DRAFT
WORK PROGRAMME 2026

adopted by the EU-Rail Governing Board

extracts relating to the System Pillar

In accordance with Council Regulation (EU) 2021/2085 and with Article 33 of the Europe's Rail Financial Rules from S2R GB Decision n° 11/2019 adopted by the GB decision n° 02/2021.

The Work Programme is made publicly available after its adoption by the Governing Board.

NOTICE RELATED TO S2R JU SUCCESSOR

On 30 November 2021, Council Regulation (EU) 2021/2085 of 19 November 2021, establishing the Joint Undertakings under Horizon Europe and repealing Regulations (EC) No 219/2007, (EU) No 557/2014, (EU) No 558/2014, (EU) No 559/2014, (EU) No 560/2014, (EU) No 561/2014 and (EU) No 642/2014, entered into force. In accordance with this Regulation, the Europe's Rail Joint Undertaking (EU-Rail) became the legal and universal successor in respect of all contracts, including employment contracts, procurement contracts and grant agreements, liabilities and acquired property of the Shift2Rail Joint Undertaking (S2R JU). Therefore, if reference is made to S2R JU's contracts/agreements/assets/liabilities in this Work Programme, they should be understood as those of EU-Rail's. In addition, in accordance with Article 174(12), at its first meeting on 21 December 2021, the Governing Board adopted Decision n° 2/2021 listing the decisions adopted by the Governing Board of the S2R JU that shall continue to apply for EU-Rail.

LIST OF ACRONYMS AND ABBREVIATIONS

Acronym/ Abbreviation	Full Title
ABAC	Accrual Based Accounting
AI	Artificial Intelligence
ALM	Application Lifecycle Management
ATO	Automatic Train Operation
ATP	Automatic Train Protection
A&V	Auralisation and Visualisation
BEMU	Battery Electric Multiple Unit
BIM	Building Information Modelling
CA	Commitment Appropriation
CAAR	Consolidated Annual Activity Report
CAPEX	Capital Expenditure
CAS	Common Audit Service of DG RTD
CBA	Cost Benefit Analysis
CBM	Condition-Based Maintenance
CBO	Common Back Office
CCA	Cross Cutting Activities
CCRCC	Control Command and Railway Communication Conference
CDM	Conceptual Data Model
CEI	Call for Expression of Interest
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
CERT	Computer Emergency Response Team
CFM	Call for Members
CMS	Capacity Management System
(C)COLA	(Common) Collaboration Agreement
CSA	Coordination and support action
CSIRT	Computer Security Incident Response Team
DAC	Digital Automatic Coupler
D&E-Net	Dissemination and Exploitation Network
DG RTD	Directorate-General of the European Commission for Research and Innovation
DMI	Driver Machine Interface
DOI	Digital Object Identifier
DRIMS	Dynamic Railway Information Management System
DSS	Decision Support System
EC	European Commission
ED	Executive Director
EN	European Norm
ERA	European Union Agency for Railways (formerly European Railway Agency)
ERRAC	European Rail Research Advisory Council
ERTMS	European Rail Traffic Management System

Acronym/ Abbreviation	Full Title
ETCS	European Train Controlling System
EU	European Union
EU-Rail	Europe's Rail Joint Undertaking
EUSPA	European Agency for the Space Programme
FACTs	Flexible AC Transmission Systems
FDFTO	Full Digital Freight Train Operations
FFFIS	Form Fit Functional Interface Specifications
FIS	Functional Interface Specifications
FRMCS	Future Railway Mobile Communication System
FWC	Framework Contract
GA	Grant Agreement
GB	Governing Board
GIS	Geographic Information System
GNSS	Global Navigation Satellite System
GoA	Grade of Automation
H2020	Horizon 2020, EU Framework Programme for Research and Innovation
HMU	Hydrogen Multiple Unit
HST	High Speed Train
HVAC	Heating, Ventilation and Air-Conditioning
IA	Innovation Action
IAMS	Intelligent Asset Management System
IAS	Internal Audit Service of the European Commission
IC	Innovation Capabilities
ICT	Information and Communications Technology
IEC	International Electrotechnical Commission
IKAA	In-kind contributions to additional activities
IM	Infrastructure Manager
IMU	Inertial Measurement Unit
IP	Innovation Programme
IPR	Intellectual Property Rights
ISO	International Standardisation Organisation
IT	Information Technology
ITD	Integrated Technology Demonstrator
JTI	Joint Technology Initiative
JU	Joint Undertaking
KPI	Key Performance Indicator
LCC	Life-Cycle Cost
LIDAR	Light Detection and Ranging
LTE	Long-Term Evolution (standard for wireless communication)
MAAP	Multi-Annual Action Plan
MaaS	Mobility as a Service
MAWP	Multi-Annual Work Programme
MB	Moving block

Acronym/ Abbreviation	Full Title
MBSE	Model-Based System Engineering
MFF	Multiannual Financial Framework
MoU	Memorandum of Understanding
MP	Master Plan
N&V	Noise and Vibration
NLOS	Non-line-of-sight
NTP	Network Time Protocol
OC	Open Call
OCORA	Open CCS On-board Reference Architecture
ODM	Operational Data Management
OPEX	Operational Expenditure
OTM	On Track Machine
PA	Payment Appropriation
PPP	Public-Private Partnership
PRM	Persons with Reduced Mobility
PTC	Positive Train Control
PTI	Platform Train Interface
PTO	Public Transport Operator
RAIM	Receiver Autonomous Integrity Monitoring
RAL	Unpaid amount
RAMS	Reliability and Maintainability System
RBC	Radio Block Centre
RCA	Reference Command Control and Signalling Architecture
R-CSIRT	Railway Computer Secutiry Incident Response Team
RFID	Radio Frequency Identification
R&D	Research and Development
R&I	Research and Innovation
RIA	Research and Innovation Action
RoI	Return of Investment
RU	Railway Undertaking
S2R (JU)	Shift2Rail (Joint Undertaking)
SaaS	Software as a Service
SBA	Single Basic Act (Council Regulation No 2021/2085 establishing the Joint Undertakings under Horizon Europe)
SC	Scientific Committee
SEMP	System Engineering Management Plan
SERA	Single European Railway Area
S&C	Switches and Crossings
SiC	Silicon Carbide
SIL	Software in the Loop
SIWG	System Implementation Working Group
SME	Small and Medium Enterprise
SNE	Seconded National Expert

Acronym/ Abbreviation	Full Title
SP	System Pillar
SPD	System Platform Demonstration
SPRA	System Pillar Reference Architecture
SPSG	System Pillar steering group
SRG	States Representatives Group
SRIA	Strategic Research and Innovation Agenda (for EU-Rail SRIA=MP)
SSG	Scientific Steering Group
SWL	Single Wagon Load
SteCo	Steering Committee
TAF	Telematic Application for Freight
TAP	Telematic Application for Passengers
TCMS	Train Control and Monitoring System
TC	Tender Call
TD	Technology Demonstrator
TL	Train Load
TMS	Traffic Management System
TRA	Transport Research Arena
TRL	Technology Readiness Level
TSI	Technical Specifications for Interoperability
TSN	Time Sensitive Networking
TSP	Travel Service Providers
UAV	Unmanned Aerial Vehicle
URID	User Requirements Working Group
V&V	Verification & Validation
WA	Work Area
WCRR	World Congress on Railway Research
WP	Work Programme

WORK PROGRAMME 2026

The System Pillar

The System Pillar (SP) aims to define the concept of operations for Rail and a functional rail system architecture for the future, considering interfaces within different rail segments and other modes.

To achieve an architecture that offers the demanded functional improvements concerning production performance, reliability, quality, and cost as well as the needed architecture quality, the System Pillar (SP) follows the defined process, based on the principles of Model-Based System Engineering (MBSE).

The System Pillar is managed and led by the System Pillar Unit of EU-Rail, under the responsibility of the Executive Director, within the governance established by the Single Basic Act (Council Regulation (EU) No 2021/2085 of 19 November 2021).

The System Pillar has the responsibility to support a consistent and coordinated approach to the evolution of the rail system according to the EU policy goals. Article 86 5a of the Single Basic Act states:
"develop in its System Pillar a system view that reflects the needs of the rail manufacturing industry, the rail operating community, Member States and other rail private and public stakeholders, including bodies representing customers, such as passengers and freight and staff, as well as relevant actors outside the traditional rail sector. The 'system view' shall encompass:

- the development of the operational concept and system architecture, including the definition of the services, functional blocks, and interfaces which form the basis of rail system operations;

- the development of associated specifications including interfaces, functional requirement specifications and system requirement specifications to feed into Technical Specifications for Interoperability (TSI) established pursuant to Directive (EU) 2016/797 or standardisation processes to lead to higher levels of digitalisation and automation

- ensuring the system is maintained, error-corrected and able to adapt over time and ensure migration considerations from current architectures

- ensuring that the necessary interfaces with other modes, as well as with metro and trams or light rail systems, are assessed and demonstrated, in particular for freight and passenger flows;"

Based on the requirements in the Single Basic Act, the role of the System Pillar in providing inputs to the European Harmonisation channels is set out in the document "EU-Rail and Harmonisation".[1] In summary this means the development and proposal of mature inputs to existing European harmonisation channels, in particular European Standardisation and Technical Specifications for Interoperability (TSI).

---

[1] https://rail-research.europa.eu/wp-content/uploads/2023/08/20230604-EURAIL-and-Harmonisation_Version_1.0.pdf

In addition the System Pillar, through the development and maintenance of the Standardisation and TSI Input plan (STIP) collects all of the relevant harmonisation outputs of EU-RAIL into a single source document.

1.1.1.1 STANDARDISATION AND TSI INPUT PLAN (STIP)

The Standardisation and TSI Input Plan (STIP) is the main means to coordinate the transfer of EU-Rail results, relevant for harmonisation, into the ERA Change Control Management (CCM) process for TSI revision and the standardisation work of ESOs.

The inputs are then assessed by ERA and the ESOs for being considered as input to the ERA CCM process for TSI revision and the standardisation processes. In addition these outputs are aligned with the EC request to ERA on TSI revision and the EC request to standardisation bodies, ensuring a coherence between the work of EU-RAIL and the European harmonisation processes.

For the first version of the STIP, topics for harmonisation have been delivered by the members of EU-Rail via the Task and Domains of the System Pillar as well as the Flagship Projects of the Innovation Pillar. In total, over 200 topics were proposed, analysed by the System Pillar Core Group and EU-Rail and classified to allocate the topic to a manageable number of categories. The proposed categories are outlined in the table below.

Category for topic classification		
Category		**Description**
Main section		
C1	Operational harmonisation	Topics related to operational processes and rules
C2	Evolvability and maintainability	Topics aiming at enhanced compatibility between versions and easy maintainability
C3	TMS and CMS	Topics related to enhanced European TMS and CMS
C4	ATO GoA2	Topics related to ATO until GoA2
C5	ATO GoA3/4	Topics related to ATO until GoA3/4
C6	Remote supervision and control	RTO as application independent from ATO Goa3/4 (can come earlier) specific applications, e.g. shunting yards.
C7	ASTP	Topics related to enhanced odometry and localisation systems
C8	FDFTO	Topics related to enhanced freight traffic including DAC
C9	FRMCS	Topics related to new radio system
C10	Onboard	Topics related to CCS onboard systems
C11	Cybersecurity	Topics for cybersecurity in CCS systems
C12	Safety management	Topics related to safety in CCS
C13	PRAM	PRAM topics
C14	Trackside assets	Topics related to CCS trackside assets
C15	Traffic CS	Topics related to enhanced Traffic CS and interfaces to TMS/CMS
C16	Driving control, Adhesion management	Topics related to adhesion management and driving control
C17	Energy management and supply	Topics related to energy management and operational measures
C18	Bridge dynamics	Topics related to vehicle-bridge dynamical interaction
C19	Alternative propulsion, traction energy	Topics related to battery and hydrogen train

C20	TCMS	Topics related to TCMS
C21	Subsystem Components	Topics considering e.g. braking, environmental conditions etc.
C22	Reduction environmental impact	Topics considering noise, air quality and climate change
C23	Composite materials	Use of composite materials for lightweight design
C24	ETCS CR enhancement	ETCS CR enhancements from ERA assessed by the SP
Additional topics[2]		
C25	Digital asset management, data spaces and models	Topics related to data spaces, data models and asset engineering
C26	Digital Twin	Topics related to Digital twin modelling and digital register
C27	Virtual certification	Methods for virtual certification and implementation
C28	Zero-Onsite-Testing	Use of simulations and lab testing procedures
C29	Drones	Topics related to the use of drones in railway applications
C30	Field force applications	Topics related to field forces (maintenance staff and machines)
C31	Diagnosis, monitoring	Topics related to diagnosis, condition-based maintenance in railway applications

Table: Categories for Harmonisation.[3]

The first version of the STIP was published in summer 2024 after an extensive review and revision process. Comments from sector stakeholders including sector associations were assessed and resolved in a comment assessment table. At the same time the STIP was aligned with the European Commission requests for TSI revision and for standardisation, ensuring a consistent time planning and content of STIP inputs to the TSI revision and standardisation. Additionally, STIP introduces a new internal EU-Rail harmonisation mechanism—the System Pillar document—as an industrial standard. The final STIP V1.0 was adopted by the SP Steering Group.

The second version of the STIP is currently being discussed at Sector level, the new version aims to strengthen the integration of EU-Rail outcomes into harmonisation frameworks by establishing a structured and transparent mapping of expected results. The new version will be aligned with appropriate harmonisation channels and updated timelines. It defines collaborative processes with the European Union Agency for Railways (ERA) and the European Standardisation Organisations to ensure timely delivery of harmonisation topics into the TSI revision and European standardisation processes.

Through the Standardisation and TSI Input Plan, the System Pillar has defined a clear and agreed plan for the evolution of the CCS/TMS system, the TSI enhancements, and standards, which will support

---

[2] The section "Additional Topics" includes topics with one or more of the following characteristics:

- Topics which do not yet have a defined time planning due to the early state and uncertainty in the development process.
- Topics which are very innovative and disruptive compared to established technical solutions. Acceptance and uptake by the sector might therefore require additional alignment and coordination.
- Topics for which the state of maturity does not allow a scheduled input to harmonisation channels in the short/medium term. Development and specification work is still ongoing, aiming at a higher maturity and the inclusion in one of the next STIP versions.

[3] Please consider that the list of topics may change/evolve as the project progress.

interoperability, modular interchange ability, system integration ability, robustness, harmonisation and implementation of the Single European Railway Area (SERA), and the role of EU-Rail (both System Pillar and Innovation Pillar) in delivery. The STIP document is under revision and will be updated in 2026, in order maintain the critical role supporting the harmonised introduction of improvements into the European rail system, supporting competitiveness interoperability, and safety.

System Pillar engineering process

The System Pillar specification work is based on a system engineering approach defining system levels as shown in figure below:
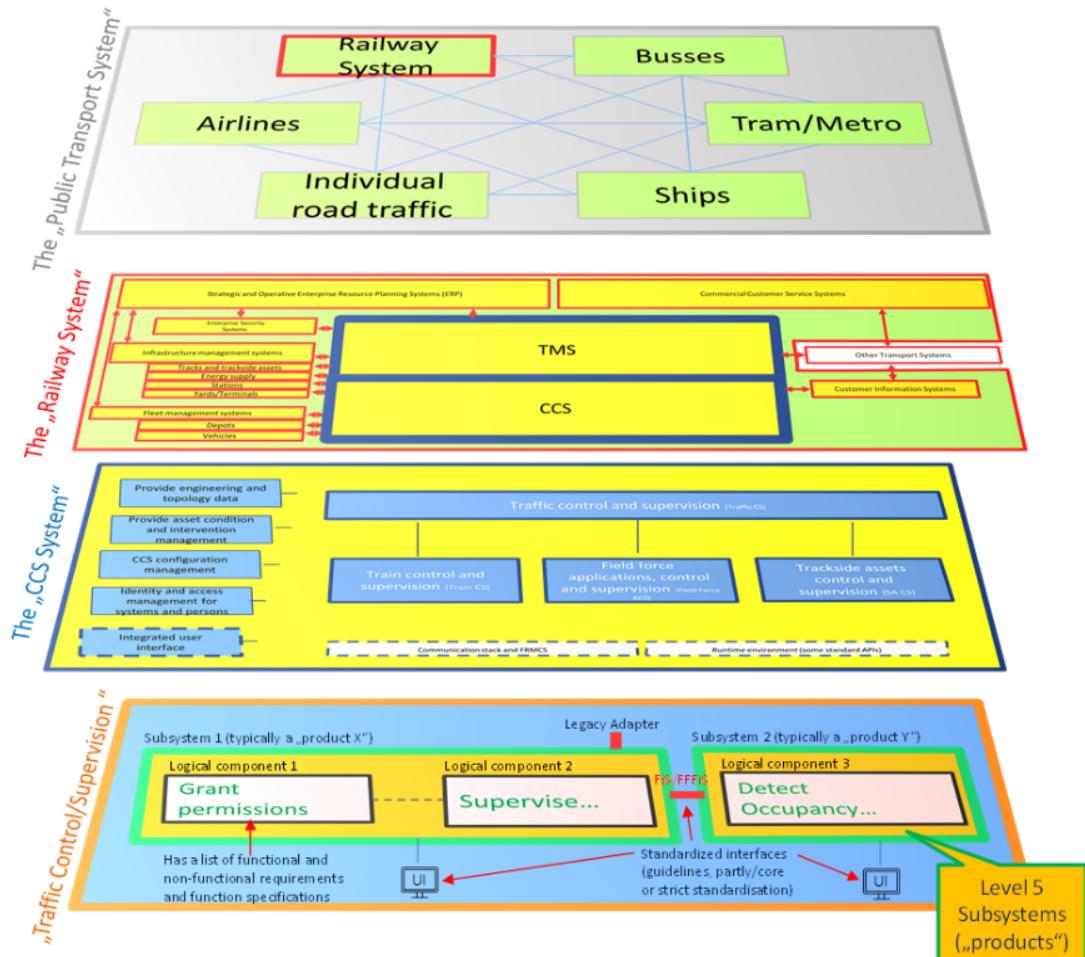
*Figure: System Level 1-5 view, the content is based on indicative CCS/TMS*

Figure below outlines the principles of the viewpoint-driven model-based system engineering approach that emphasises a clear separation of need analysis, requirement engineering and architecture building. Based on the operational needs, the system requirements are defined and used to specify the logical and physical architecture of the system.
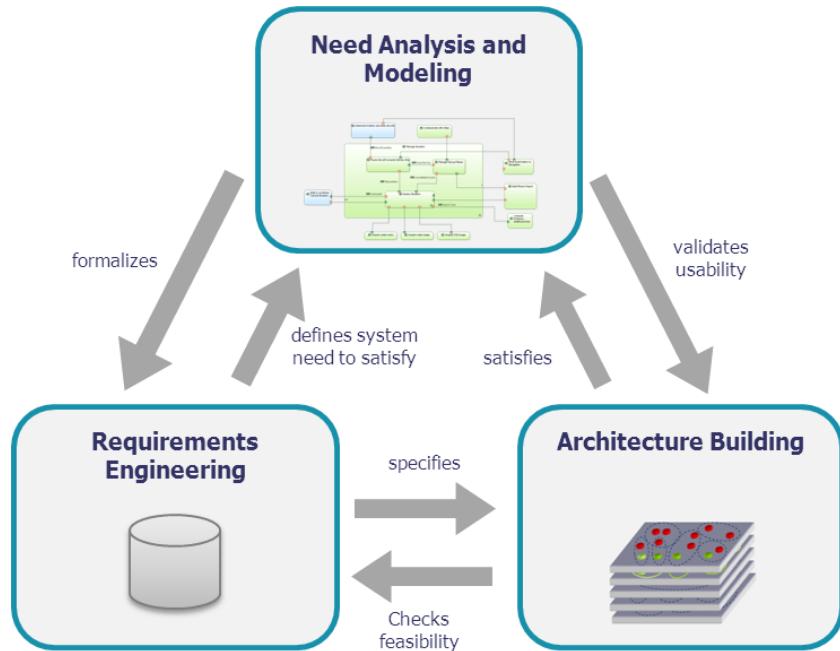
Figure: Viewpoint driven approach [Augmenting requirements with models to improve the articulation between system engineering levels and optimize V&V practices', INCOSE International Symposium, 29: 1018-1033]

During the first year of the System Pillar (Q4 2022-Q3 2023), the workflows supporting the described model-based system engineering approach for developing the railway system architecture have been launched. The performed work comprises both the top-down system engineering approach, starting from the CBOs and operation use cases, as well as the bottom-up integration of the existing outcomes of previous S2R works or other sector initiatives (as OCORA, EULYNX etc.) The work of these independent sector initiatives is critically assessed and integrated into the SP specification work where suitable. The process steps of the implemented model-based system engineering approach have been elaborated in the System Engineering Management Plan (SEMP) and applied to a first set of operational capabilities.

During the second year of the System Pillar (Q4 2023-Q3 2024), the above-described approach has been pursued. Additionally, the System Pillar is coordinating the harmonisation outputs and needs from the EU-RAIL programme in the Standardisation and TSI Input Plan (STIP) and supporting the interaction of the related activities of EU-RAIL with ERA and the standardisation bodies (incl. the Sector Forum Rail (SFR, now COG rail). The specific harmonisation topics for EU-Rail as a whole are being integrated and delivered in the Standardisation and TSI Input Plan. Additionally, the System Pillar published a paper on report on Energy Saving in Rail[4] outlining a comprehensive strategy for improving energy efficiency across the European rail system.

During the third year of the System Pillar (Q4 2024 – Q3 2025), the first inputs to Technical Specifications for Interoperability (TSI) and their associated documents (subsets, applications guides, etc.), EU Standards and other SP documents have been published. It is to be highlighted the publication of:

• the Cybersecurity specifications . With the aim to enable interoperability for cybersecurity interfaces across European rail automation systems and facilitate compliance with EU cybersecurity legislation and international standards. Four documents have been published: Secure Component Specification, Secure Communication Specification, Shared Cybersecurity Services Specification and Secure Program Requirements.

---

[4]   https://rail-research.europa.eu/wp-content/uploads/2024/07/ERSIPB-EDSIPB-B-S2R-219-01_-_20240314_Energy_saving_measures_in_rail_report_changes__2_.pdf

- Traffic CS Major Design Decisions . It outlines the strategic design decisions made by the Traffic Control and Supervision (Traffic CS) domain within the EU-Rail System Pillar. It supports the development of a harmonised, modular, and scalable European railway control system architecture.

- Traffic CS System Concept . It outlines the architecture, functionality, and migration strategy for the Traffic Control and Supervision (Traffic CS) domain within the EU-Rail System Pillar. It defines how Traffic CS supports the Single European Railway Area (SERA) through harmonized, modular, and scalable signalling systems to support interoperable, ETCS Level 2-based railway operations across Europe.

- Trackside Assets CS Specifications BL4R2 and BL4R3 . It is a joint publication of 25 specification documents by EU-Rail and EULYNX, supporting the future European railway system architecture. Specifically, it provides Interface definitions, system requirements, and data models for signalling subsystems. Alignment with EU-Rail's System Pillar and the Control-Command and Signalling (CCS) target system.

- Transversal CCS CCS-TMS Data model : It is a standardized framework aimed at enabling seamless data exchange across railway systems. Developed under the ERJU Transversal CCS, this model specifies data structures that are critical for various railway functions such as engineering, asset management, operational plan, train protection, and automated train operations.

- Task 5 Harmonised European railway Diagnostics : It outlines a strategy for harmonising diagnostic data across the European railway sector to support condition-based maintenance and improve operational efficiency.

During the next 3 years, the System Pillar (Q3 2025 – Q3 2028) is expected to consolidate and advance its harmonisation efforts across the European rail system, particularly in Control Command and Signalling (CCS). Despite a reduced budget compared to the previous period, the SP aims to deliver a coordinated set of specifications for ETCS Level 2-only operations, including harmonised operational rules, trackside and onboard systems, and cybersecurity frameworks. Key deliverables include pilot-ready specifications for Traffic Control Systems, enhanced diagnostics, and modular onboard architectures. The SP will also support non-CCS domains such as Digital Automated Coupling (DAC), Traffic Management Systems (TMS), and safety and RAMS methodologies. These efforts are designed to enable real-world pilots, reduce lifecycle costs, and ensure interoperability and scalability across Europe's rail infrastructure

SP ORGANISATIONAL STRUCTURE OF THE ACTIVITIES

The figure below, includes the first and second level operational break down structure of the System Pilar, as of 2024. Additional specific projects and/or may be added in the upcoming years, as the development identifies new lines of work to fulfil the CBOs.
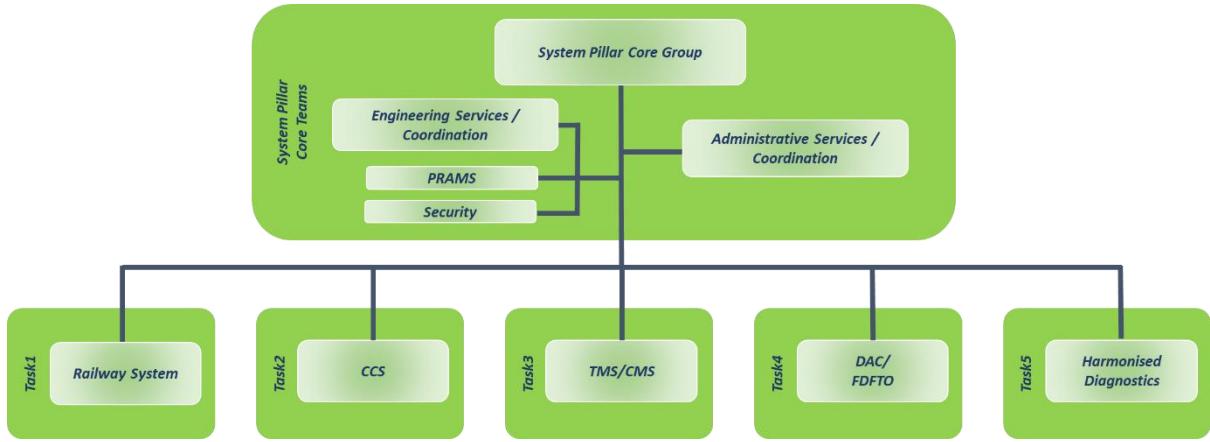
Figure: first level operational breakdown structure of the System

The roles and responsibilities of the following SP groups are depicted in the EU-Rail's Governance and Process Handbook[5]:

- SP Steering Group, Core Group, Engineering Services / Coordination (comprising Engineering Environment Team, Standardisation and TSI input planning, External Architectural support, PRAMMS Management and Assurance), Administrative Services (comprising Programme Office, Economic Analysis),
- Task 1: Railway System,
- Task 2: (Advanced) CCS system design,
    - The cross-cutting domain teams (comprising Operational Design, Architecture and release coordination and Migration and roadmap),
    - The CCS System Design Teams: comprising Traffic control and supervision, Train control and supervision, Trackside assets control & supervision, CONEMP (including now Transversal CCS component and Computing environment),
- Task 3: TMS system design,
- Task 4: DAC/FDFTO[6]System design,
- Task 5: Harmonised diagnostics.

System Pillar Core Teams

System Pillar Core Group

The System Pillar Core Group (SPCG) provides the competent leadership and expertise of the development of the functional layered railway system architecture, specification models and Operational Concepts that enable safe, secure and efficient delivery of the new systems. Moreover, the SPCG manages the common business objectives and deliverables from the different SP Tasks.

Engineering Environment Team

The Engineering Environment team includes methods definition (System Engineering Management Plan (SEMP))[7] and tools provision and training (Polarion[8], Capella[9], SysML[10] specification environment) for the whole System Pillar. The Engineering Environment team monitors the formal quality of the

---

[5]https://rail-research.europa.eu/wp-content/uploads/2023/01/EU-Rail-Governance-and-Process-Handbook.pdf

[6] DAC = Digital Automatic Coupler / FDFTO = Full Digital Freight Train Operations (part of FA 5 project)

[7] SEMP: see https://rail-research.europa.eu/wp-content/uploads/2023/08/221206-SP-SEMP-V1-final.pdf

[8] Polarion: ALM Software used in SP, see https://polarion.plm.automation.siemens.com/

[9] MBSE tool used by the SP, see https://mbse-capella.org/

[10] sysML: Systems Modeling Language, see https://sysml.org/

work items, their correct allocation to the tasks and domains, and the consistency, traceability and integrity of the specification.

Performance, Reliability, Availability, Maintainability, and Safety (PRAMS) Team

The PRAMS team is in charge to define the strategy, policies, methods, and principles to be followed by the other Tasks and Domains during the design activities as well as to coach and support implementation. PRAMS team do not produce PRAMS Analysis, Hazard and Risk Analysis, for system components or system parts; these activities are delegated to the related Domain that have to include members with PRAMS skills. The PRAMS Functional team is in place to have a proper coordination and synchronization.

Security Team

Security requirements are coordinated centrally this includes top-level design and assurance of the security strategies and requirement implementation in the System Pillar Tasks and the specification of the subsystems for monitoring and the system control access.

System Pillar Task 1: EU Rail System

The System Pillar Task 1 will be focused on the European railway network to which Directive 2016/797 applies. The vision of the European railway system is:

- Support to the creation of the SERA (Single European Rail Area), i.e. no technical and operational boundaries for trains, standardisation (economies of scale), safety (including learning from information sharing) and resilience.

- Performant and competitive.

- Synchronised deployment, and

- Full alignment with the future system.

The system architecture used by the System Pillar needs to be structurally and logically consistent, and reflect the structural reality that, currently, there is no single European railway system.

The high-level target architecture(s) will input to the considerations of the optimal level of technical and safety harmonisation building on cutting-edge technologies, making it possible to facilitate, improve and develop railway services within the Union, and with third countries, and to contribute to the completion of the SERA and the progressive achievement of the internal market.

The scope of Task 1 should not be time-bound and can consider several iterations of development i.e. it should be ambitious and flexible to consider the impact of new technologies and processes with regards to rail (e.g. from the innovation pillar) allowing for more performant, more efficient and less costly rail traffic. These innovations may require a substantial revision of, inter alia, safety concepts and the regulatory framework underpinning operations both with the clear goal to harmonise across Europe.

To achieve the overall evolution and target architectures defined in Task 1 will be a complex challenge. Best practice from other industries shows that successful integration of system architecture approaches, especially when moving from current engrained systems like in rail, is to take the opportunity when systems are in any case evolving to put in place the correct system architecture processes and principles.

System Pillar Task 2: CCS

The regulation and implementation of European rail control-command and signalling (CCS) is of central importance in the running of a safe, efficient, interoperable, robust cost-efficient and reliable rail service in Europe. CCS deals with all the on-board and trackside equipment required to ensure safety and to plan, command and control movements of trains authorised to travel on the network as well as the efficient integration of maintenance processes that occupy tracks.

Historically the automatic systems developed over time to monitor drivers' operation (continuous speed monitoring and avoidance of signals passed at red) have been developed to be different and they are still substantially different in each national railway network, and thus a major barrier to operate one European network.

A central focus at European level has been the implementation of ERTMS (European Railway Traffic Management System), a major industrial programme to harmonise the automatic train control and communication system and underpin interoperability throughout the rail system in Europe. Deployment of ERTMS provides the backbone for a digital, connected SERA.

The current harmonisation at European level, through the CCS TSI, addresses the safety and interoperability requirements, the on-board functions and the interfaces between trackside and on-board related to train protection, signalling the permission to move the train and radio communication. Hence, not the full CCS system.

For trackside CCS beyond that specified in the CCS TSI, there are currently network or deployment specific approaches of trackside engineering, operational concept, signalling rules and their interfaces.

The current typical CCS on-board configuration includes multiple proprietary TCMS (train control management systems) and Class B driven interfaces between the main train on-board building blocks, which are currently not harmonised.

As a result, even if ERTMS as it stands is implemented in full across the EU, national systems for significant parts of the CCS system would continue, along with national operational rules driving customisation, and a continued overall fragmented CCS market of signalling configurations and rail business models.

This situation significantly increases CCS complexity and reduces the opportunity for more open and competitive markets across Europe. It also creates a system that is not conducive to harmonised evolution and innovation and induces errors and incompatibilities in implementation of the TSI regulated interfaces. Finally, it undermines the performance of the rail system in favour of clients opting for other mobility and transport solutions.

Hence the CCS task is to develop a harmonised operational concept and functional system architecture for a genuine integrated European CCS system, supported by a model-based systems architecting & engineering approach, beyond the current specifications in the CCS TSI, with much greater standardisation and much less variation than at present. Differences in operation are one of the key root causes for complexity as well as product diversity and therefore are a major cost driver. The harmonization of operational principles where economically possible – in particular under cab signalling and radio-based ETCS is key to achieve generic CCS solutions, minimize national requirements, reduce life cycle cost and achieve operational interoperability. This integrated CCS system will on the one hand deliver unrestricted movement of trains, on the other hand, it will create a single market for rail components.

CCS – both on-board and trackside - will be based on a standardised modular system architecture using standardised interfaces. In order to preserve investment made, the System pillar should not only create adequate interface but care about migration feasibility (i.e. clear and affordable transition steps) and find paths for moving beyond the current system with proprietary interfaces and allowing modularity of components.

The need for the CCS task is because digitalisation technologies are ready for use in rail with huge potential to improve passenger and freight services. Digitalisation coupled with automation is one effective way to increase performance and capacity with less new infrastructure investments, e.g. thanks to the simplification of systems and the reduction of expensive trackside assets (light signals, axle counters etc.). Without high quality architecture, adding such new technologies and maintaining compatibility will not be possible.

The purpose of the focus on CCS is therefore to take advantage that as networks and Member States migrate to CCS systems of ERTMS L2 or above – the opportunity is taken to do this in a harmonised manner following functional layered architecture principles: this will set a common basis that will allow to evolve systems at the technological evolution pace. It will be a major change from "black boxes" to "software solutions" computing environments.

Operational interoperability is an equally important goal of the Single European Rail Area. A further major opportunity is thus to create harmonized operational rules.

On this basis, a converging shared vision on future rail operations based on ERTMS-alone Level 2 and Level 3 networks will set up the baseline for the operational and technological solutions to ensure and continue evolutions of rail.

System Pillar Task 3: Traffic Management System (TMS)/ Capacity Management System (CMS)

TM/CM means to create a long-term to short-term operational plan (production plan) that fulfils customer needs in an optimized way, to prepare and let execute the plan, and to predict and react on deviations and events with adapted planning or initiated interventions to solve production problems. The operational plan describes in very detail all types of track usage (train movements, stabling, construction sites, usage restriction areas, etc.).

Task 3 aim for Traffic Management is to reach a high, smart and flexible automation and cooperation levels for its long- or short-term simulation, planning, forecasting and coordination processes (cross-company, cross-country) in a way that allows to work with an integrated and rolling high-quality plan in near-real-time, based on automated information exchange between all involved planning partners.

The harmonization of operational processes is a key driver towards a deep and seamless integration of the new services and capabilities, with a specific focus on national borders; this is fundamental for the evolution of the Traffic and Capacity Management System to get an effective SERA.

The basic vision will also include a highly digitalized tactical short-term planning with the relevant cost-efficient approach to address risks and opportunities.

This will allow task 3 of SP to achieve, though harmonised input of innovation into standardisation processes, the objectives to support (with the application by stakeholders) the:

- ability to sustain a given service quality, punctuality, and safe operation, by completeness of planning, adequate level of information, rapid responses to capacity requests and planning changes and reducing the impact of disturbances,

- Leverage on real-time information and data sharing to provide accurate status in order to provide to customer rapid alerts of traffic congestion and in general provide valuable data and information,

- Enabling of more efficient infrastructure usage and better predict capacity needs of infrastructure.

System Pillar Task 4: Digital Automatic Coupler (DAC) / Full Digital Freight Train Operations (FDFTO)

Coupling is done manually by a worker who must climb between wagons to hook and un-hook them, requiring physically exhausting manual operation in a hazardous environment. A more efficient, sustainable and competitive rail freight system is essential to meet the needs of both climate protection and rising transport volumes. Digital automatic coupler is an enabler to create a modern and digital European railway freight transport. It will not only increase efficiency thanks to automation processes, but it will also ensure sufficient energy supply for telematics applications, as well as safe data communication throughout the entire train.

Through the work in task 4, mainly regarding the high-level specifications and providing the system view, System Pillar will be supporting the improvement of freight train composition, operation and capacity allocations of paths, stabling tracks (e.g. waiting for terminal slots) and shunting (yard) work.

System Pillar Task 5: Harmonised Diagnostics

The ambitious plans of the European Union and railway undertakings are targeting a significant increase in rail usage. This increase requests a higher availability of railway infrastructure and rolling stock but also shortens the time for maintenance for both infrastructure and rolling stock. Thus, fast, and accurate data sharing among different stakeholders is key for better maintenance.

Previous and on-going projects have already developed approaches and concepts for standardized data exchange. However, a harmonized European approach for exchanging maintenance data has not yet been established and data which is currently produced by different technologies (e.g. checkpoints) cannot be exchanged across Europe, which hinders development of the railway sector and blocks business cases.

The initial remit is to select a limited number of examples to demonstrate "proof of concept" European harmonization on the approach, based on the SP Data Model. The procedure methodology and proposed solution should be worked out using simple, non-critical and useful examples, keeping the complexity of the task within manageable limits. Therefore, existing and proven systems should be considered as far as possible, and feasibility demonstrated using a non-critical, useful applications and applying a system wide view.

SP DELIVERABLES, MILESTONES AND HARMONISATION PLANNING

The work of the System Pillar is structured along the different tasks described in previous section SP organisational structure of the activities. In the following section the deliverables and milestones are summarized per task and domain.

Task 1 Railway System

The main ambition for the Task 1 is to get a list of the needed and important improvements in the overall rail system t. (for a better "to be" architecture). A preliminary analysis should highlight differences in the selected interaction processes between countries represented in Task 1 to assess migration issues. For prioritized capabilities, full operational analysis and system analysis should be finalized using the SEMP.

The system view will allow a common understanding in the space of European railway systems the stakeholders' needs, resources, and capability to deliver beyond the existing implementation of railway sub-system or products. It will support tackling harmonisation, enable innovation, and build the capability in the railway system.

These improved business and technical process solutions will, to the extent needed, describe the rationale behind the requirements of the to-be target Business Process Architecture and Operational Design. The design work for Task 1 is not intended to describe all process and improvement aspects of the full railway system in full detail, especially when no need for harmonisation inside of the System Pillar is identified.

The Task 1 will focus during 2025 and 2026 on developing a high-level system architecture on system level 2.

Task 2 CCS
The activity of task 2 on CCS represents the main focus of the System Pillar activities and is divided in several domains.

Task 2 CCS: Domain Architecture and Release Coordination

T2 ARC domain is responsible for the following "coordination areas" including the Change Request coordination, CCS harmonization coordination and the SP release management. Each coordination issue is not a design task per se, but fulfils a cross-domain, cross-task and SP-IP oriented roles and supports by this the management task of the Coregroup for a specific content area. Each coordination issue shall be handled by one coordinator who is responsible for it.

During the period of the Work Programme T2 ARC domain is expected to deliver the High-level logical architecture overview on system level 3.

Task 2 CCS: Domain Operational Harmonisation

It is the task of the domain to integrate the stakeholder needs of RU and IM into the operational design in a way that allows to harmonize CCS procedures in the interoperable interactions and to harmonize CCS products according to the harmonization scope of the System Pillar. The target of the domain is to deliver until October 2025 the rulebook chapters for the topic package 1 (Movement A to B, Revoke Movement Permission, Manage Usage restrictions, Movement A to B, Boarding and disembarking of passengers, Revoke Movement Permission, Preparation to train departure, Approaching Stop Location and Train arrival) for drivers, signallers, trackworkers and shunting workers.

During the period of the Work Programme, T2 OD domain is expected to deliver the rulebook chapters for the topic package 2 (Change of train orientation, INIT trackside initialisation, Configuration update, Movement A to B, moving in SR, continue after trip, handling train after loss of communication and OS sweeping) for drivers, signallers, trackworkers and shunting workers).

Task 2 CCS: Domain Traffic Control and Supervision

The domain Traffic CS is a core element of the overall CCS functionality. Therefore, the progress with regards to the description of the functionality, the final alignment about interfaces and the interior architecture is key for the coming period until October 2025. The domain now goes into the phase of concrete specification of system and interfaces, which also increases the workload and need a tight collaboration with Task 2 OD.

Additionally, during the Work Programme period, Traffic CS is expected to work on the migration analysis and strategy.

Task 2 CCS: Domain Train Control & Supervision

The Train CS domain is responsible for the onboard CCS system. This includes beside the ETCS vehicle equipment also the additional components and functions like ATO (GoA 2 -4), RTO (Remote train operation), C-DAS and others from the on-board perspective. Close alignment with the

communication domain (now Lot 3) required to define the interface between FRMCS and the Train CS system.

During the period of the Work Programme, work is expected to advance on the Common bus to connect ETCS with other components, Improved odometry, and Train Length and Train integrity determination.

Task 2 CCS: Domain Trackside Assets Control & Supervision

The Trackside CS domain is responsible for the specification of the sub systems controlling the trackside objects like points, track vacancy detection, level crossings and others. With this a unified interface between the Traffic CS system and the object controller should ensure the interchangeability between both components. After the successful release of the TACS specification (BL4R3) in July 2025, the work in this period should focus on the remaining topics for maintaining the specification for Trackside Assets CS.

Task 2 CCS: CONEMP

The CONEMP (Concept of employment, formerly Computing Environment and Transversal CCS domains) domain designs the operational processes of the future that are used to manage the CCS assets (installation, maintenance, change, incident management, decommissioning). The harmonization and optimization of those processes will have a direct positive impact to the lifecycle costs (Opex) of the Railway System in line with the stakeholder requirements.

Based on the operational processes the CONEMP domain derives the functionality for the relevant transversal services such as configuration and diagnosis in the systems, as well as the related requirements for systems implementing those services.

In the Work Programme period it is expected that CONEMP publishes the Standardisation of Computing Environment.

Task 3 TMS & CMS

TMS&CMS carries out the coordination and execution of the detailed design work for the lower System Levels 3, 4 and 5 for the Traffic Management System/Capacity Management and defines detailed operational processes and requirements, functional system analysis and technical architecture.

In the Work Programme period work will advance on specifications for the interface of the Operational Plan between Traffic CS and TMS enabling optimized traffic management of the harmonized trackside system, and drafts for proposals for functional enhancements for the Telematics TSI according to the federated variant for Capacity and Traffic Management.

Task 4 DAC/FDFTO

Task 4 is responsible to manage all cross-cutting activities related to DAC/FDFTO (e.g., regarding operational procedures, architecture and interfaces embedding the onboard system, developed by FP51, into the overall railway system), manage the input to the Standardisation and TSI Input Plan (STIP) for DAC/FTDFTO and supports FP5 regarding authorisation strategy. This implies working in close alignment and cooperation with Innovation Pillar Flagship Project 5 (FP5) and EDDP, including participation in mediation of conflicts with other Innovation Flagship Areas and SP Tasks.

For the period of the Work Programme Task 4 is expected to deliver the first RuleBook of harmonised operational procedures.

Task 5: Harmonised Diagnostics

Harmonised European Railway Diagnostic (HERD) of the System Pillar will generate a set of proven technically and procedurally harmonised diagnostic data use cases and will provide a guideline for a harmonised diagnostic data exchange. The main benefit of HERD is the gain of harmonised condition information for integrated asset management.

The HERD team consists of representatives of the data user as well as of the data provider from supplier industry, infrastructure managers (IM), railway undertakings (RU), and vehicle keepers (VK). Strong alignment with the Innovation Pillar Flagship projects FP1, FP3 and FP5 as well as with the System Pillar Tasks 1, 2 and 4 is ensured by the team members.

For the period of the Work Programme Task 5 is expected to deliver the generic document/template for Harmonised Diagnostics Data Interface.

System Pillar Core Teams

Engineering Environment Team

The Engineering Environment team includes methods definition (System Engineering Management Plan (SEMP)) and tools provision and training (Polarion, Capella, SysML specification environment) for the whole System Pillar. It monitors the formal quality of the work items, their correct allocation to the tasks and domains, and the consistency, traceability and integrity of the specification. The Engineering Environment team has a central and active role in guiding and supporting other teams. Modelling and specification (including integration of external input) is done in the Tasks and domains. The Engineering Environment team is not contributing to the specification or modelling work itself but is actively supporting where needed and taking care that the work of the Tasks and domain can be done in an efficient way and with the needed quality.

The deliverables for the period of the Work Programme are the SEMP v4. Additional deliverables will be determined in the second half of 2025 building on the outputs of 2025.

PRAMS

The PRAMS team is in charge to define the strategy, policies, methods, and principles to be followed by the other Tasks and Domains during the design activities as well as to coach and support implementation. PRAMS team do not produce PRAMS Analysis, Hazard and Risk Analysis, for system components or system parts; these activities are delegated to the related Domain that have to include members with PRAMS skills. The PRAMS Functional team is in place to have a proper coordination and synchronization.

During the period of the Work Programme, PRAMS team will focus on maintenance of Safety related topics for the following documentation EU Hazard Data Base, Modular Safety Case structure, Modular Architecture, MTBSF criteria, Condition Base Monitoring requirements and PRAM requirements and guidelines. Specific deliverables for the period of the Work Programme will be determined in the second half of 2025 building on the outputs of 2025.

The Security team is in charge of centrally coordinating the Security requirements, including top-level design and assurance of the requirement implementation in the System Pillar Tasks and the specification of the subsystems for monitoring and the system control access. A focus for 2026 will be the input to future TSIs.

CCS TSI Maintenance Activities

The aim of the activities defined in the Lot 3 CCS TSI Maintenance Activities is:

- To resolve errors in the current TSI CCS in order to remove ambiguities in the specifications;
- To transfer results of Lot 2 and any other agreed enhancements into the ERA CCM process for the TSI CCS (with possible impact on TSI OPE);
- To facilitate the inclusion of completed versions of FRMCS specifications in future CCS TSIs;
- To help infrastructure managers and vehicle owners with the deployment of ERTMS by solving their (potential) technical problems and by putting into place appropriate processes for testing, validation and certification in view to facilitate the authorisation;
- To provide and maintain harmonised engineering guidelines.

SYSTEM PILLAR AND INNOVATION PILLAR INTERACTIONS

EU-Rail, through the System Pillar (SP) will aim to have a coherent approach to the evolution of the EU rail system through a system architecture approach.

The SP has a discrete work scope to set the system architecture of the rail system (Task 1), and in particular the CCS, TMS/CMS and DAC/FDFTO architecture (Task 2, 3 and 4), as well as coordinating the standardisation and TSI outputs of EU-RAIL. While the main focus will be on these Tasks, the System Pillar will have to integrate and duly consider other key elements, such as interfaces to urban mobility and energy systems.

EU-RAIL will develop the operational concept(s) and functional system architecture with much greater standardisation, a wider scope, aiming at no variation compared to present.

The Innovation Pillar (IP) will deliver, through research and innovation, advances in, inter alia, advanced traffic management, digital and automated train operations, and rail freight.

The description of the interaction is found in the EU-Rail Governance and Programme Handbook[11].

The interaction between the IP projects and the SP is both-way. For the specification and development of the demonstrators for innovative technologies, the Flagship Projects of the IP will consider the specifications of the railway target architecture, developed by the System Pillar. Since the complete specification of all levels of the target architecture (including level 5, physical architecture) will not be available in the coming year, higher-level specifications and realistic assumptions will be used.

In return, the Flagship projects will inform the SP about the technical feasibility and efficiency of different system solutions evaluated in the demonstrators and therefore contribute to the guidance and realignment of the specification of the target railway architecture.

Therefore, the main objectives of the IP-SP interaction are:

- To identify the main technical standardisation areas of collaboration between SP and IP,

- To build in the projects the necessary details of the continuous process integration to reach together the EU-Rail outcomes that will achieve target system complying with the CBO,

- To include necessary provisions to achieve the Standardisation and TSI input plan together with all the necessary mature standards and regulation proposals,

- To assess that the inputs expected by the Flagship projects from the SP are foreseen to be achievable on time.

---

[11] https://rail-research.europa.eu/wp-content/uploads/2023/01/EU-Rail-Governance-and-Process-Handbook.pdf

Calls for tenders and other actions

In 2026, EU-Rail is planning to implement the following call for tenders within the framework of the MAWP:

Procurement procedure	Title	Scope	Indicative timetable (Q-quarter)	Indicative budget (EUR)
Implementation framework contracts for services	Europe's Rail System Pillar	Implementation of a 6-year framework contract (3 lots) following an open call for tenders procedure with a total value (3 lots) of EUR 58,6 million (ceiling increase through a procurement negotiated procedure[12]).	Q1-Q4 2026	Specific contracts 2026 (3 lots): 8 000 000

---

[12] Point 11.1(e) of Annex I to Financial Regulation (Reg. (EU, Euratom) 2024/2509)

1.1.2 The System Pillar steering group

The System Pillar steering group (SP-STG) shall be an advisory body of the Europe's Rail Joint Undertaking in charge of providing advice on System Pillar issues.

It is composed of representatives of the Commission, representatives of the rail and mobility sector and of relevant organisations, the EU-Rail's Executive Director, the chairperson of the SRG and representatives of the ERA and of the ERRAC. The body is chaired by the Commission.

It is the task of the SP-STG to provide advice to the Executive Director and Governing Board on matters, such as the following:

- the approach to operational harmonisation and the development of system architecture, including on the relevant part of the Master Plan;
- delivering on the specific objective regarding introducing a unified operational concept and a functional, safe and secure system architecture; as well as an integrated European rail traffic management, command, control and signalling systems, including automated train operation;
- carrying out the task related to developing within the System Pillar a system view that reflects the needs of the rail manufacturing industry, the rail operating community, Member States and other rail private and public stakeholders, including bodies representing customers, such as passengers and freight and staff, as well as relevant actors outside the traditional rail sector;
- monitoring the progress of the System Pillar.

Four meetings of the SPSG are foreseen in 2026, one each quarter.

The System Pillar Steering Group is supported by the JU System Pillar Unit and the System Pillar Core Group.

Additionally, the System and Innovation Programme Board, in its advisory role to the Executive Director, supports the activities of the System Pillar steering, committed to advising on the coordination of resources, budgets and timescales, as well as interaction with the Innovation Pillar as well as change management and conflicts.

The EU-Rail Governing Board, as the body responsible for the overall oversight over the EU-Rail's activities, is the final decision body within the System Pillar decision-making process.

Annex IV – System Pillar working method and System Engineering management plan

The System Pillar working method aims at fast and balanced decision making with full sector involvement. Integrated teams within one place - the System Pillar - work on and propose developed positions for sector consideration:

To ensure best results, the System Pillar design process ensures clarification and agreement on objectives and requirements early in the process as a basis for the subsequent decisions on operational design and architecture.

- The aim is to have developed positions put forward by the tasks and associated domain teams based on concentrated resource and a short interaction flow on system design level within the System Pillar teams, enabling speed of development. For this purpose, a detailed working plan, following the concepts of sprints, is established for 2024 for most of the System Pillar Teams. It specifies in detail the process flow and timeline for the development of the target railway system architecture, comprising the conception and modelling of operational capabilities and processes, system capabilities and functional chains as well as logical and physical architecture of the different subsystems (onboard, trackside CCS, etc.). Every design phase of the target architecture (described by the architecture level) is divided into a specification and review phase, aiming at fast and efficient content generation and a reliable, high-quality review.
- To ensure an effective and efficient use of the available resources, the detailed work planning includes the allocation of the resources to specific roles: Specifiers are responsible for developing the architecture concepts and models, requiring a high level of resource commitment to enable the most efficient content generation. The created content is then reviewed and revised by the advisor group, with limited time but a high level of expertise to ensure the high quality of the created content.
- The quality of the System Pillar deliverables is ensured by a review and approval process, defined in the Review and Approval process of the SEMP. Outcomes of a task/domain are first reviewed internally, including the related mirror groups, to ensure the high quality and sector alignment for the performed specification work. Afterwards, the internally approved deliverable is sent to the Core Group for review and approval. Once approved, the deliverable is presented at the Steering Group for decision and final approval before official release.
- Where appropriate, sector organizations are encouraged to support their representatives in the System Pillar teams and the Core Group with input - consolidated positions, early consideration of issues etc.

On all hierarchical levels of the decision-making process a balanced sector representation will ensure that developed and fully considered positions are put forward to the System Pillar Steering Group and Governing Board.

A detailed description of the model-based system engineering process and the related working arrangement including specification work, review and approval can be found in the 2nd version of the System Engineering Management Plan (SEMP). The SEMP is structured along the following content:

- The engineering processes describing the workflow of engineering regarding:
  - System Design Processes: e.g. process steps to get from use cases down to functional design, conception and modelling of the levels of the railway target architecture.
  - Management Processes: e.g. how to collect, decide or allocate requirements or project management processes, or change management processes, how to monitor progress and verify consistency with Common Business Objectives.

- o Review and approval processes: how to ensure a high-quality review by relevant sector stakeholders and a transparent approval of SP deliverables.
  - o Publication/Standardisation Processes: e.g. TSI input processes, specification maintenance.
- Definition of design methods:
  - o Methods: e.g. how hazards should be linked to risks, and risks be linked to requirements.
  - o Ontology, vocabulary: e.g. how to name results of SP or things in the railway landscape.
  - o Design and modelling standards, notation: e.g. template structures for documents like "system definition", or how to describe and draw a function or interface, or how requirements or use cases should be formulated.
- Tools to be used:
  - o Design Tools: e.g., to write traceable content, for modelling, approval tools, model proving, etc.
  - o Management tools: e.g. project management, issue management, workflow automation, etc.
  - o Information flow automation: Carrying, converting and linking files from different tools, manage exchanges between teams.

Annex V – System Pillar deliverables and milestones

Engineering Environment Team

DELIVERABLES

The domain has as a support team mostly continuous reactive task.

Management of Domain

No	Deliverable	Milestone

0	**Management of Domain**
	• **Description of Deliverable:** Management activities to ensure that the below described deliverables are provided in form and time.
	• **Intermediate Milestones:**
	   o Remit Deliverables preliminary structure and detailed scope is defined in Polarion
	   o Domain planning with expected tasks required for each Remit deliverable is set up in Polarion.
	   o Reporting to SPCG and PMO based on detailed action report per task area (solved tickets)
	• **Definition of Done:** Planification, monitoring, intermediate and final reporting are done
	• **Interaction with other Domains/IP:** Coordination required with all domains.
		Continuous task
		
		Nov. 2025
		
		Q4 2025
		
		Bi-Monthly

SP meta-data management

No	Deliverable	Milestone
01	**SP meta-data management**	Q3 2026
	• **Description of Deliverable:** The valid system requirement set of the SP in its current managed state is accessible via Polarion in a structured way • **Intermediate Milestones:**	
	o Glossary release including list of references	Q1 2026
	o Status report on the overall SP requirement set and traceability	Q2 2026
	• Glossary release including list of references	Q3 2026
	• **Definition of Done:** Release notes including status description, links to the Polarion reports (with defined revisions), open points, assessment of the quality status. • **Interaction with other Domains/IP: All domains**	

SEMP updates

No	Deliverable	Milestone
02	**System engineering management plan**	Q3 2026
	• **Description of Deliverable:** The SEMP is updated according to current needs and application. • **Intermediate Milestones:**	

		Q1 2026
○ Draft SEMP V5: SEMP light, list of topics that require updating defined and agreed		
○ SEMP V5		Q3 2026
• **Definition of Done:** The SEMP is consistent, applied, and does not contain unused elements.		
• **Interaction with other Domains/IP: All domains**		

Formal quality checks and configuration management:

No	Deliverable	Milestone
03	**Formal quality checks and configuration management:**	Q3 2026
	• **Description of Deliverable:** All output documents have been checked according to the rules as defined in the SEMP, including the review, approval and release processes. A periodic gap report is created to support domains in resolving open points.	
	• **Intermediate Milestones:**	
	○ Status report on document quality	Q4 2025
	○ Status report on document quality	Q1 2026
	○ Status report on document quality	Q2 2026
	○ Status report on document quality	Q3 2026
	• **Definition of Done:**	
	• **Interaction with other Domains/IP:** All domains	

Ad Hoc

No	Deliverable	Milestone
99	**Ad Hoc Activity**	continuous
	• **Description of Deliverable**: There may be additional requests to be accommodated on an ad hoc basis, for example contribution to maturity checkpoint reviews of the Innovation Pillar	
	• **Intermediate Milestones:** to be defined (if applicable)	
	• **Definition of Done:** To be agreed with the SPCG	
	• **Interaction with another Domains/IP:** to be defined (if applicable)	

PRAMS

DELIVERABLES

As described above in the following picture we can see the deliverables structure of the SAFETY Domain.
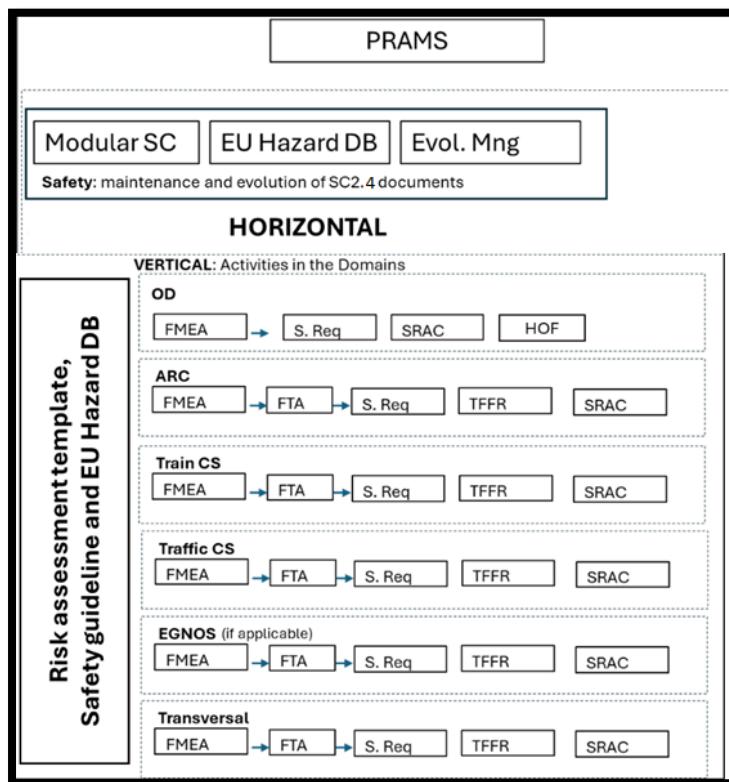
The Vertical activities shown in the picture for each domain are related to the canonical safety process. Each domain together with SAFETY team and CG will use the process according to the design status and specific needs of the domain.

Management of Domain

No	Deliverable	Milestone
0	**Management of Domain** • **Description of Deliverable:** Management activities to ensure that the below described deliverables are provided in form and time. • **Intermediate Milestones:** ○ Remit Deliverables preliminary structure and detailed scope is defined in Polarion ○ Kanban Board with expected tasks required for each Remit deliverable is set up in Polarion. ○ Reporting to SPCG and PMO based on detailed action report per task area (solved tickets) • **Definition of Done:** Planification, monitoring, intermediate and final reporting are done • **Interaction with other Domains/IP:** Coordination required with all domains.	Continuous task Q4 2026 Bi-Monthly

Support and coordination of Vertical Activities

No	Deliverable	Milestone
01	**Support and coordination of Vertical activities.** • **Description of Deliverable:** Each domain according to their development phase will deliver the related SAFETY deliverables according to the principles and methods defined by SAFETY, so called Horizontal Activities. SAFETY domain will support and coordinate those activities assuring the right quality and conformity to the defined principles and methods. To continue the support and coordination of vertical activities:	Continuous task

	a) Continue to support to SP Domains when dealing with safety activities in using the SAFETY templates and tools:
	
	    i. EU Hazard Database,
	    ii. Handling of control loops
	    iii. FMEA: Failure mode and Effect Analysis
	    iv. FTA: Fault Tree Analysis
	    v. Safety Requirements definition
	    vi. TFFR: Tolerable Functional Failure Rate (from ERJU Hazard Database).
	    vii. SRAC: Safety Related Application Condition (if any)
	
	b) Continue to support the Train CS, Traffic CS, Trackside Assets, Cyber-security, Computing Environment, Transversal CCS teams to define the Architecture of the systems and ensure it is compliant with regulations, standards, and the RAMS requirements.
	
	c) Support EGNOS project in certification activities.	

	• **Intermediate Milestones:**
	   o Animate regular SAFETY Functional team meetings to synchronise safety activities between different SP domains
	   o Regular reporting to SPCG and PMO
		Q3 2026
		
		Bi-Monthly

	• **Definition of Done:** The glossary items are checked and approved, no redundant entries, the synchronization and link to ERA ontology is assured, the glossary is used in the domains. • **Interaction with other Domains/IP:** All domains.	

EU Hazard Database

No	Deliverable	Milestone
02	**EU Hazard Database** • **Description of Deliverable:** To extend the list of accidents and hazards with risk acceptance principles and quantified values (i.e. for top level system hazards having explicit risk estimation as risk acceptance principle) to fasten the realisation of risk assessment and harmonized practices among manufacturers and RUs/Ims in line with risk assessment process defined in SC2.4.. The quantified values to be defined based on an analysis of hazards and contributing conditions leading to the accidents classified within the ERJU and defined risk assessment process. The list of accidents and hazards is based on the future regulation CSM-ASLP but will consider a larger scope with actual lists of accidents and hazards at national level (i.e. SIRF, VDE, ESF) and feedback coming from safety analyses from SP domains. To improve the EU Hazard Database which aims at mutualizing the use of standardized accidents and hazards for railway projects: a) Integrate additional hazards from other sources (e.g. NSA, suppliers), b) Consolidate the link between the EU Hazard Database and FMEA/FTA activities. c) Integrate in the database the feedbacks coming from SP domains safety analyses. (EU Hazard Database and Risk Assessment process and templates are complementary and mandatory to get efficient SAFETY activities realized within SP Domains)	Q3 2026

	• **Intermediate Milestones:**	
	○ Start the review process for the intermediate release of updated EU Hazard Database to be shared for review with other domains and ERA including extended list of accidents and hazards and their connections.	Mar-26
	○ Updated release of EU Hazard Database addressing comments from other SP Domains and ERA and updates on list of hazards/accidents and their connections.	Jun-26
	• **Definition of Done:** 2nd version Released to the sector.	
	• **Interaction with other Domains/IP:** All Domains and IPs	
	• **STIP Reference (if applicable):** STIP_80	

Risk assessment process and templates

No	Deliverable	Milestone
03	**Risk assessment process and templates**	Q3 2026
	• **Description of Deliverable:** Consolidation of risk assessment process and templates (i.e. CENELEC Phase 3, 4 and 5) presenting all safety activities within SP Domains (up to Phase 5). The following activities are planned:	

	a) HAZOP for analyzing the conditions leading to accidents (on Railway System level - bird's eye perspective)
	    -> What hazards have to be taken into account? (align with existing ones of the database)
	    -> What risk mitigation principles have to be defined? (align with existing ones of the database) - definition of a complete set	

	b) Development of a RiskScore Matrix approach (acc. to VDE V 0831-103, based on CSM-DT) for deriving and quantifying system safety functions based on the risk mitigation principles defined in Hazard EU Hazard DB.	
	c) Fault Tree Analysis: apportionment and quantification (template and guideline provided by SAFETY team) of hazards and system safety functions of Railway System level to lower level of the System Pillar Reference Architecture (e.g. L3: CCS, L4: Traffic CS, L5: ETPS).	
	d) (*EU Hazard Database* and *Risk Assessment process and templates* are	
	e) complementary and mandatory to get efficient SAFETY activities realized within SP Domains)	
	• **Intermediate Milestones:**	
	○ Start the review process for the 1st version of HAZOP according to SEMP process	Mar-26
	○ Start the review process for the 1st version of Safety Functions list according to SEMP process	Jun-26
	○ Updated release of HAZOP and Safety functions list addressing comments from other SP Domains and ERA.	Oct-26
	• **Definition of Done:** 2nd version Released to the sector.	
	• **Interaction with other Domains/IP:** All domains and IPs	
	• **STIP Reference (if applicable):** not applicable	

Generic Design Safety Case Structure

No	Deliverable	Milestone
04	**Generic Design Safety Case Structure**	Q3 2026

• **Description of Deliverable:** To establish and consolidate a "Generic Design Safety Case structure" adequate to the new harmonised modular architecture of SP; and to provide the specific process for their application and authorisation (e.g. how to assess them, integrate them, deal with authorisation/approval).		

  It is a structure made to benefit from the new railway standardised modular architecture of SP. This structure will allow to drastically reduce the number of SRAC, support parallel developments between systems and drastically reduce effort, needed resources and completion time when integrating modular building blocks into subsystems, vehicles and railway systems authorised for operation. In the SC2.4 contract the Modular Safety Case Structure has been developed and will be reviewed in the Sector .. From SC2.6 additional features will be added to address all required elements mandatory to get an efficient deployment of the System Pillar Reference Architecture.

  To consolidate the Generic Design Safety Case (GDSC) approach which helps at integrating the modular components into specific application with maximizing the reuse between different projects:

  a) Define DSC templates and their hierarchical interactions and validate them by the AsBo Cooperation Group,

  b) Define the structure of a EU Safety Related Application Condition (SRAC) database.

  c) Define roles and tasks for each stakeholder involved in the GDSC imbricated safety cases (e.g. assign responsibilities to the CCS-OB integrator in the vehicle)

  d) Define a new cross-acceptance process to ease the reuse of ISA/NoBo certificates in real projects

  (Generic Design Safety Case and Evolution Management in a Modular Architecture are complementary and mandatory to get efficient future projects using modular systems based on SP reference architecture)

- **Intermediate Milestones:**
  - ○ Start the internal System Pillar Review Process according to the SEMP — May-26
  - ○ Second release updated according to the feedbacks/comments from the sector (NoBo/AsBo organizations to be involved and feedback is expected in SC2.6) — Sep-26
- **Definition of Done:** 3rd version Released to the sector.
- **Interaction with other Domains/IP:** All Domains and Ips, AsBo Corporation group
- **STIP Reference (if applicable):** STIP_79

Evolution Management of Safety Related Systems in a Modular Architecture

No	Deliverable	Milestone
05	**Evolution Management of Safety Related Systems in a Modular Architecture**	Q3 2026
	• **Description of Deliverable:** Changes to the existing regulations to improve the management of evolutions of a safety-related system (including cyber-security related and RAM related evolutions in a safety-related system). To consolidate the Evolution Management process for safety related systems which help at reducing the lifecycle management of modular systems: a) Improve the connection with the Assessment Bodies (AsBo) Cooperation Group and NB Rail association initiated in SC2.4 to consolidate the process (e.g. integration in the next CSM-RA),	

b) Update the process by developing the integration activities regarding testing and assessment from modular component to overall modular system at railway level. c) Update the process to ensure a complete alignment with Train CS, Traffic CS, Trackside Assets, Cyber-security, Computing Environment, Transversal CCS, concerning the design, development, homologation, and deployment of software evolutions. d) Update the process to consider the hardware evolutions. e) Update the process to consider the conclusions from the FP2 DATO WP26 Modular Platform Specification "D26.4 – Summary of findings and recommendations from study on modular certification and homologation". (*Generic Design Safety Case Strategy* and *Evolution Management of Safety Related Systems in a Modular Architecture* are complementary and mandatory to get efficient future projects using modular systems based on the SP Reference Architecture)	
• **Intermediate Milestones:** o Start the System Pillar Review Process according to the SEMP regarding SC2.4 deliverables	May-26
o New release updated according to the feedbacks/comments from the sector plus the point b) to e) (adjustments may be done after the first intermediate milestone depending on the inputs' availability) (NoBo/AsBo organizations to be involved and feedback is expected in SC2.6)	Sep-26
• **Definition of Done:** 3rd version Released to the sector. and no more opened comments from external reviewers. • **Interaction with other Domains/IP:** All Domain, IPs, NB Rail, AsBo Corporation group • **STIP Reference (if applicable):** STIP_81	

STIP TASKS

Collaboration with STIP related topics

No	Deliverable	Milestone
6	**Task Collaboration with STIP related topics**	Q3 2026
	• **Description of Deliverable:** Maintenance of SAFETY STIP Documents. Publish the Change Request(s) to specify the necessary evolutions in the standards and evolutions to allow a modular architecture • **Intermediate Milestones:**	

	o Identification of activities and joint plan with related Tasks and Domains,
	  o Description of foreseen actions.
	  o Review the STIP and any applicable update considering Domain developments
	  o LEAD the following STIP related Deliverables/Tasks
	     i. Maintenance of Existing document if necessary:
	       1. STIP_79 - Modular Safety Case Structure
	       2. STIP_80 - EU Hazard Database
	       3. STIP_81 - Evolution Management in a Modular Architecture
		Cont.

	• **Definition of Done:** Maintain the existing STIP documentation in case is necessary.	
	• **Interaction with other Domains/IP:**	
	• **STIP Reference (if applicable):** STIP_79, STIP_80, STIP_81	

Cybersecurity

DELIVERABLES

Management of Domain

No	Deliverable	Milestone
0	**Management of Domain (0,5 FTEs)**	Continuous task
	• **Description of Deliverable:** Management activities to ensure that the below described deliverables are provided in form and time	
	• **Intermediate Milestones:**	
	o Remit Deliverables preliminary structure and detailed scope is defined in Polarion	Nov. 2025
	o Kanban Board with expected tasks required for each Remit deliverable maintained in Polarion.	Q4 2025
	o Reporting to SPCG and PMO based on detailed action report per task area (solved tickets)	Bi-Monthly
	• **Definition of Done:** Planification, monitoring, intermediate and final reporting are done	
	• **Interaction with other Domains/IP:** Coordination required with all domains.	

SP Cybersecurity Specification (v1.1 or v2.0)

No	Deliverable	Milestone
01	**SP Cybersecurity Specification (v1.1 or v2.0) (0,4 + 0,1 FTEs)**	Sep 26
	• **Description of Deliverable:** Release of updated SP Cybersecurity Speciation (four main document + supporting documents), structure the Polarion project data along SEMP.	
	• **Intermediate Milestones:**	
	o Review version available and start of review	Jun 26
	o Review comments incorporated	Aug 26
	o Approval version available	Sep 26
	• **Definition of Done:** Approved and released SP Cybersecurity specification v1.1 or v2.0	
	• **Interaction with other Domains/IP:** Transversal, Traffic CS, Train CS, DAC,…	
	• **STIP Reference (if applicable):** C11	

Security CR for TSI CCS

No	Deliverable	Milestone
02	**Security CR/technical input to ERA TWG for TSI CCS (0,2 FTEs)**	Oct 26
	• **Description of Deliverable:** CR to address security gaps in TSI CCS	
	• **Intermediate Milestones:**	
	o Draft version of CR template content and update of the preassessment template content if necessary	Dec 25

		Jun 26
	o Final version of CR template content	Jun 26
	o Approve version of CR	Oct 26
	• **Definition of Done:** Approved CR by SPSG	
	• **Interaction with other Domains/IP:** as applicable (depends of TSI)	
	• **STIP Reference (if applicable):** STIP_175	

Security CR for TSI ENE

No	Deliverable	Milestone
03	**Security CR/technical input to ERA TWG for TSI ENE (0,1 FTEs)**	Oct 26
	• **Description of Deliverable:** CR/technical input to ERA TWG to address security gaps in TSI ENE	
	• **Intermediate Milestones:**	
	o Draft version of CR template content /technical input to ERA TWG and update of the preassessment template content if necessary	Dec 25
	o Final version of CR template content /technical input to ERA TWG	Jun 26
	o Approve version of CR template content /technical input to ERA TWG	Oct 26
	• **Definition of Done:** Approved content by SPSG	
	• **Interaction with other Domains/IP:** as applicable (depends of TSI)	
	• **STIP Reference (if applicable):** STIP_175	

Security CR for TSI Telematics (TAF/TAP)

No	Deliverable	Milestone
04	**Security CR/technical input to ERA TWG for TSI Telematics (TAF/TAP) (0,1 FTEs)**	Oct 26
	• **Description of Deliverable:** If required review of the SC2.4 outcomes. CRs to address security gaps in TSI Telematics (TAF/TAP)	
	• **Intermediate Milestones:**	
	o Draft version of CR template content /technical input to ERA TWG and update of the preassessment template content if necessary	Dec 25
	o Final version of CR template content /technical input to ERA TWG	Jun 26
	o Approve version of CR template content /technical input to ERA TWG	Oct 26
	• **Definition of Done:** Approved content by SPSG	
	• **Interaction with other Domains/IP:** as applicable (depends of TSI)	
	• **STIP Reference (if applicable):** STIP_175	

Security CR for TSI OPE

No	Deliverable	Milestone
05	**Security CR for TSI OPE (0,1 FTEs)**	Oct 26
	• **Description of Deliverable:** CRs to address security gaps in TSI OPE	
	• **Intermediate Milestones:**	
	o Draft version of CR template content /technical input to ERA TWG and update of the preassessment template content if necessary	Dec 25
	o Final version of CR template content /technical input to ERA TWG	Jun 26
	o Approve version of CR template content /technical input to ERA TWG	Oct 26
	• **Definition of Done:** Approved content by SPSG	
	• **Interaction with other Domains/IP:** as applicable (depends of TSI)	
	• **STIP Reference (if applicable):** STIP_175	

Security approval process description

No	Deliverable	Milestone
06	**Security approval process description (0,2 FTEs)**	Q3 2026
	• **Description of Deliverable:** Description of security approval aligned to existing safety approval process	
	• **Intermediate Milestones:**	
	o Draft approval process description	Q2 2026
	• **Definition of Done:** approved description	
	• **Interaction with other Domains/IP:**	
	• **STIP Reference (if applicable):** new STIP entry?	

Technical migration path description

No	Deliverable	Milestone
07	**Technical migration path description (0,2 FTEs)**	Q2 2026
	• **Description of Deliverable:** Description of the technical migration path (update of existing systems, system extension, interfacing to legacy systems) for CCS	
	• **Intermediate Milestones:**	
	o Draft technical migration description	Q1 2026
	• **Definition of Done:** approved description	
	• **Interaction with other Domains/IP:**	
	• **STIP Reference (if applicable):** new STIP entry?	

Cooperation with SP domains and IP projects

No	Deliverable	Milestone
08	**Cooperation with System Pillar Domains and Innovation Pillar (0,3 FTEs)**	Continuous task
	• **Description of Deliverable:** Cooperation with System Pillar Domains and Innovation Pillar demonstrator projects for continuous support of the integration of the SP security requirements.	
	• **Intermediate Milestones:**	
	o Meeting plan with other domains	Q4 2024
	• **Definition of Done:** Meetings held	
	• **Interaction with other Domains/IP:**	
	a. SP domains (Train CS, Traffic CS, TMS, Architecture, Transversal)	
	b. selected IP demonstrator projects (DAC, ATO, FRMCS (MORANE), EGNOS, …)	
	• **STIP Reference (if applicable):**	

Ad Hoc

No	Deliverable	Milestone
99	**Ad Hoc Activity (0,1 FTEs)**	continuous
	• **Description of Deliverable**: There may be additional requests to be accommodated on an ad hoc basis, for example contribution to maturity checkpoint reviews of the Innovation Pillar	
	• **Intermediate Milestones:** to be defined (if applicable)	
	• **Definition of Done:** To be agreed with the SPCG	
	• **Interaction with another Domains/IP:** to be defined (if applicable)	
	• **STIP Reference (if applicable):** -	

STIP TASKS

Collaboration with STIP related topics

No	Deliverable	Milestone
	Task Collaboration with STIP related topics (FTEs incl. in 1.3.0 Management of the domain)	
	• **Description of Deliverable:**	
	• **Intermediate Milestones:**	
	o Identification of activities and joint plan with related Tasks and Domains,	
	o Description of foreseen actions.	
	o Review the STIP and any applicable update considering Domain developments	Cont.
	o LEAD the following STIP related Deliverables/Tasks	
	i. STIP_175	Cont.
	• **Definition of Done:**	
	• **Interaction with other Domains/IP:**	
	• **STIP Reference (if applicable):**	

Task 1 Railway System

DELIVERABLES

Management of Domain

No	Deliverable	Milestone
0	**Management of Domain**	Continuous task
	• **Description of Deliverable:** Management activities to ensure that the below described deliverables are provided in form and time.	
	• **Intermediate Milestones:**	
	o Remit Deliverables preliminary structure and detailed scope is defined in Polarion	Nov. 2025
	o Kanban Board with expected tasks required for each Remit deliverable is set up in Polarion.	Q4 2025
	o Reporting to SPCG and PMO based on detailed action report per task area (solved tickets)	Monthly
	• **Definition of Done:** Planification, monitoring, intermediate and final reporting are done	
	• **Interaction with other Domains/IP:** Coordination required with all domains.	

High level system architecture on system level 2 (Global Architecture To-Be Model)

No	Deliverable	Milestone
01	**High level system architecture on system level 2: Names of the subsystems and interfaces**	Q3 2026
	• **Description of Deliverable:** Defining and providing the TO-BE architecture according to the SEMP.	
	Technological neutral System architecture description, with description of the functions and interfaces and derived High-Level recommendations to other Tasks.	
	• **Sub-Milestones:**	
	o Transfer to Polarion the exiting Task 1 work including:	Jan 2026

i.   Analysis of "Operate Train" (SC2.3/4) Capability (Includes the Sectoral Feedback)
     ii.   Analysis of "Manage Energy" (SC2.3/4) Capability (Includes the Sectoral Feedback)
    iii. Analysis of "maintain and monitor infrastructure" (SC2.4) Capability (Without Sectoral Feedback)
  ○ Transfer to Polarion the first draft TO-BE Global Architecture Model
  ○ Publishing pain point analysis and sending to the mirro group for feedback
  ○ Sending to Mirror Group on each capability.
	Jan 2026

○ 1st Version of Global Architecture Model based on process and interactions over time between railway entities (scenario-based dynamic view)	Oct 2026
○ Integrate TO-BE architecture with Task 3 and mirror group inputs	Oct 2026

• **Definition of Done:** First stable DRAFT approved by SPCG
• **Interaction with other Domains/IP:**
  ○ Task1/Task3: Alignment on modelling according to T1 model
  ○ **Task1/T2,T4,T5: To be defined during SC2.6**
  ○ FP4 Manage Energy & other capabilities : alignment on high level architecture
  ○ Collaboration with ERA on railway system definitions
• **STIP Reference (if applicable): STIP_192**	

Improvement or update of "To-Be" Global Architecture Model based on interactions with FPs & SP Tasks (if necessary)

No	Deliverable	Milestone
02	**Check and align with Flagship Projects (FPs) and SP Tasks on pain points and requirements and adapt the to-be architecture if necessary.**	Oct 2026
	• **Description of Deliverable: Improvement or update** of "To-Be" Global Architecture Model based on interactions with FPs & SP Tasks (if necessary)	

	• **Sub-Milestones:**
	  a. **Improvement or update** of Global Architecture Model "To-Be" based on interactions with FP4 (if necessary)
	  b. **Improvement or update** of Global Architecture Model "To-Be" based on interactions with Task 2 (if necessary)
	  c. **Improvement or update** of Global Architecture Model "To-Be" based on interactions with Task 3 (if necessary)
	  d. **Improvement or update** of Global Architecture Model "To-Be" based on interactions with Task 4 (if necessary)
	  e. **Improvement or update** of Global Architecture Model "To-Be" based on interactions with Task 5 (if necessary)
		Continuous

	• **Definition of Done:** Updated first stable DRAFT after interactions (if necessary) approved by SPCG	Oct 2026

	• **Interaction with other Domains/IP:**
	  ○ Task1/Tasks: Alignment on modelling according to T1 model (if necessary)
	  ○ **Task1/ FPs:** Alignment on modelling according to T1 model (if necessary)
	• **STIP Reference (if applicable): -**	

Collaboration with ERA and the relevant outcomes on railway system definitions

No	Deliverable	Milestone

No	Deliverable	Milestone
03	**Collaboration with ERA and the relevant outcomes on railway system definitions**	On request/ Continuous

	• **Description of Deliverable:**
	  o Collaboration with ERA and the relevant outcomes on railway system definitions
	• **Definition of Done:** First stable DRAFT after interactions with ERA (if necessary) approved by SPCG
	• **Interaction with other Domains/IP:**
	  o Interactions with ERA on railway system definitions
	• **STIP Reference (if applicable): -**
		Oct 2026

Ad Hoc

No	Deliverable	Milestone
99	**Ad Hoc Activity**	Continuous
	• **Description of Deliverable**: There may be additional requests to be accommodated on an ad hoc basis, for example contribution to maturity checkpoint reviews of the Innovation Pillar • **Intermediate Milestones:** to be defined (if applicable) • **Definition of Done:** To be agreed with the SPCG • **Interaction with another Domains/IP:** to be defined (if applicable) • **STIP Reference (if applicable): -**	

STIP TASKS

Task 1 Collaboration with STIP related topics

No	Deliverable	Milestone
09	**Task 1 Collaboration with STIP related topics**	

	• **Description of Deliverable:** Collaboration for STIP related topics/deliverables.
	• **Intermediate Milestones:**
	  o Identification of activities and joint plan with related Tasks and Domains,
	  o Description of foreseen actions.
	  o Review the STIP and any applicable update considering Domain developments
	  o LEAD the following STIP related Deliverables/Tasks
	    • STIP_192
	  o SUPPORT the following STIP related deliverables/tasks
	    •
		Cont.

Task 2 CCS: Domain Architecture and Release Coordination

DELIVERABLES

The ARC domain is a management support team which does not produce own specification, it only protocols coordination activities and summarizes the architecture conclusions for the domains. All results and designs are documented in domain deliverables. The ARC domain does not report on deliverables.

The work of the ARC domain is continuously documented by the following documentation in Polarion:

1. Journal of ARC activities
    a. Conclusion protocols from ARC (coordinators)
    b. Conclusion protocols from ARC-F (Lead by SPCG)
2. TSI CR Pre-Assessment plan and documents
3. System Pillar Release Plan and document lists

Management of Domain

No	Deliverable	Milestone
0	**Management of Domain** • **Description of Deliverable:** Management activities to ensure that the below described deliverables are provided in form and time. • **Intermediate Milestones:**	Continuous task
	o Remit Deliverables preliminary structure and detailed scope is defined in Polarion	Nov. 2025
	o Domain planning with expected tasks required for each Remit deliverable is set up in Polarion.	Q4 2025
	o Reporting to SPCG and PMO based on detailed action report per task area (solved tickets)	Bi-Monthly
	• **Definition of Done:** Planification, monitoring, intermediate and final reporting are done • **Interaction with other Domains/IP:** Coordination required with all domains.	

Journal of ARC activities

No	Deliverable	Milestone
01	**Journal of ARC activities**	Q3 2026
	• **Description of Deliverable:** Journal including a description of ARC performed activities, including: • Conclusion protocols from ARC (coordinators) • Conclusion protocols from ARC-F (Lead by SPCG) • **Intermediate Milestones:**	
	o Semestral Journal	Q1 2026
	• Semestral Journal	Q3 2026
	• **Definition of Done:** Journal with ARC activities is approved by the SPCG • **Interaction with other Domains/IP: All domains**	

TSI CR Pre-Assessment plan and documents

No	Deliverable	Milestone
02	**TSI CR Pre-Assessment plan and documents**	Q3 2026
	• **Description of Deliverable:** TSI CR Pre-Assessment	
	• **Intermediate Milestones:**	
	o First submission to the ERA CCM of all CR for next iteration of TSIs	Dec 2025
	o Pre-Assessment documents available up to March 2026	Q1 2026
	o Pre-Assessment documents available up to October 2026	Q3 2026
	• **Definition of Done:** approved by the SPCG • **Interaction with other Domains/IP: All domains**	

System Pillar Release Plan and document lists

No	Deliverable	Milestone

No	Deliverable	Milestone
03	**System Pillar Release Plan and document lists** • **Description of Deliverable:** The deliverable includes a list of all relevant available System Pillar documents, including classification (type of document) • **Intermediate Milestones:**	Q3 2026
	o Update of the System Pillar Release Plan and document list	Q1 2026
	o Update of the System Pillar Release Plan and document list	Q3 2026
	• **Definition of Done:** approved by the SPCG • **Interaction with other Domains/IP:** All domains	

Ad Hoc

No	Deliverable	Milestone
99	**Ad Hoc Activity** • **Description of Deliverable**: There may be additional requests to be accommodated on an ad hoc basis, for example contribution to maturity checkpoint reviews of the Innovation Pillar • **Intermediate Milestones:** to be defined (if applicable) • **Definition of Done:** To be agreed with the SPCG • **Interaction with another Domains/IP:** to be defined (if applicable)	continuous

Task 2 CCS: Domain Operational Harmonisation

DELIVERABLES

Management of Domain

No	Deliverable	Milestone
0	**Management of Domain** • **Description of Deliverable:** Management activities to ensure that the below described deliverables are provided in form and time. • **Intermediate Milestones:**	Continuous task
	o Remit Deliverables preliminary structure and detailed scope is defined in Polarion	Nov. 2025
	o Kanban Board with expected tasks required for each Remit deliverable is set up in Polarion.	Q4 2025
	o Reporting to SPCG and PMO based on detailed action report per task area (solved tickets)	Bi-Monthly
	• **Definition of Done:** Planification, monitoring, intermediate and final reporting are done • **Interaction with other Domains/IP:** Coordination required with all domains.	

Harmonized CCS-related operational processes for ETCS L2 and ATO GoA 1/2

No	Deliverable	Milestone
01	**Guideline for harmonized CCS related operational processes for ETCS L2 and ATO GoA 1/2** • **Description of Deliverable:** TSI OPE 2026 - Guideline for harmonized CCS related operational processes for ETCS L2 and ATO GoA 1/2 (based on the entity/actor analysis and the analysed operational use cases of SC2.3). For the case of radio-based ETCS alone operation, operational rules described as detailed situation and configuration specific processes for all actors (incl.	Q3 2025

<table>
<tr><td>

signaller), for degraded modes, and with a binding time-ordered sequence of actor and system actions with defined input and output. The operational design is based on specific system and engineering requirements which define a more restricted trackside implementation for radio based ETCS alone operation.

The recommended amendment for TSI OPE in the form of actor specific Rulebooks. Includes operational rules now also described as detailed situation and configuration specific processes for all actors (incl. signaller), for all degraded modes, and with a binding time-ordered sequence of actor and system actions with defined input and output. The work includes the preparation of TSI CR where necessary. User interface description is part of the specification, and includes the list of functionalities and displayed information, as well as basic layouts and catalogue of symbols.

- **Milestone overview for S 2.4 – SC2.7: Capabilities to be specified**
  - **SC 2.4**
    - **Release 1 (15.4.2025)**
      - Movement A to B (subtopics part 1)
      - Revoke Movement Permission (subtopics part 1)
    - **Release 2 (15.7.2025)**
      - Manage Usage restrictions (subtopics part 1)
      - Movement A to B (subtopics part 2)
      - Boarding and disembarking of passengers
    - **Release 3 (30.9.2025)**
      - Revoke Movement Permission (subtopics part 2)
      - Preparation to train departure
      - Approaching Stop Location
      - Train arrival (ending journey)

</td><td>

Previous contract

</td></tr>
<tr><td>

- **Operational Processes**
  - **Release 4**
    - Finalisation of release 3 topics
    - Change of train orientation
    - Configuration update
    - Movement A to B (subtopics part 3)
  - **Release 5**
    - Moving in SR
    - Continue after trip
    - Handling train after loss of communication
    - OS sweeping
    - Runaway vehicle
    - Proceed after TIMS failure
    - Pass a technically non-supervised point

</td><td>

15.4.2026

15.10.2026

</td></tr>
<tr><td>

- **ETCS L2 Rulebook**
  - **Release x+1**
  - **Release x+2**
- *X - Dependant on the finalization of SC2.4 Rulebook results.*

</td><td>

15.4.2026
15.10.2026

</td></tr>
<tr><td>

- Definition of Done: Rulebook with filled chapters for the topics of SC2.6, aligned with existing TSI or running TSI CR (e.g. EUG guidelines), approved on domain level and by the Coregroup. Major harmonization impacts are prepared as a compressed harmonization decision list, ready for the Steering Group.
- **Interaction with other Domains/IP:** Traffic CS, Task 3, TrainCS
- **STIP Reference (if applicable):** STIP_2

</td><td></td></tr>
</table>

Ad Hoc

No	Deliverable	Milestone
99	**Ad Hoc Activity** • **Description of Deliverable**: There may be additional requests to be accommodated on an ad hoc basis, for example contribution to maturity checkpoint reviews of the Innovation Pillar, or reviews of TrafficCS system specification. • **Intermediate Milestones:** to be defined (if applicable) • **Definition of Done:** To be agreed with the SPCG • **Interaction with another Domains/IP:** to be defined (if applicable) • **STIP Reference (if applicable): -**	continuous

STIP TASKS

Collaboration with STIP related topics

No	Deliverable	Milestone
	Task Collaboration with STIP related topics • **Description of Deliverable:** • **Intermediate Milestones:** o Identification of activities and joint plan with related Tasks and Domains, o Description of foreseen actions. o Review the STIP and any applicable update considering Domain developments o LEAD the following STIP related Deliverables/Tasks i. STIP_2 o SUPPORT the following STIP related Deliverables/Tasks: i. STIP_19 ii. STIP_102 iii. STIP_103 iv. STIP_104 • **Definition of Done:** • **Interaction with other Domains/IP:** • **STIP Reference (if applicable):**	Cont. Cont.

Task 2 CCS: Domain Traffic Control and supervision

INTERMEDIATE MILESTONES FOR THE DELIVERABLES ATO-TS, ETPS, PES

The following list defines the intermediate milestones per contract and release:

- **Release 1**
  - Movement A to B (subtopics part 1)
  - Revoke Movement Permission (subtopics part 1)
- **Release 2**
  - Manage Usage restrictions (subtopics part 1)
  - Movement A to B (subtopics part 2)
  - Boarding and disembarking of passengers
- **Release 3**
  - Revoke Movement Permission (subtopics part 2)

- Preparation to train departure
- Approaching Stop Location
- Train arrival (ending journey)
- **Release 4**
  - Finalisation of release 3 topics
  - Change of train orientation
  - Configuration update
  - Movement A to B (subtopics part 3)
- **Release 5**
  - Moving in SR
  - Continue after trip
  - Handling train after loss of communication
  - OS sweeping
  - Proceed after TIMS failure
  - Pass a technically non-supervised point
- **Release 8 (goal: finish release v1)**
  - Handling of emergency situation
- **Release 9 (start release v2)**
  - HO between ETCS Systems
  - Entry Transition to CCS area
  - Exiting Transition to CCS area
- **Release 10 (goal: finish release v2)**
  - Splitting trains
  - Joining trains
  - Pass level crossing
  - Pass a non-protected level crossing
  - Shunting inside controlled areas
- **Maintenance Release**
- **release v3**
  - **Release X**
    - Reversing
    - SPP-18263 - txx - 305 Overrunning/routed in wrong direction
    - Working area excluding normal train operation
    - Entering non-controlled area
    - SPP-18236 - txx - 152 Entering non-controlled area
    - Exiting from non-controlled area
    - SPP-18238 - xx - 153 Exiting from a non-controlled area
    - Manage Usage restrictions (subtopics part 2)

DELIVERABLES

Management of Domain

No	Deliverable	Milestone
0	**Management of Domain** • **Description of Deliverable:** Management activities to ensure that the below described deliverables are provided in form and time.	Continuous task
	• **Intermediate Milestones:**	
	○ Remit Deliverables preliminary structure and detailed scope is defined in Polarion	Nov. 2025
	○ Kanban Board with expected tasks required for each Remit deliverable is set up in Polarion.	Q4 2025

No	Deliverable	Milestone
	○ Reporting to SPCG and PMO based on detailed action report per task area (solved tickets)	Bi-Monthly
	• **Definition of Done:** Planification, monitoring, intermediate and final reporting are done	
	• **Interaction with other Domains/IP:** Coordination required with all domains.	

System specification and interfaces ATO Trackside *function* (perh. incl. interface to PES)

No	Deliverable	Milestone
01	**System specification and interfaces ATO Trackside *function***	Q3 2026
	• **Description of Deliverable:** The result document structure (along SEMP configuration plan) is completed concerning topics package 1 and concerning the ATO trackside function	
	• **Intermediate Milestones: See previous chapter**	
	• **Release 4**	15.4.2026
	• **Release 5**	15.10.2026
	• *X - Dependant on the finalization of SC2.4 results.*	
	• **Definition of Done:** The topic workitem traces are complete, aligned with existing TSI documents or running CR, and reviewed by SPCG. Major design decisions are described ready for decision in STG. The topic requirements are described and approved as SRS and for all harmonized system and user interfaces as FiS/FFFiS. Impact to existing interoperability specifications (in CCS TSI) is identified including harmonization of functional/engineering rules and proposed changes to existing requirements.	
	• **Interaction with other Domains/IP:** OD, Train CS, Task 3	
	• **STIP Reference (if applicable):** STIP_19, STIP_104	

System specification Trackside Protection System (ETPS) incl. interface to adjacent CCS area

No	Deliverable	Milestone
02	**System specification and interfaces of the European trackside protection system**	Q3 2026
	• **Description of Deliverable:** The result document structure (along SEMP configuration plan) is completed concerning the topics package 1 and concerning the European trackside protection system	
	• **Intermediate Milestones: See previous chapter**	
	• **Release x+1**	15.4.2026
	• **Release x+2**	15.10.2026
	• *X - Dependant on the finalization of SC2.4 results.*	
	• **Definition of Done:** The topic workitem traces are complete, aligned with existing TSI documents or running CR, and reviewed by SPCG. Major design decisions are described ready for decision in STG. The topic requirements are described and approved for all harmonized system and user interfaces as FiS/FFFiS. Impact to existing interoperability specifications (in CCS TSI) is identified including harmonization of functional/engineering rules and proposed changes to existing requirements.	
	• **Interaction with other Domains/IP:** OD, Train CS, Task 3, Lot 3	
	• **STIP Reference (if applicable):** STIP_102, STIP_101	

System specification and interfaces of the Plan Execution System

No	Deliverable	Milestone
03	**System specification and interfaces of the Plan Execution System**	Q3 2026

No	Deliverable	Milestone
	- **Description of Deliverable:** The result document structure (along EN50126, phase 1-5, and for the design safety case) is completed concerning topics package 1 and concerning the execution and adaption layer system - **Intermediate Milestones: See previous chapter**	
	• **Release x+1** • **Release x+2**	15.4.2026 15.10.2026
	- *X - Dependant on the finalization of SC2.4 results.* - **Definition of Done:** The topic workitem traces are complete, aligned with existing TSI documents (like EUG guidelines) or running CR, and reviewed by SPCG. Major design decisions are described ready for decision in STG. The topic requirements are described and approved for all harmonized system and user interfaces as FiS/FFFiS. Impact to existing interoperability specifications (in CCS TSI) is identified including harmonization of functional/engineering rules and proposed changes to existing requirements. - **Interaction with other Domains/IP:** OD, Train CS, Task 3 - **STIP Reference (if applicable):** STIP_103	

Trackside migration analysis

No	Deliverable	Milestone
04	**CCS Trackside migration analysis**	Q3 2026
	- **Description of Deliverable**: Deliverables build on the SC2.4 results. - **Definition of Done:** To be agreed with the SPCG. - **Interaction with other Domains/IP:** OD, Train CS, Task 3 - **STIP Reference (if applicable):** -	

Ad Hoc and technical concepts

No	Deliverable	Milestone
99	**Ad Hoc Activity**	continuous
	- **Description of Deliverable**: There may be additional requests to be accommodated on an ad hoc basis, for example contribution to maturity checkpoint reviews of the Innovation Pillar - **Intermediate Milestones:** to be defined (if applicable) - **Definition of Done:** To be agreed with the SPCG - **Interaction with another Domains/IP:** to be defined (if applicable) - **STIP Reference (if applicable):** -	

STIP TASKS

Collaboration with STIP related topics

No	Deliverable	Milestone
	Task Collaboration with STIP related topics	
	- **Description of Deliverable:** - **Intermediate Milestones:**	

	○ Identification of activities and joint plan with related Tasks and Domains,
	   ○ Description of foreseen actions.
	   ○ Review the STIP and any applicable update considering Domain developments
	   ○ LEAD the following STIP related Deliverables/Tasks
	      . STIP_19
		Cont.

	i. STIP_102	
	ii. STIP_103	
	iii. STIP_104	
	o SUPPORT the following STIP related Deliverables/Tasks:	Cont.
	. STIP_2	
• **Definition of Done:**		
• **Interaction with other Domains/IP:**		
• **STIP Reference (if applicable):**		

Task 2 CCS: Domain Train Control and supervision

DELIVERABLES

Management of Domain

No	Deliverable	Milestone

0	**Management of Domain**
	• **Description of Deliverable:** Management activities to ensure that the below described deliverables are provided in form and time.
	• **Intermediate Milestones:**
	  o Remit Deliverables preliminary structure and detailed scope is defined in Polarion
	  o Kanban Board with expected tasks required for each Remit deliverable is set up in Polarion.
	  o Reporting to SPCG and PMO based on detailed action report per task area (solved tickets)
	• **Definition of Done:** Planification, monitoring, intermediate and final reporting are done
	• **Interaction with other Domains/IP:** Coordination required with all domains.
		Continuous task
		
		Nov. 2025
		
		Q4 2025
		
		Bi-Monthly

Ethernet CCS consist network (full stack)

No	Deliverable	Milestone
01	**Ethernet CCS consist network (full stack)** • **Description of Deliverable:** Concept for addressing Common Onboard Network in TSIs. Complete harmonized onboard CCS communication layer full stack without the current options for layers 3-6 incl. safety integrity layer. For time-critical safety applications a safe time layer (similar to Subset-056) for Ethernet CCS consist of network shall be analysed and aligned with IEC TC9 working group WG43 (IEC61375-2-3).. Application layer SUBSETs shall be updated according to the new Ethernet CCS communication layers which include the required Cyber Security measures. Application layer subsets are to be updated accordingly. Safe time Layer is needed for time-critical safety applications which establishes a relative but safe time synchronisation for safe timestamping. The deliverable are the mature CR solution proposal for the different CR identified as necessary to cover this topic • **Intermediate Milestones:** o CR solution proposal draft and delivery of comments to IEC specifcaiton process	Q3 2026 Feb. 2026

		Sep. 2026
	• **Definition of Done:**	
	• **Interaction with other Domains/IP:** FP2	
	• **STIP Reference (if applicable):** STIP_68	

Train interfaces enhancement

No	Deliverable	Milestone
02	**Train interfaces enhancement**	Q3 2026
	• **Description of Deliverable:** Functional enhancement for the train interface to allow for CCS onboard systems to be deployed on vehicles as a product from different vehicle suppliers. (ensure CCS onboard exchangeability)	
	• **Intermediate Milestones:**	
	o CR agreed problem description and first input necessary for the CCM database of the agreed CR within the bundle	Dec. 2025
	o Mature solution proposal for each of the CR included in the CCM database	Q32026
	• **Definition of Done:**	
	• **Interaction with other Domains/IP:**	
	• **STIP Reference (if applicable):** STIP_71	

Multi Display solution

No	Deliverable	Milestone
03	**Multi Display Concept**	Q3 2026
	• **Description of Deliverable:** Train Display System – Multiple display system concept. Define Multiple DMI concept based on existing documents / information and specific topics.	
	• **Intermediate Milestones:**	
	o Document structure and properties in Polarion, identified task associated and detailed scope added	Q4 2025
	o Continuation of Train CS Task Remit 10.3.3 from SC 2.4 contract	Q1 2026
	o Update basic concept of Phase 2.4 (Basic concept of apportionment of the logic of applications for the "Multi Display System")	Q1 2026
	o Update Demonstrator requirements	Q2 2026
	• **Definition of Done: Document is approved at domain level and reviewed by SP CG**	
	• **Interaction with other Domains/IP: TCCS**	
	• **STIP Reference (if applicable):** STIP_69	

Train interface adaption for integrity handling and train length / overall consist length

No	Deliverable	Milestone
04	**Train interface adaption for integrity handling and train length / overall consist length**	Q3 2026
	• **Description of Deliverable:** Joint analysis and decision of the train length merging function and its interfaces with task 4 according decision from SC2.4. TLMF and its interfaces are specified in cooperation with FA 5	
	• **Intermediate Milestones:**	
	o CR agreed problem description and first input necessary for the CCM database of the agreed CR within the bundle. For TLMF inluding Interface	Dec. 2025

		Q3 2026
	to DAC control unit (Traction Control Unit LCU) a System Pillar documents in Polarion shall be elaborated. No CR. ○ Mature solution proposal for each of the CR included in the CCM database • **Definition of Done:** TSI Document ready for sector review • **Interaction with other Domains/IP:** Task 4, FP2, FP5 • **STIP Reference (if applicable):** STIP_73	

On board modularity and upgradeability

No	Deliverable	Milestone

05a	**On board modularity and upgradability**
	
	Based on the results of SC 2.4. . Update of the System Architecture Definition of Train CS specific tasks and the associated updated Train CS Architecture. Continuation of the CCS-OB migration recommendations based on the result of SC 2.4Based on the results of the architecture work in train CS to include considerations of results of FRMCS V2 or cyber
	
	•**Intermediate Milestones:**
	
	  • snapshot of System Architecture Definition, including revised content from Train CS remit groups and update on cybersecurity and FRMCS considerations
	  • updated of System Architecture Definition, including revised content from Train CS remit groups and update on cybersecurity and FRMCS considerations
	
	•**Definition of Done:** : Achievement of defined milestones approved by SPCG and/or SPSG
	
	• **Interaction with other Domains/IP: FP2 / CE / Safety /TCCS**
	
	• **STIP Reference (if applicable): STIP 135**
		Q3 2025
		
		Q1 2026
		
		Q3 2026

05b	On board modularity and upgradability
	
	Identify current painpoints and cost/complexity drivers for CCS onboard updates (mainly SW changes, e.g. error corrections) and upgrades (including the migrations steps from SAD), Propose solutions or mitigations
	
	•Intermediate Milestones:
	
	  • Identify main painpoints for updates and upgrades
	
	  • Identify mitigations or solutions to these pain points
	
	•Definition of Done: : Achievement of defined milestones approved by SPCG and/or SPSG
	
	• Interaction with other Domains/IP: FP2 / CE / Safety /TCCS
	
	• STIP Reference (if applicable): STIP 135
		Q3 2026
		
		Dec. 2025
		
		Q3 2026

Basic advanced safe train positioning: Full ASTP preparation, Odometry enhancement and Robustness clarification

No	Deliverable	Milestone
06	**Basic advanced safe train positioning: Full ASTP preparation, Odometry enhancement and Robustness clarification**	

- **Description of Deliverable:** Basic ASTP aim to increase the current odometry performances, specify availability requirements and to prepare for the upgrade to Full ASTP. It includes objectives to:
- - Modify the specified performance accuracy of distances measured on-board in a technology-agnostic manner , compatible with current odometry system in operation, and valid for basic and full ASTP.
- - Clarify the "robustness" requirements of the odometry (based on the state of current odometry systems already in operation). The goal is to unambiguously specify under which conditions the performance requirements shall be fulfil and what the allowed degraded mode. Clear availability and reliability targets shall be defined, aligned on operational needs. Additionally, efforts will be made to make the accuracy target model requirements more testable.
- Create a test and validation concept for the ETCS odometry to define the conditions under which the performance has to be achieved as well as the methods to measure. This should consider also the different sensors currently in use.
- Based on an agreed economic and technical approach, specify
    a. New standard "odometry output available for all OB systems specifying a first version of the new odometry output"
    b. interface taking into account user needs (e.g. potentially balise information) which shall be previously defined by Train CS and potential other consumers external to CCS-OB
    c. Finalization of EGNOS for Rail deliverable 3.3.1.3
- **Intermediate Milestones:**
    - CR agreed problem description for the next CCS TSI update and first input necessary for the CCM database of the agreed CR within the bundle — Dec. 2025
    - Mature solution proposal for each of the CR included in the CCM database — Feb 2026
    - E4R deliverable 3.3.1.3 finalizes — Q3 2026
- **Definition of Done: Achievement of defined milestones**
- **Interaction with other Domains/IP:**
- **STIP Reference (if applicable):** STIP_29, 68, 71

No	Deliverable	Milestone
07	**Multiple Display Concept**	Q3 2026
	• **Description of Deliverable:** Train Display System – Multiple display system concept. Define Multiple DMI concept based on existing documents / information and specific topics.	
	• **Intermediate Milestones:**	
	○ Document structure and properties in Polarion, identified task associated and detailed scope added	Q4. 2025
	○ Continuation of Train CS Task Remit 10.3.3 from SC2.4. contract	Q1 2026
	○ Update Basic concept of Phase 2.4 (Basic concept of apportionment of the logic of applications for the "Multi Display System")	Q1 2026
	○ Update Demonstrator requirements	Q2 2026
	• **Definition of Done:** Document is approved at domain level and reviewed by SPCG	
	• **Interaction with other Domains/IP:** TCCS	
	• **STIP Reference (if applicable):** STIP_69	

Ad Hoc

No	Deliverable	Milestone
99	**Ad Hoc Activity** • **Description of Deliverable**: There may be additional requests to be accommodated on an ad hoc basis, for example contribution to maturity checkpoint reviews of the Innovation Pillar • **Intermediate Milestones:** to be defined (if applicable) • **Definition of Done:** To be agreed with the SPCG • **Interaction with another Domains/IP:** to be defined (if applicable) • **STIP Reference (if applicable): -**	continuous

STIP TASKS

Collaboration with STIP related topics

No	Deliverable	Milestone
	Task Collaboration with STIP related topics • **Description of Deliverable:** • **Intermediate Milestones:**	
	o Identification of activities and joint plan with related Tasks and Domains, o Description of foreseen actions. o Review the STIP and any applicable update considering Domain developments o LEAD the following STIP related Deliverables/Tasks i. STIP_29 - Basic advanced safe train positioning: Full ASTP preparation, Odometry enhancement and Robustness clarification (Train CS) ii. STIP_68 - Ethernet CCS consist network (full stack) iii. STIP_71 - Train interfaces enhancement iv. STIP_73 - Train interface adaption for integrity handling and train length / overall consist length o SUPPORT the following STIP related Deliverables/Tasks: i. STIP_8 Service Function Configuration (Phase 1) ii. STIP_174 (include or not? Sector opinion requested) Functional and technical impact from analysis of driving rules for freight trains iii. STIP_135 ETCS CR enhancements	Cont.
	o LEAD/SUPPORT CCS onboard CR process: i. Definition and drafting of CR problem description, preassessment template, mature solution proposal for the different CCS CR that would be proposed by SP to ERA CCM process related to the technical scope of traffic CS ii. Review and opinion of any external CCS CR that would be received from ERA CCM process related to the technical scope of traffic CS iii. Review and opinion of Driving rules for ATO GoA2 for Freight and loco hauled trains	Cont.

Task 2 CCS: Domain Trackside Assets Control & Supervision

DELIVERABLES

Management of Domain

No	Deliverable	Milestone
0	**Management of Domain** • **Description of Deliverable:** Management activities to ensure that the below described deliverables are provided in form and time. • **Intermediate Milestones:** 　o Remit Deliverables preliminary structure and detailed scope is defined in Polarion 　o Kanban Board with expected tasks required for each Remit deliverable is set up in Polarion. 　o Reporting to SPCG and PMO based on detailed action report per task area (solved tickets) • **Definition of Done:** Planification, monitoring, intermediate and final reporting are done • **Interaction with other Domains/IP:** Coordination required with all domains.	Continuous task Nov. 2025 Q4 2025 Bi-Monthly

Draft update of EU-RAIL Trackside Assets Specification

No	Deliverable	Milestone
01	**Draft EU-RAIL Trackside Assets Specification BL5**	Q3 2026
	• **Description of Deliverable:** Draft update of the next baseline of the EU-RAIL Trackside Assets Specification, including error corrections and completion of backlog topics on specifications. The expected scope of the work to be considered in the preparation of the update is: 　o Update of SCI specifications according to the CRs as needed by Service Function Configuration 　o Backlog CR topics, such as enhanced support of multi-element controller 　o Update according to the needs identified by other domains, e.g. OD and Traffic CS 　o Enhancement of Test Catalogue specification • **Intermediate Milestones:**	
	o BL5 scope drafted	Q1 2026
	o BL5 scope agreed	Q2 2026
	o BL5 first draft available	Q3 2026
	• **Definition of Done:** BL5 first draft available and on track for publication in 2027 • **Interaction with other Domains/IP:** TCCS and OD/Traffic CS • **STIP Reference:** STIP_176	

Handover generic documents to CONEMP Domain

No	Deliverable	Milestone
02	**Handover generic documents to CONEMP Domain**	Q1 2026
	• **Description of Deliverable:** Generic specification documents for Service Function Diagnosis and Service Function Configuration are handed in an agreed and managed process to CONEMP Domain (was: Transversal Domain).	

All CRs are properly managed and full traceability between SP/EULYNX BL4R4 version of the documents and the new BL5 documents is ensured. Specification documents under responsibility of TACS (e.g. SDI information models and all SCI) are updated as needed to ensure consistency with generic documents (e.g. glossary/terminology).

- o Eu.Doc.77 Interface definition SDI
- o Eu.Doc.94 Interface specification SDI Generic
- o Eu.Doc.76 Interface definition and specification SMI
- **Intermediate Milestones:**
  - o Handover process agreed with CONEMP Domain — Q4 2025
  - o Handover completed — Q1 2026
- **Definition of Done:** All CRs are properly managed and full traceability between SP/EULYNX BL4R4 version of the documents and the new BL5 documents is ensured.
- **Interaction with other Domains/IP:** TCCS
- **STIP Reference (if applicable):** STIP_8, STIP_10

Ad Hoc

No	Deliverable	Milestone
99	**Ad Hoc Activity**	continuous
	• **Description of Deliverable**: There may be additional requests to be accommodated on an ad hoc basis, for example contribution to maturity checkpoint reviews of the Innovation Pillar	
	• **Intermediate Milestones:** to be defined (if applicable)	
	• **Definition of Done:** To be agreed with the SPCG	
	• **Interaction with another Domains/IP:** to be defined (if applicable)	
	• **STIP Reference (if applicable): -**	

STIP TASKS

Collaboration with STIP related topics

No	Deliverable	Milestone
	Task Collaboration with STIP related topics	
	• **Description of Deliverable:**	
	• **Intermediate Milestones:**	
	o Identification of activities and joint plan with related Tasks and Domains, o Description of foreseen actions. o Review the STIP and any applicable update considering Domain developments o LEAD the following STIP related Deliverables/Tasks . STIP_176	Cont.

	o SUPPORT the following STIP related Deliverables/Tasks:
	  . STIP_8 - Service Function Configuration (Phase 1)
	  i. STIP_9 - Service Function Configuration (Phase 2)
	  ii. STIP_135 - ETCS CR enhancements
	  iii. STIP_193- Requirements specification and C-ITS interface specification for subsystem Level Crossing.
		Cont.

      iv.   STIP_194 - Use cases and requirement specification for different interfaces allowing information flow wayside to on-board

Task 2 CCS: CONEMP Domain

DELIVERABLES

Management of Domain

No	Deliverable	Milestone
0	**Management of Domain** • **Description of Deliverable:** Management activities to ensure that the below described deliverables are provided in form and time. • **Intermediate Milestones:** o Remit Deliverables preliminary structure and detailed scope is defined in Polarion o Kanban Board with expected tasks required for each Remit deliverable is set up in Polarion. o Reporting to SPCG and PMO based on detailed action report per task area (solved tickets) • **Definition of Done:** Planification, monitoring, intermediate and final reporting are done • **Interaction with other Domains/IP:** Coordination required with all domains.	Continuous task Nov. 2025 Q4 2025 Bi-Monthly

Concept of Employment for CCS

No	Deliverable	Milestone
01	**Concept of Employment (CONEMP) for CCS** • **Description of Deliverable:** Re-use and integrate the existing artefacts (Traffic CS, Train CS, TCCS, CE, TACS) into one consistent overall CCS CONEMP. Harmonization scope for CONEMP processes defined, evaluated, prioritized and approved. Finalize Operational Analysis & process description of CONEMP processes in harmonization scope (Onboard & Trackside Elements). Define ambition level and harmonization scope for operational processes, link to CBOs and level of automation and ensure approval with stakeholders. In particular specify and complete exported constraints and requirements for external processes, such as validated topo and engineering data, based on ERA-ontology. Ensure SL3-5 specification (capella, polarion) for transversal functions and computing environment is fully consistent with CCS CONEMP and update where needed. • **Intermediate Milestones:** o Overall CCS CONEMP consolidated based on existing input o Overall CCS CONEMP finalized and ambition level defined o Overall CCS CONEMP approved and released as ER-Rail internal publication o SL3-5 specifications for transversal functions updated as needed • **Definition of Done:**. CONEMP harmonization scope evaluated and prioritisation approved. Stakeholder requirements defined and approved, all relevant operational processes [including precise actor roles] specified and approved, EU-RAIL internal publication of documents, and breakdown to SL3-	 Q1. 2025 Q2 2025 Q3 2026 Q4 2026

5 specifications updated, SL4 functional allocation agreed with domains, overall consistency and traceability checked.
- **Interaction with other Domains/IP:** OD/Traffic CS, Train CS, TACS, Task 3 (TMS/CMS)
- **STIP Reference (if applicable):** -

ERA-ontology extension for CCS

No	Deliverable	Milestone
02	**ERA-ontology extension for enabling the CCS/TMS Data Model**	Q3 2026
	Description of Deliverable: Update the contributions to extending and amending the ERA-ontology for enabling the derived CCS/TMS Data model according to the evolution of SP Domain specifications and based on feedback from current reference implementations of the model. Contribute to the extension of the ERA-ontology also for Diagnosis and ETCS-UI related data, in close cooperation with ERA TWG on Driver Route Book. Provide automated process for extension of ERA-ontology to ensure CCS/TMS Data model is fully derivable from ERA-ontology. Guide and support FP 1 TT in developing the planning data validation method and tooling for ERA-ontology (rdf).	
	• **Intermediate Milestones:**	
	o ERA-ontology extension proposal delivered	Q1 2026
	o CCS/TMS Data model updated as a resulting process of ERA-ontology extension	
	o Planning data validation tooling reviewed, corrections and amendments proposed to ERJU	Q3 2026
	• **Definition of Done:** CCS/TMS Data model updated and derived from ERA-ontology, Planning data validation reviewed and amended	
	• **Interaction with other Domains/IP:** All system design domains, in particular Traffic CS, Task 3 (TMS/CMS), Task 4 (FDFTO/DAC), Task 5 (HERD), IP FP 1 TT (Data validation tooling prototype), IP FP2 i.e. WP27 and WP44/45	
	• **STIP Reference (if applicable):** STIP_11	

Service Function Diagnosis Specification

No	Deliverable	Milestone
03	**Service Function Diagnosis Specification**	Q3 2026
	• **Description of Deliverable:** Updated Service Function Diagnosis Specification (SL3-SL5) based on feedback from other SP System Design Domains and from reference implementations e.g. from the IP. Utilize the newly developed toolchain in close cooperation with EET to scale the approach for diagnostic product group models creation with other domains and tasks. Define/extend the data models for Computing Environment architecture (I1-CE) to Service Function diagnosis specification elements. Finalize handover of generic SDI documents from TACS in a controlled change management process with full traceability, to ensure full integration into SP environment and ERA-ontology for	
	o Eu.Doc.77 Interface definition SDI	
	o Eu.Doc.94 Interface specification SDI Generic	
	• **Intermediate Milestones:**	
	o Handover process agreed with TACS Domain	Q4 2025
	o Handover completed	Q1 2026
	o I1-CE requirements integrated	Q2 2026
	o Service Function Diagnosis Specification (SL3-SL5) updated	Q3 2026

- **Definition of Done:** All CRs are properly managed and full traceability between SP/EULYNX BL4R4 version of the documents and the new BL5 documents is ensured. Service Function Diagnosis Specification (SL3-SL5) updated according to the feedback received from other SP system design domains or IP reference implementations. ERA-ontology extended for the needs of diagnosis. Backwards compatibility clarified and migration strategy defined if necessary
- **Interaction with other Domains/IP:** Safety and IP (FA1, FA2, FA3), Train CS, TACS, Traffic CS, Task 4 (FDFTO/DAC), Task 5 (HERD
- **STIP Reference (if applicable):** STIP_10

Service Function Configuration Specification

No	Deliverable	Milestone
04	**Service Function Configuration Specification**	Q3 2026
	Description of Deliverable: Updated Service Function Configuration Specification (SL3-SL5) based on other SP System Design Domains and from reference implementations e.g. from the IP. Integrate CCS specific requirements from Computing Environment work (I1) to Service Function Configuration specification elements to cover CE use-cases (e.g. multistage deployment with separate preload and activation for each stage and Functional System deployment Rules (FSDR)). Requirements from shared security services fully integrated or covered. Finalize handover of generic SMI documents from TACS in a controlled change management process with full traceability to ensure full integration into SP environment and ERA-ontology for o Eu.Doc.76 Interface definition and specification SMI	
	• **Intermediate Milestones:**	
	o Handover process agreed with TACS Domain	Q4 2025
	o Handover completed and I1 requirements integrated	Q1 2026
	o Service Function Configuration Specification (SL3-SL5) updated	Q2 2026
	• **Definition of Done:** All CRs are properly managed and full traceability between SP/EULYNX BL4R4 version of the document and the new BL5 documents is ensured. Service Function Configuration Specification (SL3-SL5) updated according to the feedback received from other SP system design domains or IP reference implementations. Backwards compatibility clarified and migration strategy defined if necessary. • **Interaction with other Domains/IP:** All system design domains, in particular Traffic CS, Safety and IP (FA1, FA2, FA3), Train CS, TACS, Traffic CS, • **STIP Reference (if applicable):** STIP_8	

Service Function Configuration Safety analysis

No	Deliverable	Milestone
05	**Service Function Configuration Safety analysis**	Q3 2026
	• **Description of Deliverable:** Finalize and approve Safety risk analysis for full configuration management process, identifying all hazards and risk acceptance criteria (Safety Requirements) and operational consequences / conditions and performance in line with the overall CONEMP process and SL5 specifications. • Note: To cover the end-to-end process, the risk analysis should also refer to the SRACs defined for engineering/configuration data of overall CCS system (or on lower subsystem level)	

• **Intermediate Milestones:**		
o Safety risk analysis updated	Nov 2025	
o All Safety Requirements and Operational Conditions identified and agreed	Q1 2026	
o Safety risk analysis approved by all impacted domains	Q2 2026	
• **Definition of Done:** PRAMS risk analysis decided on SP STG level as ERJU internal release		
• **Interaction with other Domains/IP:** Safety, TACS, OD/Traffic CS, Train CS		
• **STIP Reference (if applicable):** STIP_8		

Computing Environment specifications for I2 and I3

No	Deliverable	Milestone
06	**Computing Environment specifications for I2 and I3**	Q2 2026
	Description of Deliverable: Specifications of the Computing Environment interfaces I2 (hardware abstraction interface) and I3 (virtualization interface). Integration of artefacts into CONEMP and SL3-5 specifications of CONEMP Domain including full linking and traceability between the Polarion work items and Capella models. Finalize alignment with other system domains and release of SL5 specifications of I2 and I3.	
	• **Intermediate Milestones:**	
	o Polarion and capella artefacts aligned and linked with overall CONEMP Domain specification	Q4 2025
	o I2 and I3 requirements aligned with all system domains	Q1 2026
	o I2 and I3 specifications approved and submitted to SP STG	Q2 2026
	• **Definition of Done:** I2 and I3 decided on SP STG level as ERJU internal release	
	• **Interaction with other Domains/IP:** Safety, TACS, OD/Traffic CS, Train CS, Cybersecurity	
	• **STIP Reference (if applicable):** STIP_4	

Ad Hoc

No	Deliverable	Milestone
99	**Ad Hoc Activity**	continuous
	• **Description of Deliverable**: There may be additional requests to be accommodated on an ad hoc basis, for example contribution to maturity checkpoint reviews of the Innovation Pillar	
	• **Intermediate Milestones:** to be defined (if applicable)	
	• **Definition of Done:** To be agreed with the SPCG	
	• **Interaction with another Domains/IP:** to be defined (if applicable)	
	• **STIP Reference (if applicable): -**	

STIP TASKS

Collaboration with STIP related topics

No	Deliverable	Milestone
	Task Collaboration with STIP related topics	
	• **Description of Deliverable:**	

• **Intermediate Milestones:**		
o Identification of activities and joint plan with related Tasks and Domains,		
o Description of foreseen actions.		
o Review the STIP and any applicable update considering Domain developments		
o LEAD the following STIP related Deliverables/Tasks		
. STIP_8 - Service Function Configuration (Phase 1)		
i. STIP_10 - Service Function Diagnosis		
ii. STIP_11 – ERA-ontology extension and amendment enabling CCS/TMS Data Model	Cont.	
iii. STIP_74 - ETCS related UI representation (including catalogue of symbols, rules, tools and guidelines		
o SUPPORT the following STIP related Deliverables/Tasks:		
. STIP_18 - Function distribution and Interface between TMS/TrafficCS		
i. STIP_29 - Basic advanced safe train positioning: Full ASTP preparation, Odometry enhancement and Robustness clarification (Train CS)	Cont.	
ii. STIP_135 - TSI ETCS CR enhancements		

Task 3: TMS & CMS

DELIVERABLES

Management of Domain

No	Deliverable	Milestone
0	**Management of Domain**	Continuous task
	• **Description of Deliverable:** Management activities to ensure that the below described deliverables are provided in form and time.	
	• **Intermediate Milestones:**	
	o Remit Deliverables preliminary structure and detailed scope is defined in Polarion	Nov. 2025
	o Kanban Board with expected tasks required for each Remit deliverable is set up in Polarion.	Q4 2025
	o Reporting to SPCG and PMO based on detailed action report per task area (solved tickets)	Bi-Monthly
	• **Definition of Done:** Planification, monitoring, intermediate and final reporting are done	
	• **Interaction with other Domains/IP:** Coordination required with all domains.	

Function distribution and Interface between TMS/TrafficCS

No	Deliverable	Milestone
01	**Maintain Function distribution and Interface between TMS/TrafficCS**	Q3 2026
	Description of Deliverable: Maintain document in case Traffic CS provides additional inputs.	
	• Consistent splitting of the features of a Supervision system between the two systems (TMS and TrafficCS, functional allocation on System Level 3) which implement the former and finalization of the specification of the interface between TMS and TrafficCS, based on SCI-OP. Finish and	

	maintain Capella model and linking with TrafficCS on System Analysis level.	
	• **Intermediate Milestones:**	
	o Maintenance of document (if applicable, Traffic CS provides additional inputs)	Q4. 2025
	o Maintenance of document (if applicable, Traffic CS provides additional inputs)	Q1. 2026
	o Maintenance of document (if applicable, Traffic CS provides additional inputs)	Q2 2026
	o Maintenance of document (if applicable, Traffic CS provides additional inputs)	Q3 2026
	• **Definition of Done:**. TMS/TCS Document is aligned with Traffic CS and other possible Task 2 related domains and in line with related operational capabilities harmonized in Operational Rulebook of OD/Traffic.	
	• **Interaction with other Domains/IP:** Traffic CS, CONEMP Domain (TCCS+CE)	
	• **STIP Reference (if applicable):** STIP_18	

Proposal for updates of the Telematics TSI

No	Deliverable	Milestone
02	**Proposal for updates of the Telematics TSI**	
	• **Description of Deliverable:** Functional enhancements for the Telematics TSI for Capacity Management as well as Traffic Management including harmonized processes, messages and data sources in the area of	
	. rolling planning and framework agreements	
	a. ticket sales and validation	
	b. prioritisation rules based on socioeconomic modelling (for example conflict resolution / capacity congestion relief)	
	c. harmonised approach recommendation on priority rules for traffic management	
	d. harmonised rules and procedures for network cooperation between national Traffic Control Centers	
	e. defining common tool for communication and cooperation scenarios and rules for incident management	
	f. harmonised approach for common risk management	
	g. harmonised procedures, reports and dashboards for post-analysis of delays	
	h. definition of KPIs to assure a high data quality	
	• **Intermediate Milestones:**	
	o Analysis of operational processes	Q4/2025
	o Proposal of functional allocation and description	Q1/2026
	o Specification drafted	Q3/2026
	o CR bundle pre-assessment submitted	
	• **Definition of Done:** CR bundle pre-assessment submitted and agreed with ERA representatives	
	• **Interaction with other Domains/IP: FA1**	
	• **STIP Reference (if applicable): STIP16, STIP_2.0_173**	

Ad Hoc

No	Deliverable	Milestone
99	**Ad Hoc Activity**	continuous

• **Description of Deliverable**: There may be additional requests to be accommodated on an ad hoc basis, for example contribution to maturity checkpoint reviews of the Innovation Pillar • **Intermediate Milestones:** to be defined (if applicable) • **Definition of Done:** To be agreed with the SPCG • **Interaction with another Domains/IP:** to be defined (if applicable)	
• **STIP Reference (if applicable):** -	

STIP TASKS

Collaboration with STIP related topics

No	Deliverable	Milestone
	Task Collaboration with STIP related topics • **Description of Deliverable:** • **Intermediate Milestones:**	

	o Identification of activities and joint plan with related Tasks and Domains,
	   o Description of foreseen actions.
	   o Review the STIP and any applicable update considering Domain developments
	   o LEAD the following STIP related Deliverables/Tasks
	       . STIP_16 - Definition of functional enhancements for capacity management
	       i. STIP_18 - Function distribution and Interface between TMS/TrafficCS
	      ii. STIP_173 - Traffic Management based upon the "European Network Principles"
	   o SUPPORT the following STIP related Deliverables/Tasks:
	       . STIP_11 - CCS/TMS Data Model
	       i. STIP_135 - ETCS CR enhancements
	      ii. STIP_17 - Function distribution and Interface between TMS/CMS (with FP1)
		Cont.
		
		Cont.

Task 4: DAC/FDFTO

DELIVERABLES

Management of Domain

No	Deliverable	Milestone
0	**Management of Domain** • **Description of Deliverable:** Management activities to ensure that the below described deliverables are provided in form and time.	Continuous task
	• **Intermediate Milestones:**	
	o Remit Deliverables preliminary structure and detailed scope is defined in Polarion	Nov. 2025
	o Kanban Board with expected tasks required for each Remit deliverable is set up in Polarion.	Q4 2025
	o Reporting to SPCG and PMO based on detailed action report per task area (solved tickets)	Bi-Monthly

- **Definition of Done:** Planification, monitoring, intermediate and final reporting are done
- **Interaction with other Domains/IP:** Coordination required with all domains.

EU DAC Operational harmonisation

No	Deliverable	Milestone
01	**EU DAC Operational harmonisation** • **Description of Deliverable:** − **EU DAC Rulebook,** encompassing provisions for degraded and emergency modes based on return of experience (REX) from training activities and the start of Pioneer-DAC-Trains (PDT) − Definition of a European DAC Rulebook Organization: an entity tasked with the development, maintenance, and dissemination of updates to the DAC Rulebook. This organization shall operate in alignment with ongoing technological developments and incorporate feedback from DAC Pioneer Trains and Full Deployment Trains. It is intended to succeed the existing FP5 systems and procedures organization upon the conclusion of the FP5 project.	Oct 2027
	• **Intermediate Milestones:** ○ Degraded and emergency modes and extension to full deployment	Jun 2026
	○ Development of a concept of Digital Content Management System	Oct 2026
	○ First iteration of implementation of REX from training PDT	Dec 2026
	• **Definition of Done:** DAC Rulebook incl. degraded and emergency modes; EU DAC Rulebook CMS concept • **Interaction with other Domains/IP:** Task 2 OD, FP5-TRANS4R-M • **STIP Reference (if applicable):** STIP_38	

FDFTO Central Instance (FCI)

No	Deliverable	Milestone
02	**FDFTO Central Instance (FCI)** • **Description of Deliverable**: data organization coherent with Federated Data Space as per following indications from FP1 *Motional* WP31 *Rail Data Space*	June 2026
	• **Intermediate Milestones:** ○ Revision with stakeholders (EDDP, UIP, and others)	June 2026
	• **Definition of Done:** SP Document is published • **Interaction with other Domains/IP:** FP5-TRANS4R-M, FP1-MOTIONAL (TT part) • **STIP Reference (if applicable):** STIP_47	

Ad Hoc

No	Deliverable	Milestone
99	**Ad Hoc Activity** • **Description of Deliverable**: There may be additional requests to be accommodated on an ad hoc basis, for example contribution to maturity checkpoint reviews of the Innovation Pillar • **Intermediate Milestones:** to be defined (if applicable) • **Definition of Done:** To be agreed with the SPCG • **Interaction with another Domains/IP:** to be defined (if applicable)	continuous
	• **STIP Reference (if applicable): -**	

STIP TASKS

Collaboration with STIP related topics

No	Deliverable	Milestone
	Task Collaboration with STIP related topics	
	• **Description of Deliverable:**	
	• **Intermediate Milestones:**	
	○ Identification of activities and joint plan with related Tasks and Domains,	
	○ Description of foreseen actions.	
	○ Review the STIP and any applicable update considering Domain developments	
	○ LEAD the following STIP related Deliverables/Tasks	Cont.
	i. STIP_38 - Operational standards	
	ii. STIP_47 - FDFTO Central Instance (FCI)	
	○ SUPPORT the following STIP related Deliverables/Tasks:	
	i. STIP_32: EN 18171	
	ii. STIP_33: New standard for electrotechnical equipment of freight wagons and locos equipped with automatic coupler	
	iii. STIP_34: New standard for e-coupler and the electrical energy system of freight wagons and locos equipped with automatic coupler	
	iv. STIP_35: EN 15839 update	
	v. STIP_36: FDFTO Train Functions	
	vi. STIP_37: Sufficient migration of the DAC	Cont.
	vii. STIP_39: RID/ TSI WAG (EU) 321/2013 update	
	viii. STIP_40: TSI WAG (EU) 321/2013 update	
	ix. STIP_41: TSI Loc&Pas (EU) 1302/2014 update	
	x. STIP_42: TSI Loc&Pas (EU) 1302/2014 update	
	xi. STIP_43: EN 15227 update	
	xii. STIP_44: TSI Loc&Pas (EU) 1302/2014 update	
	xiii. STIP_45: EN 15663 update	
	xiv. STIP_46: EN 15528 update	
	xv. STIP_73: Train interface adaption for integrity handling and train length / overall consist length	
	• **Definition of Done:**	
	• **Interaction with other Domains/IP:** FP5-TRANS4R-M	

Task 5: Harmonised Diagnostics

DELIVERABLES

Management of Domain

No	Deliverable	Milestone
0	**Management of Domain**	Continuous task
	• **Description of Deliverable:** Management activities to ensure that the below described deliverables are provided in form and time.	
	• **Intermediate Milestones:**	
	○ Remit Deliverables preliminary structure and detailed scope is defined in Polarion	Nov. 2025

	Kanban Board with expected tasks required for each Remit deliverable is set up in Polarion.	Q4 2025
	Reporting to SPCG and PMO based on detailed action report per task area (solved tickets)	Bi-Monthly

- **Definition of Done:** Planification, monitoring, intermediate and final reporting are done
- **Interaction with other Domains/IP:** Coordination required with all domains.
- **Preparation of the HDDI PoC implementation in Wave 1:** Start in SC2.6, to be continued in SC2.6, and to be completed by end of 2026.

Harmonised Diagnostic Data Interface (generic document/template)

No	Deliverable	Milestone
01	**Harmonised Diagnostic Data Interface (generic document/template)**	Q4 2025
	• **Description of Deliverable:** The purpose of HDDI is to ensure the compatibility of use-case specific data generated by different systems, suppliers and/or in different European countries to improve railway asset management and to generate sustainable benefits for all stakeholders. Each HDDI specification is generated for the specific use case. This generic document will be used as a template for future use case dependant specifications and will be continuously developed. It should not be published jet.	
	• **Intermediate Milestones:**	
	o Internal review	Nov 2025
	o First revision	Dec 2025
	• **Definition of Done:**. Template is released on the T5 share point	
	• **Interaction with other Domains/IP: -**	
	• **STIP Reference (if applicable):** STIP_164	

HDDI for wheel monitoring diagnostic data

No	Deliverable	Milestone
02	**HDDI for wheel monitoring diagnostic data**	Q3 2026
	• **Description of Deliverable:** Specification of the HDDI for the wheels monitoring diagnostics using wayside train monitoring systems (WTMS).	
	• **Intermediate Milestones:**	
	o Implementation of the input from SDI-WTMS	Q1 2026
	o Mirror group review	Q2 2026
	o Final version	Q3 2026
	• **Definition of Done:** Document is ready for SPCG review	
	• **Interaction with other Domains/IP: SP/TT, IP/FP3**	
	• **STIP Reference (if applicable):** STIP_165	

Investigation of the need of pantograph data harmonisation

No	Deliverable	Milestone
04	**HDDI for pantograph diagnostics (initial investigations)**	Q3 2026
	• **Description of Deliverable:** Collection of user requirements for the pantograph diagnostics using Check Points and Video Gates for the use case specification.	
	• **Intermediate Milestones:**	
	o Interviews with stakeholders are completed	Q4 2025
	o Stakeholder analysis done	Q3 2026

- **Definition of Done:**. Document is released on the T5 share point
- **Interaction with other Domains/IP:**
- **STIP Reference (if applicable):** STIP_168

Additional activity: Collaboration with Innovation Pillar FA3

No	Deliverable	Milestone

05	**FP3 WAVE 1: Deliver support to FP3/WP7 in Wave 1 (2026) for preparation of the HDDI-Demonstrator and PoC implementation**
	• **Description of Deliverable:** ÖBB-Holding and ADIF, as member of SP-Task 5 (HERD), will start a new subtask in FP3/WP7.5.4 from 01/2026 until 11/2026 to prepare the input for the implementation of the HDDI (WTMS) demonstrator (PoC) in collaboration with FP3/WP7. This is a direct contribution to the FP3-targets (see next bullet-point below).
	Planned outcome by end of 2026:
	   a. Definition of the interfaces to WP7 in terms of harmonisation of the diagnostic data in two UC:
	      ○ WTMS
	      ○ Pantograph monitoring
	   b. Preparation of the time-schedule and alignment with the relevant stakeholders
	• **Intermediate Milestones:**
		12/2026

	a. Interfaces to FP3 WP7 in terms of harmonisation of the diagnostic data in two UC:
	      ○ WTMS
	      ○ Pantograph monitoring
		Q3/2026

	• **Definition of Done:** PoC included in FA3 proposal for 2. call • **Interaction with other Domains/IP: FP3** • **STIP Reference (if applicable):** STIP_164 / _165	

Dissemination

No	Deliverable	Milestone
05	**Dissemination of the HERD outcome**	Q3 2026
	• **Description of Deliverable:** Regular participation in international conferences. Join the IP-MID-Term conferences. Presentation in the Innotrans 2026. • **Intermediate Milestones:**	
	○ Identify the conferences and workshops as well as the people to present.	Q4 2025
	○ Presentation on the Innotrans 2026.	Q3 2026
	• **Definition of Done:** mind. 3 presentations and HERD participation in Innotrans. • **Interaction with other Domains/IP:** • **STIP Reference (if applicable):**	

Ad Hoc

No	Deliverable	Milestone
99	**Ad Hoc Activity**	continuous
	• **Description of Deliverable**: There may be additional requests to be accommodated on an ad hoc basis, for example contribution to maturity checkpoint reviews of the Innovation Pillar • **Intermediate Milestones:** to be defined (if applicable)	

	• **Definition of Done:** To be agreed with the SPCG	
	• **Interaction with another Domains/IP:** to be defined (if applicable)	
	• **STIP Reference (if applicable):** -	64

STIP TASKS

Collaboration with STIP related topics

No	Deliverable	Milestone
	Task Collaboration with STIP related topics	
	• **Description of Deliverable:**	
	• **Intermediate Milestones:**	
	o Identification of activities and joint plan with related Tasks and Domains,	
	o Description of foreseen actions.	
	o Review the STIP and any applicable update considering Domain developments	
	o LEAD the following STIP related Deliverables/Tasks	
	i. STIP_162 - Definition of the HERD framework **- delivered**	
	ii. STIP_163 - Framework Process of Accepting of new Use Cases for Harmonisation of Railway Diagnostic Data **- delivered**	Cont.
	iii. STIP_164 - Harmonised Diagnostic Data Interface- Template	
	iv. STIP_165 - HDDI for wheel monitoring diagnostic data	
	v. STIP_168 – HDDI for pantograph diagnostics	