected from EU-RAIL activities, for example linked to DAC, ATO, and advanced train positioning.

To note, for the purposes of this document the scope of TSIs also includes subsets, associated guidelines, and other associated documents.

TSIs may also make an explicit, clearly identified reference to European or international standards or specifications or technical documents. The contents of these documents are regarded as annexes to the TSIs concerned, and for the purposes of this document within the scope of TSIs. The coordination of the publication of harmonised standards in line with related TSI is not in scope of the standardisation and TSI input plan.

2.2 Standardisation

Standards and standardisation have been highlighted under the Europe 2020 strategy as pivotal in driving EU's research and innovation activities, reaffirming the important role of standards for innovation, as sources of competitiveness and in underpinning a smart, sustainable, and inclusive growth. European projects are now expected to stimulate pre-normative and standardisation activities.

The benefits of integrating standardisation into the Research and Innovation processes are numerous and have been explored in past research projects:

[6] See (ERA, Technical Specifications for Interoperability, 2023)
[7] See (EU, Directive (EU) 2016/797 on the interoperability of the rail system within the European Union, 2016)

- It ensures compatibility of the results with what is already on the market or in practice.
- It makes the results available to a wide range of stakeholders, offering opportunities to discuss and promote project outcomes with the entire community.
- It ensures that the project results will be used well beyond the duration of the project.
- It helps complying with regulatory requirements.
- By incorporating the findings and integrating the latest knowledge into standards, and as a technology transfer channel, it provides foundations for further developments and research.
- It is a powerful tool for bringing research and new technologies to the market.
- It promotes innovation to policy makers and, particularly in emerging technologies, it increases the credibility of innovation, therefore attracting further investment.

However, while timely and well-designed standards can support innovation, premature standards or standards lacking market uptake may have detrimental impacts on innovation and regulation. Therefore, strategic approaches for timely and validated standardisation are critical for innovation systems. Early writing of adapted and specific standardisation roadmaps for all relevant project outcomes is proposed to be carried out.

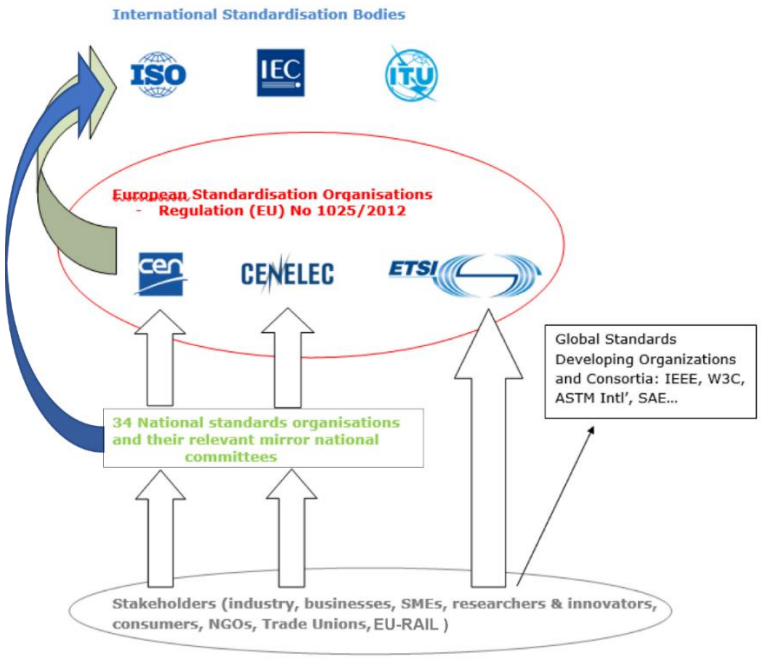

Figure 2: The standardisation landscape (© CEN-CENELEC)

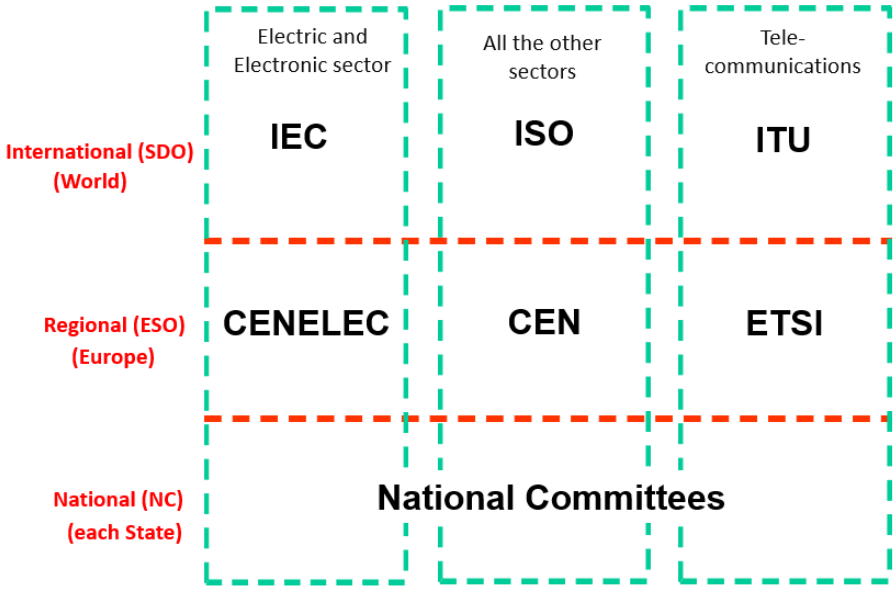

Figure 3: Standardisation organisations and sectors (© CEN-CENELEC)

The overall standardisation process in outlined in Figure 2. Stakeholders of the railway sector deliver proposals for standardisation to the national standardisation bodies. Standardisation requests are then created for the domain-specific European or International Standardisation Organisation (Figure 3).[8] Information about the standardisation bodies and the standardisation process can be found in Annex C and the guidelines, e.g. for CEN/CENELEC [9] and ETSI[10].

2.3 System Pillar Documents

Some outputs of EU-RAIL may not be planned for input to TSI or EN standards.

However, they are of interest for the railway sector for introducing and deploying innovations and should be considered as a category of normative documents. They should be published, managed and made available in an official way, allowing easy public access and referencing.

[8] See (CEN-CENELEC, The role of standards in supporting Technology Transfer, 2022)
[9] See (CEN-CENELEC, The role of standards in supporting Technology Transfer, 2022)
[10] See (ETSI, ETSI, 2023)

Such a process does not preclude these documents becoming inputs to TSIs or standards at a later date.

An example for such kind of normative documents in the railway domain are the track asset specifications developed within the EULYNX project.[11] While the baselines 1 to 3 of the specifications have been published directly by EULYNX, the release 2 of Baseline 4 will be partly published jointly by EULYNX and the SP. This is the first case of a SP document publication.

EU-RAIL output which has the status of a System Pillar document will be validated, adopted and published according to a process described in section 6. The consultation process with mirror groups and working circles will ensure that the SP documents are aligned and agreed on with the sector and are accepted as an normative document. The access to the SP deliverables will be public allowing their broad free use, but not their modification outside the SP.

The SP will be responsible for the CCM of these documents. Since the SP is part of EU-RAIL joint undertaking with a limited lifetime, the SP documents have to be handed over in due time to the appropriate body.

SP documents can be used as a basis for later input to the standardisation or TSI CCM process. It must be ensured that System Pillar Documents are not in contradiction to TSIs or European Standards.

2.4 Additional harmonisation channels

Additional harmonisation channels are possible (such as ERA Technical Opinion based on an innovative solution, see for instance Art. 10 of the LOC&PAS TSI), acceptable means of compliance, or ERA guidelines.

If the need is identified during the SP consultation process with the sector, such additional harmonisation channels might be used on a case-by-case basis.

[11] See (EULYNX, 2023)

3 Standardisation and TSI Input Plan

3.1 Approach and framework

The specific harmonisation topics for EU-RAIL as a whole will be integrated and delivered in the Standardisation and TSI Input Plan. The Standardisation and TSI Input Plan delivers a list of harmonisation topics without describing technical solutions in detail.

The information requested in the Standardisation and TSI Input Plan is delivered by the submitter (FPs, SP task/domains, other).

The quality of the information is checked for completeness and consistency by EU-RAIL, supported by the SP resource where appropriate.

The STIP is then sent to the System Pillar Steering Group for validation and approval.

The STIP is public. After the approval by the Steering Group, it will be officially circulated to ERA, SFR, RASCOP and potentially other sector organisations. Confidential elements will be removed from the circulated version.

The individual topics described in the STIP will be submitted and processed within the relevant harmonisation channel according to their development.

The process for preparing the Standardisation and TSI input plan and providing input to the harmonisation channels is summarized in Figure 3 and outlined in the following sections and chapters.

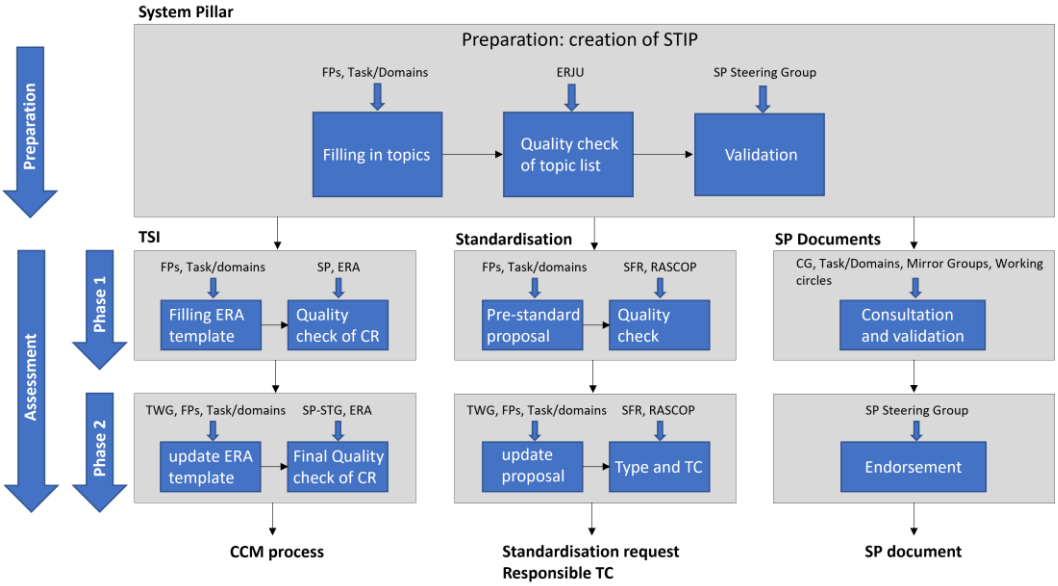

Figure 4: Process for preparing the STIP and providing input to harmonisation channels (© EU-RAIL)

3.2 Standardisation and TSI Input Plan Template

The collection of topics for the Standardisation and TSI Input Plan is prepared and assessed within the Standardisation and TSI Input Plan template (see Annex A) which is based on the experience from Shift2Rail with the Standardisation Rolling Development Plan (SRDP).[12]

The SRDP was inspired by the European ATM Standardisation Rolling Development Plan[13] [14], put in place under the Single European Sky initiative and has been proved very useful and manageable. The 5th version has been published.

The main change compared to the SRDP is the inclusion of TSI inputs, and System Pillar documents to give a full picture of the relevant EU-RAIL harmonisation activities.

Depending on the complexity of the topic identified there may be packages of several related and dependent standardisation items in the Standardisation and TSI Input Plan.

The STIP template includes the following information:

- Submitter
- Harmonisation channel
- Expected timeline
- Strategic objectives
- Existing specification documents (e.g. TSI, standards)

[12] See (*IMPACT-2 WP5 - Del5.1 Global Roadmap Standardisation*, 2019)
[13] See (European ATM Standards Coordination Group, 2023)
[14] The main deliverable of the EASCG is the European ATM Standardisation Rolling Development Plan (A-RDP) bringing together all relevant standardisation activities and their status

- Contact persons
- Dependencies with related specification documents

The STIP does not include an explicit prioritisation of the topics. The implementation of the topics depends on the defined expected timeline, considering harmonisation needs and dependencies with related specification documents.

This information is gathered by the lead project (IP or SP) considering consultations with relevant regulation and standardisation stakeholders (ERA, EC, SFR, ESOs etc.)

3.3 Preparation of the Standardisation and TSI Input Plan

The process for completion of the Standardisation and TSI Input Plan is as follows:

I. Collect all relevant potential or known harmonisation topics from the System Pillar and Innovation Pillar activities
II. Quality check and validation of the Standardisation and TSI Input Plan by EU-RAIL, supported by SP resource
III. Approval of the document at the System Pillar Steering Group

In the first instance, the version1 of the STIP is expected to be completed and validated by the end of 2023.

Subsequent updates will occur on an agreed basis (likely annual).

Intermediate ad-hoc updates may be possible.

3.3.1 Collect all relevant potential or known harmonisation topics from the System Pillar and Innovation Pillar activities

Inputs and requirements for harmonization are identified from the planning of the System Pillar and Innovation Pillar activities.

EU-RAIL will send to the System Pillar Tasks and Domains, and the Innovation Pillar Flagship projects a request to complete the template in Annex A for the expected relevant harmonisation outputs.

Definition of the Harmonisation Channel
As part of the information to be provided, the project submitter should indicate the proposed harmonisation channel. In most instances, this is expected to follow the established practice for the topic. In certain cases, it may be an open question. In this case the considerations such as the need for mandatory or voluntary application will be considered as a basis for determining the most effective channel.

3.3.2 Validate the inputs

EU-RAIL with support from SP resource will coordinate and collate the information.

The quality of the completed Standardisation and TSI Input Plan Template with the proposed harmonisation topics is assessed by EU-RAIL with support from SP resource, considering completeness and consistency of the delivered information. Iteration with relevant topics to ensure completeness and consistency may be necessary.

For some topics, it may not be possible to include all the template information as the development is at a too early stage. In this case, the information given will be re-checked and enhanced in collaboration with ERA, SFR and the sector representative bodies at the occasion of the next release of the Standardisation and TSI Input Plan.

3.3.3 Approve the Standardisation and TSI Input Plan at the System Pillar Steering Group

Following this quality check, the Standardisation and TSI input plan is put forward for approval at the System Pillar Steering Group (SP-STG). The process of endorsement will involve the European Commission, ERA, and the wider sector as members of the SP-STG.

3.4 Topic proposals to harmonisation channels

The validated Standardisation and TSI Input plan serves as basis for delivering input to the different harmonisation channels. The process for proposing input to the TSI CCM process, the standardisation process and for creating SP documents is described in the following chapters.

4 TSIs

The System Pillar will coordinate EU-RAIL proposals for TSI enhancement: All EU-RAIL topics linked to potential change of legislation are collected for the Standardisation and TSI Input Plan. The Standardisation and TSI Input Plan is approved by the System Pillar Steering Group and mature Change Requests will be developed with ERA as input to the CCM process.

4.1 EU-RAIL CR topic proposals

Proposals for TSI Change Requests (CR) emerging from the EU-RAIL activities (SP and IP) will be identified in the Standardisation and TSI Input Plan. These can potentially apply to any TSI.

Through their participation in the SP Core Group and Steering Group (SP-STG) meetings, ERA participates in the strategic definition and validation of the Standardisation and TSI Input Plan.

The alignment between ERA and EU-RAIL and a sufficient maturity of the CR proposals is proposed to be ensured by a two-phase process for delivering CRs to the ERA CCM process[15], outlined in the following sections and illustrated in Figure 4.[16] The responsibility for the including of the CR into the CCM process lies at ERA.

4.1.1 First submission of CR (Phase 1)

The main objective of Phase 1 is to achieve strategic alignment for the new functions and/or enhancements that will be proposed as Change Requests (CR) for the TSIs.

CR proposals on a topic will be created based on one or more line items within the Standardisation and TSI Input Plan. Within the ERA Change Control Management (CCM) process it will be decided if these proposals are considered by ERA.

The new developed ERA template will be used (see Annex B, or subsequent updated version). The information will be provided, and the template filled by the submitting lead project (either in the SP Task or Domain, or the IP Flagship Project). Beside a description of the problem and the proposed solution, the submitter may be requested by ERA to deliver an economic consideration, if needed/applicable.

The System Pillar will provide the capacity to assess the quality of the proposal in collaboration with ERA. EU-RAIL supported by System Pillar resource will approve the filled in ERA template before official submission to ERA.

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[15] See (ERA, Change Control Management process for non-IT related products/services, 2022)
[16] It is expected that these changes will be reflected where necessary in an updated CCM process. In the event the CCM revision is different the document will be updated accordingly.

In view to ensure the wider visibility of the sector (notably those stakeholders that are not participating to SP Task or Domain, or the IP Flagship Project), as part of the assessment, the System Pillar will invite the EU associations acting as sector representative bodies to provide input and feedback on the filled in ERA template.

Once submitted, it will be considered by the Agency and accepted (or not) into the CCM process.

For this purpose, ERA will, where needed, agree with the lead project a set of maturity criteria for assessing the CR. The strategic alignment and the maturity criteria will support the efficient development and drafting of a complete and mature CR solution proposal ready for phase 2 submission.

It should be noted that in the submission of the CR at phase 1, whilst the problem description should be complete, the solution proposal for the CR working item is not necessarily fully mature, and the information provided in the template may not be complete. It is the aim of the proposed process to achieve the highest completeness possible and to deliver a mature CR which facilitates further steps in the CCM.

4.1.2 Submission of a mature CR solution (Phase 2)

Following the Phase 1 submission, the necessary work to conclude on the TSI input to enable the submission of a mature CR will be carried out within EU-RAIL.

For certain topics, an ERA Topical Working Groups (TWG) or TSI Working Groups (TSI WG) may lead the development of the delivery of the CR resolution proposal under consideration. In this case, where needed representatives from the EU-RAIL projects (either SP or IP) may participate in the TWG or TSI WG.

Once complete (and if applicable, taking into account the maturity criteria delivered by ERA[17]), the CR resolution proposal will be re-submitted to ERA which will update the CR in the CCM process. The ERA template will be used also for phase 2 (see Annex B). The information will be provided, and the template filled by the lead project (either in the SP Task or Domain, or the IP Flagship Projects).

Under the coordination of EU-RAIL and the System Pillar Core Group, the System Pillar will perform a quality check and assessment of the CR resolution proposal including a review of the technical requirements for maturity (defined by ERA in phase 1) and the economic assessment.

In view to ensure the wider visibility of the sector (notably those stakeholders that are not participating to SP Task or Domain, or the IP Flagship Project), as part of the assessment, the System Pillar will invite the EU associations acting as sector representative bodies. These associations' role will be to provide input and feedback on the filled in ERA template enabling the submission of a mature CR.

[17] The ERA maturity criteria are to be confirmed by the CCM review process

The finalised CR resolution proposal will be endorsed by the SP Steering Group.

The assessment of the CR resolution proposal by the SP and the sector associations will include considerations on:

- system version compatibility,
- operational impact,
- PRAMSS[18] and migration,
- consistency with the SP target architecture,
- the defined operational concepts and
- the Common Business Objectives (CBOs).

This process is to support the delivery of mature outputs into the TSI revision process managed by ERA with the relevant Working Party(ies).

Topical Working Groups

It is the remit of ERA to decide whether to set up specific Topical Working Groups (TWG) or TSI Working Groups (TSI WGs) to support the specification development work.

Where CRs provided by EU-RAIL are dealt with in TWGs or TSI WGs, participation in the Topical Working Group may come from the System Pillar and/or Innovation Pillar, as relevant to the subject under discussion. The participation of the sector representative bodies in the TWGs and TSI WGs should support sector alignment regarding CRs brought in by EU-RAIL and from other sources.

[18] PRAMSS: Performance, Reliability, Availability, Maintainability, Safety, Security

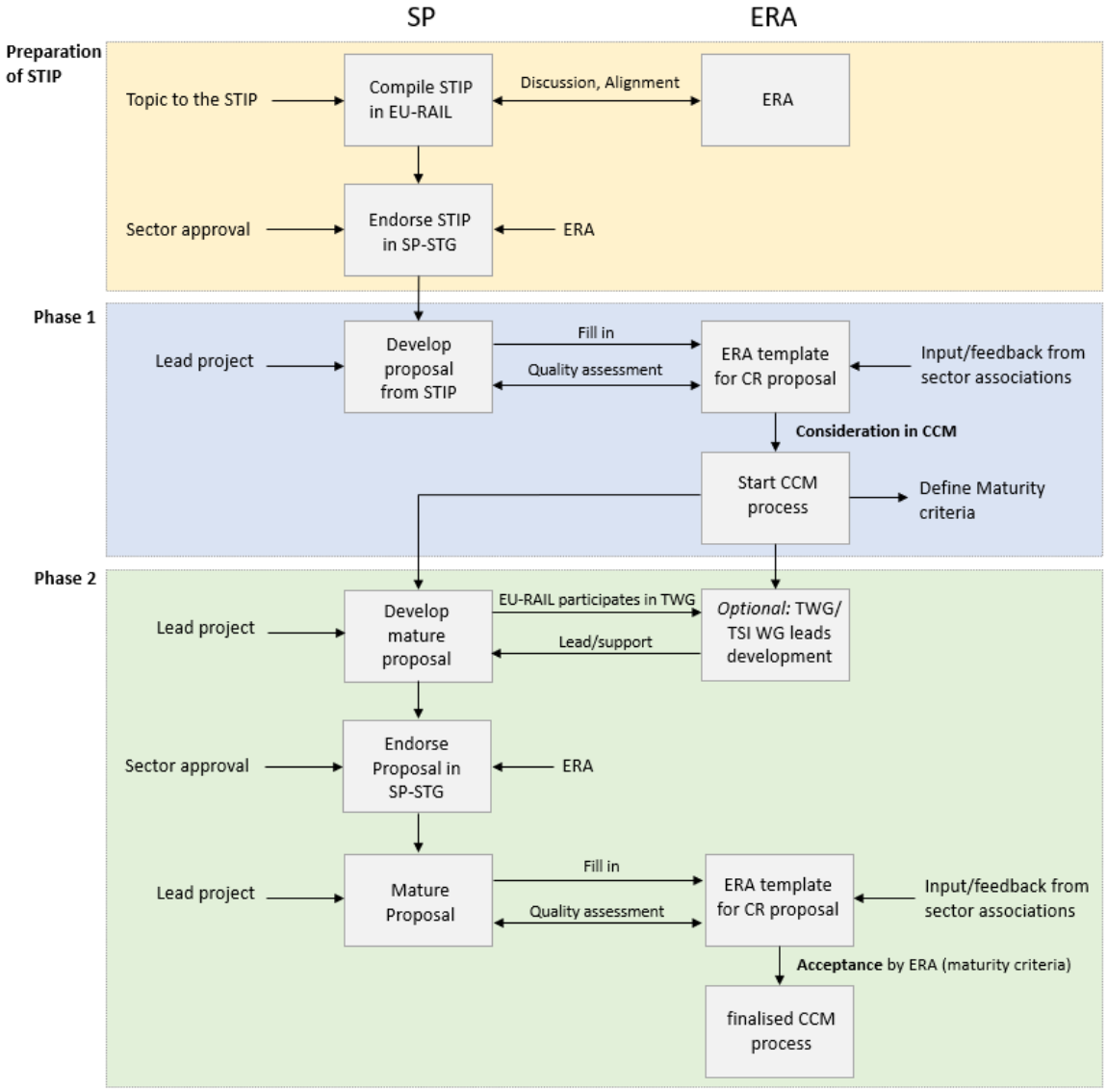


Figure 5: 2 phase process for creating mature CR to the ERA CCM process (© EU-RAIL)

4.2 External CR enhancements

ERA may request support from the System Pillar for TSI Change Requests submitted from outside of EU-RAIL.

In the first instance, the focus will be on CCS and CCS-linked change requests (for example OPE TSI for operational processes that have to be harmonised.) but may in some cases be requested by ERA for other TSIs if a link to EU-RAIL activities is identified.

The main objective is to allow ERA, when considered necessary, to request from EU-RAIL an analysis of the specific CR problem description and/or solution with the strategic vision of the overall railway system.

After ERA has provided the CR under development to the SP, the latter will [within a reasonable time period] provide an assessment to ERA including, *inter alia:*

I. Quality: In addition to the ERA assessment of the CR, the SP may be asked to analyse case-by-case if the CR has a clear objective, a detailed scope (content table of the changes to the subsets), a clear transition framework, a reliable economic assessment and consideration of technical maturity
II. System impact: check CR impact on SP architecture, system version compatibility, operational concept, migration and CBOs
III. Assessment of the economic impact analysis, provided case-by-case in collaboration with the submitter of the CR
IV. Assessment of the planning and project of delivery, provided by the submitter of the CR

This assessment will be delivered by the relevant task/domain team as well as related mirror groups and working circles and approved by the SPSG to align with the sector representative bodies. ERA will then take into account this information in managing the CR according to the CCM process.

4.3 Proposed changes to CCM

The ERA CCM process is currently under revision by ERA.

In order to support the proposed process described above, the following changes are proposed for consideration by ERA in any update to the CCM process as described in the ERA document PRO_CCM_002 V 2.1.[19] The following changes are proposed for the CCM process for CCS TSI. Changes for other TSI CCM processes remain to be discussed.

[19] See (ERA, Change Control Management process for non-IT related products/services, 2022)

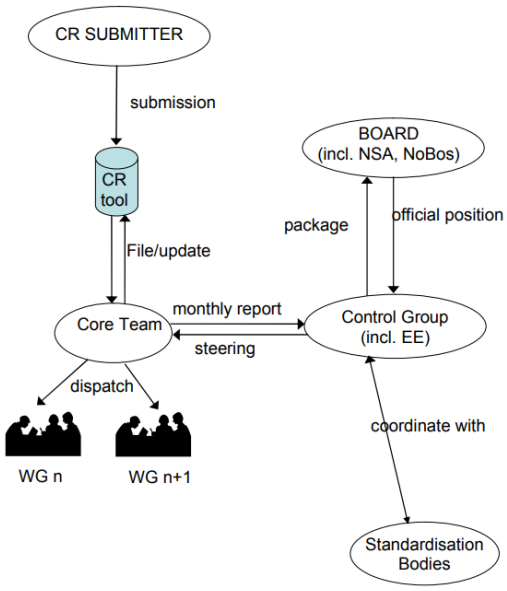


Figure 6: CCM process (© ERA)

The proposed change: to add SP as entity that can submit a CR in sections 2.2.2.1.1.1 or 2.2.2.1.1.2. This does neither undermine nor substitute the submission channels of the existing CCM process.

It is proposed that the SP will be the submitter of all the CR enhancements coming from the JU, adding it as a submitting entity for CRs.

<80> propose to add new CR

2.3.3.5.3.1 The SP shall for the CR enhancements, ensure their alignment with the target system. To achieve this, there will be a strategic and technical check of the enhancement CR against SP architecture, operational concept, and CBOs.

<60> propose to modify

2.3.3.4.3 The Control Group is responsible to validate topic list for the CR as identified by the ERJU, paying specific attention to those which affect current implementations and after checking the input of the SP through the Standardisation and TSI Input Plan. If the CR is considered as relevant for the next expected baseline or is related to the maintenance of an existing baseline the CR state changes to 'Assigned'.

5. European Standardisation

5.1 Input to Standardisation

EU-RAIL will support the standardisation process by delivering mature proposals for EN Standards in line with EU policy goals to European Standardisation Organisations (CEN, CENELEC, ETSI).

The link to international standardisation (IEC, ISO, ITU) is not directly ensured by EU-RAIL. Instead, the European Standardisation bodies are cooperating with international organisation in order to align standardisation activities. The alignment can result in EN ISO (between CEN and ISO by the Vienna Agreement), EN IEC (between CENELEC and IEC by the Frankfurt Agreement) and EN ISO/IEC (if joint work between ISO and IEC) standards.

The System Pillar will coordinate the delivery of standardisation proposals based on the Standardisation and TSI Input Plan:

- **EU-RAIL proposals to the European standardisation process:** All EU-RAIL inputs and needs for standardisation are collected in the Standardisation and TSI Input Plan template.

  The proposed standardisation items are sent to SFR/RASCOP for quality assessment and for deciding on the respective standardisation pathway (which ESO or Technical Committee (TC) to be involved or activated) (Phase 1). The standardisation items are revised based on SFR/RASCOP feedback (phase 2) and proposed to the Technical Committees of the ESO under charge.[20] Finally, standardisation work items are created in CEN, CENELEC and ETSI upon request by the Commission or directly transmitted to the TC in charge.

  External standardisation topics: External standardisation items not coming from but linked to EU-RAIL activities and related to the global goal of a Single European Railway Area (e.g., DAC, Energy, …) should be highlighted by the ESOs to the SP at the level of the SFR in order to achieve alignment of ESO's and ERJU activities.

A regular mutual transfer of inputs and requirements between the System Pillar and SFR/RASCOP shall ensure an effective and efficient standardisation process (see Figure 5).

[20] See (CEN, 2023)

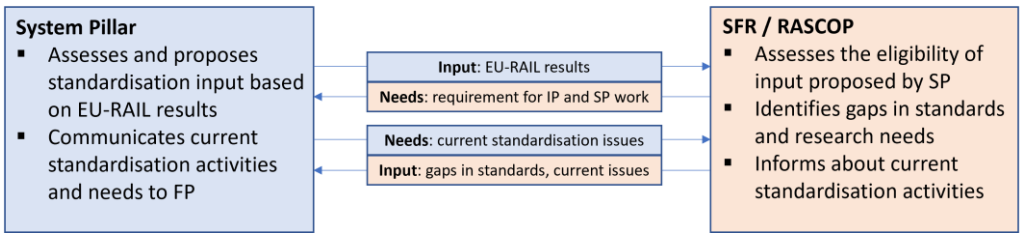


Figure 7: Inputs and requests/needs between the System Pillar and SFR/RASCOP (© EU-RAIL)

To ensure that standardisation needs are considered right from the beginning, they will be part of the project planning. The planning is based on requirements and operational needs defined within the System Pillar and aligned with the defined system architecture.

5.2 Standardisation process

The standardisation process distinguishes between different categories of standards:

- **Harmonised standards (not referenced in the TSI)**
  - A standard can be considered harmonized when it was subject of the Standardisation Request of the European Commission towards the European Standardisation Organisations (CEN, CLC, ETSI), received a positive assessment from the responsible HAS[21] consultant and desk officer and subsequently is listed in the Official Journal of the EU (OJEU). By this, the standard achieves a legal value and provides presumption of conformity with the relevant part of the European law. Nevertheless, it remains voluntary.

- **Harmonised standards (referenced in TSIs)**
  - Harmonised standards or parts of it may additionally be referenced within a TSI. By this, the standard or its referenced part becomes mandatory.

- **Non-harmonised standards**
  - Standards which do not tackle a subject being covered by EU legislation. The new work item proposal for such a standard can be brought in by National Committees or Technical Committees representing a group of technical competent experts on the national or European level. However, The European Commission can reference already existing non-harmonised standards transforming them to harmonized standards.

The different ways for initiating the European standardisation process are summarized in Figure 6. A detailed description of the processes for the approval of the new work

[21] HAS Consultant: Harmonised Standards Consultant

item, the standard development and the approval of the standard can be found e.g. in the guidelines of CEN/CENLEC[22] and ETSI[23].

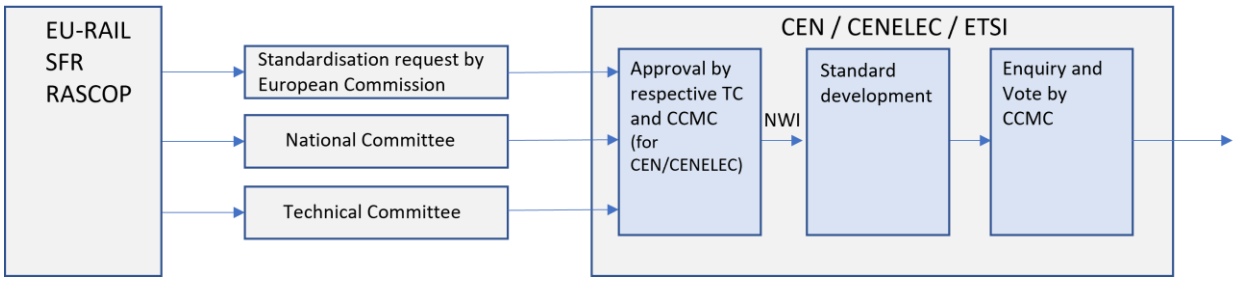


Figure 8: Initiation of a standardisation process (© EU-RAIL)

For creating the new work item (NWI) proposal, the following information and acceptance criteria must be fulfilled:

- Identification of Proposers (Including contact persons)
- Title of the proposed standard
- Scope of the proposed standard
- Purpose and economic justification (Including a list of stakeholders and the benefits they can have)
- Existing patents or other IPR
- Existing starting documents or preliminary draft standard

Once the new work item has been adopted, the standardisation process is launched by the chosen TC (see Figure 7). After the drafting phase, an enquiry is prepared and conducted in order to collect comments from all concerned stakeholders. Based on the outcome, the standard is finalised and (if required) voted before publication.

[22] See (CEN-CENELEC, Internal Regulations Part 2 - Common Rules for Standardisation Work, 2022)
[23] See (ETSI, ETSI Directives Version 45, 2022)

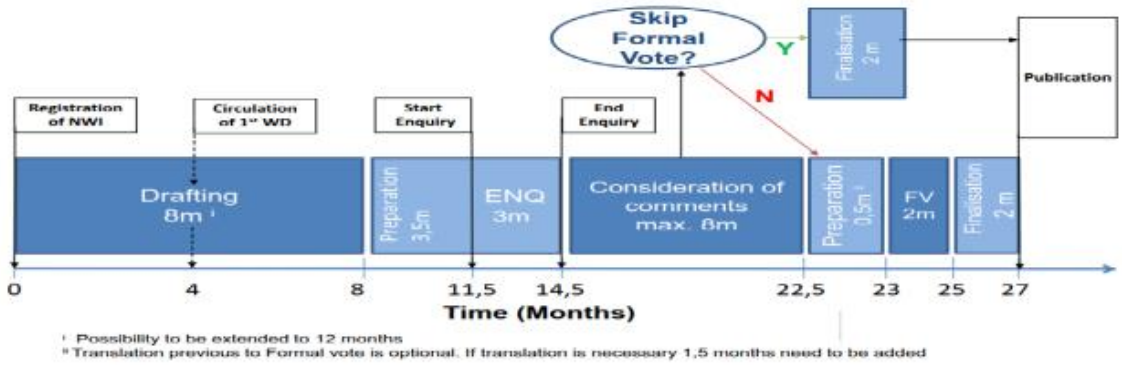


Figure 9: The standardisation process in CEN (© CEN-CENELEC)

5.3 Consultation with SFR and RASCOP

The Standardisation and TSI Input Plan serves as basis for discussion with the Sector Forum Rail (SFR) and RASCOP aiming at assessing the following points:

- Identify possible impacts on the European standardisation and related regulation (standards referenced in TSI)
- Orientate the standardisation proposal or demand towards the relevant standardisation body and technical committee, including international standard developing organisations (using the support of the European Standardisation Organisation CEN, CENELEC and ETSI)
- Identify where decision and action are needed for the setting up of specific survey groups
- Advise on priorities and standardisation trajectories according to the sector's agenda.
- Make the Standardisation Technical Committees aware of potential impacts on their activities and on possible contributions to the ongoing or upcoming work items.

Based on the Standardisation and TSI Input Plan, the members of the SFR and RASCOP express or confirm their interest in taking over the development of future standardisation activities and identify the relevant ESO and/or Technical Committee (TC),.

In order not to overload the agenda of these structures, and overall, not to delay the connection between the EU-RAIL experts and standardisation working groups, two distinct cases should be considered:

1. When an EU-RAIL contribution is impacting an ongoing standardisation activity within the TCs, this contribution is made directly within the standardisation working group. However, EU-RAIL will ensure that the sector associations are kept informed about the cooperation with the TCs in the RASCOP and SFR meetings.

2. If no clear link can be established between the EU-RAIL contribution and the ongoing standardising activities, coordination and preparation of the standardisation by the SFR and RASCOP is needed.

If standardisation proposals which have been confirmed require clarifications or more detailed preparation, Specific Topical Groups (STG) including the relevant experts can be set up. At the group meetings, the following issues can be discussed:

- The identification of any synergy or potential conflict between ongoing research activities or projects that may have similar needs or impacts on the standardisation area.
- A clear description of the rationale for standardisation
- An mapping of the existing standards or standardisation initiatives and other normative documents that cover the topic
- Identification of the impacted standards and their potentially needed evolution
- Identification of long-term impacts or activities beyond the project timeline or not mature enough to be undertaken
- Possible need for enablers
- Identification of possible obstacles
- Prioritization of issues and proposal of standardisation roadmap.

After the clarification of all open issues, the standardisation proposal is included into the European Commission standardisation request in case the standard is considered to become harmonised or transmitted directly to the appropriate TC secretary as a proposal for a New Work Item.[24]

Because of their strong connection and interdependency with the activities conducted in the CEN/CENELEC/ETSI committees, the international standardisation performed by ISO and IEC need to be considered in the EU-RAIL standardisation approach. Considering the impact of e.g. digitisation this also includes non-railway specific standards. However, it has been decided, that no direct cooperation between the System Pillar and the international standardisation bodies is established. Instead, it is the responsibility of the European standardisation bodies to ensure the link with ISO and IEC. For this purpose, specific agreements between CEN and ISO, as well as between CENELEC and IEC exist.

The processes for harmonised and non-harmonised as well as existing and non-existing standards are described in Annex D.

[24] See (CEN, 2023)

6. System Pillar documents

EU-RAIL outputs which are not planned for TSIs regulation or European standardisation, but which may be useful as guidance to procurements can be published in the form of System Pillar Documents.

System Pillar documents can be used as voluntary standardisation documents, provided that they are of a sufficient maturity and quality for that scope. The System Pillar must ensure that these documents are not in contradiction to TSIs or European Standards or any other EU legislation.

The use of SP documents has been applied for the first time to the joint publication of a subset of the EULYNX Baseline 4, release 2 specification by the SP and EULYNX.[25]

System Pillar documents are not precluded from becoming inputs to TSIs or Standards at a later date.

6.1 Assessment and approval Process

The assessment of SP documents is done collaboratively by the SP tasks and domains working on the topic under question. It aims at aligning the SP documents with the Common Business Objectives and with the sector.

The alignment with the sector is ensured by consulting the adequate mirror groups (IM, railway undertakings, operators, suppliers) as well as working circles during the assessment and approval process. Thereby, sector representative bodies contribute to the assessment.

After considering all comments the SP documents are finalised by the SP Core Group and approved by the SP Steering Group. After approval, the SP is responsible for the publication and CCM of these documents.

6.2 Publication

After approval by the Steering Group the SP documents will be published and available. This will allow a release management and referencing of SP documents. As non-mandatory normative documents, SP documents do not comprise any legal obligations and their use is not under the responsibility of EU-RAIL. Therefore, EU-RAIL is not responsible on how SP documents are used for implementations.

[25] See (EULYNX, 2023)

Annex A: Standardisation and TSI Input Plan template

For the collection and assessment of the possible inputs for harmonisation the Standardisation and TSI Input Plan template is used. The template is made available both in the ALM tool Polarion and as an excel table. A guideline for filling in the template will be proposed.

Annex B: ERA CR template

The following template is the draft of ERA Change Request Template for the revised CCM process. It is currently under preparation by ERA. The SP process will in any case use the officially released version of the template.

Change Request Template

<CR Number - CR Title>

	Elaborated by
Name	text
Position	
Date	Enter a date.
Signature	

Section 5 to be filled in by the pre-assessment team:

	Elaborated by	*Approved by*
Name	text	
Position		
Date	Enter a date.	Enter a date.
Signature		

Document History

Version	*Date*	*Comments*
Text		

<SECTION 1, 2, 3 and 4 TO BE FILLED IN BY THE SUBMITTER OF THE CR>

Note: the submitter can provide the necessary documents from its research & development project and refer to the relevant clauses within these documents to answer the questions below.

1. Context and problem definition

1.1. Documents and References

< Please add the documents and references as input to the submission of this CR>

<Documents should cover business case (e.g reference to results of evaluation reports, e.g. ex-post evaluations, early impact assessments) and technical documents (e.g specification, analysis etc.)>

1.2. Problem and problem drivers

<What is the main **problem** which this change will address?

<What are the underlying **problem drivers / root causes**?><What is the **evidence and magnitude** of the problem and problem drivers?>

<What are the **consequences of the problem**?>

1.3. Baseline scenario

<What is the likelihood that the problem would persist if no action is taken?>

<How will the problem evolve in the absence of additional action?>

1.4. Main assumptions

<State here any remarks or assumptions that are relevant for clearly delimiting the scope of the problem and baseline scenario.>

1.5. Stakeholders affected

<Who is affected by the problem? Please refer to the relevant **stakeholders**, as appropriate, below. Only select those stakeholders that are affected (positive or negative impact) when implementing the change request.

Stakeholder	**Description (of positive or negative impact)**
Manufacturer(s)	
Railway Undertaking(s)	
Vehicle Keeper(s)	
Infrastructure Manager(s)	
Member State(s)	

Authorising Entitie(s) (ERA or NSAs)	
Notified Bodi(es)	
Designated Bodi(es)	
CSM Assessment Bodie(s)	
Other	< please specify 'other'>

1.6. Subsystems impacted

<Selection of one or several subsystems (in the sense of the Interoperability Directive) that would need to be analysed to address the problem in a holistic manner>

Subsystem	**Impacted (Y/N)**	**Comment**
On-board control-command and signaling		<please specify which aspect is im Radio, ATO, Train detection, etc) >
Rolling stock		<please specify which aspect is im traction etc) >.
Infrastructure		
Energy		
Operation and Traffic Management Subsystem		<If yes, please indicate if explicit s potential impact on operational saf factors have to be considered in th
Maintenance		
Telematics applications for passenger and freight services		

1.7. TSIs and registers impacted

<Selection of one or several TSIs and registers that would need to be reviewed to address the problem in a holistic manner>

References to TSI: Technical Specifications for Interoperability | ERA (europa.eu)References to TSI: Technical Specifications for Interoperability | ERA (europa.eu)

TSI	Impacted (Y/N)	Comment <please specify which clause(s) are impacted, and when relevant indicates which new clause(s) should be created>	
CCS		<please specify which aspect is impacted (e.g ETCS, Radio, ATO, Train detection, etc) >.	
RST – LOC&PAS		<please specify which aspect is impacted (e.g braking, traction etc) >.	
RST – WAG			
PRM			
Noise			
INF			
ENE			
SRT			
OPE		<If yes, please indicate if explicit screening of the potential impact on operational safety and human factors have to be considered in the CR solution>.	
TAP			
TAF			

References to Registers: Registers | ERA (europa.eu)Registers | ERA (europa.eu)

<Please indicate if any of the registers are impacted>.

Registers	Impacted (Y/N)	Comment
ERADIS		
ERATV		
RINF		
EVR		
Others		< please specify 'other'>

1.8 Impact to CSM regulation
<Selection of one or several CSM regulation: CSM for risk evaluation and assessment, CSM for monitoring, CSM on SMS requirements, CSM on supervision, CSM on common safety targets, CSM for conformity assessment>

2. Objectives

2.1. Specific objectives

<What are the **specific objectives** of this change request? (The objectives should be as S.M.A.R.T. as possible.)>

<E.g. link the specific objectives to the main categories of safety increase, operational performance increase or cost reductions>.

3. CR Proposed Solution

3.1. Description

<Please describe the proposed CR solution>. <If there are multiple way forwards, please describe the different options and the reasons why a consensus is not yet reached>.

<Provide a selection of the specific activities and/or specific functions that are impacted by the problem within the TSIs>. Example : EC verification, Braking, Driver Display, integration of ETCS into RST >

3.2. Regulatory impact linked to transition & migration (e.g. compatibility)

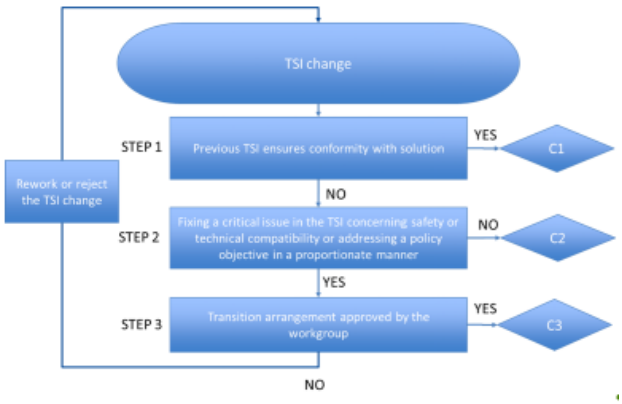
<Please provide the expected regulatory implementation requirements within the TSI framework for the impacted subsystem/part/ IC and for the CR proposed solution>

<e.g. reference to compatibility analysis of the proposed CR solution with existing subsystems>.

<e.g. reference to the mandatory or optional character of the CR solution within the TSI>.

<e.g. please provide the economic assessment if the proposed transition regime is justified by an assessment>

<below guidance for categorisation of change >



Impacted TSIs clause(s)	**Proposed transition regime** <please indicate if the proposed change(s) is (are): - C2 : generic transition of 7 years or - C3 : specific transition regime>	**Transition regime supported by an (economic) assessment (Y/N)** <note: C3 changes require an economic assessment>

3.3. Maturity (technology readiness level and specification availability)

<Is there a feasibility study available for the CR solution>?

<Please describe the status of the maturity of the CR solution being developed and the remaining steps before the CR Solution could be validated by the ERA system authority>.

<Does the objective depend on other CRs or other items?>

<E.g. Please add the report of the safety analysis if this is required for the validation of the CR solution>.

<What is the estimated remaining workload envisaged to further develop the CR Solution?>

3.4. Documentation

<Expected documents to be created or modified as part of the legal framework or application guide (e.g TSIs, subsets, EN-standards …)>

Document	**Current version (if existing)**	**New version**

4. Economic assessment

4.1 Development costs for achieving maturity of the specifications into the legal framework

<Please provide the remaining development activities and costs (e.g. tests, engineering guidelines, …) not yet covered into the CR proposal for achieving sufficient maturity of the solution for integration into the legal framework ?>

<e.g. Does the CR solution require a test campaign, engineering guidelines, …?>

4.2 Development costs for the solution

<Please provide the one-off development costs for the implementation of the solution according to the proposed transition regime>:

<e.g. for software changes, does the CR solution imply a low/medium/high effort on software development?>

4.3 Implementation Costs/Migration

<Please provide the expected transition regime for implementation of the CR into the products and the migration costs associated to the implementation of the CR>

<e.g. is it limited to a one-off development cost or are there recurrent costs at vehicle/trackside to take into account>?

4.4 Benefits after implementation of the solution

<Please provide the evidence in how far the CR solution fulfils the specific objectives and hence the benefit(s) and its magnitude>

<SECTION 5 TO BE FILLED IN BY THE PRE-ASSESSMENT TEAM>

5. Evaluation of the CR

5.1 CR Acceptable – Economic evaluation?

(e.g. Are the objectives and the migration scenario of the CR Solution sufficiently realistic and positive to allow the acceptance of the CR?)

5.2 CR Acceptable – Policy evaluation?

Are the objectives and the migration scenario of the CR Solution in line with the strategic objectives/target system (policy evaluation) as defined by the ERJU?

(e.g. CR Solution does not hinder the migration towards a target system and does not facilitate further national divergence in ETCS implementations)?

5.3. CR Postponed - Technical evaluation?

Is the CR Solution sufficiently mature to be evaluated?

If not, please list the technical conditions required to re-evaluate the CR?

Are the impacted systems clearly defined (e.g amendment to different systems?)

5.4. CR Rejected - Technical evaluation?

Does the CR solution has a significant (technical) risk ('collateral damage') for which the solution should be rejected?

5.5. CRs Assigned -Efficient allocation of CR?

Does the CR solution require specific competences for which it should be assigned to a specific workgroup or entity?

Does the CR cover multiple aspects which require it to be split into several CRs?

5.6. CR Planning

Initial Workload Estimation (for accepted CRs: based on the draft CR Solution, what is the estimated remaining workload envisaged to further develop the CR Solution, both internal and external)

Planning (how does the internal workload fit into the overall planning of activities)

Required Competences (is staff foreseen for processing the CR available)

Note for the pre-assessment team:

The following elements should be considered :

OBECTIVES:

- Involve a multifunctional team responsible for reviewing, accepting or rejecting CRs.
- CRs analysis based on knowledge of complete change impact to RSYS : Vehicle design, Vehicle Operation, Vehicle Maintenance including digitalisation.
- Limit CRs to those which are mandatory/ offer benefit in relation to EC policy objectives, ERA prioritisation etc..
- Facilitate economic evaluation
- Ensure stakeholders interest : EC, Applicants, Manufacturers, RUs, IMs
- Communicate on CRs information/decision

INPUT :

- EU regulations and other legislation (directives,TSIs, NRs etc),
- EC requests,
- System pillar : standard and TSI plan,
- List of CRs (existing and new) and previous decisions,
- Resource availability,
- Prioritisations list,

TASKs

- Review open CRs (including cleaning up…),
- Review and update pre -assessment template,
- Assess CRs according to the pre-assessment template,
- Decide on CR status : assigned, postponed, rejected, supeseded,
- Present the decision to the relevant WPs,
- Draft related terms of reference when a workgroup is needed,
- Update ClearQuest.

OUTPUT :

- CR decision to proceed : identification of the concerned TWG/WP in charge of leading the CR, identification of need to create additional CRs… ,
- Impacted TWG, WP informed,
- Decision on level of management of the CR : e.g specific task force created (for ATO G03/GO4),
- Recommendation on : decision making process, deliverables (e.g TSIs requirements proposal), planning, interfaces meeting needed …

ATTENDEES :

- Chairman : RSYS head of units
- Participants:
  - One representative of each RSYS unit,
  - One representative of the Analysis team,
  - Other on requests RSYS PO, Registers, Digitalisation etc
  - Other external on request: submitter.

Annex C: Standardisation organisations

CEN is a European Standardization Organization, operating within the framework of EU Regulation 2022/2480[26], whose members are joint producers and disseminators of market-driven European Standards (ENs) that serve the needs of business, industry and other interested parties.[27]

The Railway Technical Committee **CEN TC 256** is responsible for the development of European Standards for all applications (except electrical and electronic subjects), in the field of railways, including urban transport, specifically intended for vehicles and fixed installations of the European Union. The concerned stakeholders comprise rail users, public and private rail transport operators (passenger and freight), Infrastructure owners, Manufacturers and maintainers, Service providers (e.g. consultants, financiers etc.), Public authorities (National and European), Leasing Companies, Regulatory Bodies, and Trade associations.

CENELEC is a European Standards Organization, which brings together the National Electrotechnical Committees of 34 European countries and prepares voluntary standards in various sectors in the electrotechnical field.

Its Railway technical committee **CENELEC TC 9X** prepares standards for the railway and urban guided transport fields which include rolling stock, fixed installations, management systems (including communication, signalling, and processing systems) for railway and mass transit operations, their interfaces andtheir ecological environment. These standards therefore cover the fields of railway networks, metropolitan transport networks (including metros, tramways, trolleybuses, and fully automated transport systems). They relate to various parts such as systems, subsystems, software and hardware components and they deal with electrical, electronic, and mechanical aspects, the latter being limited to items depending on electrical factors.

Beside the railway specific TCs (CEN/TC 256 and CLC/TC 9X), Technical committees in other domains play an important role in railways, including e.g. telecommunication, cyber and IT security and energy efficiency.[28]

ETSI is a European Standards Organization (ESO) dealing with telecommunications, broadcasting and other electronic communications networks and services. **ETSI TC RT** is relevant for the development of FRMCS.

[26] See (EU, Regulation (EU) 2022/2480, 2022)
[27] See (CEN-CENELEC, Internal Regulations Part 1 - Organisation and structure, 2022)
[28] See (CEN-CENELEC, CEN CENELEC Technical Committees, 2023)

CEN, CENELEC and ETSI support European regulations and legislation through the creation of European Standards. Only standards developed or adopted and voted by these three ESOs are recognized as European Standards (ENs).

On the international level standardisation is conducted by the International Organisation for Standardisation (ISO) and the International Electrotechnical Commission (IEC).[29]

Created in 2012, the **ISO TC269** deals with standardization of all systems, products and services specifically related to the railway sector, including design, manufacture, construction, operation, and maintenance of parts and equipment, methods and technology, interfaces between infrastructure, vehicles, and the environment, excluding those electrotechnical and electronic products and services for railways which are within the scope of IEC/TC 9.

Among the 130 technical committees of the IEC developing standards over the whole range of electrotechnical techniques, **IEC TC 9** prepares international standards for the railways field which includes rolling stock, fixed installations, management systems (including supervision, information, communication, signalling and processing systems) for railway operation, their interfaces and their ecological environment.

These standards:

- cover railway networks, metropolitan transport networks (including metros, tramways, trolleybuses and fully automated transport systems) and magnetic levitated transport systems.
- relate to systems, components and software and they will deal with electrical, electronic and mechanical aspects, the latter being limited to items depending on electrical factors.
- deal with electromechanical and electronic aspects of power components as well as with electronic hardware and software components.
- Other IEC Technical Committees of relevance for the railway sector are e.g. TC 56, TC 65, TC 204, ScS Smart energy, TA 4 Digital System interfaces and others.[30]

ITU is the international standardisation organisation developing standards related to Telecommunications. There is no specific committee inside ITU which is dedicated to railway; nevertheless, ITU takes care in its own publications of railway requirements cooperating with IEC and ISO through specific liaisons.

[29] See (Schmitt L. , 2021)
[30] See (IEC, 2023)

Annex D: Processes for addressing standardisation needs

Process for harmonised and non-harmonised standards

The process for initiating a harmonised standard is outlined in Scenario 1 (see Figure 9 + Figure 11), the process for a non-harmonised standard in Scenario 2 (see Figure 10 + Figure 11).

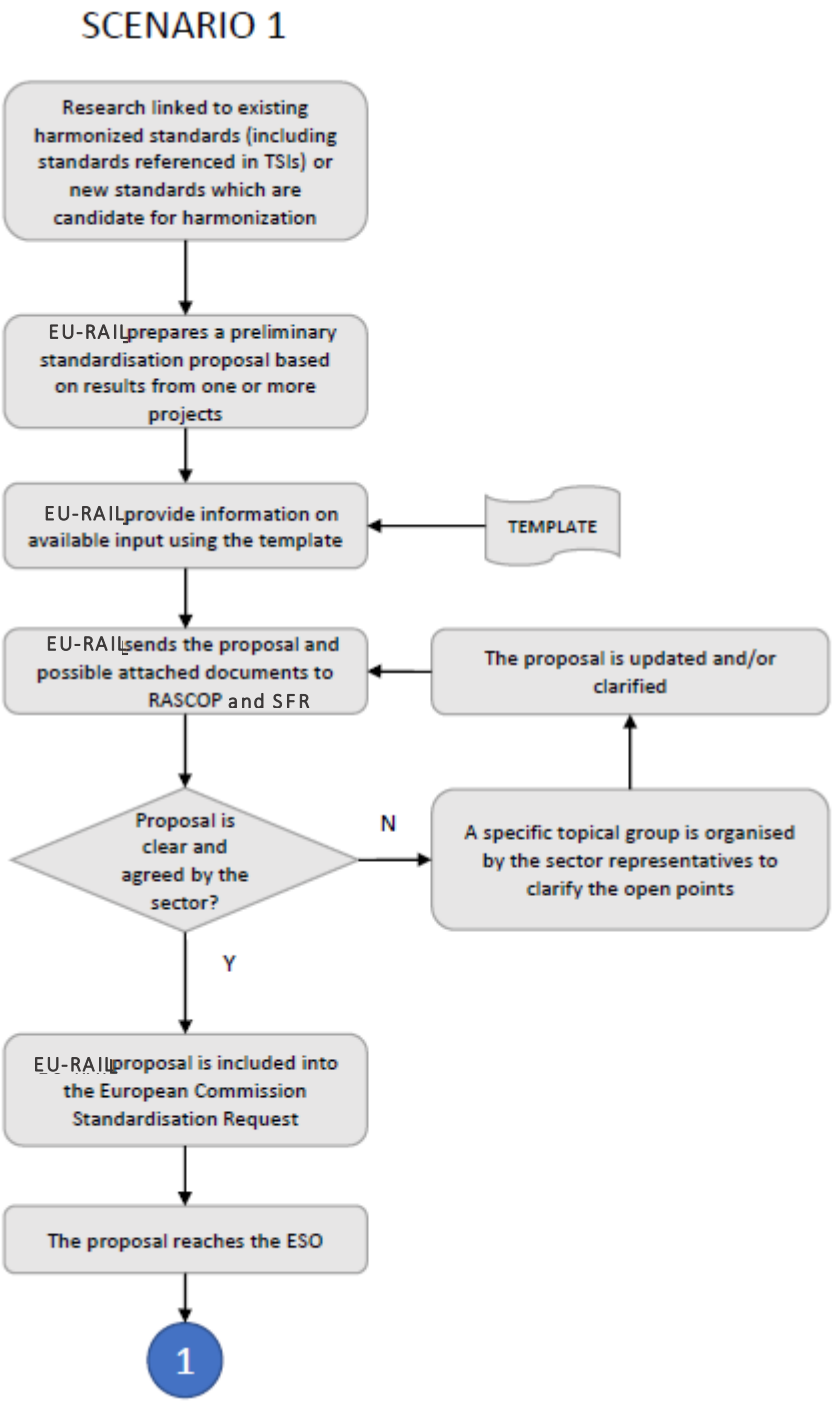


Figure 10: Initiation of standardisation process for existing or new harmonized standards (part 1) (© CEN-CENELEC)

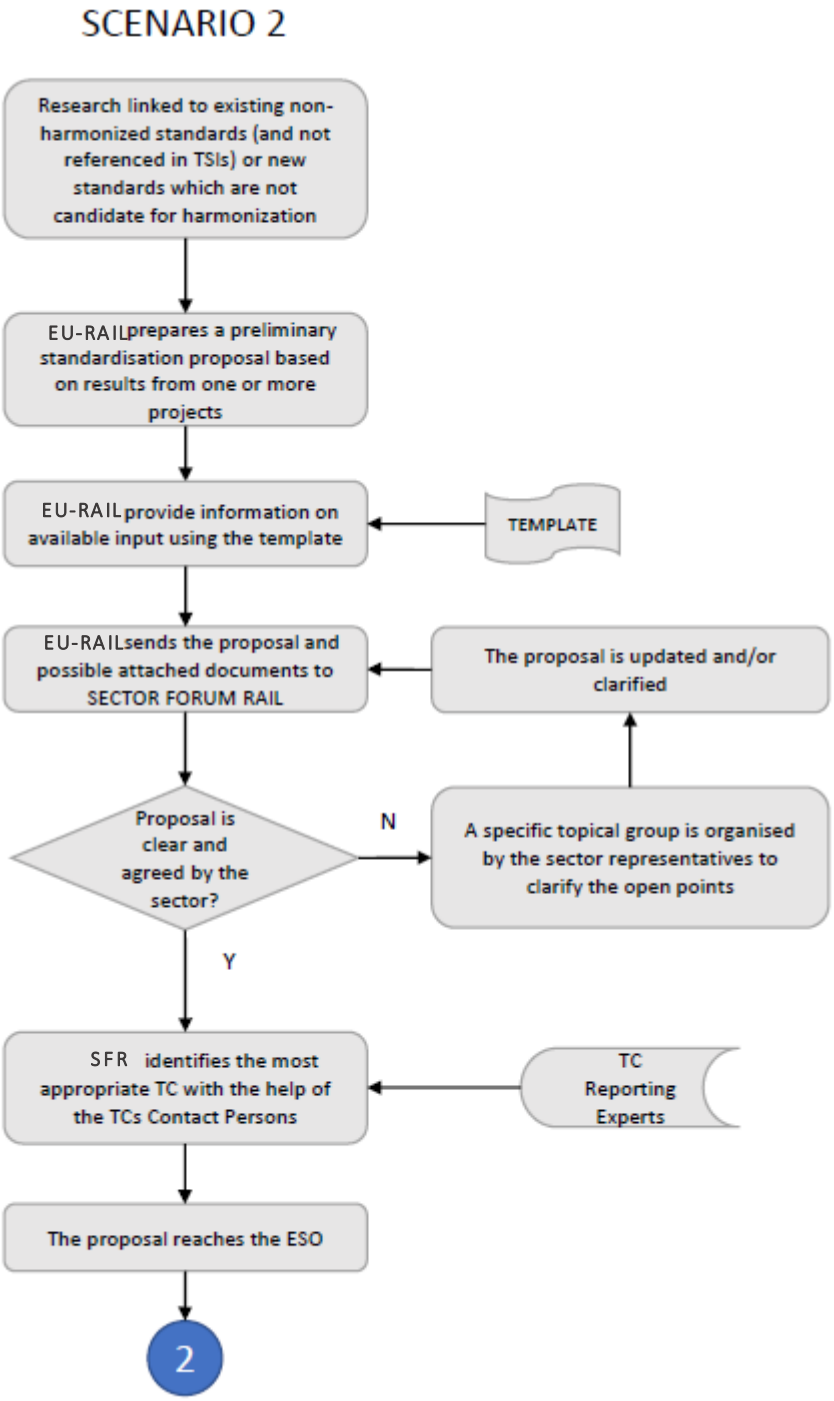


Figure 11: Initiation of standardisation process for existing or new non-harmonized standards (part 1) **(**© CEN-CENELEC)

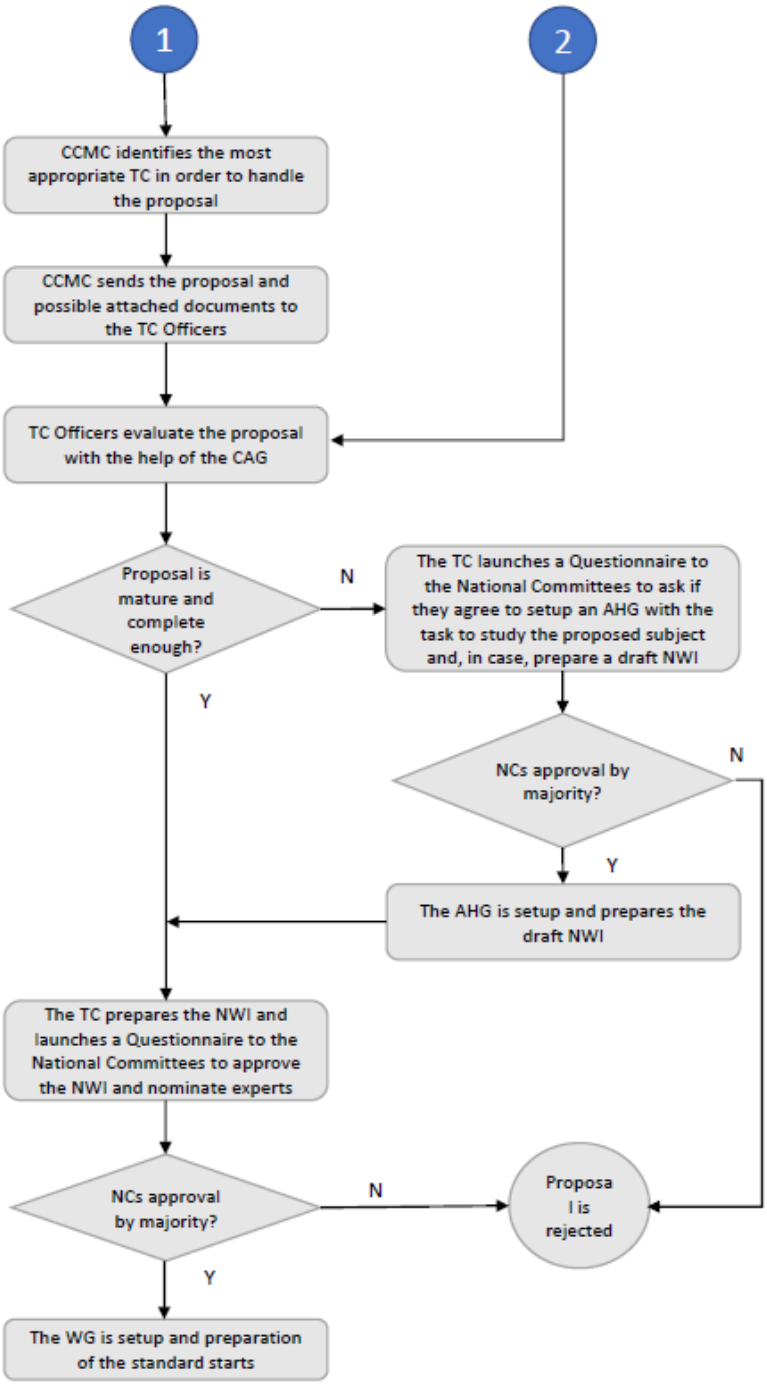


Figure 12: Initiation of standardisation process for existing or new non-harmonized standards (part 2) **(**© CEN-CENELEC)

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