
Europe's Rail
Co-funded by
the European Union
EUROPE'S RAIL
GENERAL ASSEMBLY
ONLINE
21-22
November
2024
@EURail_JU
Europe's Rail Joint Undertaking

Agenda – Day 1

14.00 – 14.10	**Welcome from the EU-Rail Governing Board Chair**
14.10 – 14.30	**JU State of Play from EU-Rail Executive Director**
14.30 – 15.45	**Advisory Board Activities** • Scientific Steering Group • States' Representatives Group • Deployment Group
15.45 – 16.00	*Coffee Break*
16.00 – 16.45	**The Role of R&I towards a Competitive and Sustainable Rail System: Priorities of the New Commission**
16.45 – 17.05	**European DAC Delivery Programme**
17.05 – 17.15	**Closing Words by the Governing Board Chair**

Welcome from the EU-Rail Governing Board Chair

Kristian Schmidt

JU State of Play from EU-Rail Executive Director

Giorgio Travaini

Objectives of 2024 and achievements:
Objectives

a. the Innovation Pillar:

1) the monitoring and performance analysis of the **first results of the 2022 Flagship Projects**; **2)** the ramp-up and grant conclusion of the projects resulting from the **Call 2023-1**; **3)** the **launch of the** as well as from the **Call 2024-1 and grant conclusion** with additional Exploratory research activities and anticipate as well some Flagship Area activities

b. the System Pillar:

1) Delivering the first **Standardisation and TSI Input plan** to the European Commission and verify in the mid of 2024 the results on the new mandate ; **2) launching the activities** to be undertaken in the second half of 2024, as well as preparing the outline of the activities to be performed in 2025,

c. the Deployment Group:

1) **Operationalisation** of the high-level and topical working group(s), following the GB decision for their creation, **2)** supporting the activities of the **European DAC Delivery Programme**, in particular working with the European Commission

d. the Membership:

1) Launch of of a **call for expression of interest in view of selecting Associated Members, ,** after having made an in-depth assessment of the Programme, an update of the Multi-Annual Work Programme (MAWP), and after identifying possible gaps to be filled by new entities' commitment.

e. S2R Programme: contractual closing of the H2020 project activities, having achieved its targets, and **exploit** where relevant their positive **results in the new EU-Rail Programme.**

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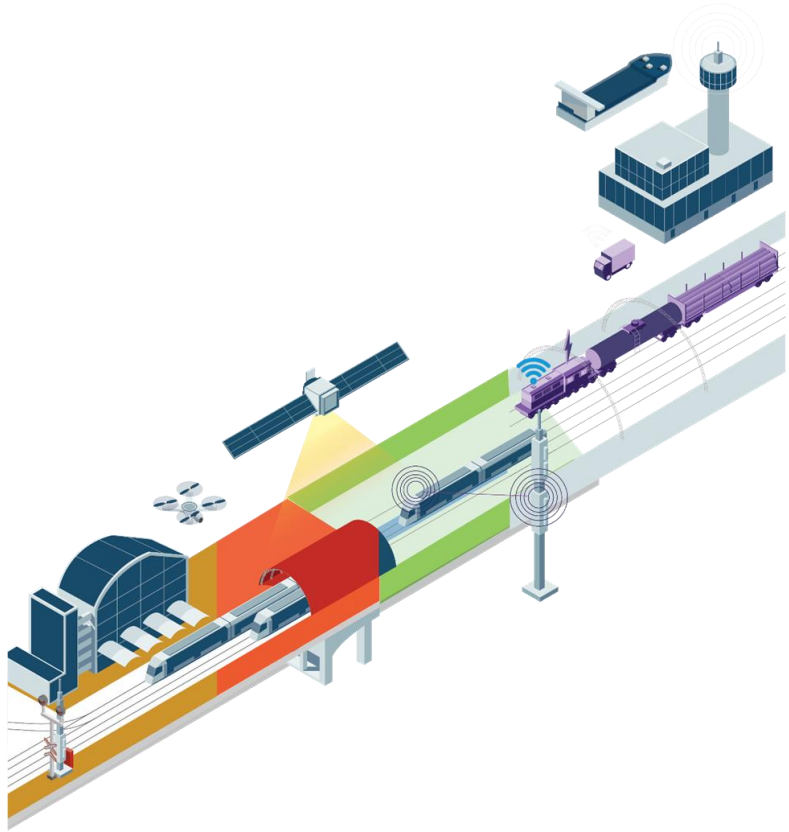
Objectives of 2024 and achievements:

Shift2Rail Programme Status

- Shift2Rail Programme finalized, with main results (achieving higher TRLs) disseminated in S2R Catalogue of Solutions.
- The work performed in Shift2Rail increased the TRL of the innovations needed to create a SERA in a harmonised way across countries.
  - ✓ 695 prototype testing activities with an average TRL of 5/6
  - ✓ 72 new products launched into the market
  - ✓ 20-41%* reduction in LCC
  - ✓ 58-96%* increase in capacity
  - ✓ 39-57%* improvement in reliability and punctuality

** depending on the rail segment of application*



IP1 Cost-efficient and Reliable Trains, including high-capacity trains and high speed trains

IP2 Advanced Traffic Management and Control System

IP3 Cost-efficient, Sustainable and Reliable High Capacity Infrastructure

IP4 IT Solutions for Attractive Railways Services

IP5 Technology for Sustainable and Attractive European Rail Freight

CCA Cross Cutting Activities

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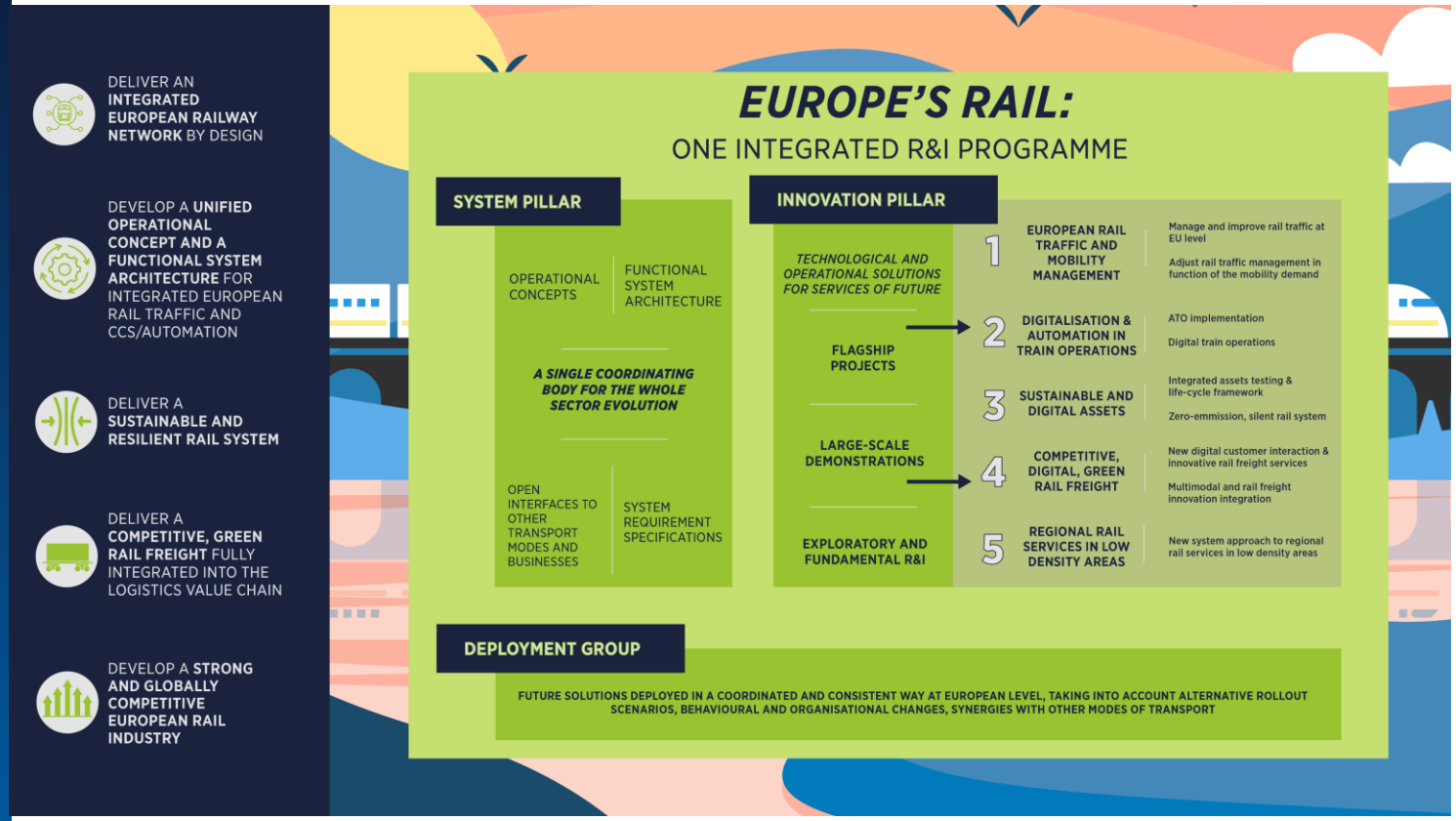
Objectives of 2024 and achievements:

EU-Rail Programme Status



- ✓ First **7(9) Flagship Projects** granted and running / under monitoring, including Travelwise (FP1); in addition, Morane-2 (FP2) and DACtiVate (FP5) in GAP phase.
- ✓ **14 Explorative and disruptive research projects** started;
- ✓ Call 2024 launched with 3 **topics** and second **joint call topic** with SNS JU;
- ✓ **System Pillar** fully running and outputs delivered;
- ✓ **EDDP** participation increased, technical and harmonization results obtained;
- ✓ Set up **High-Level Deployment Group.** Agreed on FRMCS Deployment as first topic.

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Objectives of 2024 and achievements:

Innovation Pillar

FP1 MOTIONAL
European Rail Network and Mobility Management

- Specification phase under finalisation and moving on to demo preparation (TRL4). Federated Data Spaces development are maturing including architecture and sandbox. CMS/TMS alignment with RNE and SP progressing. Digital twin methodology agreed – sandbox environment specified.

FP2 R2DATO

- Successful Remote controlled tram demo in Oslo in September. Specifications phase is coming to an end. Initial testing for Moving block already started. EGNOS4RAIL project is progressing: EGNOS for Rail system and service have been delivered by EUSPA and ESA. Overview of rail and aviation certification processes delivered by ERA/EUSPA. VCTS architecture agreed.

FP3 iam4Rail

- Installation finalized/under finalization and data collection started for most of Assets Management use cases. Field test campaigns readiness for all robotic platforms.

Objectives of 2024 and achievements:

Innovation Pillar

- Majority of the laboratory tests/simulations finalized (e.g. optimized bogie motor gearbox, airflow management) and demonstrations under preparation (e.g. H2 high-pressure tank and energy management system, BEMU, urban energy hub in a light rail environment, electro-mechanical pantograph and brakes).

- Preliminary operational procedures and system requirement specification for DAC finalised. Functions for DAC defined in the EDDP and the proposed updated time plan has been included in the 2nd amendment. First testing.

- Specifications of requirements and setup of scenarios for the FP6 Technical Enablers defined for suitable regional system solutions. Definition of Use Cases and preparatory work for the demonstration for Cost efficient performing CCS system and preliminary specification of requirements for digital platform for CCS validation and TSI certification. A first concept for a lightweight, emission free rolling stock with modular interior.

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Objectives of 2024 and achievements:
Innovation Pillar

Pods4Rail	Concept Development of a System for Pods and Pod-Carriers to be used as Moving Infrastructures mainly for Rail, but as well for Road and Ropeways Published Deliverables
RAIL4CITIES	Railway stations for green and socially inclusive cities Published Deliverables
InBridge4EU	Enhanced Interfaces and train categories for dynamic compatibility assessment of European railway bridges Published Deliverables
ESEP4Freight	European Shift Enabler Portal for Freight Published Deliverables
Academics4Rail	Building a community of railway scientific researchers and academia for ERJU and enabling a network of PhDs (academia teaming with industry) Published Deliverables
LEADER 2030	Learnings for European Autonomy to Deliver Europe's Rail in 2030 Published Deliverables
DACcord	DAC migration roadmap towards deployment and related activities Published Deliverables
MaDe4Rail	Maglev-Derived Systems for Rail Published Deliverables
QUIETERRAIL	A step change in prediction, mapping, acceptance testing and cost-effective mitigation for railway noise and vibration Published Deliverables
NEXUS	Next-gen technologies for enhanced metro operations Published Deliverables
SYMBIOSIS	SYstemic Mobilisation for Joint Biodiversity and Infrastructure Published Deliverables
XCROSS	The next generation of railway crossing asset management technology Published Deliverables
PHDS EU-Rail	EXTENDING THE RAIL NETWORK OF PHDS IN EUROPE'S RAIL JOINT UNDERTAKING Published Deliverables
DACFIT	DAC: Freight's intelligent transformation Published Deliverables

FA7 and Exploratory Research.

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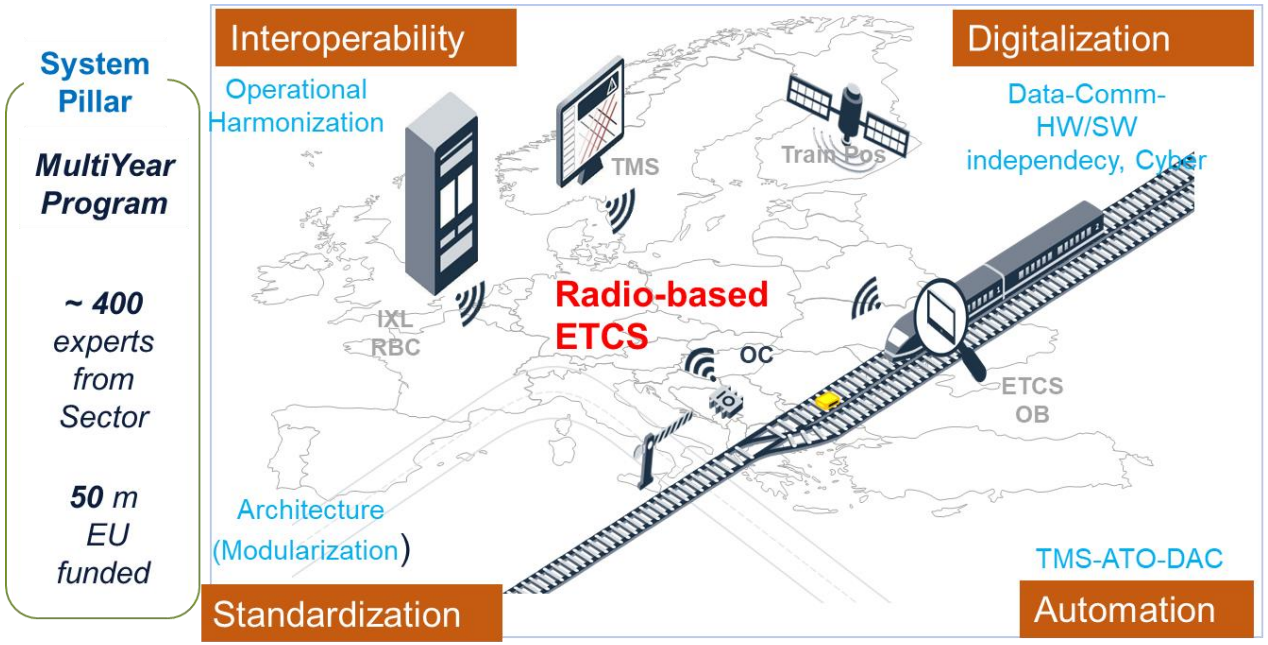
Objectives of 2024 and achievements:

Outcomes of the System Pillar

In the second year of the SP, the model based system engineering approach was fully established. The first design concepts and specification results were approved and published (see right)



General
- ✓ The first version of the Standardisation and TSI Input Plan (STIP) was published

PRAMS/Security
- ✓ The guidelines for implementing cybersecurity in rail were published (draft)
- ✓ System Concept and PRAMS plan
- ✓ CBM RAMS rules

Task 1, Railway system
- ✓ As-is operationally architecture on prioritised capabilities
- ✓ Energy report on energy saving measures

Task 2, Operational
- ✓ Operational capabilities

Task 2, Traffic CS
- ✓ Operational analysis (CONEMP) and System Analysis (FRS)
- ✓ A proposal for the target trackside architecture was developed, based on ETCS L2 without line signals

Task 2, Train CS
- ✓ Onboard architecture (logical and physical)

Task 2, Trackside assets
- ✓ The EULYNX Baseline 4 Release 3 specification were published jointly with the System Pillar

Task 2, Transversal
- ✓ The CCS/TMS data model was published
- ✓ CCS/TMS diagnosis and configuration concepts

Task 3, TMS/CMS
- ✓ 5 variants for European TMS were proposed and analysed
- ✓ System concept and system architecture

Task 4, DAC/FDFTO
- ✓ Harmonised operation procedures

Task 5, HERD
- ✓ 2 use cases for harmonised diagnostics were analysed

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Objectives of 2024 and achievements:
EU-Rail after 2 years

26
MEMBERS

361
PARTICIPANTS

58
SMEs

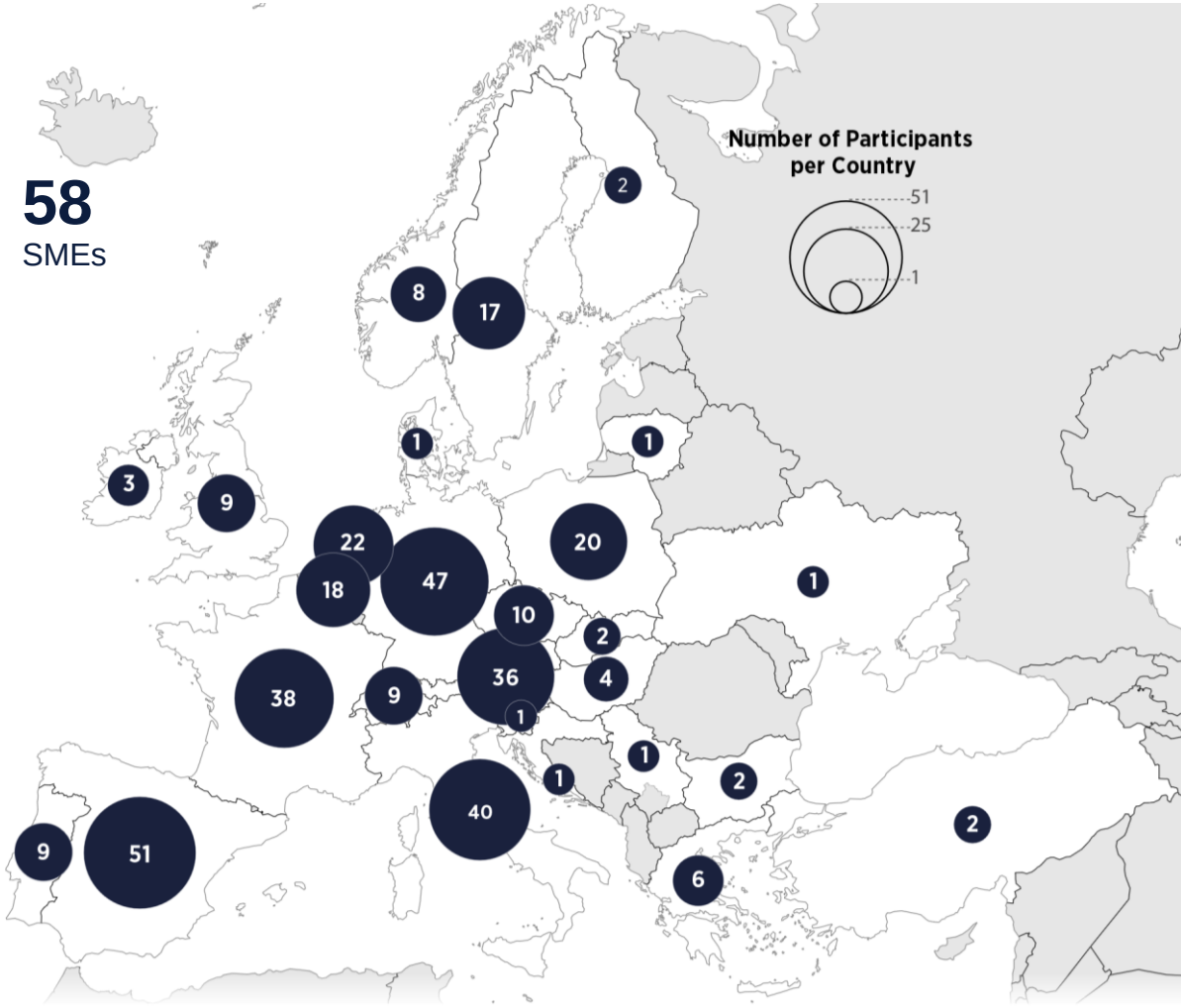
27
COUNTRIES

27
RESEARCH CENTERS
& UNIVERSITIES

2022 - € 566.7 M
14 Projects & 2 Tenders

2023 - € 44 M
7 Projects & 24 Tenders

2024 - € 31.9 M
3 Projects & 8 Tenders



Administrative boundaries: © EuroGeographics © UN–FAO © Turkstat
Cartography: Eurostat – IMAGE, 11/2024

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Objectives of 2024 and achievements:

Deployment Group Set-Up

- ✓ Deployment Group is operationalised in its informal setup, in agreement with the EC and pending the formal approval, as
- ✓ High-Level Core Group:
  - ✓ 3 meetings already organised.
  - ✓ Chaired by sector (Director EIM), co-chaired by European institutions
- ✓ Dedicated sub-groups. First subgroup on FRMCS deployment.

Launch of the Associated Member Call

OPEN CALL FOR EXPRESSION OF INTEREST with a view to selecting associated members with the potential to contribute to the achievement of the objectives of the Europe's Rail Joint Undertaking

- ✓ Deadline to submit applications was 4 November 2024
- ❑ Assessment ongoing
- ❑ Selection and integration of new Members, part of the objectives of 2025

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Objectives and Work Programme for 2025

What to expect from the Innovation Pillar

- The monitoring and performance analysis of the FPs' results of 2023-2024, in preparation for the demonstration activities of 2025 and 2026; Collaboration with EUSPA and ESA; Collaboration with IMs and RNE on digitalisation of capacity and traffic management;
- The ramp-up, following the conclusion of the grant agreements in 2024, of the projects resulting from the Call 2024-1 that complement the FPs with additional anticipated activities of the related areas, as well as to provide a platform for more disruptive innovation in hyperloop technologies and concepts; Synergies with the European Smart Networks and Services (SNS) JU;
- Launch of calls for Flagship, FA7 and Exploratory projects,
- Integration of the results of the Call for expression for interest for Associated Members;
- Launch of the call for proposals for the implementation of the second wave of Flagship Areas.

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Objectives and Work Programme for 2025

What to expect from the System Pillar

- ❑ Deliver specifications as input to Technical Specifications for Interoperability and EN standards according to the Standardisation and TSI Input Plan
- ❑ Reach sector agreement about the SP target architecture (and the migration strategy to reach the target)

PRAMS and Security
- ❑ Modular safety case structure and EU hazard database
- ❑ Security requirements and specifications

Task 1, Rail system
- ❑ To-be architecture for 1 capability

Task 2, Train CS
- ❑ Onboard modular architecture including Ethernet consist network, enhanced train interfaces, modularity, basic ASTP, multi display concept

Task 2, Traffic CS
- ❑ Trackside CS architecture design
- ❑ System specifications and interface of TPS, AEL and ATO trackside (Year 1 of 3)

Task 2, Operational harmonisation
- ❑ European harmonised operational rulebook (Year 1 of 3)

Task 2, Transversal CCS
- ❑ CCS/TMS data model based on extended ERA ontology
- ❑ Digital register Diagnostics Data Model Specification
- ❑ Configuration and Maintenance management

Task 3, TMS/CMS
- ❑ Interface TMS/Traffic CS (update)
- ❑ Integration TTR messages
- ❑ Cross border variants analysis CMS/TMS

Task 4, DAC/FDFTO
- ❑ Operational standards
- ❑ Central instance for data and software management

Task 5, HERD
- ❑ Demonstrator specification for pilot implementation

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Objectives and Work Programme for 2025

What to expect from the Deployment Group

- Formalisation Deployment Group by EC
- Formalisation –already informal agreed- Rules of Procedure, communication plan, Process for appointing subgroups
- First results on FRMCS Deployment (started in 2024)
  - Analyses and overview of the status of railway telecommunications in Europe
  - Investigate cross-border issues and private-public interfaces
  - Define possible migration scenarios
  - alignment with other rail transformation programs
  - Continuous interaction with ERTMS stakeholder platform
- Investigate in next deployment topic (e.g. alignment FRMCS/ERTMS/ATO/DAC developments, introducing international operational harmonization, …)

Communication/Dissemination/Stakeholder Relations

Key Information Points – Other Activities

Outreach activities

- ✓ InnoTrans stand first time with the EC and ERA
- ✓ First International Transport Forum attedance with a corporate stand
- ✓ First Transport Research Arena participation with other transport JUs
- ✓ First European start-up prize winner on the top 4 with a rail solution
- ✓ EU Train to Innotrans
- ✓ Shift2Rail Legacy Campaign

Website revamp

- ✓ Catalogue of Solutions developed
- ✓ New navigation structure put in place
- ✓ Landing page revamped

Newsletter revamp

Communication/Dissemination/Stakeholder Relations

Key Information Points – Upcoming Events

Rail Live 2024 (26th to 27th November 2024 in Zaragoza, Spain)

Press event on Net Zero Logistics Study
(February 2025, online)

Collaborative 'Joint Undertakings event' at the European Parliament (April 2025, Brussels, Belgium)

ITF 2025 Summit: Enhancing Transport Resilience to Global Shocks
(21 - 23 May 2025, Leipzig, Germany)

UITP Summit (15 to 18 June 2025, Hamburg, Germany)

Regional Matchmaking Days

Women in Rail Award

Joint event with ERA under the Danish Presidency

Q & A

Advisory Board Activities:

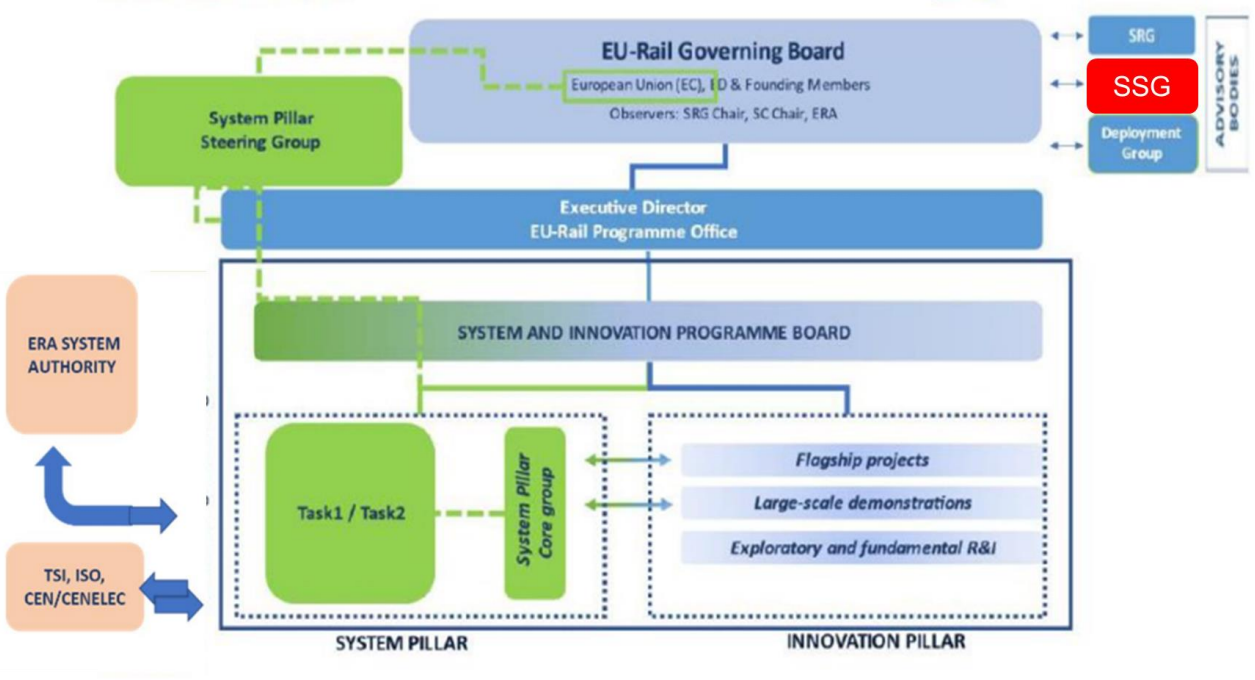
Scientific Steering Group (SSG)

Juan de Dios Sanz Bobi

Legal Framework: Implementation under Horizon Europe

SSG is adopted in the EU-RAIL Governance based on Regulation (EU) 2021/2085 (1) whereas it is declared by clause 33 the scientific advisory body concept in the Joint Undertakings in Horizon Europe, and Single Basic Act-SBA (2)-: Article 21 defines the term and the action for the Scientific Advice and Article 91, Bodies of the Europe's Rail Joint Undertaking, clause 2, opens the extension of the Scientific Advisory Body

Scientific Steering Group (SSG) in EU-RAIL JU



SSG Mission

Provide ***advice and recommendations*** to the Governing Board (GB) and Executive Director (ED) on the ***implementation, progress, and delivery of the EU-Rail Programme***, focusing on links between industrial research, innovation activities, and exploratory projects, acting on request or its own initiative.

(1) *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*

(2) *SSG adoption by EU-RAIl JU: Council Regulation (EU) 2021/2085 of 19 November 20211 establishing the Joint Undertakings under Horizon Europe ("Single Basic Act or "SBA"), and, in particular - Article 21(6) of the Single Basic Act, stating that the Scientific Advisory Body shall adopt its own rules of procedure, - Article 21(7) of the Single Basic Act, setting the role and tasks of the Scientific Advisory Group, - Article 91(2) of the Single Basic Act, naming the Scientific Advisory Body of the EU-RAIL Joint Undertaking, referred to in point (a) of Article 21(1), as the Scientific Steering Group.*

Composition and Organisation of the SSG

Formation and First Actions of the Scientific Steering Group (SSG)

- Selection Process:
  - Call for Expressions of Interest: Launched on 15 March 2023, closed on 30 June 2023.
  - Procedure finalized on 19 October 2023 with the Europe's Rail Governing Board* appointing the selected members.

- Constitution of the SSG:

  Angela di Febbraro (Chairperson), Juan de Dios Sanz Bobi (Vice-chairperson), Nacima Baron, Michele Carboni, Mathijs De Weerdt, Alessandro Fantechi, Luis Ferreira, Matthias Landgraf, Klaus Moessner, Ladislav Routil, Mariëlle Stoelinga

Public Information > details are available on the EU-Rail website:

https://rail-research.europa.eu/about-europes-rail/europes-rail-structure-of-governance/scientific-steering-group/

SSG Key Information Points

In accordance to Single Basis Act (SBA) and SSG Rules of Procedure (RoP), **SSG was requested in its last meeting (26/09) to provide Scientific Advice on:**

- **WPs:** Draft Work Programme 2025-2026 (*positive outcome of SSG*)
  2nd Amendment WP 2024 (*no SSG assessment due to no scientific content changes*)

- **EU-Rail Phasing-out Plan from HE funding:** (*positive outcome of SSG*)

SRG and SSG collaborative session in May 2024 aiming to find common activities

SSG Decisions during its last meeting:

- SSG members agreed to provide scientific advice on the Flagship projects
- SSG members expressed their agreement to get involved in the System and Innovation Programme Board (SIPB) discussions or through a joint workshop when needed

In **2025**, SSG meetings are scheduled for February, May, and October.

Advisory Board Activities:

States' Representative Group (SRG)

Miroslav Haltuf

SRG in 2024

Extraordinary SRG meeting
February 6, 2024

- SRG asks for specific study on transport policies (regulatory framework to support the uptake of innovations related to SERA); Research should be done on the optimization of the regulatory framework. Is the current framework able to ensure that ERJU results are as fast as possible implemented to the market, TSIs, standards etc.?
- SRG considers focusing on one extra topic per year within the ERJU Research activities to give some extra support, for example ATO, DAC, FRMCS, etc.
- SRG agrees with the ED a.i. proposal on DAC NCP Group

8th SRG meeting
February 28, 2024

- According to the Article 20 SBA, the States Representative Group of Europe's Rail JU (SRG) may issue on its own initiative recommendations and proposals to the Governing Board or the Executive Director on work programs for a Strategic study on R&I
- The aim of the Study is to evaluate and redesign the regulatory framework for rail to support the uptake of railway innovations related to SERA. While the research and development activities of the ERJU focus mainly on the development of the technical optimisation, the SRG sees also an urgent need for corresponding and concise research on rail transport policy.
- Reports on national R&I activities' list and their potential synergies with EU-RAIL Programme Consolidated version (similarly as presented at the General Assembly of 5-6 December 2023)

SRG in 2024

9th SRG meeting
May14, 2024

- Discussion about the SRG Opinion: Study on rail transport policy - Enhancing Railway Innovation through Regulatory Framework Optimization
- First SRG meeting with a new observer – the Transport Community of Western Balkan
- First joint session SRG/SSG

SRG at INNOTRANS
September 24-27, 2024

- Special train Brussels – Berlin
- Informal meeting of the SRG – 14 members
- SRG Chairman presented the areas of cooperation and synergies at the regular SSG meeting
- SRG Chairman's coordination meeting with European Commission, ERA and ED of the Europe's Rail JU ates Representative Group of Europe's Rail JU
- Informal meetings with SP experts on ERA ontology
- SRG Chairman's meeting with Innovate UK and UK DoT

10th SRG meeting
October 9, 2024

- Discussion on update on EC activities linked to mid-term evaluation EU-Rail and FP10
- Status of Deployment Group (DpG) setup
- The proposed dates for 2025 meetings are: 19 February, 14 May and 22 October.

SRG reporting on national R&I activities 2024

Members States - SBA Reporting 2024

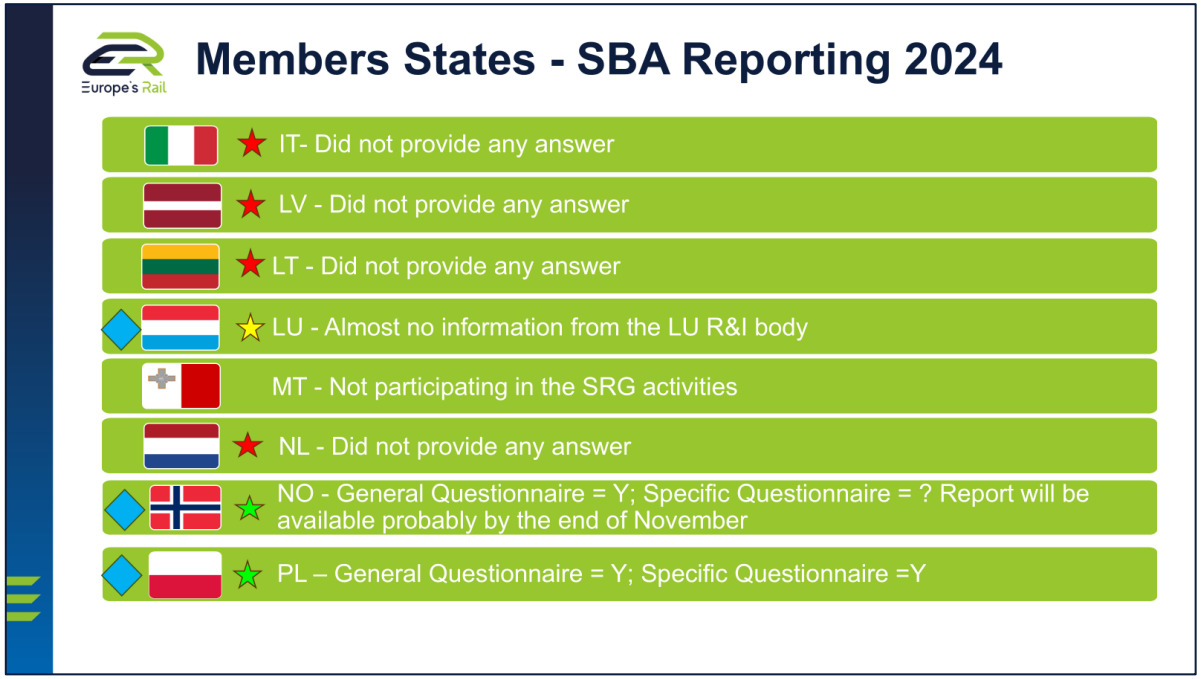
- AL – Did not provide any answer
- AT - General Questionnaire = Y
- BE - Did not provide any answer
- BG - Did not provide any answer
- CY - Not participating in the SRG activities
- CZ - General Questionnaire = Y ; Specific Questionnaire = Y
- DE - General Questionnaire = N; Specific Questionnaire = Y
- DK - Did not provide any answer

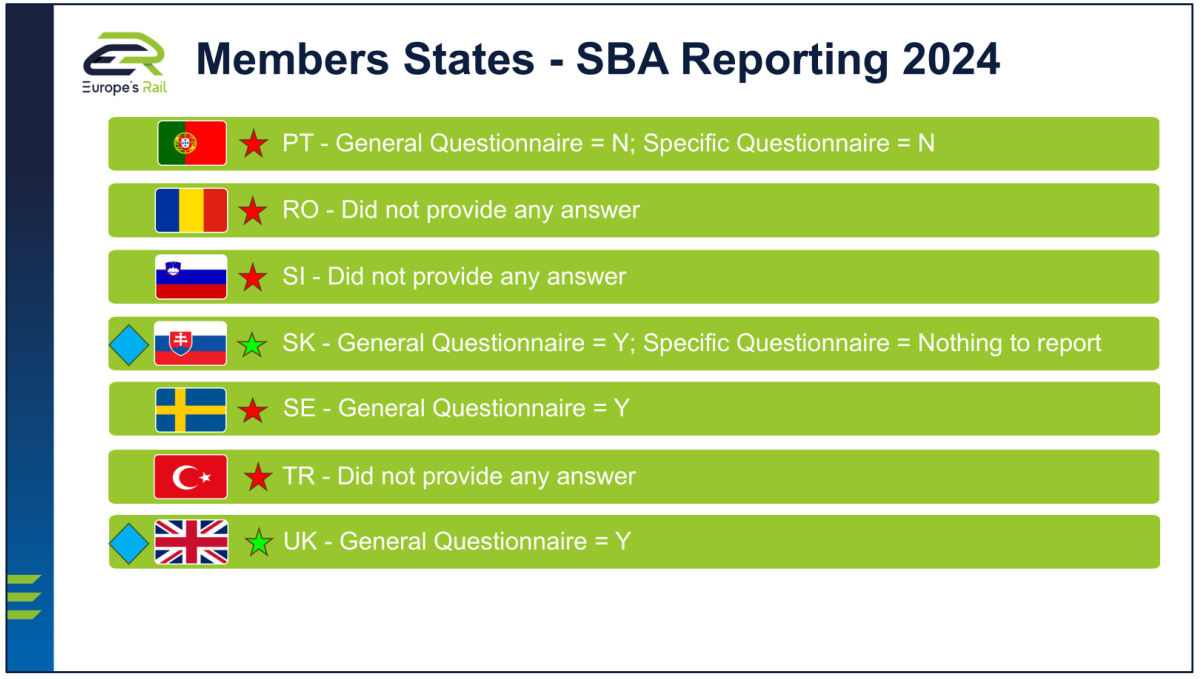
Members States - SBA Reporting 2024

- EST – Did not provide any answer
- ES - Did not provide any answer
- FI - Did not provide any answer
- FR - General Questionnaire = Y; Specific Questionnaire = Y
- GR - Did not provide any answer
- HR - Did not provide any answer
- HU - Did not provide any answer
- IRL - Did not provide any answer
- IL - Did not provide any answer

SRG summary information for Europe's Rail General Assembly 2024

SRG reporting on national R&I activities 2024





Status of reporting as per November 20, 2024

Number of Member States in the SRG - 2023: **30**

★ 8 ★ 3 ★ 17

2 Member States are not participating in the work of the SRG (CY, MT)

Number of Member States in the SRG - 2024 : **32**

★ 8 ★ 1 ★ 21

2 Member States are not participating in the work of the SRG (CY, MT)

SRG Survey on Europe's Rail

Overview Survey

Total number of participants	55 of 70
Complete answers	34
Partial answers	21
Survey response periode	15.07. – 31.08.2024

That's an excellent rate. Thank you for your commitment.

Annual reporting by Member States to the ERJU - generally considered useful

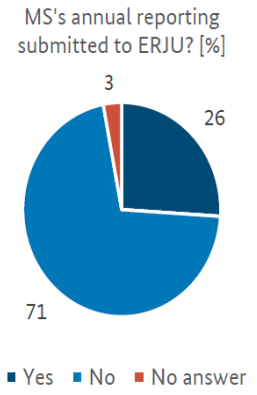
Annual reporting is seen generally as useful, especially

- Exchange on national R&D-activities, get oversight and best practice: both for SRG internally and ERJU
- Basis for possible transnational (bi-/ trilateral etc.) initiatives

But, to be recognized coordination is limited.

To be optimized/to be clarified:

- Expectations, guidelines and format of the reporting, exchange of results between SRG-Members
- Contact/exchange by ERJU



Report on national R&I activities' and their potential synergies with Europe's Rail Programme

- Article 20.10 of the Single Basic Act states:

  "The states' representatives group shall submit, at the end of each calendar year, a report describing the national or regional policies in the scope of the joint undertaking and identifying specific ways of cooperation with the actions funded by the joint undertaking."

- ✓ 2024 exercise > 11 countries provided their reports on national R&I activities' list and potential synergies with EU-RAIL JU Programme:

  AT, CZ, DE, FR, LU, NO, PL, PT, SE, SK, UK

- ✓ Several projects/programmes were identified by the MS, of which some synergies are expected by the SRG members

- ✓ Synergy actions are being proposed by EU-Rail on the identified projects by the SRG

Advisory Board Activities:

Deployment group

Karel van Gils, Keir Fitch & Monika Heiming

Status EU-RAIL Deployment Group

- **Scope**: The Deployment Group should deliver recommendations to the Governing Board of EU-RAIL on the consideration and needs in relation to the deployment of rail innovative solutions proposed by the EU-RAIL JU, to support the deployment of the innovative solutions. The Deployment Group may also issue recommendations on its own initiative.
- **Organisation**: Deployment Group is organised in its informal setup, in agreement with the EC and pending the formal approval, as
  - High-Level Core Group.
    - 3 meetings already organised.
    - Chaired by sector (Director EIM), co-chaired by European institutions
  - Dedicated sub-groups. First subgroup decided to be FRMCS deployment.
- Broad high level sector attendance (C-level)

ADIF
AERRL / Nexrail
AERRL
ALE
Alstom
CAF
CER
DB
EIM
EIM / SNCF-Réseau
FSI
Hitachi Rail
Knorr-Bremse
Norwegian Railway Directorate
ÖBB
Siemens
SNCF
SRG
Thales
TrafikVerket
UIC
UNIFE
Voestalpine Railway Systems
ERA
DG MOVE
EU-RAIL

Status EU-RAIL Deployment Group

- **FRMCS deployment subgroup set up:**
  - Deployment group is only group to analyse and discuss European coordinated deployment and migration scenario’s
  - 10 Topics remit
  - Global working plan agreed
  - Further alignment with ERTMS roll-out and other major gamechangers needed (and sector digitalisation strategy)

FRMCS Deployment related work areas & activities

Context of the subgroup FRMCS Deployment

Functional requirements

System architecture requirements

Authorization dossiers

Testing specifications

High-Level deployment group

Remit of the subgroup FRMCS Deployment

Technical issues WG:

- OBU technical WS
- TRK technical WS

Financial and legal WG:

- Business model WS
- Legal WS

Migration and Alignment WG:

- Migration WS
- Alignment WS

Plenary FRMCS subgroup

ERA authorisation process

preparing TSI drafts for the EC

EC TSI revision

ERTMS coordinator

Technical harmonization

Alignment overall railway architecture

Testing & demos

Related R&I

Technical specifications (M/603)

European standardization

WG: working group | WS: workstream

Governance and Funding & Financing

Three **working groups** (WG) dealing with different workstreams (WS) are proposed to be established:

- Technical issues group: OBU (on board units) and TRK (trackside) Technical WS
- Financial and legal group: Business model and Legal WS
- Migration and Alignment: Migration scenario and Alignment other programs WS

Way of working

- Transparency, open minded and based on trust

Funding & Financing

- Participation and work in the deployment group and its sub-groups is on a voluntary basis.
- EU-Rail and the EC/Deployment Management Team for day-to-day coordination.

FRMCS Deployment Subgroup

Remits (1 / 2)

- Status: approved
- Deployment Group as only place to discuss European FRMCS deployment
- Focus on activities based on UIC program, test and demonstration activities

1.
Overview of the **status** of railway telecommunications in Europe, encompassing current retrofit and investment plans (National Implementation Plans expected to be delivered by the Member States mid-2024 as key input)

2.
Estimation of necessary capacities in industry, operators, contractors, and network operators → plan for operational implementation

3.
Perform **financial analyses** on OPEX and CAPEX costs, funding, and financing (CBA) analyses of the migration scenarios

4.
Examination of need for **EU-wide coordination** of deployment incl. scope (deliverables), standardisation of operational procedures, and implementing technical harmonisation

FRMCS Deployment Subgroup

Remits (2 / 2)

5.
Authorisation and **regulatory frameworks**, incl. assessing how vehicles/tracks with FRMCS will be authorised quickly and if the regulatory framework needs to be modified

6.
Investigate **cross-border issues** and **private-public interfaces** (e.g. international MNO's, IM interfaces)

7.
Define possible **migration scenarios.** The technical layer and the legal, economic and political layer should be considered.

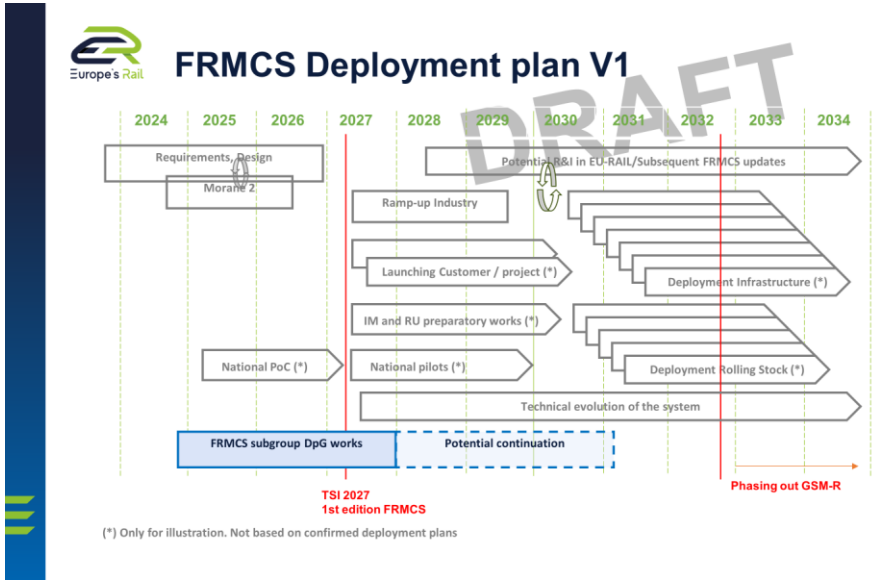
8.
Risk assessment on pace, availability, capacity of consultants/designers/contractors, technology, national priorities

9.
Ensure **alignment with other rail transformation programs** such as ERTMS, DAC, and ATO.

10.
Make recommendations in order to ensure both smooth migration and operational disturbance reduction

Planning

- Duration until 2027
- Focus on Deployment. Based on information from UIC programme and EU-RAIL calls
- Organisations (IM’s and RU’s) and countries remain responsible for dedicated Implementations
  - also to be addressed in NIP’s, national implementation plans



Next steps

Start working on FRMCS Deployment in subgroups

- Make more detailed planning
- First analyses

Professionalise Programme management

- Profile Programme management sent to DpG members

Continue alignment with other stakeholders (UIC/Associations, EC, ERA, ….)

Next High Level Deployment Group in February 2025

- First results FRMCS subgroup
- Other Deployment topics (for example how to align all different upcoming activities for the new digitalised systems (ERTMS, FRMCS, TMS/CMS, …)

Q & A

Europe's Rail

Coffee Break

See you back at 15.50 pm

The Role of R&I towards a Competitive and Sustainable Rail System: Priorities of the New Commission

Kristian Schmidt, David-Iban Villalmanzo, Ralf Kaminsky and Juan Melendez

Moderator: Andrea Gentili

European DAC Delivery Programme

Mark Topal Goekceli

EDDP in 2024

Shifting from …

… **R&D** to **Implementation**

… **Concept** to **Reality**

… **Talking** to **Doing**

Our main focus:
Fulfilling the preconditions for DAC deployment

Zoom-in: Preconditions 1 - 3

01

Single European DAC System

DAC-Technology and DAC-operations/ functionalities are **clearly defined and harmonised**

02

Proven Technology

The **technology** meets all essential requirements (incl. RAMS) and is proven through large demonstrations (incl. Pioneer Trains)

03

Proven Operational Functionality

The **operational functionalities/use cases** bring the expected benefits - proven through large demonstrations

Zoom-in: Preconditions 4-6

A **sound migration plan** is set, guaranteeing simultaneous deployment in Europe (funding programs, established production capacities, staff training, infrastructure and IT adaptations

06

Sound Migration Plan

Development of an **efficient & suitable authorisation** process & requirements

Preparing TSI drafts for the EC

05

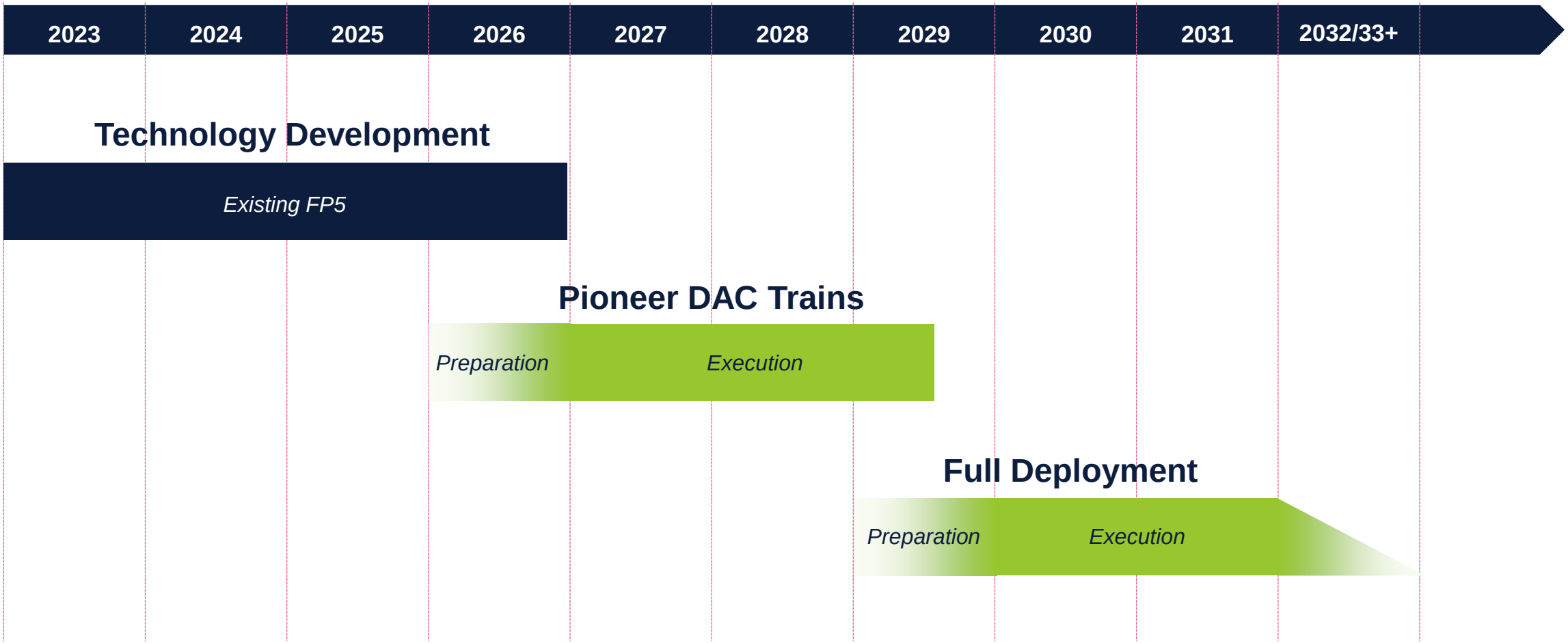
Simple Authorisation

Positive **CBA incl. adequate funding program** (EU and MS) are made available and guaranteed

04

Availability of Adequate Funding

EDDP as a programme in 3 major phases



Outlook on Technical Development

Q4 2024	2025	2026	2027

TECHNICAL DEVELOPMENT
(DAC BASIC PACKAGE)
Responsible: FP5

- Completion of the Technology Development in EU-Rail FP5 (DAC BASIC PACKAGE)
- Ramping up demonstrator trains from EU-Rail FP5 (in Austria, Germany and Sweden, ...)
- Moving forward with standardization works (CEN, CENELEC, TSI, etc.)

Outlook on Pioneer DAC Trains (PDT)

	Q4 2024	2025	2026	2027
TECHNICAL DEVELOPMENT (DAC BASIC PACKAGE) **Responsible: FP5**		• Completion of the Technology Development in EU-Rail FP5 (DAC BASIC PACKAGE) • Ramping up demonstrator trains from EU-Rail FP5 (in Austria, Germany and Sweden, ...) • Moving forward with standardization works (CEN, CENELEC, TSI, etc.)		
PIONEER DAC TRAINS PDT **Responsible: EDDP**	Continue detailed planning for Pioneer DAC Trains and make preparations to secure funding for PDTs	Preparation of the Pioneer DAC Trains PDT		• Launch of the Pioneer DAC Trains PDT • Ensuring ramp-up of production capacities on the part of industry

Outlook on Migration

	Q4 2024	2025	2026	2027
TECHNICAL DEVELOPMENT (DAC BASIC PACKAGE) **Responsible: FP5**		• Completion of the Technology Development in EU-Rail FP5 (DAC BASIC PACKAGE) • Ramping up demonstrator trains from EU-Rail FP5 (in Austria, Germany and Sweden, ...) • Moving forward with standardization works (CEN, CENELEC, TSI, etc.)		
PIONEER DAC TRAINS PDT **Responsible: EDDP**	Continue detailed planning for Pioneer DAC Trains and make preparations to secure funding for PDT	Preparation of the Pioneer DAC Trains PDT		• Launch of the Pioneer DAC Trains PDT • Ensuring ramp-up of production capacities on the part of industry
MIGRATION **Responsible: EDDP**	Major progress on fleet analysis (as part of an EU-Rail project DACfit)	Consolidate and decide on migration plan		Complete preparations for the full DAC deployment including series production readiness

Outlook on LCC, CBA & Business Case

	Q4 2024	2025	2026	2027
TECHNICAL DEVELOPMENT (DAC BASIC PACKAGE) **Responsible: FP5**		• Completion of the Technology Development in EU-Rail FP5 (DAC BASIC PACKAGE) • Ramping up demonstrator trains from EU-Rail FP5 (in Austria, Germany and Sweden, ...) • Moving forward with standardization works (CEN, CENELEC, TSI, etc.)		
PIONEER DAC TRAINS PDT **Responsible: EDDP**	Continue detailed planning for Pioneer DAC Trains and make preparations to secure funding for PDT	Preparation of the Pioneer DAC Trains PDT		• Launch of the Pioneer DAC Trains PDT • Ensuring ramp-up of production capacities on the part of industry
MIGRATION **Responsible: EDDP**	Major progress on fleet analysis (as part of an EU-Rail project DACfit)	Consolidate and decide on migration plan		Complete preparations for the full DAC deployment including series production readiness
LCC, CBA & Business Case **Responsible: EDDP (Inputs from FP5)**	Create LCC for DAC and DAC applications until 12/24 so that a CBA update can be made in the EDDP until Q1/25 (next iteration)	Iterative CBA updates		

Outlook on Funding Instruments & Policies

	Q4 2024	2025	2026	2027
TECHNICAL DEVELOPMENT (DAC BASIC PACKAGE) **Responsible: FP5**		• Completion of the Technology Development in EU-Rail FP5 (DAC BASIC PACKAGE) • Ramping up demonstrator trains from EU-Rail FP5 (in Austria, Germany and Sweden, ...) • Moving forward with standardization works (CEN, CENELEC, TSI, etc.)		
PIONEER DAC TRAINS PDT **Responsible: EDDP**	Continue detailed planning for Pioneer DAC Trains and make preparations to secure funding for PDT	Preparation of the Pioneer DAC Trains PDT		• Launch of the Pioneer DAC Trains PDT • Ensuring ramp-up of production capacities on the part of industry
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LCC, CBA & Business Case **Responsible: EDDP (Inputs from FP5)**	Create LCC for DAC and DAC applications until 12/24 so that a CBA update can be made in the EDDP until Q1/25 (next iteration)	Iterative CBA updates		
FUNDING INSTRUMENTS & POLICIES **Responsible: EDDP**		Sustainable anchoring of the DAC in the EU Commission's Work Program and in the 2028-34 budget		DAC funding program on the part of the EU and member states must be available

Outlook on all Core Activities

	Q4 2024	2025	2026	2027
TECHNICAL DEVELOPMENT (DAC BASIC PACKAGE) **Responsible: FP5**		• Completion of the Technology Development in EU-Rail FP5 (DAC BASIC PACKAGE) • Ramping up demonstrator trains from EU-Rail FP5 (in Austria, Germany and Sweden, ...) • Moving forward with standardization works (CEN, CENELEC, TSI, etc.)		
PIONEER DAC TRAINS PDT **Responsible: EDDP**	Continue detailed planning for Pioneer DAC Trains and make preparations to secure funding for PDT	Preparation of the Pioneer DAC Trains PDT		• Launch of the Pioneer DAC Trains PDT • Ensuring ramp-up of production capacities on the part of industry
MIGRATION **Responsible: EDDP**	Major progress on fleet analysis (as part of an EU-Rail project DACfit)	Consolidate and decide on migration plan		Complete preparations for the full DAC deployment including series production readiness
LCC, CBA & Business Case **Responsible: EDDP (Inputs from FP5)**	Create LCC for DAC and DAC applications until 12/24 so that a CBA update can be made in the EDDP until Q1/25 (next iteration)	Iterative CBA updates		
FUNDING INSTRUMENTS & POLICIES **Responsible: EDDP**		Sustainable anchoring of the DAC in the EU Commission's Work Program and in the 2028-34 budget		DAC funding program on the part of the EU and member states must be available

Together, we can make DAC happen!

100+ organisations and 300+ participants in EDDP
only EDDP PB and SB members are listed here

EU-Rail FP5 partners
only the beneficiaries are mentioned here

Q & A

Closing Words by the EU-Rail Governing Board Chair

Kristian Schmidt

Thank you

White Atrium Building, 2nd Floor
Avenue de la Toison d’Or 56-60
B1060, Brussels - Belgium

www.rail-research.europa.eu


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EUROPE'S RAIL
GENERAL ASSEMBLY
ONLINE
21-22
November
2024
@EURail_JU
Europe's Rail Joint Undertaking

Agenda – Day 2

09.00 – 09.15	**Opening Words by the Director General of DG MOVE**
09.15 – 11.30	**Implementation of the EU-Rail Programme** • Innovation Pillar: State of Play and Year 2 Results • System Pillar: State of Play and Year 2 Results • Preparing Deployments: Deployment Group and EDDP
11.30 – 11.45	*Coffee Break*
11.45 – 12.20	**Getting Involved in EU-Rail Activities and How to Find the Information You are Looking For**
12.20 – 12.30	**Closing Words by the EU-Rail Executive Director**

Opening Words by the Director General of DG MOVE

Magda Kopczyńska

Implementation of the EU-Rail Programme

Innovation Pillar: State of Play and Year 2 Results

Léa Paties, Sébastien Denis & Javier Ibañez de Yrigoyen

MOTIONAL | Travel Wise

Flagship Project 1

FP1-MOTIONAL: Mobility management multimodal environment and digital enablers

- **Main objective:** improve **flexibility, efficiency, resilience, and capacity adaptation of European rail network** to support development of a Single European Rail Area. Develop functional **requirements, specifications, and solutions for future European Traffic Management**, including common train planning, operations, automation, ticketing, network management and control.
- **Target solution:** **dynamic network and traffic management at European scale** built upon a harmonized functional system architecture for agile, borderless, and mixed-traffic operations and offering.
- **Benefit:** enables automatic management of cross-border rail traffic, improves service offers, operations, and capacity utilization, and enhances the competitiveness of rail-based mobility chains.
- **Four focus areas:**
  - **SG1**: Railway planning (Capacity Management systems)
  - **SG2**: Railway operations (Traffic Management systems)
  - **SG3**: Integration of Railway services with other modes (B2B)
  - **SG4**: Digital enablers transversal to railway sector

FP1 MOTIONAL
European Rail Network and Mobility Management

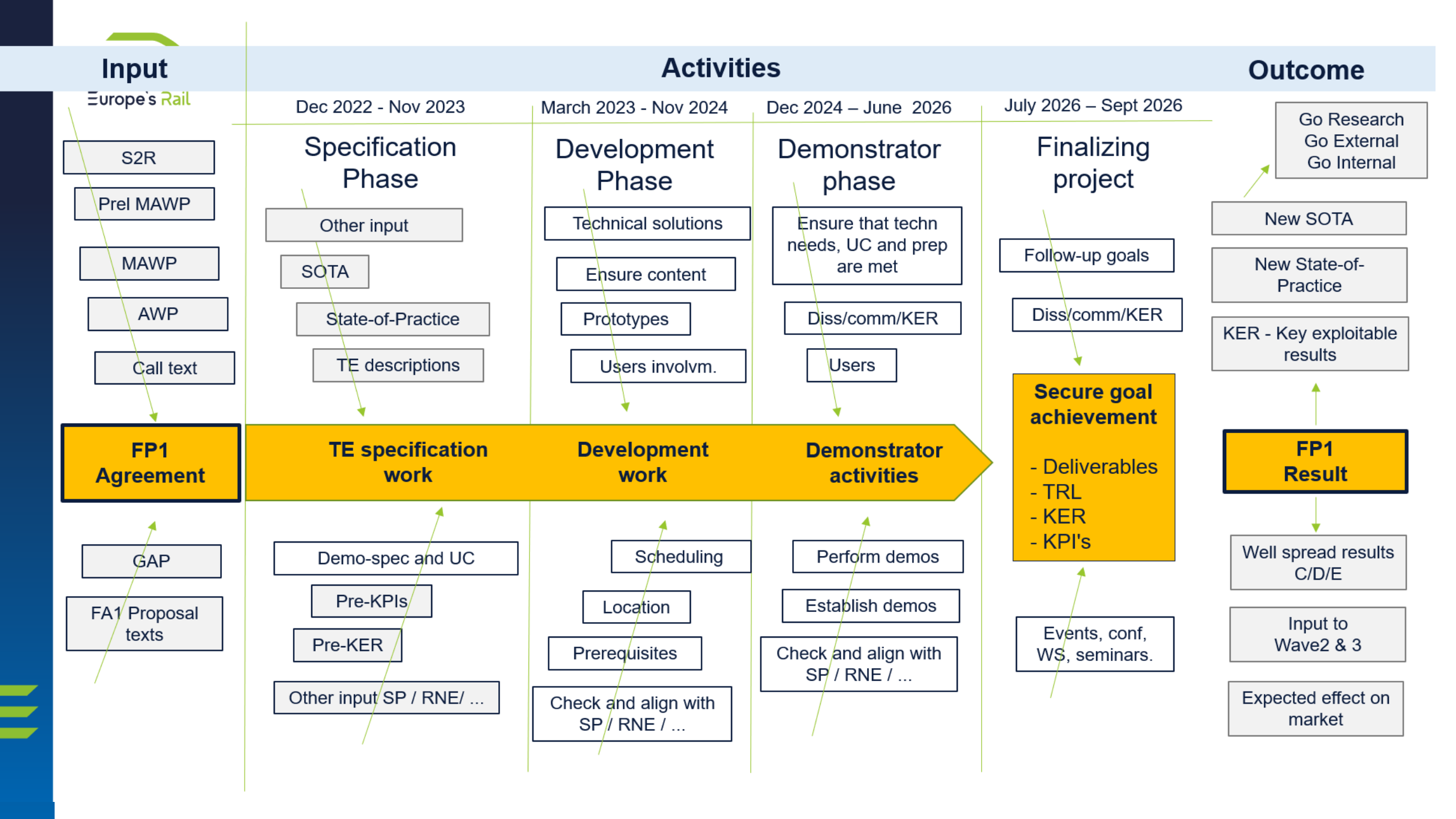
- **Total project cost:** 92.600.000,00 €
- **Project duration:** 46 months
- **Number of partners:** 28 > 89

COORDINATOR

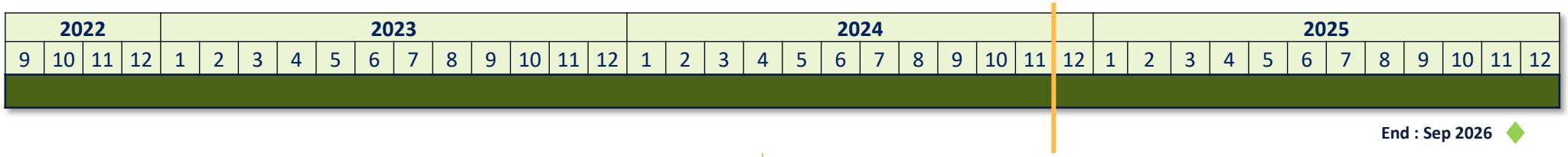
HACON

OTHER PARTNERS

adif, ALSTOM, mermec, CAF, ceit, DB, enyse, etra, Faiveley, HITACHI, indra, Jernbane-direktoratet, KNORR-BREMSE, ÖBB, PKP, ProRail, SNCF, THALES, TRAFIKVERKET, voestalpine, SŽ


Input
Activities
Outcome
Europe's Rail
Dec 2022 - Nov 2023
March 2023 - Nov 2024
Dec 2024 – June 2026
July 2026 – Sept 2026
S2R
Prel MAWP
MAWP
AWP
Call text
Specification Phase
Development Phase
Demonstrator phase
Finalizing project
Other input
SOTA
State-of-Practice
TE descriptions
Technical solutions
Ensure content
Prototypes
Users involvm.
Ensure that techn needs, UC and prep are met
Diss/comm/KER
Users
Follow-up goals
Diss/comm/KER
Go Research
Go External
Go Internal
New SOTA
New State-of-Practice
KER - Key exploitable results
FP1 Agreement
TE specification work
Development work
Demonstrator activities
Secure goal achievement
- Deliverables
- TRL
- KER
- KPI's
FP1 Result
GAP
FA1 Proposal texts
Demo-spec and UC
Pre-KPIs
Pre-KER
Other input SP / RNE/ ...
Scheduling
Location
Prerequisites
Check and align with SP / RNE / ...
Perform demos
Establish demos
Check and align with SP / RNE / ...
Events, conf, WS, seminars.
Well spread results C/D/E
Input to Wave2 & 3
Expected effect on market

FP1 MOTIONAL



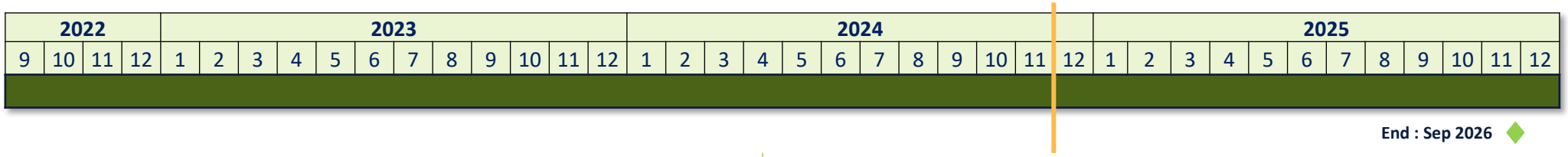
SG1 – Improved Strategic and Tactical Planning of the Rail Network

- Detailed creation of use Cases, specifications and ongoing developments up to TRL4 related to:
  - Integration of planning systems and new planning processes
  - Decision and support optimization
  - Rail traffic simulation models and feedback loops from operations
- Continuation of close collaboration with SP and RNE

SG2 – Increased Resilience of a Connected „Real Time“ Rail Network

- Ongoing developments up to TRL4 :
  - TMS Integration (TMS2X, TMS2TMS).
  - TMS resilience and efficiency (Cooperative planning, incident & disruption management).
  - Operational Feedback and ATO (Realtime Convergence with Planning, Feedback Loops).
  - automated decisions & optimizations (automated train control decisions and realtime optimization).
- Continuation of SP and RNE interactions

FP1 MOTIONAL



SG3 - Integration of Railway services with other modes (B2B)

- Developments up to TRL4 related to:
  - Integration of Rail with other transport modes (B2B Platforms and Services, Standardized Interfaces).
  - Services for Inclusive rail-based mobility (hands-free solutions, platform-based guidance, travel assistance across modes (PRM)).
  - Anticipate demand and improved resource utilization (Short and long term demand calculations, capacity improvements, disruption handling, digital twins).

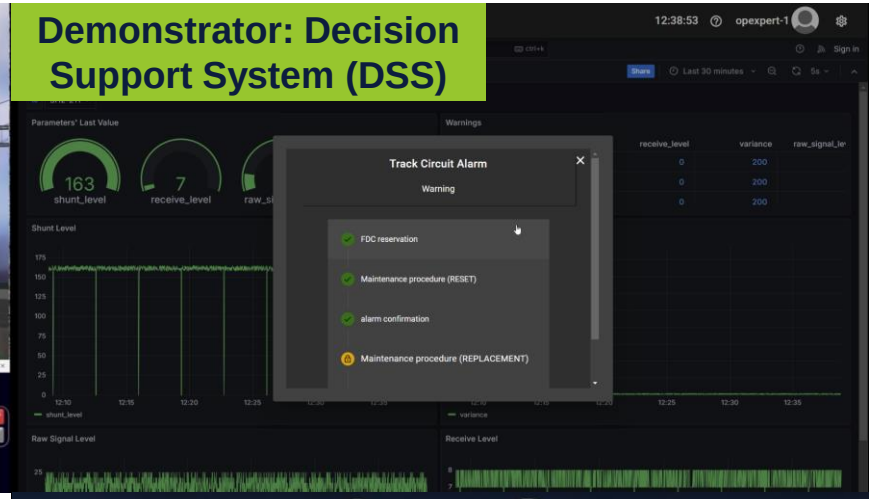
SG4 – Digital Enablers

- Federated Data space "sandbox" up and running since July 2023
- Dataspace architecture developed – Use cases collection.
- Digital twin methodology agreed – sandbox environment specified.
- Data model and format for a harmonised EU planning of railway assets, starting from CCS+ document published

FP1 MOTIONAL: Results

Crossborder TMS Simulation

Demonstrator: Decision Support System (DSS)



Demonstrator: Financial Platform for Mobility Integration

Data Used for the Demonstration

Eurostar Network (ex Thalys). GTFS data coming from https://transport.data.gouv.fr/

Paris Area Transportation Network including metro, bus, tram, urban train, regional train. Coming from IDFM Open Data. https://data.iledefrance-mobilites.fr/

FP1 MOTIONAL

Rail Data Space

Travel Wise

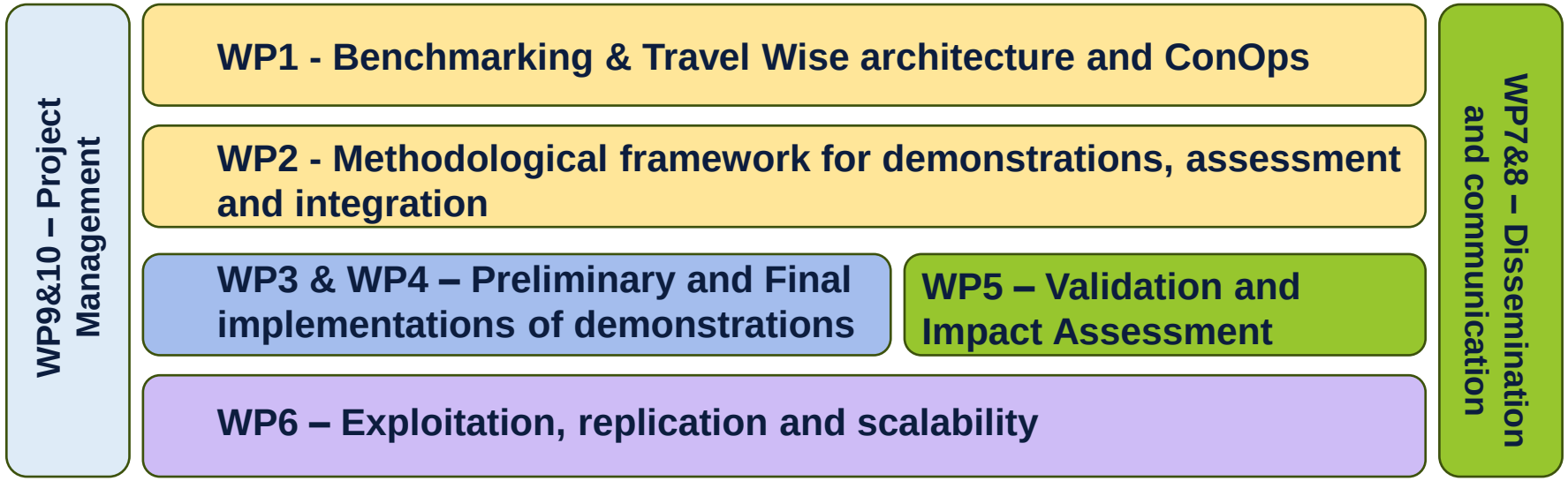
First rail-aviation synergy flagship project

Total Project Cost: 6.8M
Duration: 36 Months
Start date: 1 October 2024
Participants: 37 Partners (32 Beneficiaries)

GOALS

- Support the shift from rail and air traffic orchestration in silos to an intermodal approach
- Create an Intermodal Collaborative Decision Making to support Air-Rail operations management for nominal situations and disruptions
- Optimisation of passenger experience

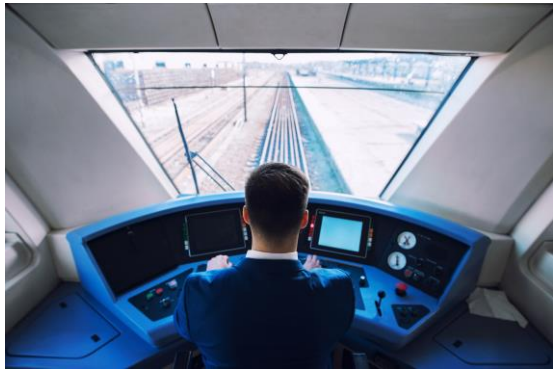
Travel Wise: Delivery Structure

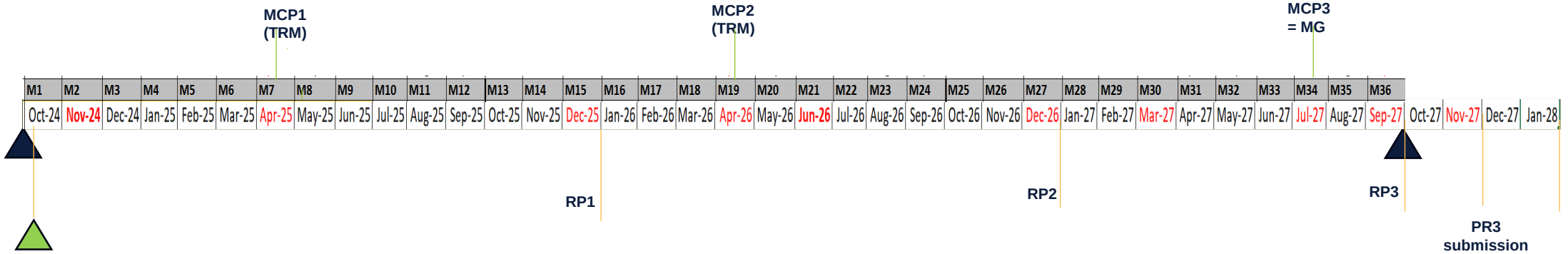


Travel Wise: Objectives

- Analysis and benchmarking of existing concepts and technologies for air-rail integration
- Air-rail Travel Wise solution ConOps and Architecture
- Foster evolution and adoption of a Common European Mobility Data Space
- Creating a single air-rail Collaborative Decision Making solution and interconnected operations plans
- Feature for improved Door to Door passenger experience
- Validation and impact assessment of Travel Wise solution
- Travel Wise Business model, stakeholder group creation and engagement
- Travel Wise Collective Intelligence Hub

Travel Wise: Timeline





TRAVEL WISE project: 1 October 2024 – 30 Sept 2027
3 Reporting periods (RP)
3 Maturity Checkpoints (2 Technical Review Meetings (TRMs) & 1 Maturity Gate)
10 Milestones

Europe's Rail

R2DATO

Rail to Digital Automated up to Autonomous Train Operations

Flagship Project 2

FP2 R2DATO: Rail to Digital Automated up to Autonomous Train Operations

- **Main objective:** take the major opportunity offered by digitalisation and automation of rail operation and to develop the Next Generation ATC and deliver scalable automation in train operations, up to GoA4 for 2030, to enhance infrastructure capacity on the existing rail networks.
- **Target solution:** European solutions fitting requirements from many different use cases across the European network.
- **Benefit:** enables increasing traffic without need for additional investment in physical infrastructure (new railway lines) – enhancing the capacity, maintaining safety levels and operational flexibility.
- **Six focus areas:**
  - **C1**: Automation processes
  - **C2**: Optimised headway
  - **C3**: Enabling digital technologies
  - **C4**: Fast and effective deployment
  - **C5:** Innovative operational solutions
  - **C6:** Demonstrators

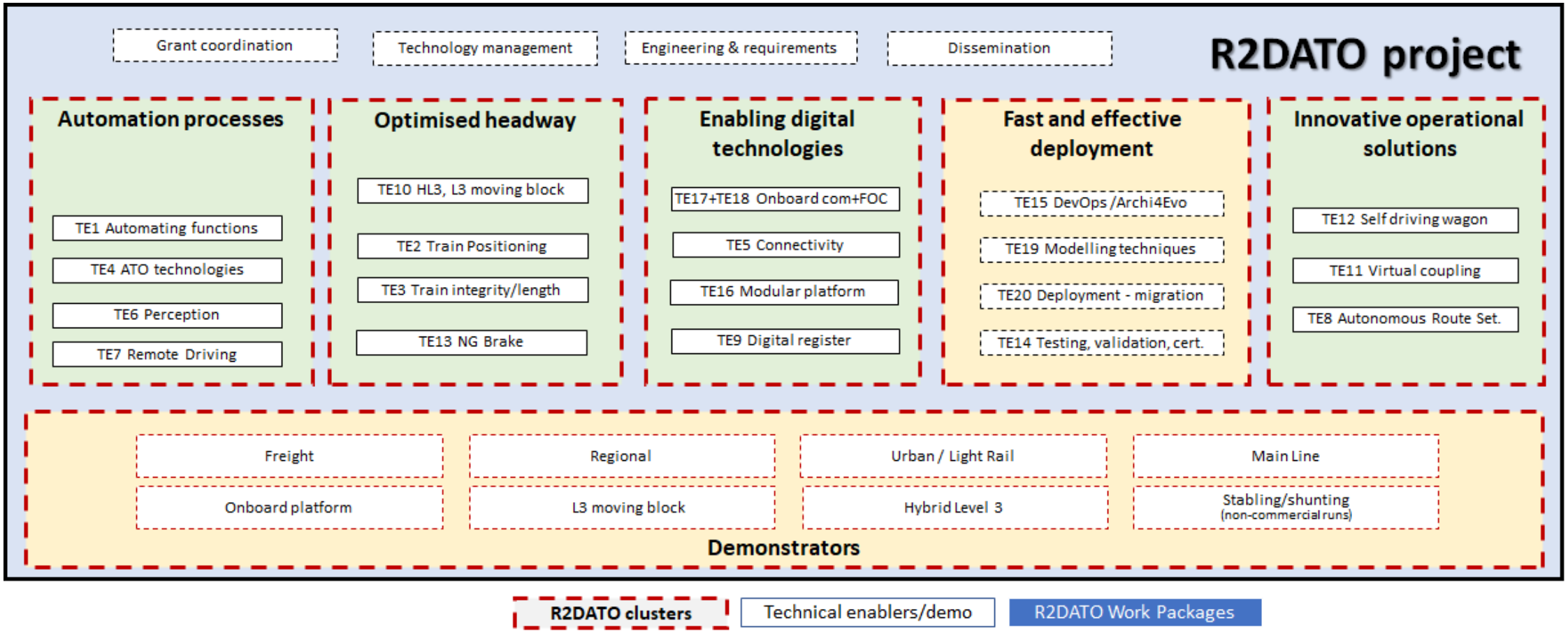
- **Total project cost:** 160.800.000,00 €
- **Project duration:** 42 months
- **Number of partners:** 75 (including AE)

Coordinator

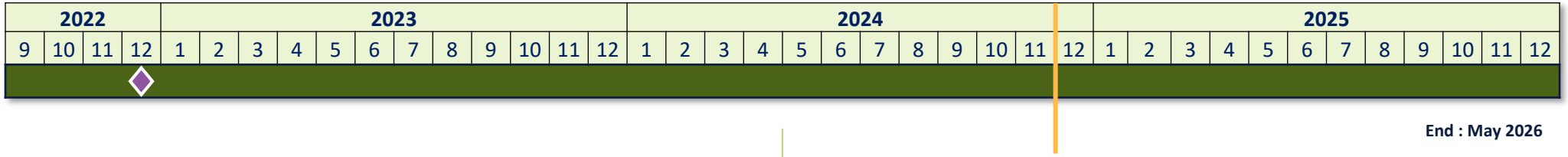
Partners

ASSOCIATED PARTNERS

R2DATO: Project Overview



FP2 R2DATO



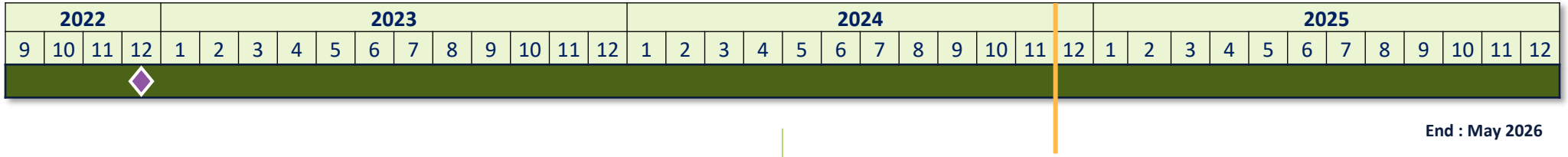
Cluster 1: Automation processes

- Use cases delivered, in line with other Flagship Projects.
- “Remote Operation of tram” demonstrator in Oslo as shown at InnoTrans 2024.
- Integration of TCMS in the baseline work of cluster APC.

Cluster 2 – Optimised headway

- Train positioning: Use Cases & requirements collected & aligned; preliminary Hazard Analysis of the generic ASTP system.
- Further integration of EUSPA & ESA for EGNOS activities (EGNOS4RAIL) - preliminary version of EGNOS for Rail system and service have been delivered by EUSPA and ESA.
- HL3 & MBS specifications aligned and completed; HL3 safety analysis also completed.

FP2 R2DATO



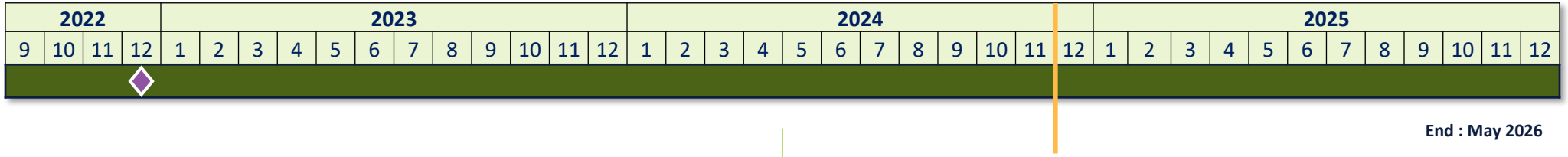
Cluster 3 – Enabling digital technologies

- Requirements, architecture & specifications on intermediate modular platform created and approved.
- Use cases & requirements for onboard communication network defined & approved; list of solution candidates completed.
- Use cases & requirements on the Digital Register completed within specific taskforce.

Cluster 4 – Fast and effective deployment

- DATO business case outlined & required inputs specifications & scheme defined.
- Common strategy & process for virtual certification of complete railway systems as well as functional upgrades defined.
- Catalogue of architectural patterns for evolvability and DevOPS process building blocks.

FP2 R2DATO



Cluster 5 – Innovative operational solution

- Autonomous route setting [AnRS] - use case list & concept defined.
- Virtual coupled train set [VCT] architecture & interfaces agreed.
- Technology development of short-range communications [SCR] & relative localization [RL] - set of test cases defined

Cluster 6 – Demonstrators

- MBS demo – release plan released; Releases 1-3 completed.
- Remote tram demonstrator completed.
- Onboard platform demo – phase 1 implemented & tested.
- Regional line demonstrator – test scenarios completed.

IAM4RAIL

Holistic and Integrated Asset Management for Europe‘s RAIL System

Flagship Project 3

FP3 IAM4RAIL: Holistic and Integrated Asset Management for Europe‘s Rail System

- **Main objective:** provide innovative technical requirements, methods, solutions, and services based on the latest cutting-edge technologies to **minimise asset lifecycle costs** and **extend service life** while meeting safety requirements and **improving the reliability, availability, and capacity of the railroad system.**
- **Target solution:** **Intelligent Asset Management System** for both **Rolling Stock** and **Infrastructure;** Increased level and technology for **automation and robots** in construction and maintenance/.
- **Benefit:** **Cost-effective** asset management, increased **RAMS** and **capacity** of the overall railway system. **Sustainable** production of **resilient** assets
- **Five focus areas:**
  - **SP1**: Wayside Monitoring and TMS link
  - **SP2**: Rolling Stock Asset Management
  - **SP3**: Infrastructure Asset Management
  - **SP4**: Railway Digital Twins
  - **SP5**: Environment, User and Worker Friendly Railway Assets

- **Total project cost:** 106.900.000 €
- **Project duration:** 48 months
- **Number of partners:** 29 > 93

COORDINATOR

adif

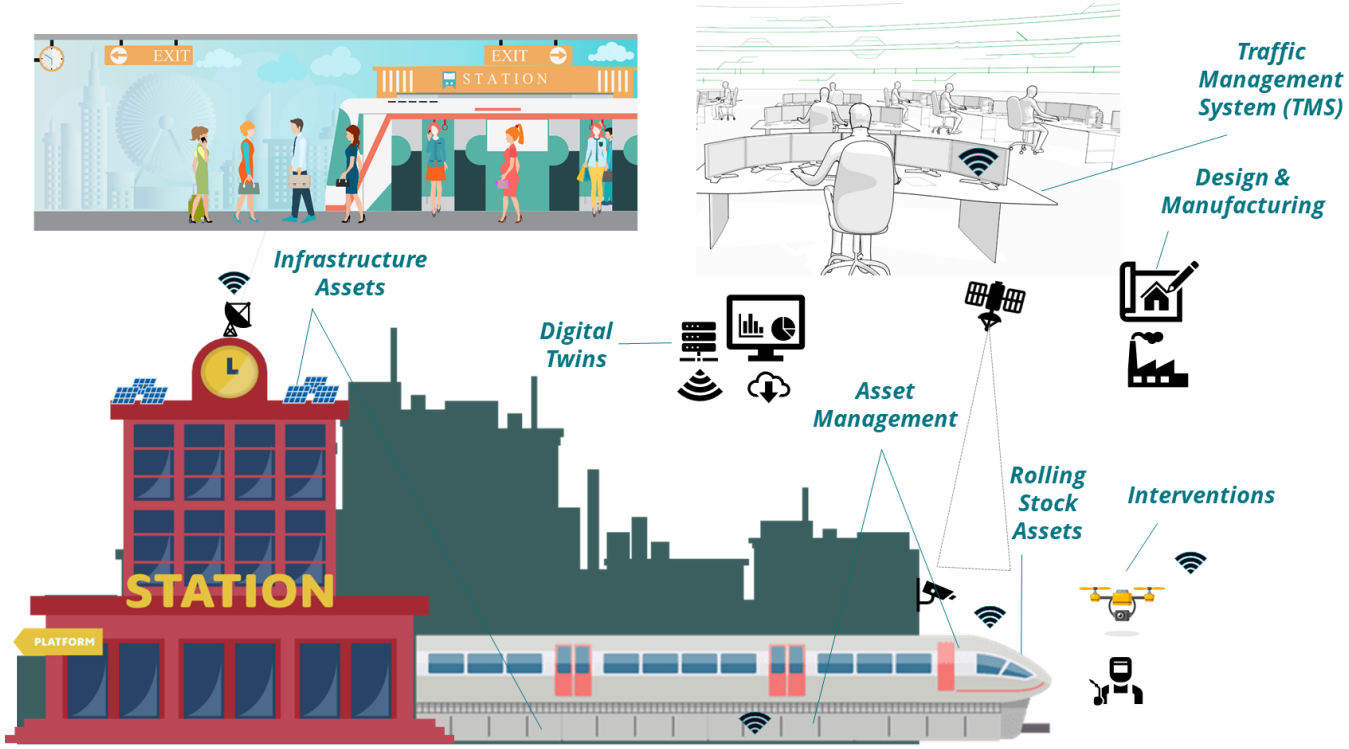
OTHER PARTNERS

ALSTOM, mermec, CAF, ceit, DB BAHN, DLR, cemosa, COMSA, enyse, Tekniker, Faiveley, Ferrovie Italiane, Hitachi Rail STS, indra, Talgo, Jernbane-direktoratet, KNORR-BREMSE, ÖBB, PKP, ProRail, SIEMENS, SNCF, Strukton Rail, THALES, TRAFIKVERKET, voestalpine

FP3 IAM4RAIL

2022				2023												2024												2025											
9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
			Start																																			

End : Nov 2026



Holistic and Integrated Asset Management

Implementing a comprehensive approach that considers maintenance, operations, financial aspects, and overall system performance

Cost-Effective Solutions

Developing a common European asset management framework using digital technologies and data analytics to minimize lifecycle costs and extend the service life of rail assets

Safety and Reliability

Enhancing the safety, reliability, availability, and capacity of the rail system through innovative technical solutions and services

Advanced Decision-Making

Utilizing AI and digital twins to improve decision-making accuracy, predict anomalies, and optimize maintenance strategies

FP3 IAM4RAIL

2022				2023												2024												2025											
9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
			Start																																			

End : Nov 2026

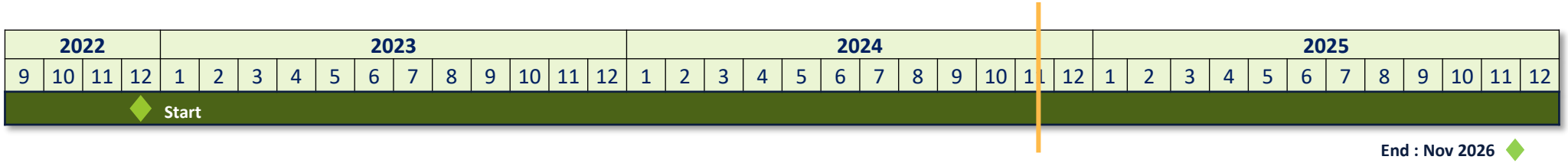
SP1 – Wayside Monitoring and TMS link

- Preliminary installations achieved in the 2 Use Cases
- Data collection started for a limited set of devices/systems, additional activities foreseen in the coming months to finalize the data collection phase.

SP2 – Rolling Stock Asset Management

- Data acquisition and monitoring technologies for both on-board (12 Use Cases) and wayside monitoring (8 Use Cases) technologies under finalization.

FP3 IAM4RAIL



SP3 – Infrastructure Asset Management

- Long Term Asset Management : Four type of DSS are under development in 2 Use Cases. DSS are focuses on long term maintenance and LCC, the development follow standardised structures for asset management.
- Installation of the first prototype intelligent sleepers for track infrastructure monitoring
- Initiation of measurement campaigns for tunnel inspection.

SP4 – Railway Digital Twins

- Completion of a useful BIM model containing all the data to populate the Asset Information system and create an efficient Digital Twin
- Data collection of the demo finalized
- Requirements for virtual certification completed.

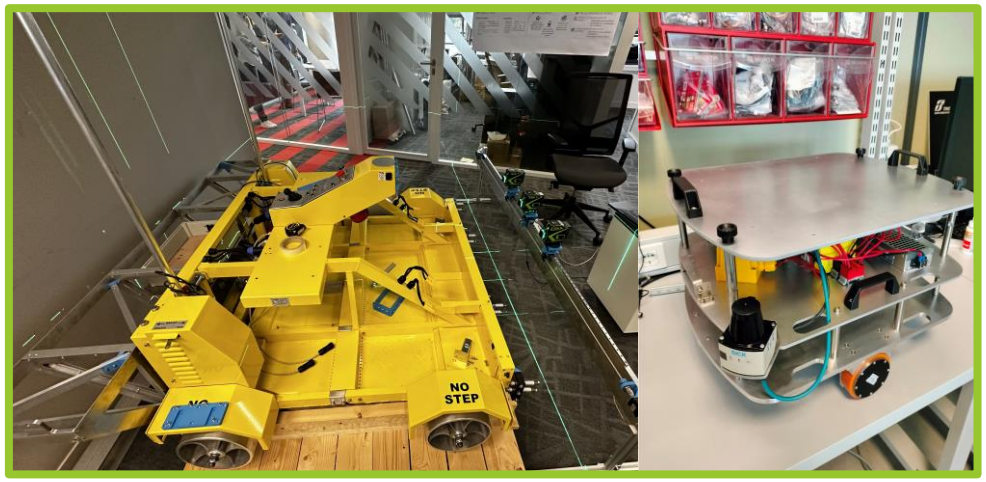
FP3 IAM4RAIL

2022				2023												2024												2025											
9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
			Start																																			

End : Nov 2026

SP5 – Environment, User and Worker Friendly Railway Assets

- New green tracks and turnouts designed
- Acquisition and production of additive manufacturing materials for repairing metallic assets and development of a Digital Warehouse
- Field test campaigns readiness for all robotic platforms.
- Exoskeleton and AR tools well defined and implementation started.



IAM4RAIL

Holistic and Integrated Asset Management for Europe‘s RAIL System

Flagship Project 4

FP4 RAIL4EARTH: Sustainable and green rail systems

- **Main objective:** provide new innovative products and services based on leading edge technologies to **minimize the overall energy consumption** and **environmental impact** of the railway system, to make this transportation mode **healthier, more attractive** and to provide **resiliency against climate change**
- **Target solution:** **Enhanced rolling stock, infrastructure, stations, and all their related sub-systems** (traction, bogies, brakes, energy storage systems, HVAC, etc.)
- **Benefit:** improve the existing sustainability performance of railways, more attractive and resilient transport mode.
- **Six focus areas:**
  - **SP1**: Alternative (to Diesel) energy solutions for the rolling stock
  - **SP2**: Energy in rail infrastructure and stations
  - **SP3**: Sustainability and resilience of the rail system
  - **SP4**: Electro-mechanical components and sub-systems for the rolling stock
  - **SP5**: Healthier and safer rail system
  - **SP6**: Trains Attractiveness (Interiors)

- **Total project cost:** 95.100.000 €
- **Project duration:** 48 months
- **Number of partners:** 23 > 71

FP4 RAIL4EARTH

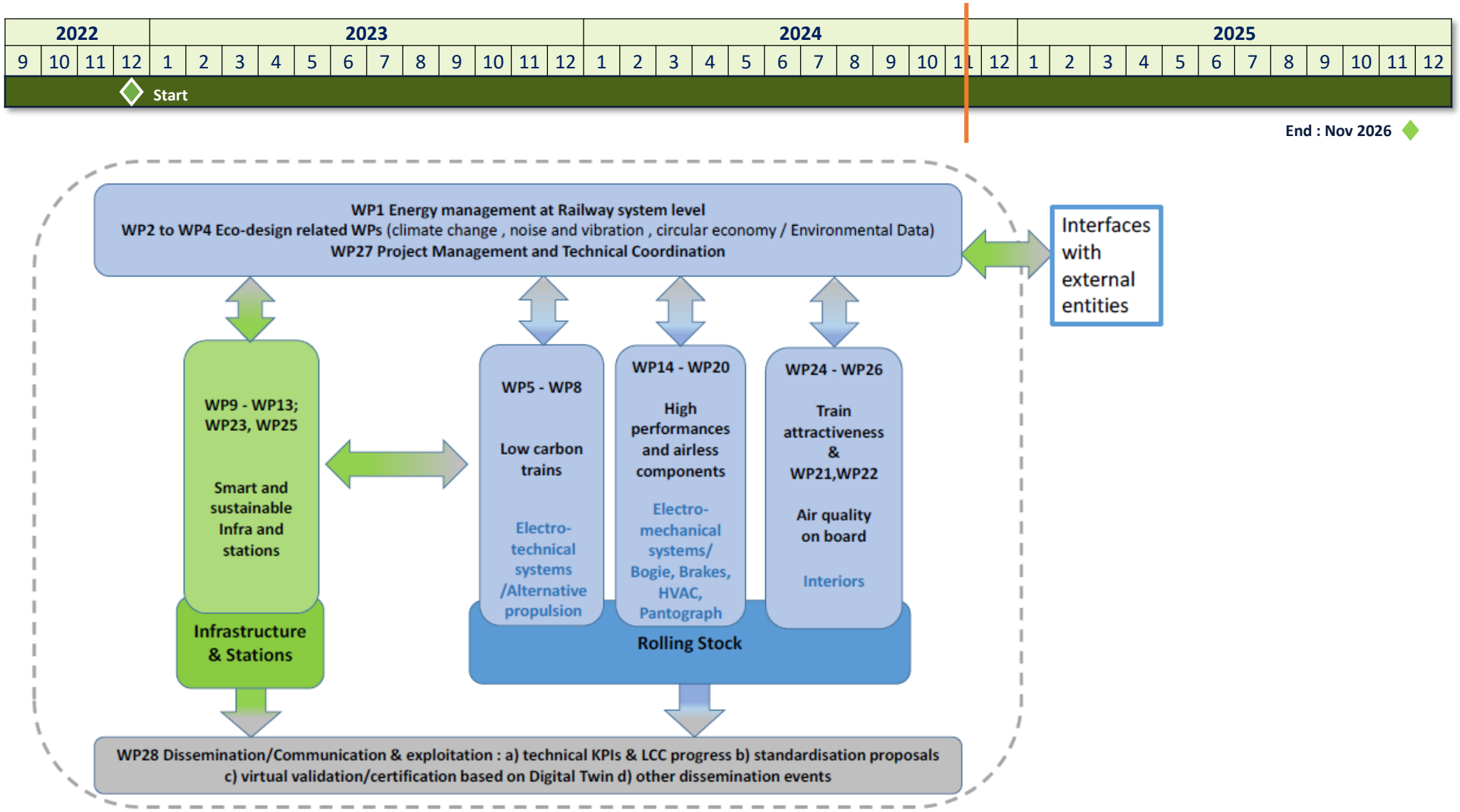
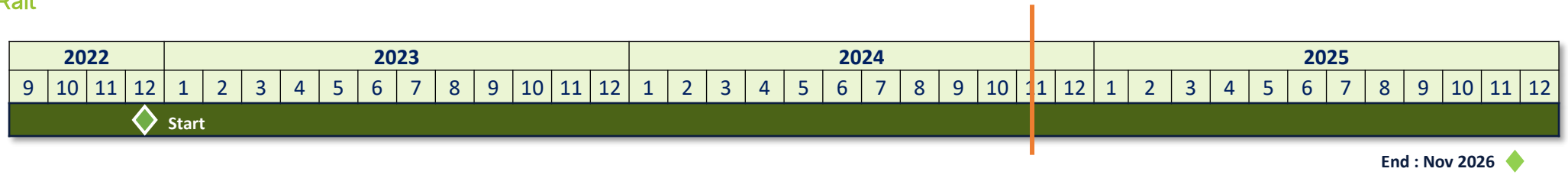


Figure 1: Schematic diagram of Rail4EARTH

FP4 RAIL4EARTH



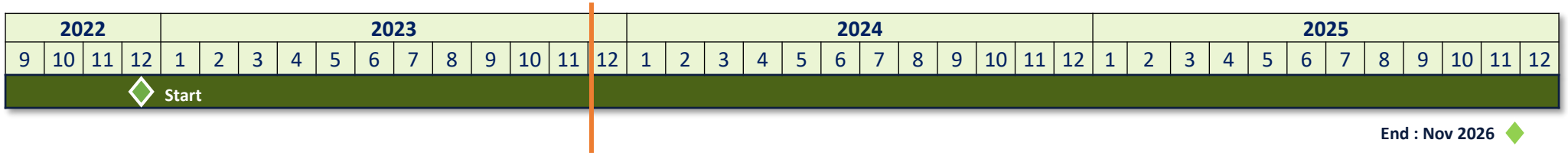
SP1 – Alternative (to Diesel) energy solutions for the rolling stock

- Test of the electric cells and module for the next generation propulsion system started.
- Battery Electric Multiunit 200 km demonstrations trains ongoing: prototype assembly
- Hydrogen storage technologies on trains (materials for the hydrogen tank): simulations performed and results under comparison.

SP2 – Energy in rail infrastructure and stations

- H2 refueling station: First interface model between vehicle and refueling station defined (taking in consideration the existing international standards, the synergies with FP6 and the lessons learnt from H2goesRail and FCH2RAIL). Design of the software tool for modelling the hydrogen refueling system and process finalized.
- Smart grid demo 1 (urban energy hub in a light rail environment): pilot demo was designed and kick-off event is planned in Rotterdam in the beginning of 2025.
- Energy storage solution for AC railway grid: Models for pi-type railway traction network, train load and interface power converters completed.

FP4 RAIL4EARTH



SP3 – Sustainability and resilience of the rail system

- Adaptation to climate change: general methodological guides for adaptation to climate change identified, to be adapted for railways.
- Noise and vibration: methodologies for studying high-speed train annoyance and tonalities have been provided and in situ tests on tonality perception have started.

SP4 – Electro-mechanical components and sub-systems for the rolling stock

- Toward airless train: electro-mechanical pantograph and brakes, preparation of demonstration ongoing.
- Optimized bogie motor gearbox: simulation completed.
- Virtual aerodynamic certification: software tool development ongoing.

FP4 RAIL4EARTH

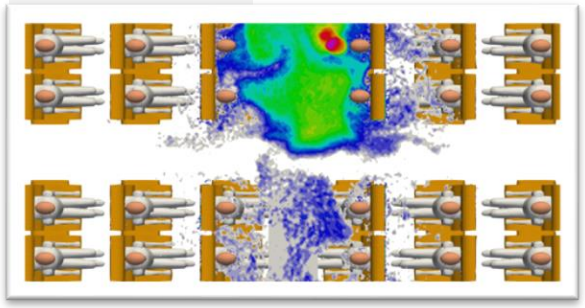
2022				2023												2024												2025											
9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
			Start																																			

End : Nov 2026

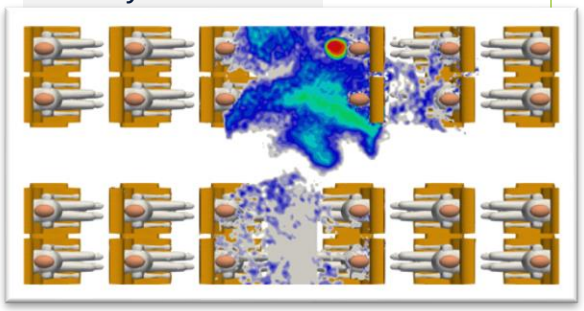
SP5 – Healthier and Safer Rail system

- Air quality in passenger cars:
  - Simulation of airflow management implemented; laboratory demonstrator equipped with the generic ventilation concepts.
  - Relevant pollutant families and evaluation criterion defined. Several filter types tested and validated, e.g. for particles.
- Air quality in tunnel and underground stations: evaluation of air quality low-cost sensors ongoing (measurement campaign in Arlanda started).

reference



new system



SP6 – Trains Attractiveness (Interiors)

- Studies for seats structures made of recycled composite material on-going, as well as research on quick fasteners, circularity of interior components and wireless power for comfort equipment.
- Studies for interior vehicle design supported by biomimicry on-going.

FP5-TRANS4M-R

Transforming Europe’s Rail Freight

Flagship Project 5

FP5-TRANS4M-R: Transforming Europe's Rail Freight

- **Main objective:** European **harmonised, scalable, upgradable DAC systems** to support digital-enabled **operational procedures** and digital **yard automation** and management solutions. **Maximise flexibility and reliability of rail freight service**s by providing **effective intermodal prediction algorithms** and **seamless planning** covering the complete end-to-end rail service

- **Target solution:** Increase in capacity, productivity, efficiency and flexibility of rail freight operations, responding to **customer demands** in a timely and flexible manner.

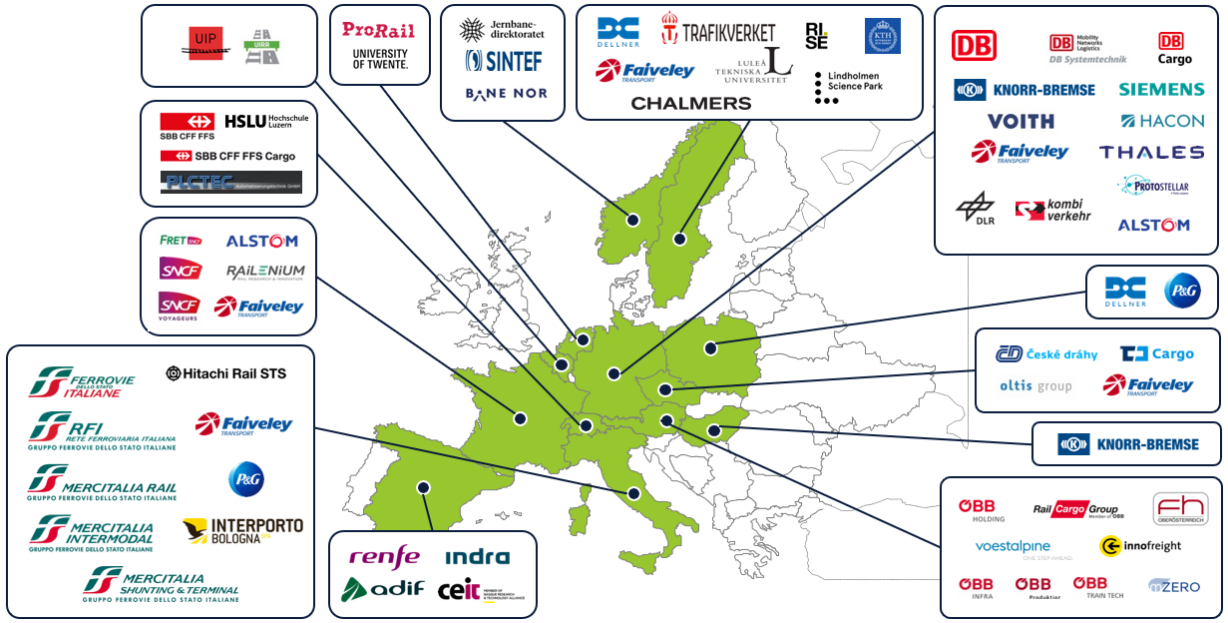
- **Benefit:** enable management of cross-border rail traffic,

  improve rail freight services and operations

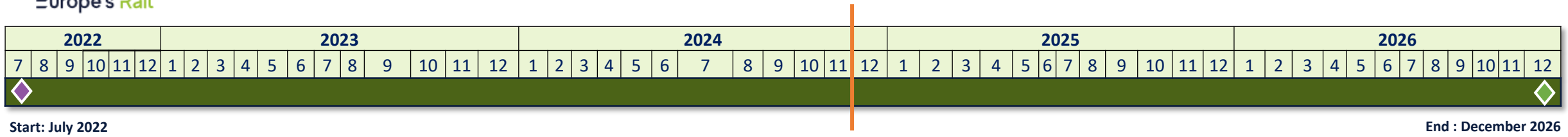
- **Focus areas:**
  - **WS1: Full Digital Freight Train Operations (FDFTO)**
  - **WS2: Seamless rail freight (Seamless)**

FP5TRANS4M-R
Transforming Europe's Rail Freight

- **Total project cost:** 97.500.000,00 €
- **Project duration:** 54 months
- **Number of partners:** 71 (AEs included)



FP5-TRANS4M-R



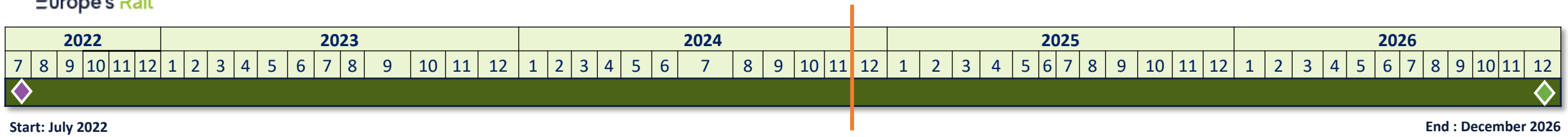
Start: July 2022

End : December 2026

WS1: Full Digital Freight Train Operations (FDFTO)

- Authorisation strategy and overall safety plan
- Preliminary Operational Procedures & System Requirement Spec FDFT & FDFTO User Requirements Specification
- Report on the high-level specification of requirements, challenges and a future target state from an operator perspective as input for FP1
- Risk assessment and harmonised safety architecture
- Requirements Specification for Yard Automation
- DAC Level 4 Functional Tests Report
- Technical Specifications of Wagon and Locomotive DAC & Validation/Test Procedures of Wagon and Locomotive DAC
- Reference Freight System Architecture
- First KPI Report
- Functional Requirements Specification of Train Functions
- Technical Specification of Wagon Power System and Communication System

FP5-TRANS4M-R



Start: July 2022 **End : December 2026**

WS2: Seamless rail freight (Seamless)

- Seamless Rail Freight Framework established
- Analysis of status quo -> Requirements towards Seamless Rail freight
- Alignment and definition of Seamless Rail Freight Systems, their functions and requirements towards other systems, WPs and FPs
- Detailed definition of use-cases
- Report on the basic functional and technical specifications for the realisation of the technical enablers of Seamless Freight, also including the final specification input for FP1
- Definition of KPI measurements
- Harmonized list of processes, milestones and timestamps based on the Rail-CDM approach
- Adoption and continuous evolution of the CMS data model

Achievements within FP5-TRANS4M-R

Train Test Lab

Opening of the train test lab

Test for e-coupler assessment

Achievements within FP5-TRANS4M-R

Demo trains

Installation and start of DAC commercial demo train in Sweden

Test with Powerline PLUS technology in Switzerland

Europe's Rail

FutuRe

Delivering Innovative rail services to revitalize capillary lines and Regional rail services

Flagship Project 6

FP6 – FutuRe: Delivering Innovative rail services to revitalise capillary lines and Regional rail services

Project motivation

- Regional railway **lines need to be revitalized or even rebuilt to make them economically, socially, and environmentally sustainable** and meet the current customer needs but also reduce CO2 emissions of the European transport sector.

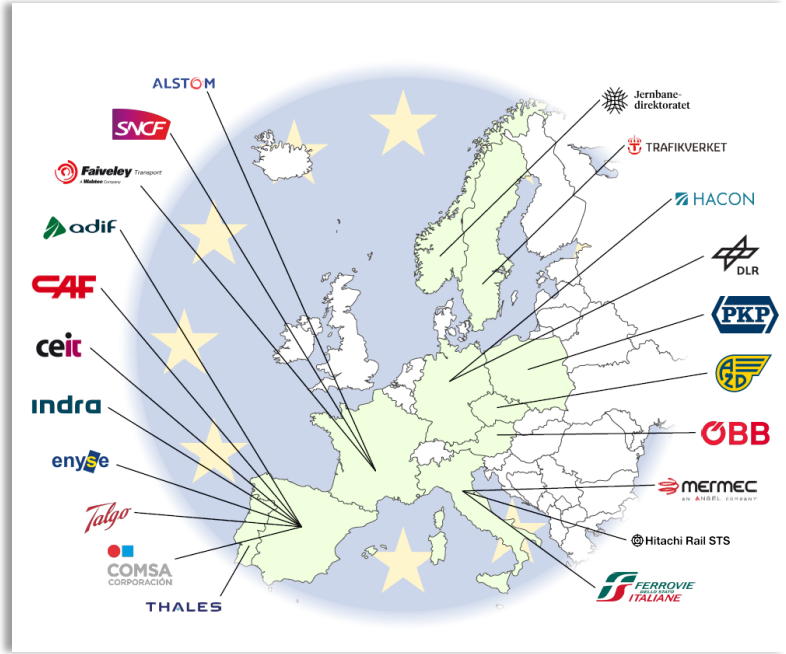
- **Target Solutions:** a concept tailored to regional railways that includes digitalization, automation and utilization of mainstream and emerging technologies for signalling and trackside components, rolling stock and customer information.

- **Benefit:** Long term viability of regional railways, lower CAPEX and OPEX, increasing quality and reliability of the service, improving customer satisfaction

- **Focus Areas:**
  - **SA1**: Suitable Regional System Solution
  - **SA2**: Cost efficient performing CCS system
  - **SA3**: Optimised Railway Asset
  - **SA4**: Sustainable Rolling Stock
  - **SA5**: Suitable Customer Service

FP6-FutuRe
Cost effective regional lines

- **Total Project Costs:** 32.9M EUR
- **Project duration:** 48 months
- **Partners:** 21 > 51

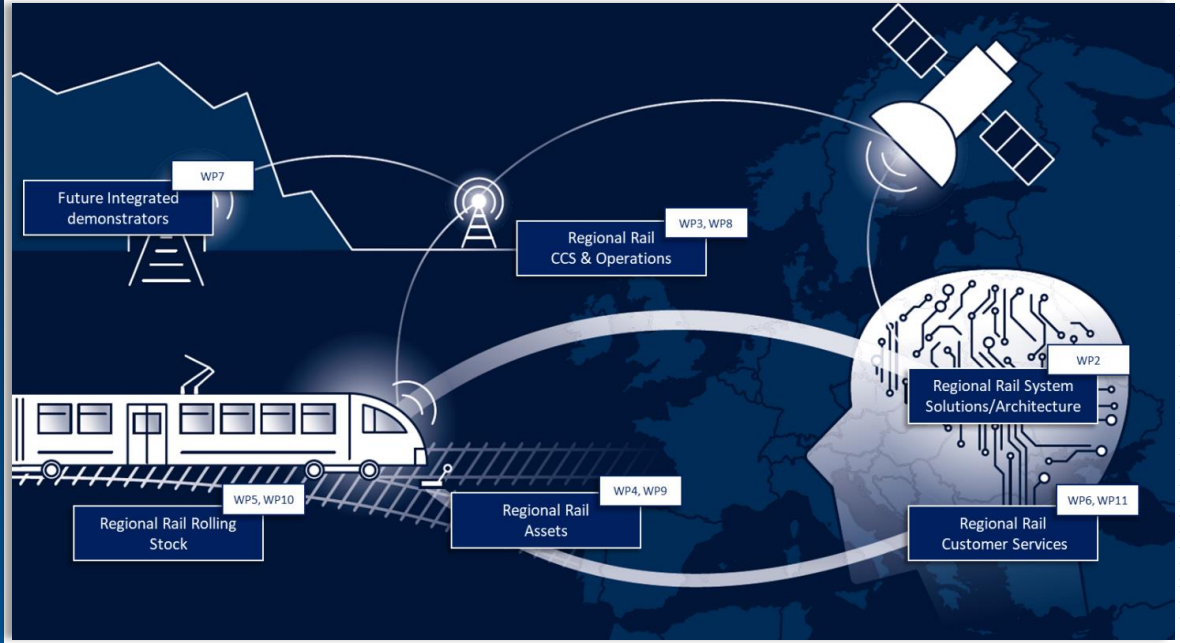


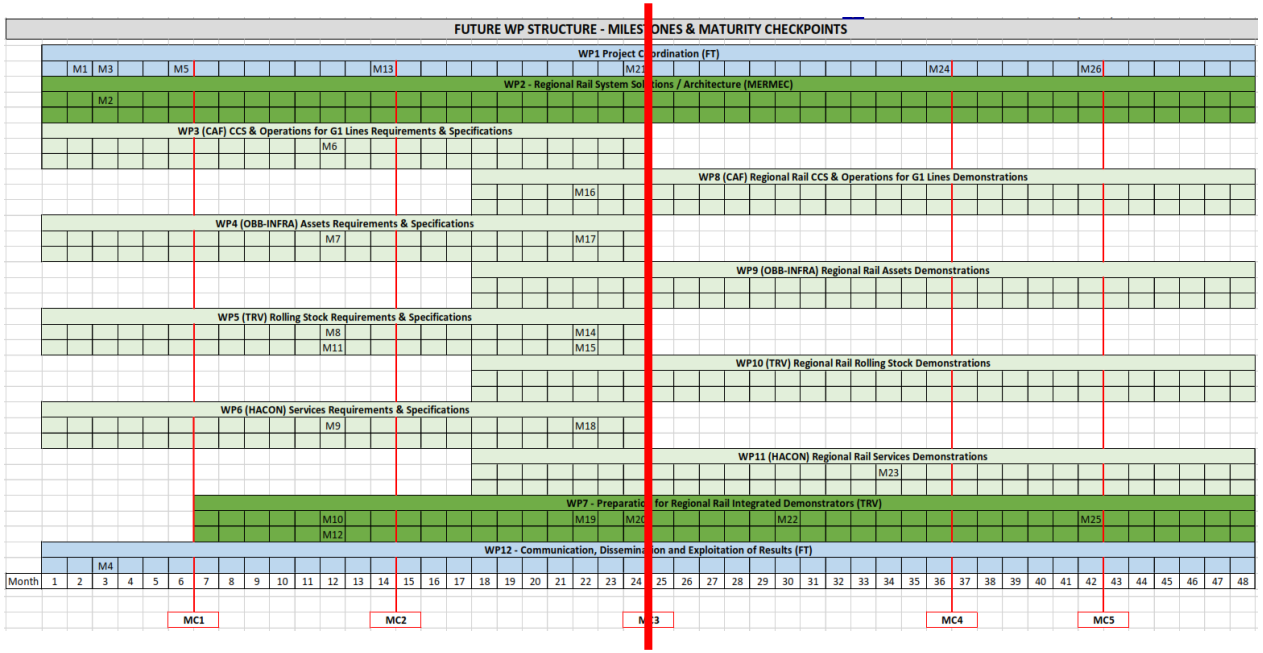
FP6 – FutuRe - Time plan and status

@[11-2024]

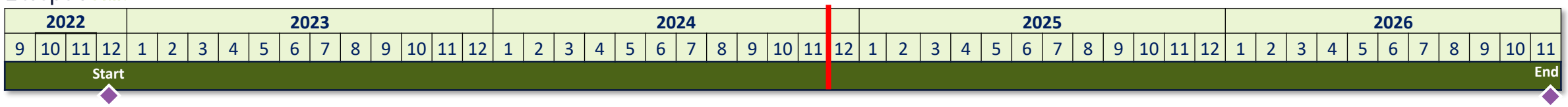
Coordinator	Alessandro Mascis [FT]	**Start**	[01-12-2022]	**Participating Companies**
FPM	Franz-Stefan Weigl [OBB]	**Duration**	[M48]	*1 - FT, 2-ADIF, 3-Alstom, 4-MERMEC, 5-AZD PRAHA, 6-CAF, 7-CEIT, 8-DLR, 9-COMSA, 10 ENYSE, 11-FS, 12-HITACHI, 13-INDRA, 14-NRD, 15-OBB-Infra, 16-PKP, 17-HACON, 18-SNCF, 19-GTSP, 20-TRV, 21-ÖBB-PV*

2022				2023												2024												2025												2026											
9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11
Start																																																		End





FP6 – FutuRe



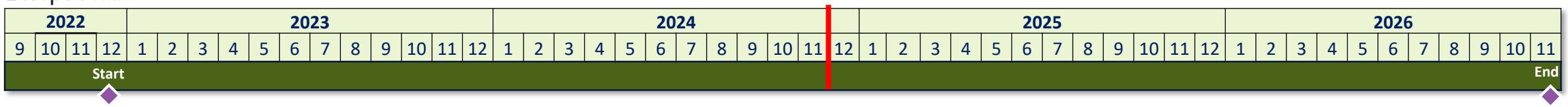
Area 1 - Suitable Regional System Solution

- Specifications of requirements and setup of scenarios for the FP6 Technical Enablers
- System Architecture for the FP6 Technical Enablers
- Key Performance Indicators

Area 2 – Cost efficient performing CCS system

- Definition of Use Cases and preparatory work for the demonstration : ATO over ETCS with GoA2/GoA4, Hybrid Level3, Traffic Management System, cost-effective fail-safe highly accurate train positioning, cost effective fail-safe on-board train integrity & train length, multi-bearer communication platform
- Preliminary specification of requirements for digital platform for CCS validation and TSI certification
- Definition of G2 Lines concept: definition of Use Cases and Requirements for integrated RBC/IxL, accurate high precision fail safe position demonstration on non interoperable lines

FP6 – FutuRe



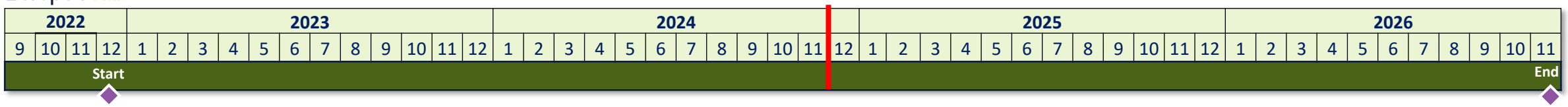
Area 3 – Optimised Railway Asset

- Definition of Requirements, Use Cases and Architecture for wayside infrastructure assets
- Definition of Requirements, Use Case and Architecture for communication covering track-train and track-cloud communications

Area 4 – Sustainable Rolling Stock

- A comprehensive state of the art report on requirement specification for rolling stock with a particular focus on mechanical architecture, mechanical parts, TCMS, traction/propulsion, modular interior
- A first concept for a lightweight, emission free rolling stock with modular interior.

FP6 – FutuRe



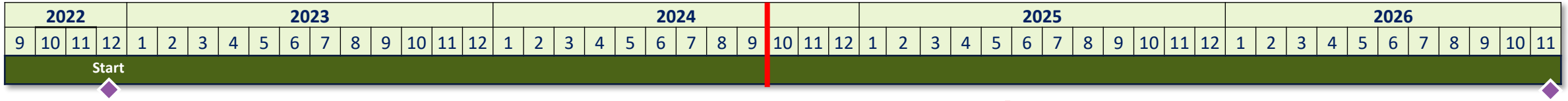
Area 5 – Suitable Customer Service

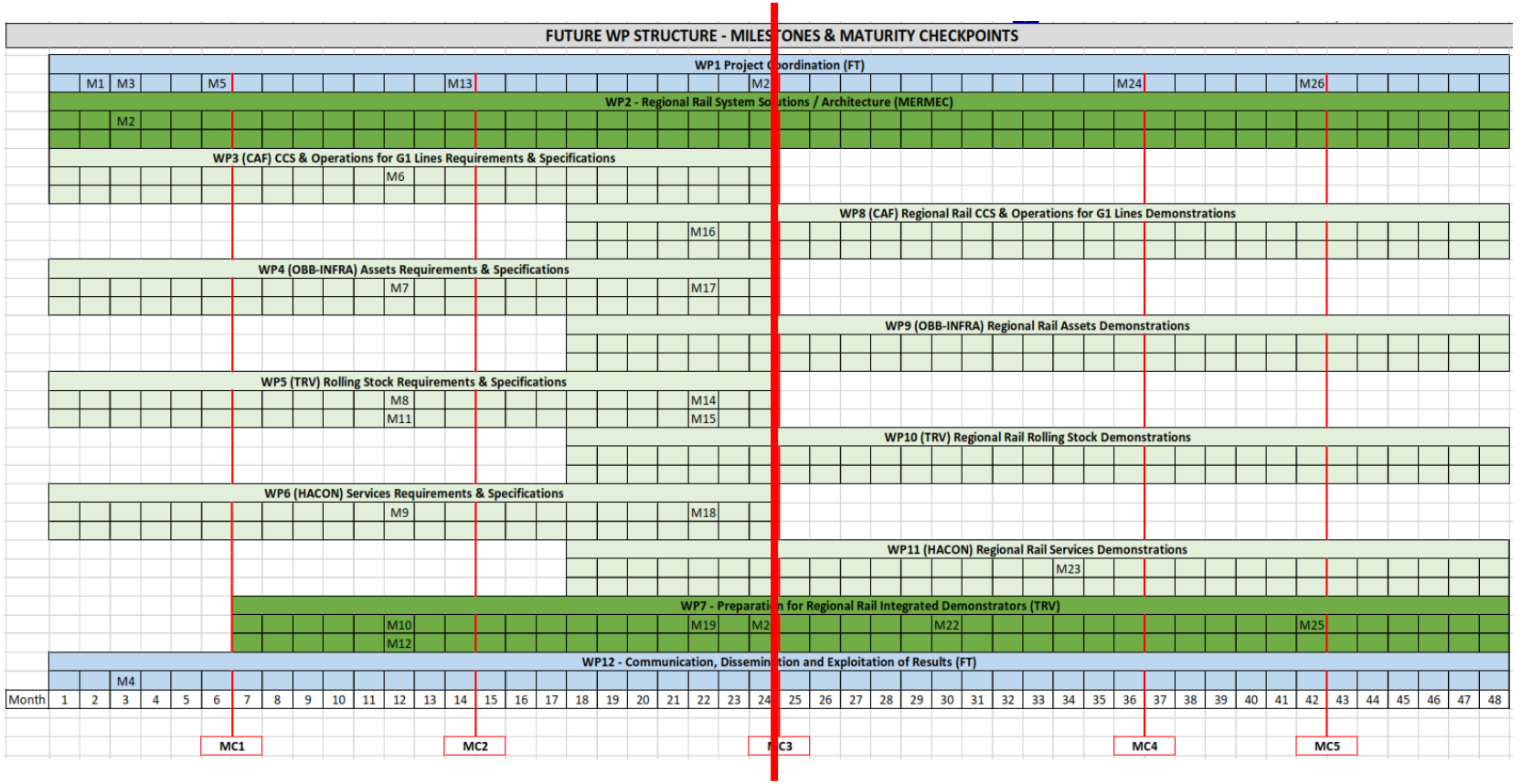
- Definition of Use Cases and Requirements for Traffic Management Systems Passenger Information Systems integration
- Definition of Use Cases and Requirements for Multimodal Travel services including freight
- Definition of Use Cases and Requirements for AI based demand prediction integrated in multimodal travel analysis and congestion monitoring algorithms

FP6 – FutuRe - Time plan and status

@[11-2024]

Coordinator	Alessandro Mascis [FT]	**Start**	[01-12-2022]	**Participating Companies**
FPM	Franz-Stefan Weigl [OBB]	**Duration**	[M48]	*1 - FT, 2-ADIF, 3-Alstom, 4-MERMEC, 5-AZD PRAHA, 6-CAF, 7-CEIT, 8-DLR, 9-COMSA, 10 ENYSE, 11-FS, 12-HITACHI, 13-INDRA, 14-NRD, 15-OBB-Infra, 16-PKP, 17-HACON, 18-SNCF, 19-GTSP, 20-TRV, 21-ÖBB-PV*





Deliverables in FP6 - Overview	
Total number in WP	69
Number submitted	21
Number outstanding	48

FP6-FuteRe: Future next steps (to M36)

- Setup of demonstrators for each technical enabler
- Ensure good alignment with the other FPs
- Monitor the key performance indicators of the project
- Provide input to SP and the STIP
- Develop the migration strategies
- Concept for integrated demonstrators for G1 and G2 lines incl. mapping of test sites and necessary equipment

SEO	SEO Description	Expected Improvement	Means of verification
SEO1	Overall reduction of the Total Cost of Ownership (CAPEX and OPEX) of the CCS system, while maintaining or increasing the present safety level.	Expected decrease by targeting 25%.	FP6 – Future will positively contribute to simplification and increased efficiency of CCS resulting into reduced CAPEX but also increasing the safety level compared with existing CSS systems used today in regional lines.
SEO2	Reduced the CAPEX of radio network and allowing for higher savings due to the utilization of public radio network in low density lines	Expected decrease by targeting 15%.	By using public radio network the costs for communication will be significantly reduced.
SEO3	Increased system availability due to reduced trackside asset failure and more reliable CCS (average delay minutes per assets and signalling failures).	Expected increase by targeting 10%.	Increased availability compared to baseline; taking into account into account EN 50126.

SEO	SEO Description	Expected Improvement	Means of verification
SEO4	Reliable cost-effective fail-safe on-board train integrity, train length detection and train positioning.	Expected increase reliability by targeting 15%.	FP6 – Future will compare with baseline systems (e.g. compared with ETCS HL3/L3, PZB or Indusi).
SEO5	Overall reduction of OPEX and CAPEX	Expected increase reliability by targeting 15%.	Cost-efficiency is the key element of the entire project and will be achieved through the development of solutions for specific parts (e.g. energy-self-sufficient solutions for assets, vehicle concepts, ATO over ETCS, more reliable CCS), thus when combining the solutions resulting in an overall decrease of OPEX and CAPEX of regional rail.
SEO6	Optimized energy consumption and higher punctuality through ATO over ERTMS targeting GoA4.	Expected decrease of energy consumption by targeting 10%.	Automated train operations result into more steadily train operations (e.g. better controlled acceleration, braking) and thus into more efficient energy consumption.
SEO7	Optimized punctuality.	Expected increased by targeting 15%	Solutions developed in FP6 – Future will allow for higher availability of infrastructure and vehicles, thus, reducing failure and increasing punctuality.
SEO8	Reduced OPEX costs/km (reduction expected due to trackside assets decrease) for trackside railway assets	Expected decreased by targeting 30%.	Reduced amount of trackside assets, respectively reduced complexity of trackside assets (e.g. less cabling) will result into less maintenance and as a result lower OPEX.
SEO9	Increased energy efficiency for trackside railway assets (as part of the OPEX saving above, not to be added on top).	Expected decreased by targeting 30%.	The developed solutions for energy self-sufficient trackside asset require less energy consumption; thus, as an overall effect energy need will decrease.
SEO10	Reduced vehicle CAPEX & OPEX through innovative, modular and lighter design, valid for the transport of good as well.	Expected decrease by targeting 50% CAPEX and OPEX, in a LCC perspective and transport of goods improvement.	The developed solutions, including less internal cabling, less weight will demonstrate their positive contribution to reducing CAPEX and OPEX.
SEO11	Notwithstanding the previous KPI, passenger vehicles development will aim for step changes in weight reduction and track force reduction, while being tolerant to higher unevenness of the tracks.	Expected decrease up to 30% of weight reduction and for some parts of the vehicle up to 60%.	Benchmarking with total weight and weight of specific of existing regional rail vehicles.
SEO12	Improved energy efficiency of railway assets	Expected increase by targeting 15%	Reducing the energy consumption of regional railway

Flagship Area 7

EU Rail: Flagship Area 7 of the Innovation Pillar

VISION of FA7

Develop **the next generation of railway transport systems** based on **fully automated multimodal mobility systems** for passengers and goods, which are **sustainable and interconnected**, **more flexible**, **natively digital, standardized and scalable**, enabling **new business models** towards on-demand mobility

OBJECTIVE of FA7

Explore non-traditional and emerging flexible and/or high-speed guided transport systems, as well as to create opportunities for innovators to bring forward ideas for shaping those future systems via a scientific approach into an existing rail system.

Destination

AUTOMATED MULTI-MODAL MOBILITY-SYSTEM

TARGET @2031 – TRL 5

Destination

MAGLEV-DERIVED TRANSPORT SYSTEMS

TARGET @2031 – TRL 6-7*

Destination

UNCONVENTIONAL FAST TRACK-BOUND TRANSPORT SYSTEMS

TARGET @2031 - TRL 5-6*

*with the assumption that other complementary initiatives and programs

Progress in 2024

Objective: To develop a concept for Pods and Pod-Carriers on railway and to identify relevant use cases and business cases.

Key activities:

- Identification of Use Cases, Business Cases / CBA, operational concept
- Concept development for vessel equipment
- Concept for the handling, loading/unloading technologies

Starting date: September 2023

Duration: 30 months | Funding: 3M

Objective: To explore non-traditional and emerging maglev-derived systems (MDS) and to assess the technical feasibility and effectiveness to introduce MDS in Europe.

Final results:

- MDS design concept configuration;
- 6 use cases considering both freight and passenger scenarios were selected and their technical and economical feasibility were analysed
- Developed a European roadmap for possible future implementation MDS using the defined use cases;
- Technical open points were identified such as electromagnetic compatibility or infrastructure adaptation and maintenance, to further researched.

Duration: 15 months | = Funding: 1.5M

Objective: Facilitating the harmonization and interoperability of hyperloop technologies and analyze the technical and economical feasibility

Activities:

- Define a harmonized hyperloop concept
- Research use-cases & business case
- Validate essential hyperloop technologies (TRL4)
- Social-economic assessment and roll out strategy
- Develop a roadmap towards implementation (industrialisation, safety)

Expected start: December 2024

Duration: 24 months | Funding: 2.3M

** Grant Agreement preparation phase*

Exploratory Research

Exploratory Research: Progress in 2024

RAIL4CITIES

Objective: to develop a new operational and applicable model of stations (SCP model), a respective EU-wide methodology for its efficient application, and a tool that decision makers can utilize for transforming stations, into real promoters of sustainable cities

Key achievement:

- Methodology (first draft) published
- Placemaking activities completed
- Living labs operation almost completed

Starting date: July 2023

End date: June 2025 | Funding: 700k€

InBridge 4EU

Objective: to develop procedures to revise and enhance some of the normative criteria used to evaluate the dynamic performance of railway bridges stipulated in the Eurocodes and TSIs.

Key achievement:

- Representative data base of RS and bridges finalized.
- Preliminary definition of amplification factor due to track irregularities φ''.
- Damping estimation in more than 60 bridges from different types.
- Test rigs for experimentally assess ballast instability built and train-bridge interaction analysis to study train running safety in ballastless track bridges completed.

Starting date: September 2023

End date: August 2026 | Funding : 928k€

LEADER

Learnings for European Autonomy to Deliver Europe's Rail in 2030

Objective: provide a forecast of the actual availability and gaps in the materials and components necessary to produce each of the innovations EU-RAIL is targeting for 2030, and make relevant recommendations for resilience to the EU Institutions and the European Industry

Key achievement:

- Analysis of all innovations planned in the EU-RAIL MP and MAWP under the point of view of 'what specific components and raw materials are necessary to produce them for the market' –almost finalized
- Cross-sectoral analysis in order to identify possible strategies/actions to re-apply in the Railway sector to increase the resilience and autonomy of its supplie

Starting date: July 2023

End date: December 2025 | Funding: 700k€

Exploratory Research: Progress in 2024

Objective: to develop a Web platform integrating web-based service and examine implementation of smart contract to boost Freight modal shift

Key achievement :

- assessment of emerging technologies and modal share analysis together with data collection
- analysis of the contractual and legal framework and smart contracts implementation

Starting date: September 2023

End date: August 2025 | Funding: 1,3 M€

Objective: to enable an effective and coordinated European-wide DAC roll-out and setting up an actionable migration and implementation plan

Key achievement :

- Operative Management of the EDDP
- DAC migration roadmap refined and further developed

Starting date: April 2023

End date: March 2026 | Funding: 1.5 M€

Objective: to create tools for mapping research theme, establish a scientific observatory to identify gaps and future needs, deliver a KPI framework for assessing the performance of Europe Rail's programme and enabling 6 PhDs in Railway Engineering

Key achievement :

- Completion of the tool
- Draft KPI assessment framework
- Progress in the research area of aerodynamics, electromagnetic compatibility, and wireless communications for trains, along with predictive maintenance and AI-driven driving assistance systems

Starting date: September 2023

End date: February 2027 | Funding: 2 M€

Exploratory Research: Progress in 2024

SYMBIOSIS

Objective: to create a comprehensive strategy that bridges transport infrastructure and energy networks while incorporating biodiversity considerations

To provide solutions to enable infrastructure project developers to showcase the impacts and benefits of their projects to achieve environmental conservation and sustainable development

Starting date: September 2024

End date: August 2027 | Funding: 2,8 M€

XCROSS

Objective: to develop a suite of integrated disruptive technologies which combine to provide a technological process for the monitoring, inspection, and maintenance intervention of crossing surface profiles, demonstrated in urban environment;

Starting date: October 2024

End date: March 2027 | Funding: 2,7 M€

QUIETERRAIL

Objective: to introduce a step change in the prediction and mapping of railway noise and vibration, in the acceptance testing of new rolling stock, and in the promotion of cost-effective noise mitigation.

Starting date: October 2024

End date: September 2027 | Funding: 4,1 M€

Exploratory Research: Progress in 2024

PhDs EU-Rail

Objective: Realization of 10 PhD positions, teaming up with the industry; and continuous process for the extension of a rail excellence scientific community.

Starting date: October 2024

End date: September 2027 | Funding: 2 M€

NEXUS

Objective: To redefine metro adaptability to demand fluctuations, deliver a comprehensive feasibility study train control systems of tomorrow and explore promising of AI and data science applications in metro transport.

Starting date: October 2024

End date: September 2026 | Funding: 3.1 M€

DACFIT

Objective: To deliver a fact-based assessment of the DAC retrofit readiness of freight locos & wagons, a fact-based DAC Retrofitting Capacity Assessment in Europe and a scalable and executable DAC retrofitting (capacity) plan.

Starting date: October 2024

End date: October 2026 | Funding: 1.5 M€

Q & A

Implementation of the EU-Rail Programme

System Pillar:
State of Play and Year 2 Results

Ian Conlon, Sönke Kraft & System Pillar Core Group

System Pillar – General Overview

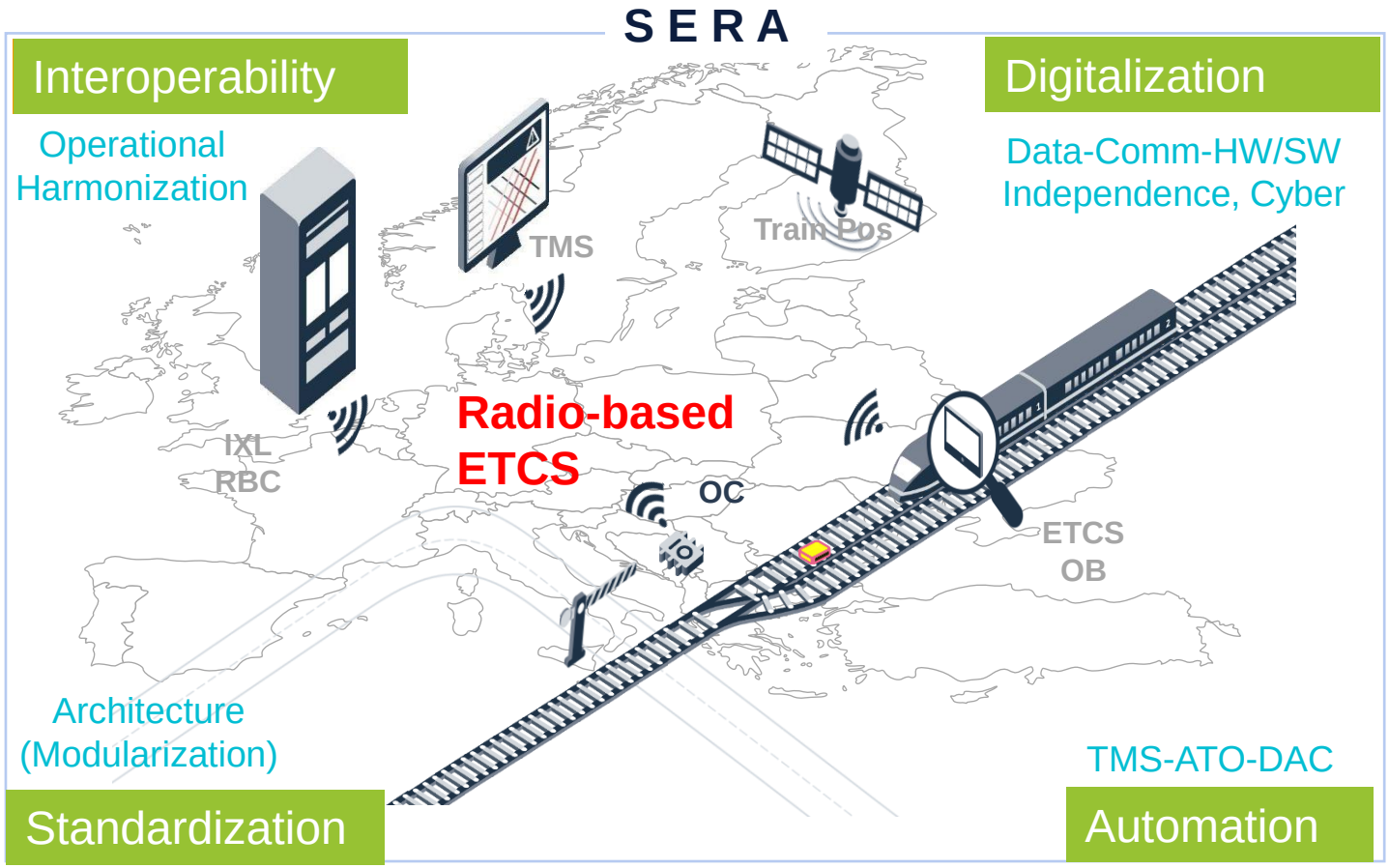
EC, ERA, Member States, and Sector agreed on a dedicated structure - System Pillar - to provide a unique opportunity to allow the Rail sector to converge on a strategic vision for the evolution of the **Single European Rail Area (SERA)**.

System Pillar

MultiYear Program

~ 400 *experts from Sector*

50 *m EU funded*



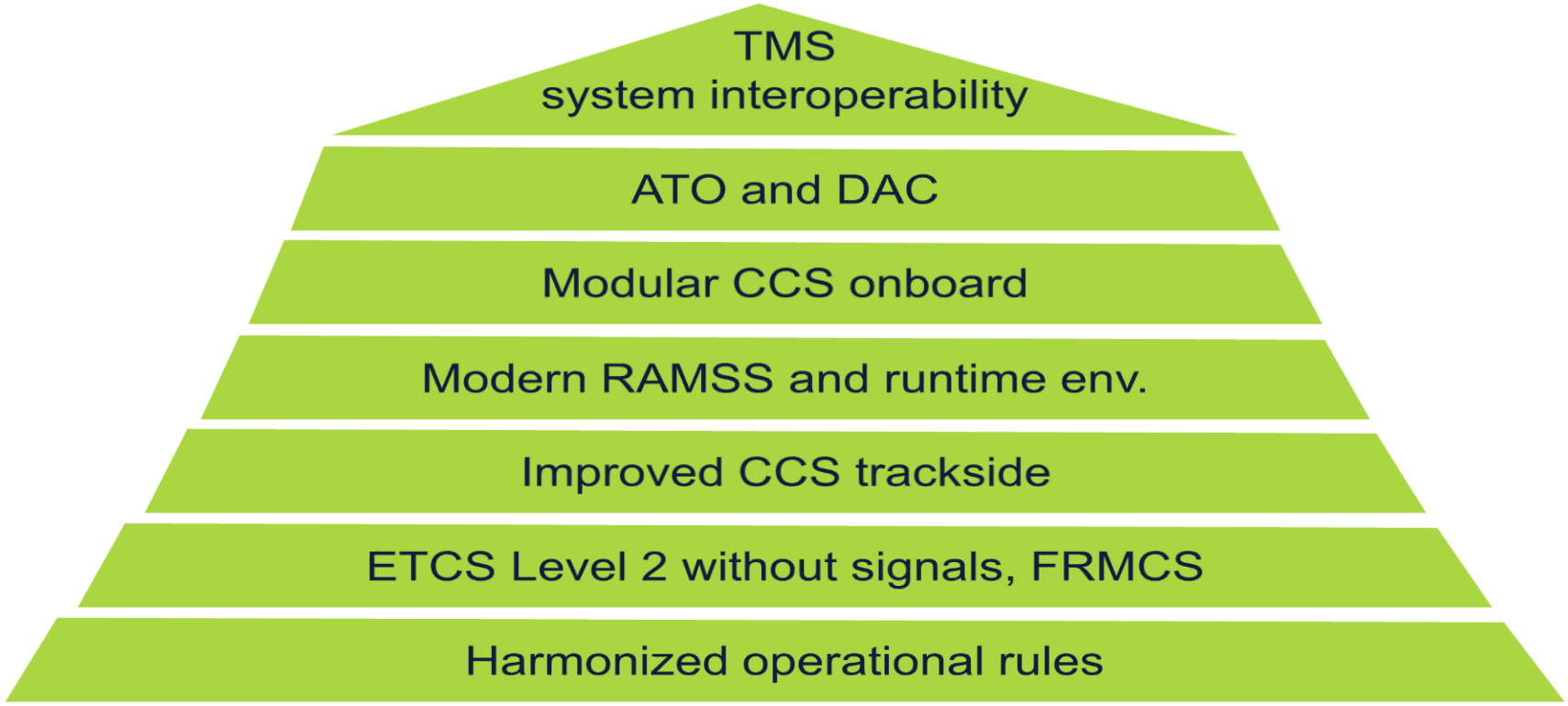
Why - The motivation for the System Pillar

Harmonize operations and products with a powerful and modular architecture.

Reduce process effort on all sides (products, assets, production)	Reduced cost
Accelerate product evolution by creating higher market potential per product	Performance, Capacity, Automation, Digitalisation.
Healthy and affordable product and asset lifecycles. Manage complexity and knowledge availability risks.	Healthy Business.
Improve interoperability	SERA.

What - System Pillar Scope

Harmonized operational rulebooks, off-the-shelf CCS products



How – organisation and process

Europe's Rail

System Pillar Steering Group

15 specialized "domains"

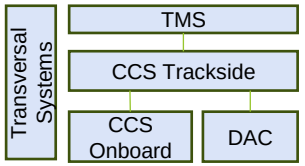
EC
ERA
Sector bodies

Railways
Suppliers
Mirror Groups

Harmonized Operational Processes

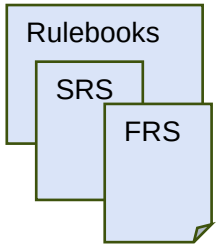
Derived harmonized requirements

Precise Architecture Specification (MBSE)



Operational Rulebooks.

Precise System and Interface Specification



"Harmonisation"

TSI CR proposal

Standardisation proposal

System Pillar Publication

Draft proposal
Propose specifications as draft input for harmonisation processes (TSI, ESOs)

State of play and outlook

State of play 2024

General
- ❑ The first version of the Standardisation and TSI Input Plan (STIP) was published

PRAMS/Security
- ❑ The guidelines for implementing cybersecurity in rail were published (draft)
- ❑ System Concept and PRAMS plan
- ❑ CBM RAMS rules

EET
- ❑ Requirement management
- ❑ SEMP update

Task 1, Railway system
- ❑ As-is operationally architecture on prioritised capabilities
- ❑ Energy report on energy saving measures

Task 2, Operational
- ❑ Operational capabilities

Task 2, Traffic CS
- ❑ Operational analysis (CONEMP) and System Analysis (FRS)
- ❑ A proposal for the target trackside architecture was developed, based on ETCS L2 without line signals

Task 2, Train CS
- ❑ Onboard architecture (logical and physical)

Task 2, Trackside assets
- ❑ The EULYNX Baseline 4 Release 3 specification were published jointly with the System Pillar

Task 2, Transversal
- ❑ The CCS/TMS data model was published
- ❑ CCS/TMS diagnosis and configuration concepts

Task 3, TMS/CMS
- ❑ 5 variants for European TMS were proposed and analysed
- ❑ System concept and system architecture

Task 4, DAC/FDFTO
- ❑ Harmonised operation procedures

Task 5, HERD
- ❑ 2 use cases for harmonised diagnostics were analysed

Outlook 2025

PRAMS and Security
- ❑ Modular safety case structure and EU hazard database
- ❑ Security requirements and specifications

Task 1, Rail system
- ❑ To-be architecture for 1 capability

Task 2, Train CS
- ❑ Onboard modular architecture including Ethernet consist network, enhanced train interfaces, modularity, basic ASTP, multi display concept

Task 2, Traffic CS
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- ❑ System specifications and interface of TPS, AEL and ATO trackside (Year 1 of 3)

Task 2, Operational harmonisation
- ❑ European harmonised operational rulebook (Year 1 of 3)

Task 2, Transversal CCS
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- ❑ Integration TTR messages
- ❑ Cross border variants analysis CMS/TMS

Task 4, DAC/FDFTO
- ❑ Operational standards
- ❑ Central instance for data and software management

Task 5, HERD
- ❑ Demonstrator specification for pilot implementation

Suppliers view

Challenges today

Although the airgap interface is harmonized in the CCS TSI, European market for Trackside and Onboard products is still missing due to:

- National market requirements
- Missing operational harmonization
- Re-development of variants of same features
- Scattering of development resources

SERA impact

Single European Railway Area impact

- European products: re-usable without adaptation
- Modularity and upgradeability
- Prerequisite: **Operational harmonization**
- Change from development oriented industry to one that is oriented to deployment

Conclusion

With the System Pillar we have, for the first time, the framework that allows the European railway sector to fully harmonize Operations and Architecture.

- High commitment and priority
- Until SERA products are ready prepare current roll-out
- System Pillar is the disruptive element for increasing speed and reducing cost on European level for Rail

Railways view

Challenges today

- Digitalization completely changed the CCS asset business
- System dependencies grow
- Procurements, asset life cycles and rollouts perform more and more insufficiently
- Increasing asset management risks
- Not making full use of the CCS potential (performance, automation)
- CCS market changes rapidly, but in what direction?

SERA impact

- The switch to of-the-shelve modular products and harmonized processes is the chance for a strong simplification
- This simplification also allows more innovation and faster deployment
- **The prerequisite:** National migration support for absorbable changes and early steps
- Change from a “one-time-construction” market to service providers who are mastering the dynamics of the digitalization

Conclusion

- The railway community believes that a harmonized and modern product architecture is crucial for the future of the European railway system
- High commitment and priority
- Complexity is growing every year, harmonization should happen fast.
- System Pillar has a central role
- Right time to start designing a national path for a long-term change process, and to make first steps which are possible today.

State of play and outlook - Highlights

Operational rulebooks

PRAMS and Security
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European operational rulebook

Harmonised operation of ETCS L2 (SP target) and DAC

published | Ongoing work

Operational rulebooks

From concepts to one European operational rulebook

Operational harmonization

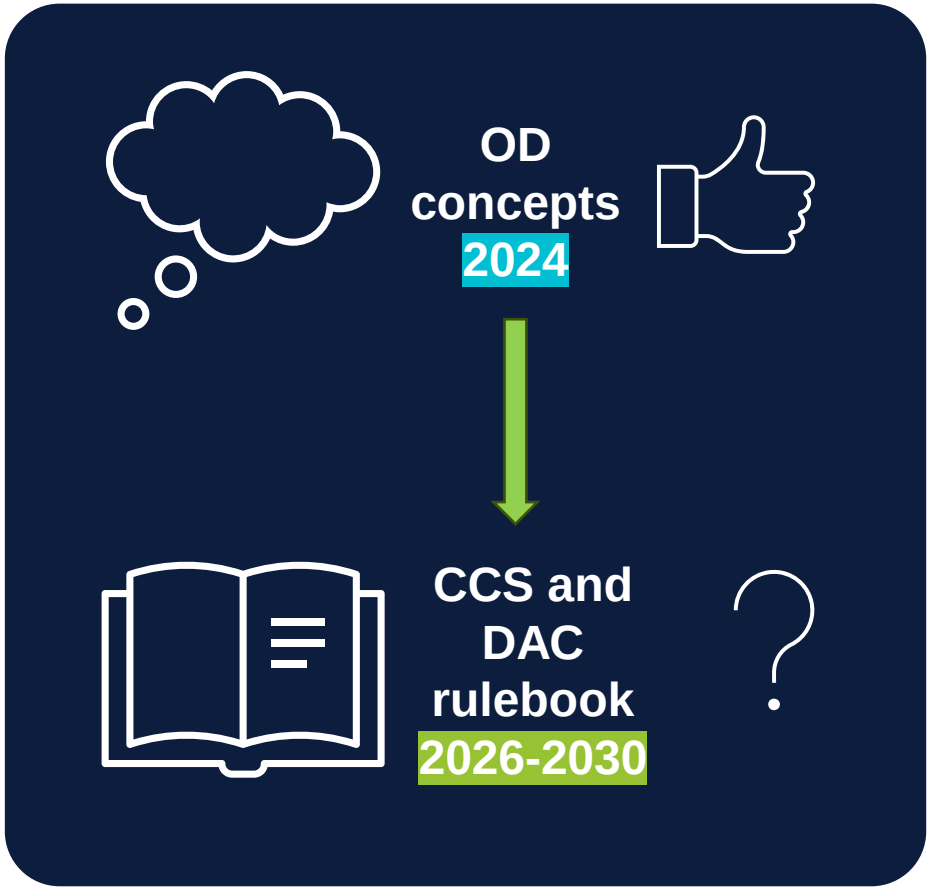
- Necessary prerequisite for the harmonization of systems, including a harmonized TS CCS.

❑ Operational domain concepts - high-level

- The Operational Domain (OD) concepts are the result of an alignment inside the OD domain, and discussed also in the OD Mirror group and CER/EIM OPE group.

❑ European operational rulebook

- The rulebook work is based on the OD concepts and goes deeper, to specify the CCS system and respective rulebook. A OD concept contains:
  - Differences of national processes
  - Aligned targets for the processes
  - Draft outline of harmonized processes
- Work started in Oct. 2024



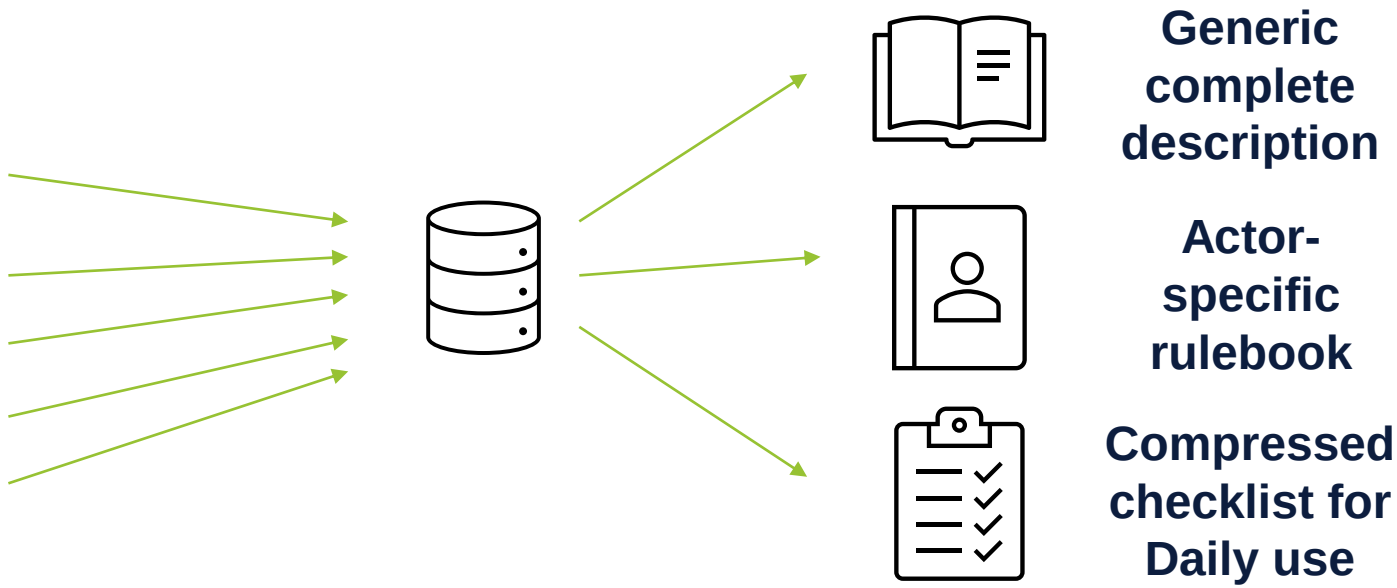
Operational rulebooks

Detailed Rulebook design – started 10-2024

The content for the European operational rulebooks will be stored in a structured database to allow output for different purposes and in different formats, online retrieval for process questions, automation of the change management process with national documentation, and fast and precise change and maintenance of the rulebook content.

Rulebook content (examples):

- Movement A to B
- Manage Usage Restrictions
- Approaching Stop location
- Boarding and disembarking of passengers
- Shunting inside controlled area
- Splitting trains
- Joining trains
- Change of train orientation



Operational rulebooks

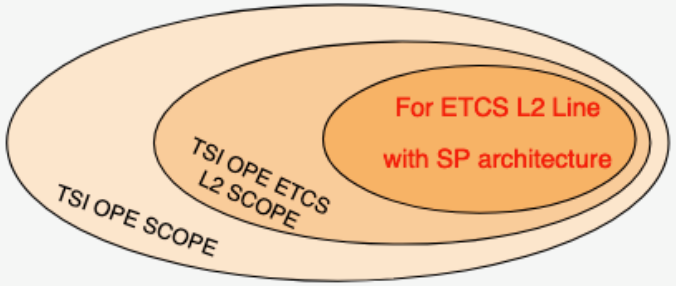
Aspects of the future operational rulebook

Basic approach: for lines equipped with the system pillar target system (standard products). This annex goes deeper in terms of operational process description to assure that the system functionality needed for the processes has a clear and completely harmonized basis. This includes the description of the following aspects:

Deeper consideration of processes

Harmonized rulebook through reducing the variability of trackside implementation

Operational rules for a specific scope



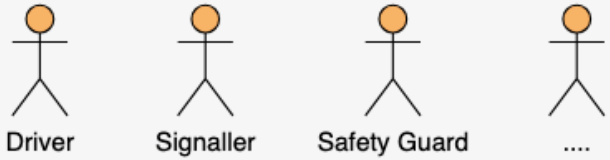
For all processes

- Normal modes incl. shunting
- Degraded modes
- Configuration specific (e.g. with/without GoA2)

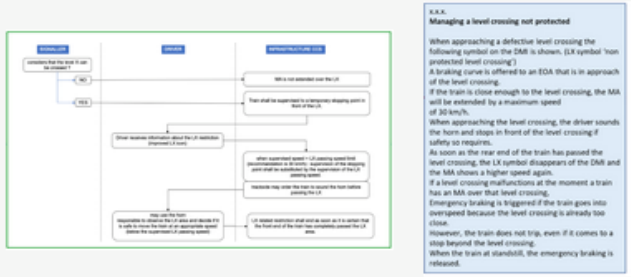
All operational processes with dependencies to CCS systems are harmonized (including shunting)

Consideration of all actors (especially signaler) included in the analysis beyond a driver focus

Operational rules for all actors



Includes description along scenarios



scenario-based and functionality-based description, perspective of the user

Operational rulebooks

List of Operational Harmonization Domain existing concepts

Normal operations

- Preparation to train departure
- Operate the train A to B
- Ending journey
- Splitting a train
- Joining trains
- Change of train orientation
- Approaching stop location
- Revoke movement permission
- Pass level crossing
- Shunting inside controlled areas
- Entering/exiting non-controlled area

Transitions

- Entry to CCS area
- Exit from CCS area
- Handover between ETCS areas

Degraded

- Moving under driver responsibility
- Reversing
- Continue after Trip (TR)
- Handling emergency situations
- Train assistance
- Handling a train after loss of communication
- Proceed after TIMS failure
- Runaway vehicle
- Sweeping a track section
- Passing non-supervised point
- Passing non-protected level crossing

Usage restrictions

- Working areas
- Manage usage restrictions
- Virtual balise cover

Basic for 3 years of rulebook work

State of play and outlook - Highlights

Trackside architecture

Trackside architecture

Trackside architecture for ETCS L2 target system

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European operational rulebook

published

Ongoing work

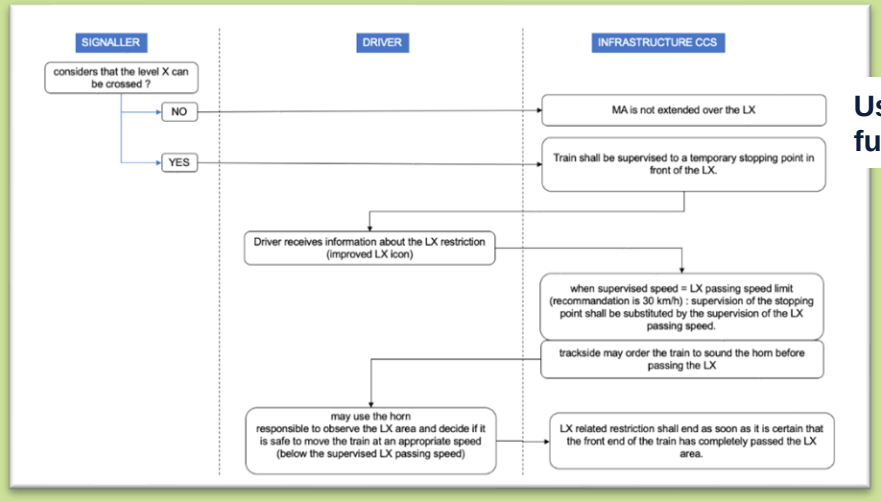
Trackside architecture

Dependence between architecture and operational rules

Operational harmonization

scenario-based (situation specific time-ordered process sequences of state-dependent actor actions and interactions with systems)

Actors of CCS system **CCS system**



System functionalities

Use of system functionalities

Defined system functionalities

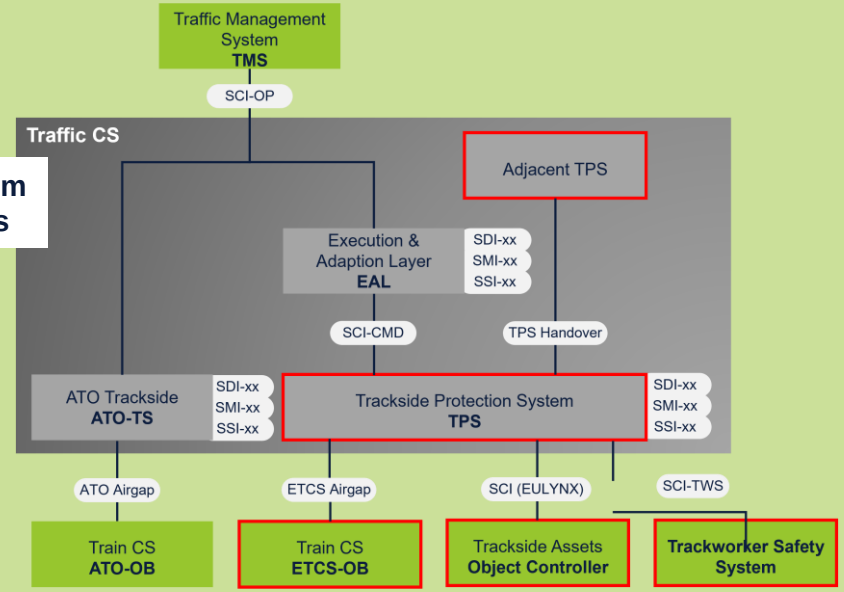
functionality

functionality

functionality

functionality

Harmonized system architecture



- Harmonised operational concept and scenarios based on ETCS L2 without signals
- Scenario based description of operational rules for each system actor

- Harmonised system architecture for ETCS L2 without signals
- System functionalities based on defined architecture

Trackside architecture

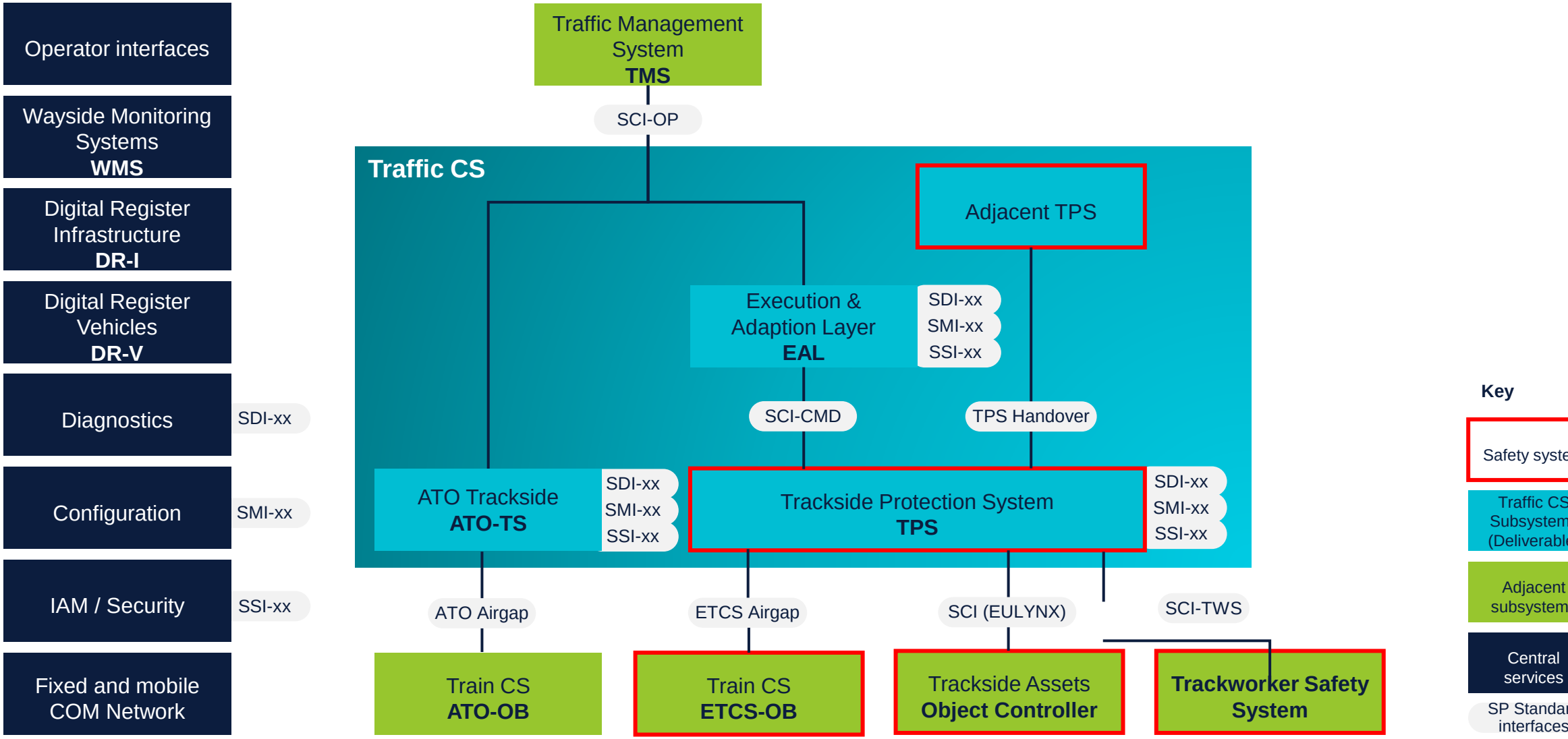
Premises for Traffic CS work

The design proposal for the trackside architecture is based on the following premises:

- **harmonized ETCS Level 2** CCS trackside application, ETCS System Version 2 or higher
- **without signals** (but with harmonized shunting signals)
- based on **FRMCS** and/or GSM-R
- control of vehicles, which are equipped with **Train length and Train integrity** devices with different performance/accuracy including no device at all, on the same line in optimal way
- **supervised manoeuvres**
- **smallest possible amount of SIL 4** functionality for lowering the overall effort for achieving safety, also aiming for generic safety cases
- control of trackside assets via **EULYNX**
- **execute an incoming operational plan** (static, or continuously updated) over the ATO GoA2 control loop (including DAC commands) and the ATP control loop.
- Implement exactly one **generic safety rule set and safety principle** without operational variants which is able to handle and check all types of TMS requests and operational concepts on traffic management level.
- Optimal **sensor fusion** of all available trackside or onboard sensor information (which may be different per train).
- **signaller user interfaces** for degraded modes, for plan corrections in the case of deviations, and for direct real-time commands
- efficient **change of topology data** used by the TPS causing smallest possible interruptions (in time and influenced area);
- safe traffic management for **any topology geometry, without additional site specific** track geometry/functionality safety analysis work steps before the usage
- **ATO GoA 2** application, but until 2027 not ATO GoA 3/4 or remote train operations
- safe and efficient **degraded modes**
- Coordination with **Transversal** for the focus on trackside evolution for Diagnosis (SDI), Maintenance and Configuration (SMI)

Trackside architecture

Trackside architecture proposal



Design advantages

Simplified pure ETCS L2 system without legacy functionality, generic product safety case	Less system effort
Integration of trackside and onboard localisation, capitalizes integrity/length information (if available per train), supervised manoeuvres, no signals	Efficient, scalable and reduced amount of trackside assets
Precise and dynamic traffic flow management supported. Short train ahead times supported.	Better use of physical capacity, or less infrastructure needed
Reduced pre-configuration needs, self-adapting traffic control.	Less engineering effort
“Mixed” vehicle abilities on the same line allowed concerning integrity and length reporting	High flexibility for vehicle and infrastructure migration
ETCS L2 can be fully controlled on TMS level. Fixed block, fixed virtual block or moving block operations possible on TMS level.	Free choice of traffic management philosophy

State of play and outlook - Highlights

Onboard architecture

Traffic CS design proposal

Onboard architecture

Onboard architecture based on modularity and standardised interfaces

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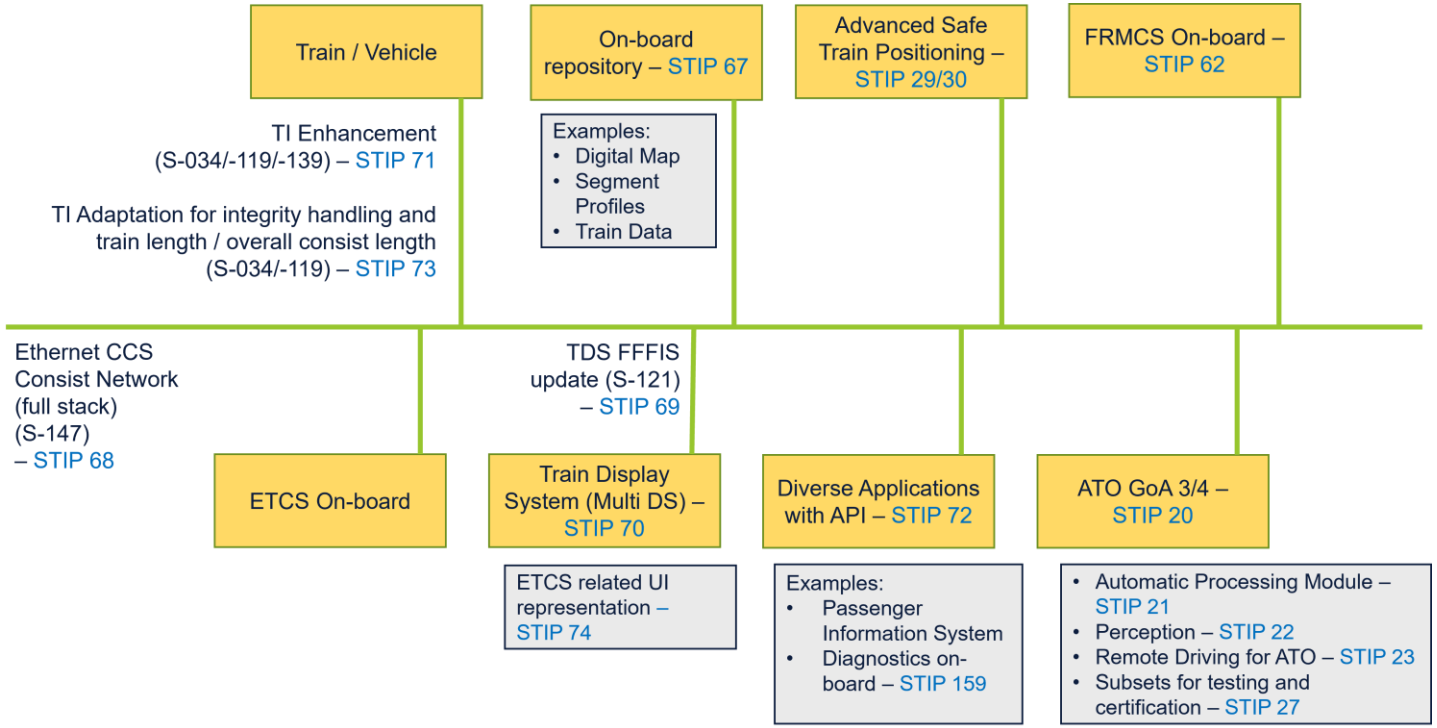
European operational rulebook

published | Ongoing work

Onboard architecture

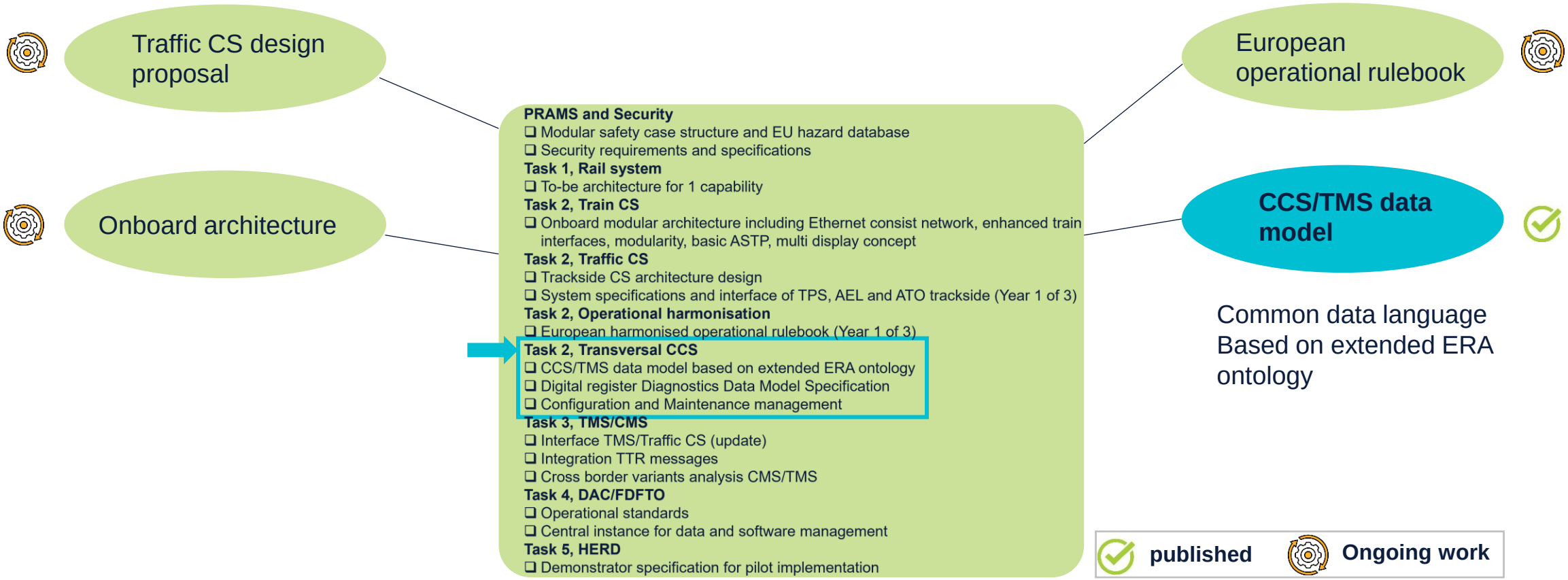
Aiming at Improved modularity



- Modularity is a parameter of the system architecture. It allows to **breakdown a large complex system into smaller and manageable sub-systems** (less complex sub-systems).
- Modularity in turn means **well-defined interfaces,** paving the way for **harmonisation**.
- The above two points immediately leads to **simplification of system integration**.
- Individual elements can be **more easily manageable** as their functionality is limited and more specifically defined.
- Modularity can be applied to **various topics**, e.g. network layers, functionality, sub-systems, … .
- Results can improve **exchangeability, upgradeability, migration, authorization** and **competition in the market**.

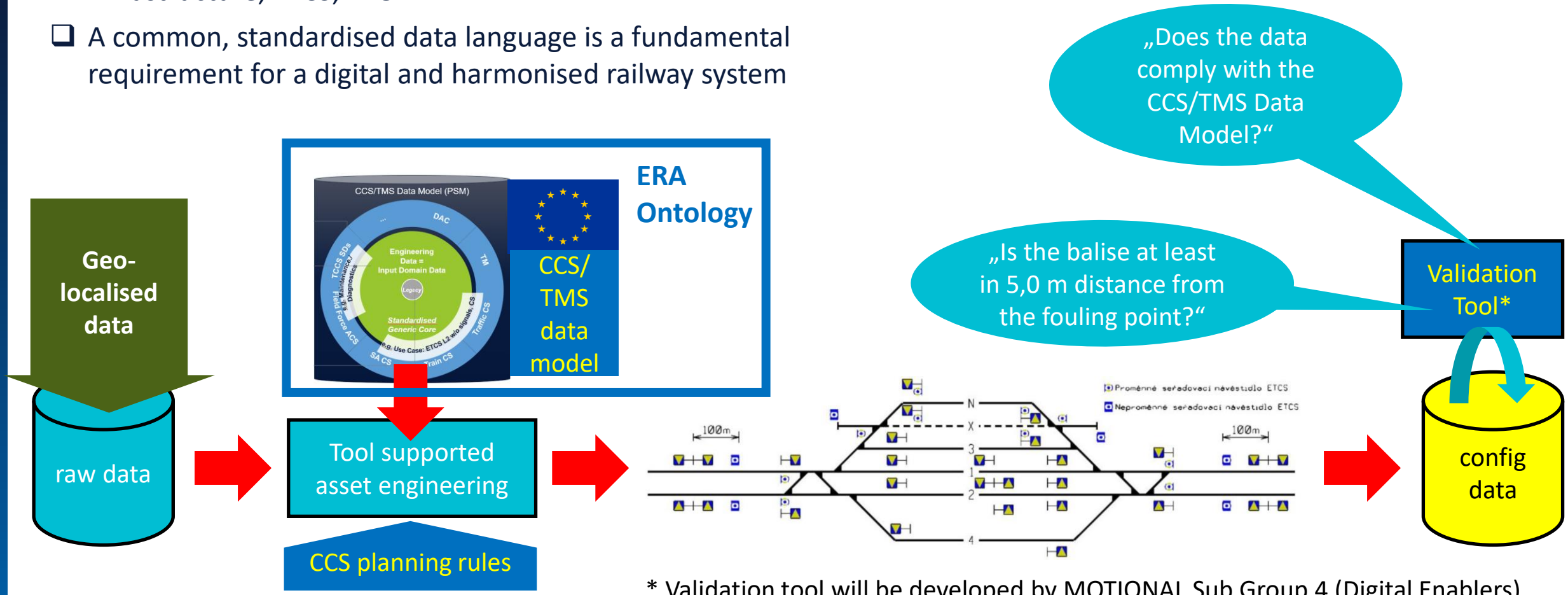
State of play and outlook - Highlights

CCS/TMS Data model



CCS/TMS data model

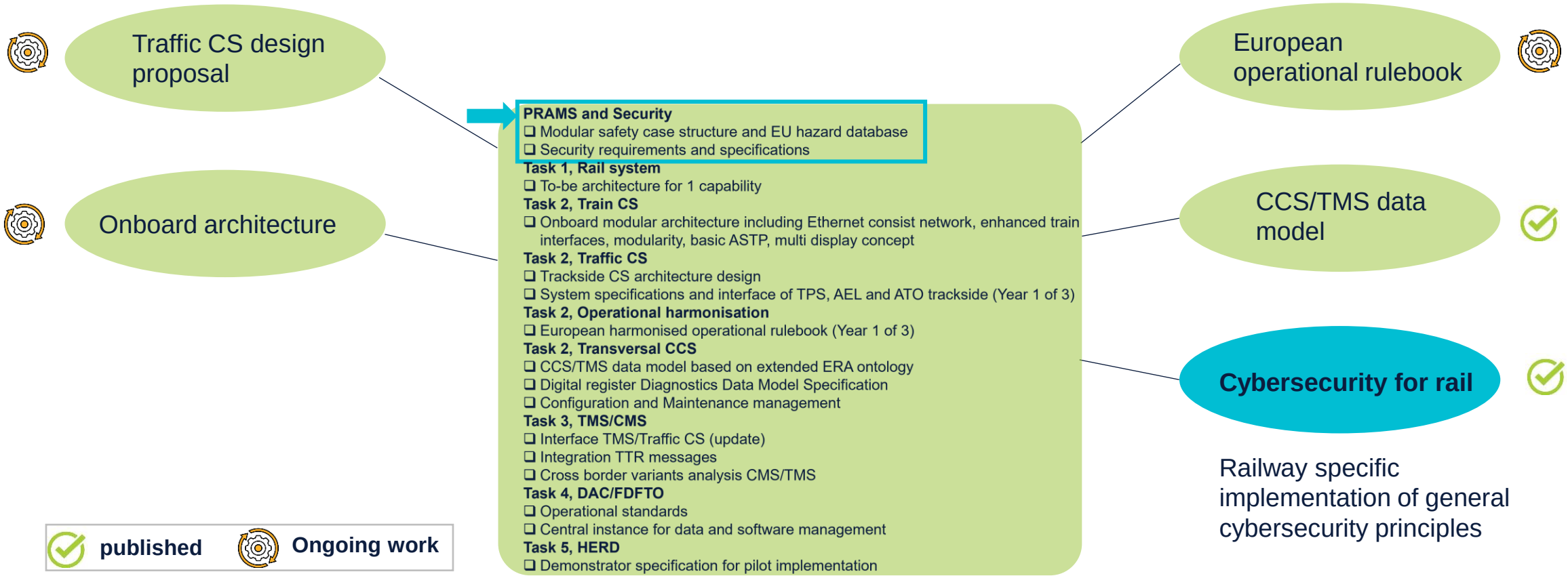
- The **ERJU CCS/TMS Data model, derived from ERA vocabulary,** encompasses several domains like Infrastructure, ETCS, ATO
- A common, standardised data language is a fundamental requirement for a digital and harmonised railway system



* Validation tool will be developed by MOTIONAL Sub Group 4 (Digital Enablers)

State of play and outlook - Highlights

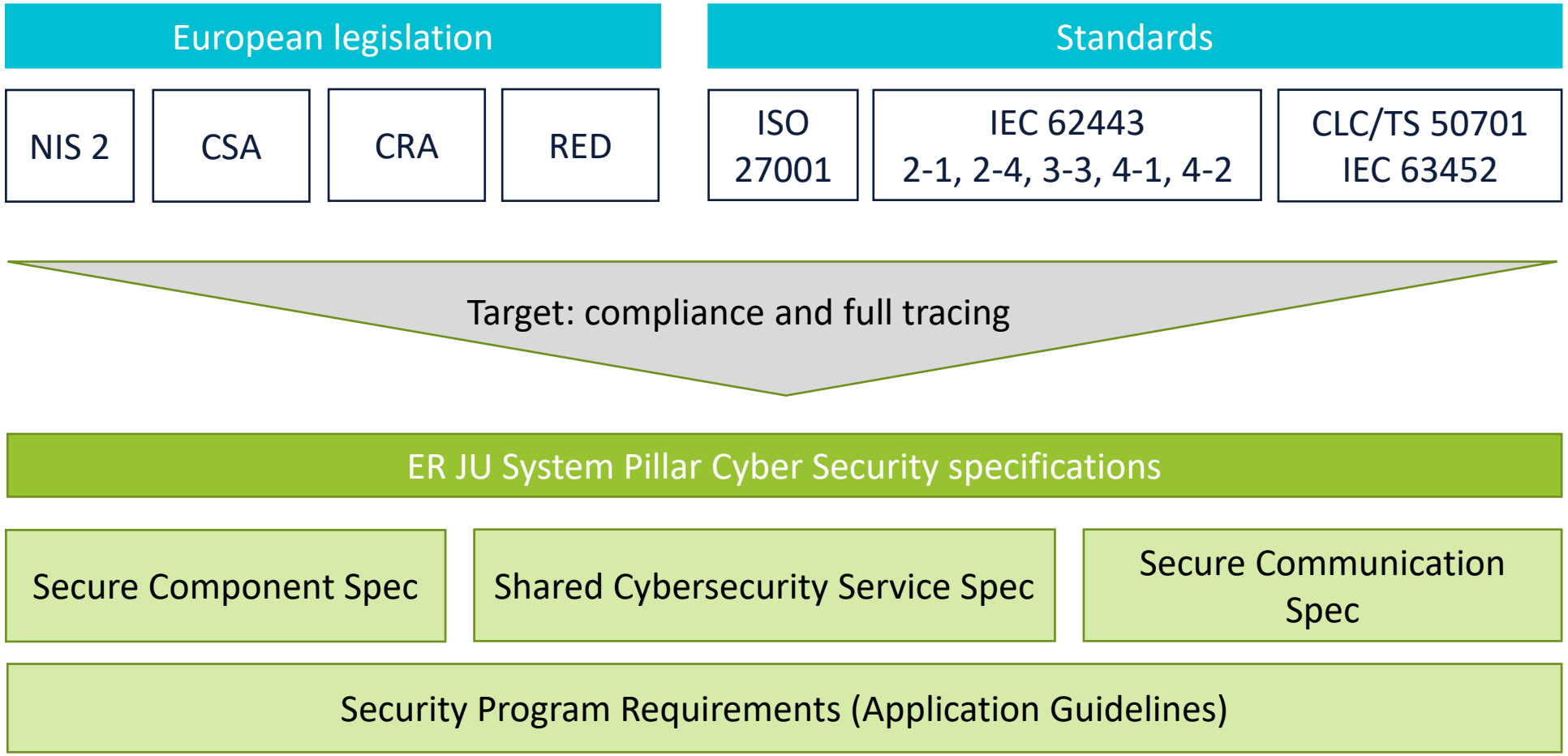
Cybersecurity for rail guidelines



Railway specific implementation of general cybersecurity principles

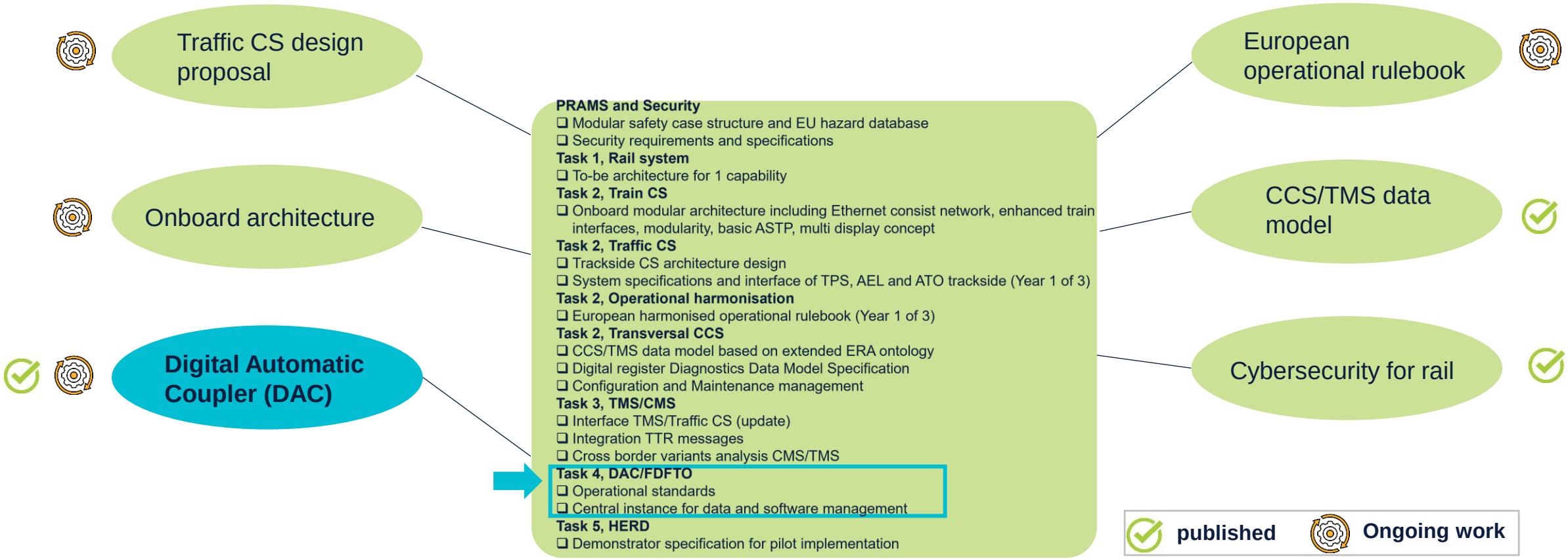
Cybersecurity for rail

SP Cyber security specifications for rail implementation



State of play and outlook - Highlights

Harmonised European Railway Diagnostics



DAC/FDFTO

The Task 4 DAC/FDFTO 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 FP5, into the overall railway system), to manage the input to the Standardisation and TSI Input Plan (STIP) for DAC/FDFTO and to support FP5 regarding authorization strategy.

Task 4 works in close alignment and cooperation with Innovation Pillar Flagship Project 5 (FP5) and EDDP@EU-Rail, including participation in mediation of conflicts with other Innovation Flagship Areas and SP Tasks.

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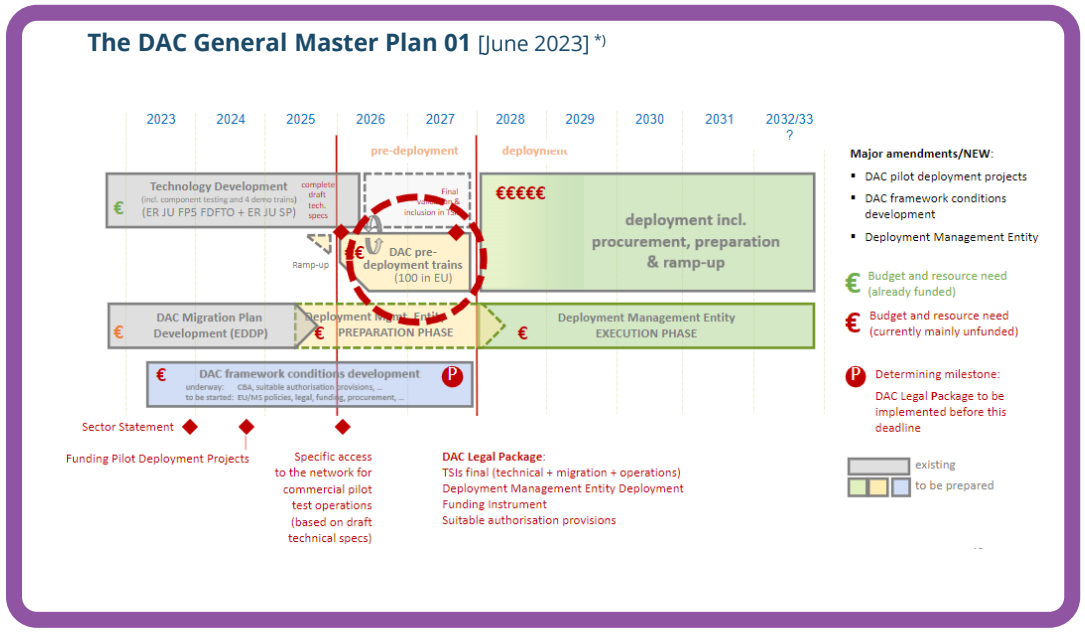
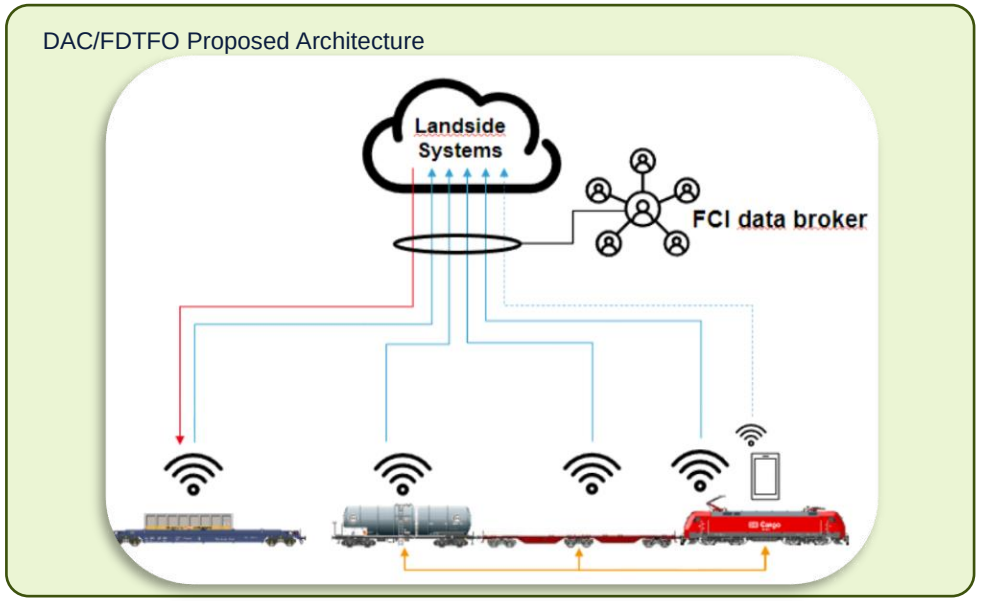


*) The Master Plan is currently under revision by EDDP@EU-Rail in close cooperation with FP5, SP Task 4 and the Pioneer Train preparation team.

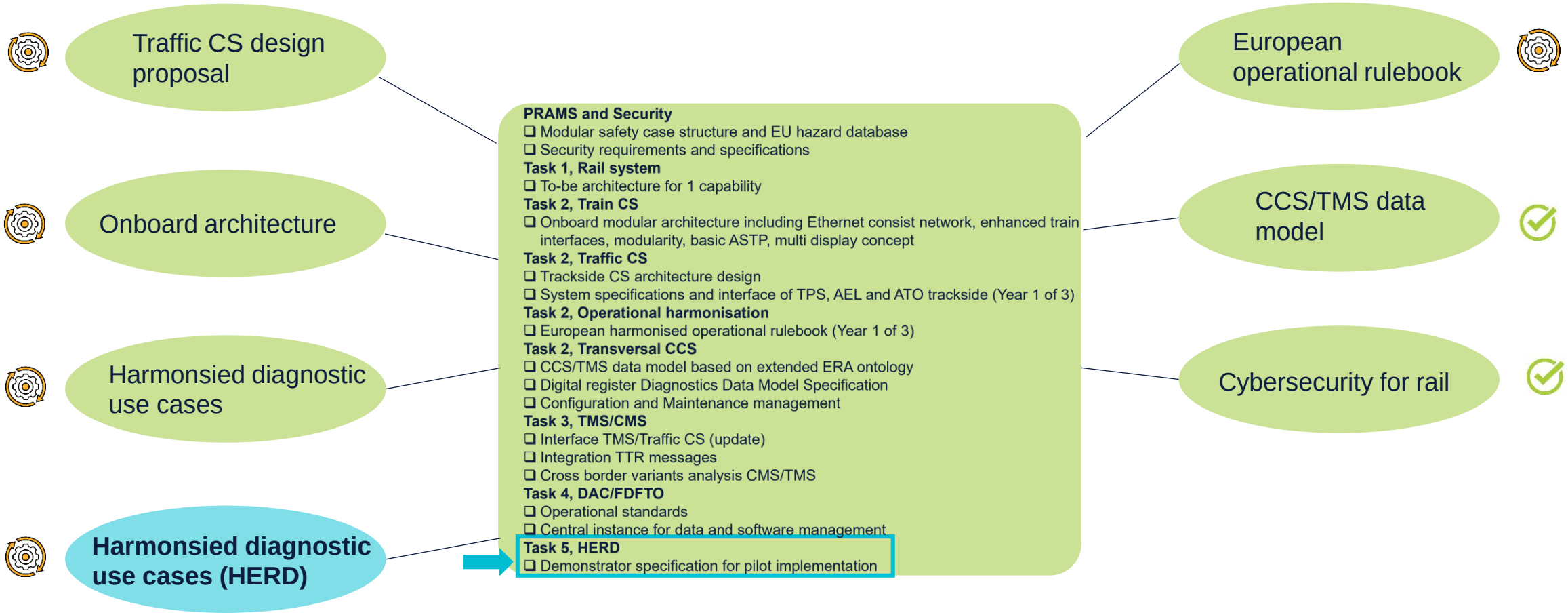


The Task 4 DAC/FDFTO Team will focus on three priority topics in the coming months:

- Creation of a **standard rulebook** for EU-wide operation of DAC
- A detailed recommendation to FP5 for reaching **safe Train Length and Train Integrity** functions enabled by DAC on Europe's freight trains
- A detailed description and roadmap for the development and implementation of a **FDFTO Central Instance** coordinating and ensuring interoperability for the DAC system

State of play and outlook - Highlights

Standardisation and TSI Input Plan

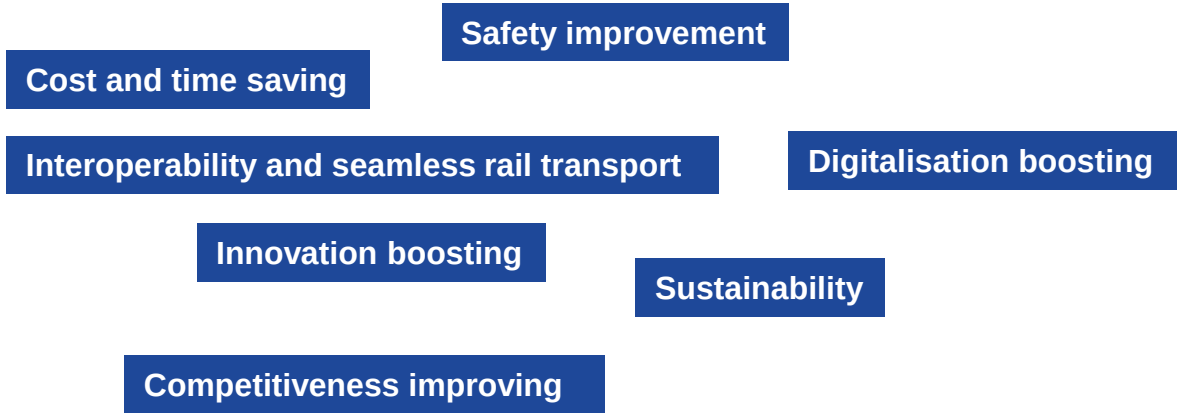


Report of HERD about harmonised diagnostic use cases

Harmonised European Railway Diagnostics (HERD)

Motivation for HERD

- Develop an architecture for harmonising the European railway diagnostic data
- Flexible combination of a mix of trackside sensor and onboard localisation systems
- Review the new techniques which automatically and autonomously can acquire diagnostic data (like drones) and integrate them
- Generate operational, use case dependent concepts for harmonized diagnostic data of the railway assets (rolling stock and track) and their interfaces
- Promote standardization



Analysed use cases

UC1: Track Side Vehicle Monitoring (WTMS)

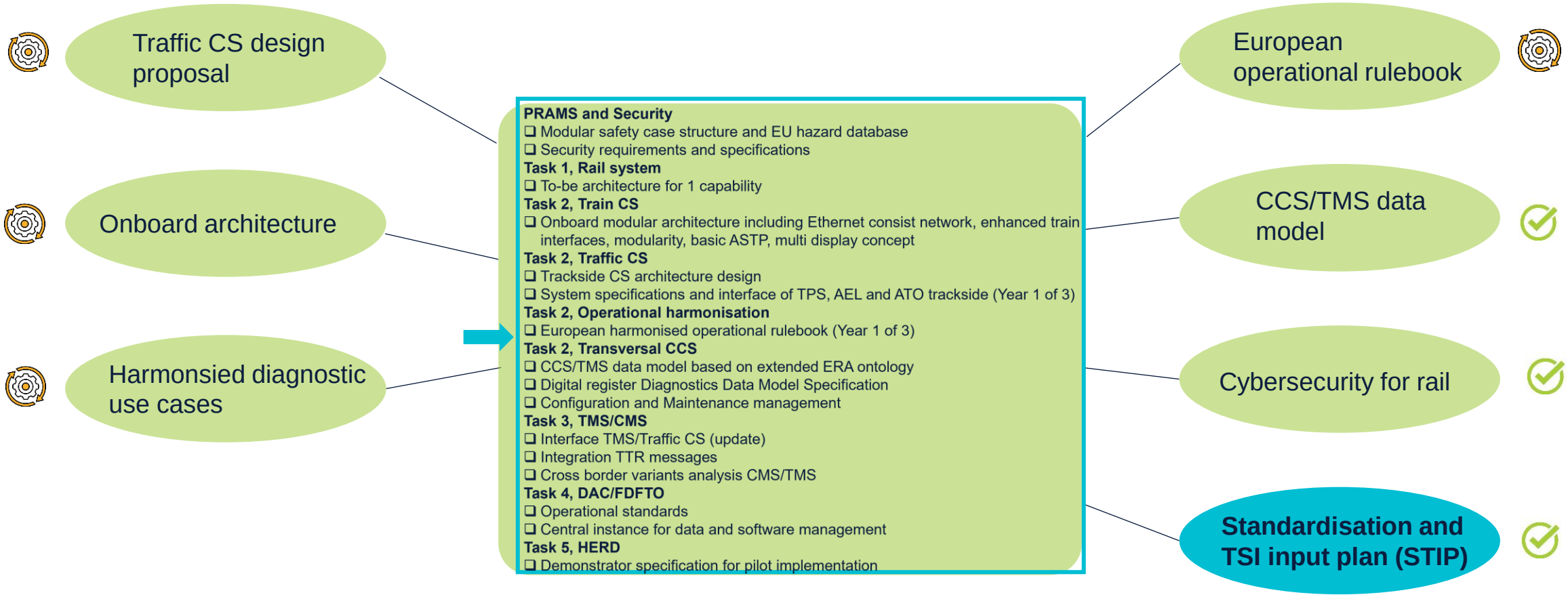
continuous monitoring and early detection of irregularities in wheel conditions

UC 2: On-Board Track Monitoring

Monitoring the track quality using on-board measuring devices

State of play and outlook - Highlights

Standardisation and TSI Input Plan



Version 1.0 of STIP published to ensure transfer of EU-RAIL results to harmonisation (TSI, standards)

Standardisation and TSI Input Plan (STIP)

Pre-Shift2Rail

- Sector coordination on standardisation
- No alignment on innovation
- Input not transparently shared
- Output in EC TSI request and mandate to ESOs more bottom up and less strategic approach on innovation

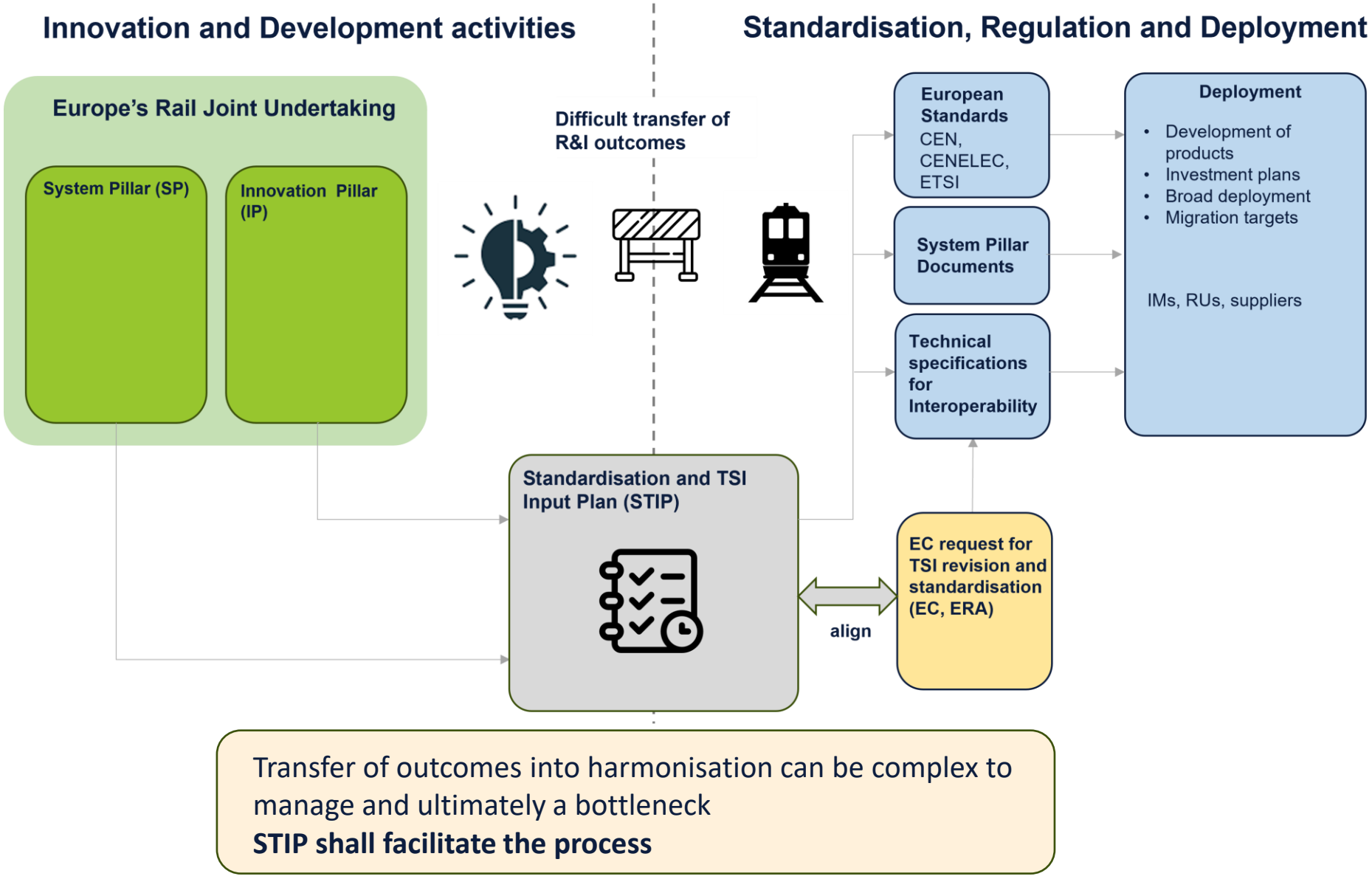
Shift2Rail

- For standardisation, better input to Sector and EC processes with Development of Standardisation rolling development plan
- Input transparently shared
- Output in EC TSI request not fully reflecting innovation, mandate to ESOs largely aligned

EU-Rail

- For TSI, standardisation and broader harmonisation, full alignment of Sector and EC processes with STIP
- Input transparently shared and endorsed (SP Steering Group)
- Output in EC TSI request and mandate to ESOs aligned with strategic approach on innovation
- Readiness for consideration on migration and deployment with the EU-Rail Deployment Group

Standardisation and TSI Input Plan



Successful implementation of EU-RAIL results are dependent on uptake within the appropriate harmonisation channel

Standardisation and TSI Input Plan

First version approved in principle (at 29/05 SP Steering group)

- ❑ Categories updated, new categories and topics included
- ❑ Topic descriptions improved

Alignment achieved with TSI request

- ❑ Aligned scope and time planning for the topics of the EC request for TSI revision
- ❑ Aligned priorities for ERA recommendation 2026 (leading to TSI revision 2027): FRMCS, DAC, Operational harmonisation, cybersecurity
- ❑ Reporting by ERA on progress made on June RISC of each year
- ❑ Adjustment to the request presented in November RISC of each year
  - ➢ Flexibility to take constraints and dependencies (e.g. STIP, EN standards) into account

Alignment with standardisation request

- ❑ New standards and standards to be revised in updated EC standardisation mandate M591 are referring to STIP outcomes to standardisation
- ❑ Alignment process ongoing

Revision of the STIP

- ❑ The current version will be updated, likely in line with updates to the TSI revision request
- ❑ From the current process we would expect
  - ❑ Better quality information on timing and content, especially given project progression
  - ❑ A tested process of all stages of the STIP process

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		
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

Q & A

Implementation of the EU-Rail Programme

Preparing Deployments: Deployment Group and EDDP

Karel van Gils & Javier Ibáñez de Yrigoyen

Context: Why are we focused on deployment and implementation?

- Start preparing now, in parallel to the design and specifications phase
- Accelerate implementation
- Achieve Rail sector Common Business Objectives
  - Increase capacity, reliability operations, reduce emissions, energy efficiency, LCC reduction, increase punctuality
- Obsolescence of current systems and assets (> 50 years old), decreasing reliability
- Innovation --> New legislation, regulations and standards
- Continuity
  - Staff shortage (all sectors: design/construct, build, maintain; also due to mass retirement)
  - Attract new people to sector
- R&I performed in EU-RAIL

High-Level Deployment Group

Including

FRMCS Deployment subgroup

Status EU-RAIL Deployment Group

Scope: The Deployment Group should deliver recommendations to the Governing Board of EU-RAIL on the consideration and needs in relation to the deployment of rail innovative solutions proposed by the EU-RAIL JU, to support the deployment of the innovative solutions.

These recommendations may include:

- technical and operational migration considerations;
- considerations on timing and need for synchronization at the European level;
- economic analyses; purchasing strategies; industrial capacity; finance and funding plans.

- Deployment Group is operationalised in its informal setup, in agreement with the EC and pending the formal approval, as
  - High-Level Core Group:
    - 3 meetings already organised.
    - Chaired by sector (Director EIM), co-chaired by European institutions
  - Dedicated sub-groups. First subgroup on FRMCS deployment.

- as soon as the group is formalised it will be open and published on our website

FRMCS Deployment Subgroup

European FRMCS Deployment related work areas & activities

Functional requirements

System architecture requirements

Authorization dossiers

Testing specifications

High-Level deployment group

Remit of the subgroup FRMCS Deployment

Technical issues WG:

- OBU technical WS
- TRK technical WS

Financial and legal WG:

- Business model WS
- Legal WS

Migration and Alignment WG:

- Migration WS
- Alignment WS

Plenary FRMCS subgroup

ERA authorisation process

preparing TSI drafts for the EC

EC TSI revision

ERTMS coordinator

Technical harmonization

Alignment overall railway architecture

Testing & demos

Related R&I

Technical specifications (M/603)

European standardization

WG: working group | WS: workstream

FRMCS Deployment Subgroup

Remits (1 / 2)

- Status: approved
- Deployment Group as only place to discuss European FRMCS deployment
- Focus on activities based on UIC program, test and demonstration activities

1.
Overview of the **status** of railway telecommunications in Europe, encompassing current retrofit and investment plans (National Implementation Plans expected to be delivered by the Member States mid-2024 as key input)

2.
Estimation of necessary capacities in industry, operators, contractors, and network operators → plan for operational implementation

3.
Perform **financial analyses** on OPEX and CAPEX costs, funding, and financing (CBA) analyses of the migration scenarios

4.
Examination of need for **EU-wide coordination** of deployment incl. scope (deliverables), standardisation of operational procedures, and implementing technical harmonisation

FRMCS Deployment Subgroup

Remits (2 / 2)

5.
Authorisation and **regulatory frameworks**, incl. assessing how vehicles/tracks with FRMCS will be authorised quickly and if the regulatory framework needs to be modified

6.
Investigate **cross-border issues** and **private-public interfaces** (e.g. international MNO's, IM interfaces)

7.
Define possible **migration scenarios.** The technical layer and the legal, economic and political layer should be considered.

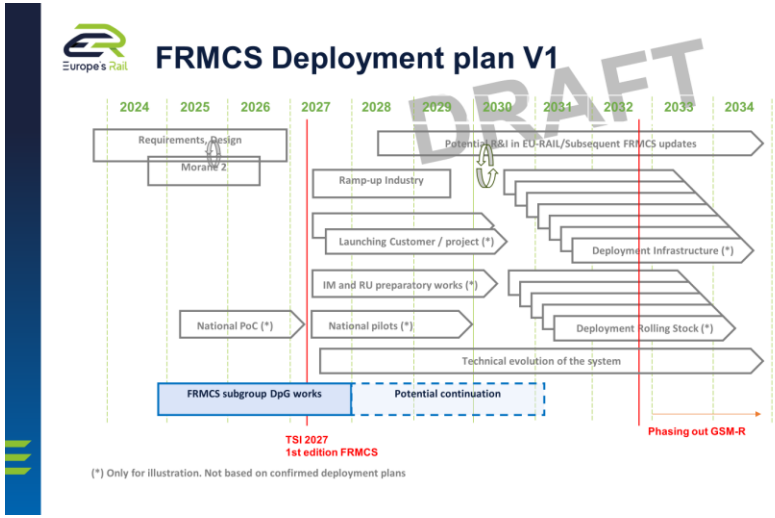
8.
Risk assessment on pace, availability, capacity of consultants/designers/contractors, technology, national priorities

9.
Ensure **alignment with other rail transformation programs** such as ERTMS, DAC, and ATO.

10.
Make recommendations in order to ensure both smooth migration and operational disturbance reduction

Planning

- FRMCS subgroup works until 2027-
- Focus on European Deployment.
- Based on information from UIC programme and EU-RAIL calls
- Organisations (IM’s and RU’s) and countries remain responsible for dedicated Implementations
  - also to be addressed in NIP’s, national implementation plans



European DAC Delivery Programme (EDDP)

All DAC-related work areas and activities

Europe's Rail Flagship Project 5	B	EC/ERA	Europe's Rail System Pillar	ESOs
	1 EDDP 2 Stakeholder Management			

A

1

DAC/"Full Digital Freight Train Operations"

target operat. proc.

functional reqs.

system architecture
tech. development
testing & demos
tech. specification
authoris. dossiers

FP 5 FDFTO sounding boards

2

Technology (mirroring & sector feedback)

3

Operational Procedures (mirroring & sector feedback)

C

1

Fleet Analyses & rtf Engineering (rtf readiness)

2

Retrofit capacity (workshops, work-force, components)

4

Infrastructural & IT adaptations

3

Migration strategies & retrofitting plan

(traffic & customer sidings analysis, operational plan)

5

Placing into service plan (safety, workforce training, rulebooks etc.)

D

1

Funding & Financing plan

2

CBA (updates)

3

Investment plan & procurement framework plan

4

Other regulatory & legal framework plans

E

1

development of efficient & suitable authorisation process & requirements

preparing TSI drafts for the EC

2

TSI revision

F

Operational procedures standardization (plan & execution)

Technical harmonisation: preparing inputs for ERA TSI drafting process & driving EU standardisation

Alignment of rail & DAC system architecture

ESOs

Executing European standardisation

G

Operating "100" pioneer DAC trains

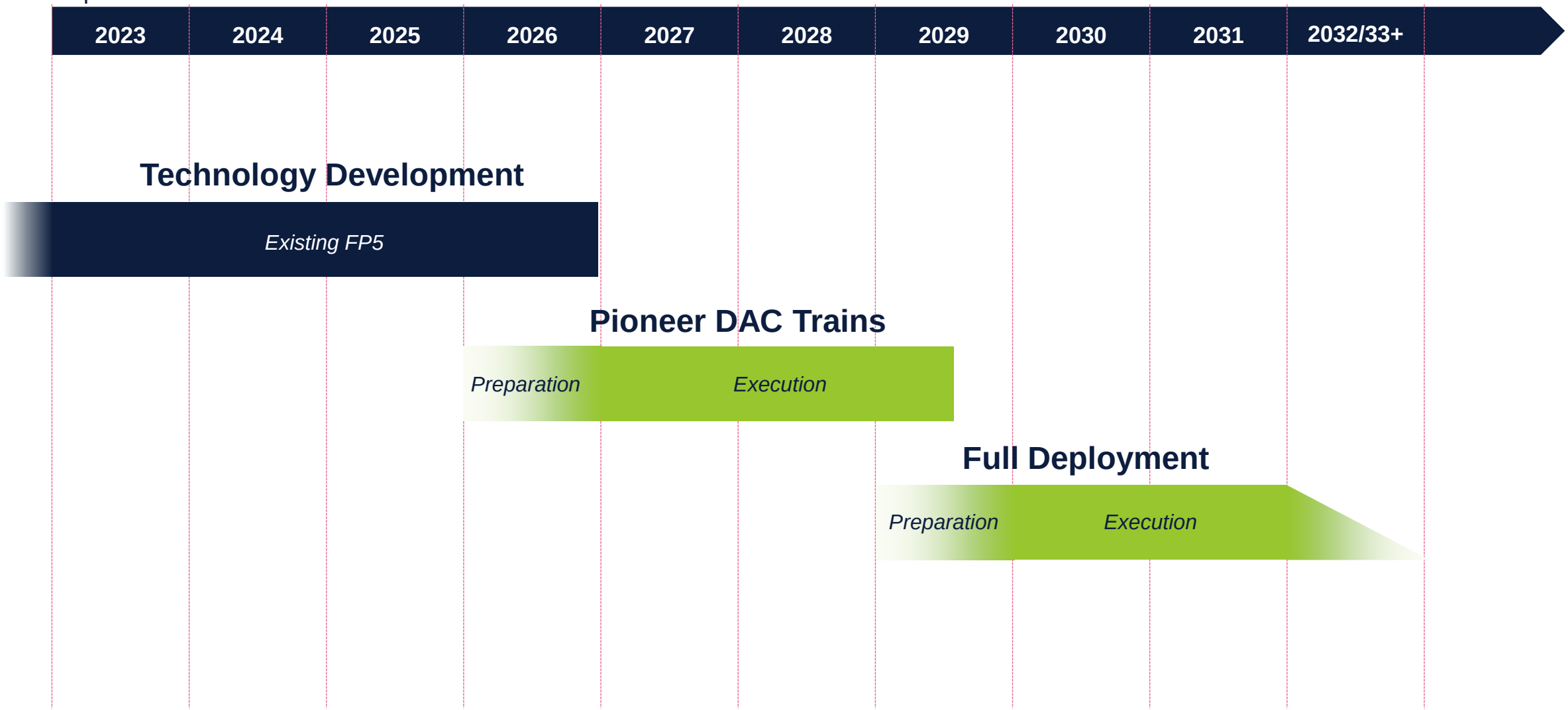
D = *Work Area* 3 = *Activity*

Overview on the various DAC/EDDP related projects

	DACcelerate	FP5TRANS4M-R	DACcord	DACFIT	EU-Rail Call 2024
	Description: • Accelerating DAC adoption through EDDP streamlining • Standardizing DAC specifications for seamless integration • Guiding comprehensive DAC integration by 2030 → Management/Integration	**Description:** • Core project for developing the DAC for Europe • Development of 16 rail freight innovations, including DAC Type 4 +5, automated shunting, → Innovation	**Description:** • Aligns DAC implementation for rail freight • Creates deployment roadmap aligned with EDDP goals • Facilitates funding and activity coordination for DAC deployment. → Management	**Description:** • Drives the implementation of DAC • Ensuring smooth transition of vehicles and facilities to DAC, optimizing logistics efficiency. → Transformation	**Description:** • derailment and propelling safety tests, crash tests, clim. chamb. • interchangeability of DAC across suppliers • Hybrid coupler locos • Wagon Onboard Unit (WoBu) → Innovation
	Partners: ViF, railiable, hwh, Molinari, OWITA, TRV, SNCF, RINA	**Partners:** 75 Diverse Participants - Includes rail end users, industry, operators, SMEs, academia	**Partners:** railiable, Railenium, TRV, LSP, UNIFE, UIC	**Partners:** DB C, k+v, Instytut Kolejnictwa, VUKV, BME ITS, VERS, IML	**Partners:** …
	Duration: 06/21 - 01/23	**Duration:** 07/22 – 12/26	**Duration:** 04/23 – 03/26	**Duration: 24 months**	**Duration: 24 months**
€	**EUR:** 2,1 M. EUR.	**EUR:** 95,1 M. EUR	**EUR:** 1,5 M. EUR	**EUR:** 1,5 Mio. EUR	**EUR**:

GAP Phase

EDDP as a programme in 3 major phases



Outlook on Technical Development

Q4 2024	2025	2026	2027

TECHNICAL DEVELOPMENT
(DAC BASIC PACKAGE)
Responsible: FP5

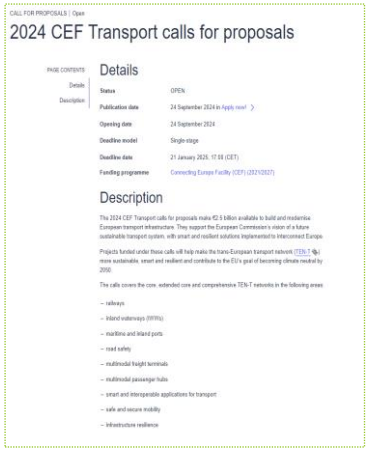
- Completion of the Technology Development in EU-Rail FP5 (DAC BASIC PACKAGE)
- Ramping up demonstrator trains from EU-Rail FP5 (in Austria, Germany and Sweden, ...)
- Moving forward with standardization works (CEN, CENELEC, TSI, etc.)

Outlook on Pioneer DAC Trains (PDT)

	Q4 2024	2025	2026	2027
TECHNICAL DEVELOPMENT (DAC BASIC PACKAGE) **Responsible: FP5**		• Completion of the Technology Development in EU-Rail FP5 (DAC BASIC PACKAGE) • Ramping up demonstrator trains from EU-Rail FP5 (in Austria, Germany and Sweden, ...) • Moving forward with standardization works (CEN, CENELEC, TSI, etc.)		
PIONEER DAC TRAINS PDT **Responsible: EDDP**	Continue detailed planning for Pioneer DAC Trains and make preparations to secure funding for PDTs	Preparation of the Pioneer DAC Trains PDT		• Launch of the Pioneer DAC Trains PDT • Ensuring ramp-up of production capacities on the part of industry

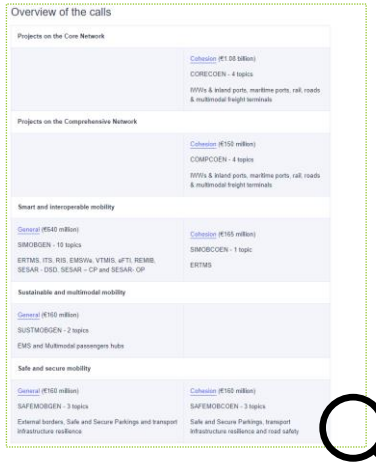
CEF call text was published on 24/09/2024

EU OBJECTIVE:
REMOVING INTEROPERABILITY BARRIERS


2024 CEF Transport calls for proposals

Details

Description


Overview of the calls

Projects on the Core Network

Projects on the Comprehensive Network

Smart and interoperable mobility

Sustainable and multimodal mobility

Safe and secure mobility

[CEF-T-2024-SIMOBGEN-REMIB-WORKS](); 640 mEUR in TOTAL for 10 topics

*Studies concerning **Digital Automatic Coupling (DAC)** for rail freight operations (including **validating the system in commercial operations**). Projects must involve relevant stakeholder groups **from at least 4 Member States and include testing in cross border and shunting yards operations**. The studies can **cover all phases/tasks necessary** for collecting data on the system reliability and availability in commercial operations (technical, administrative, legal, certification/authorisation, procedures, etc.).*

*The studies/technical reports shall **contribute to a wider deployment of DAC in the EU and therefore be publicly available**.*

Investments concerning rolling stock, notably the installation of sensors or other devices on wagons, are not supported, except as regards DAC studies

Outlook on all core activities

	Q4 2024	2025	2026	2027
TECHNICAL DEVELOPMENT (DAC BASIC PACKAGE) **Responsible: FP5**		• Completion of the Technology Development in EU-Rail FP5 (DAC BASIC PACKAGE) • Ramping up demonstrator trains from EU-Rail FP5 (in Austria, Germany and Sweden, ...) • Moving forward with standardization works (CEN, CENELEC, TSI, etc.)		
PIONEER DAC TRAINS PDT **Responsible: EDDP**	Continue detailed planning for Pioneer DAC Trains and make preparations to secure funding for PDT	Preparation of the Pioneer DAC Trains PDT		• Launch of the Pioneer DAC Trains PDT • Ensuring ramp-up of production capacities on the part of industry
MIGRATION **Responsible: EDDP**	Major progress on fleet analysis (as part of an EU-Rail project DACfit)	Consolidate and decide on migration plan		Complete preparations for the full DAC deployment including series production readiness
LCC, CBA & Business Case **Responsible: EDDP (Inputs from FP5)**	Create LCC for DAC and DAC applications until 12/24 so that a CBA update can be made in the EDDP until Q1/25 (next iteration)	Iterative CBA updates		
FUNDING INSTRUMENTS & POLICIES **Responsible: EDDP**		Sustainable anchoring of the DAC in the EU Commission's Work Program and in the 2028-34 budget		DAC funding program on the part of the EU and member states must be available

InnoTrans 2024: FP5-TRANS4M-R representation and DAC Tours

InnoTrans 2024: DAC High-Level Event at the Train Test Lab

DAC High-Level Event | TRAIN TEST LAB

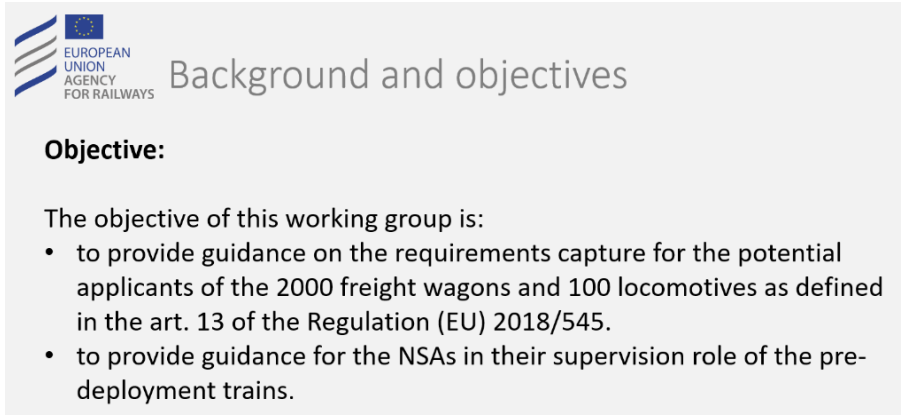
ERA & NSA state of play on authorisation

Scope of the work

Operating the Pioneer DAC Trains equipped with the DAC basic package under commercial conditions

→ Authorisation of the DAC-equiped vehicles building the Pioneer DAC Trains is necessary

→ objective of the working group „***authorisation of 100 freight trains with DAC***"



Latest activities

Topics worked on

- Filling the gap: what must be covered in Requirements capture
  - Applicability of TSI WAG and TSI LOC&PAS
  - National rules
  - Safety assessment report from AsBo – can be a particularisation of the Generic risk assessment in case of retrofitted wagons.
  - Requirements specified in EU Rail's deliverables, draft EN's, or draft ERA TD's
  - Other EU law – focus on Dangerous goods
  - Other
- Registers: updating of NVR/EVR
- Supervision role of the NSAs – update

Q & A

Europe's Rail

Coffee Break

See you back at 11.45 pm

Getting Involved in EU-Rail Activities and How to Find the Information You are Looking For

Catherine Cieczko, Zanda Litvina & Eleni Selipa

Overview of Engagement Opportunities

- Participate in the EU-Rail calls for proposal or for tender: all our calls are open
- Contribute to the EU Rail projects advisory groups
- Engaging with System Pillar: all EU representative bodies (sector associations) are part of the System Pillar Steering Group
- Get involved in our stakeholders groups: the EDDP is open for participation in Sounding Boards (operational and technological) or more active voluntary contribution in 4 working groups.

Overview of Engagement Opportunities

- Deployment group : Contribute to the discussion on the European coordinated deployment and migration scenario’s for various innovative technologies

- Attending EU-Rail events and projects public events

Resources and Documentation on our website

To understand the Joint Undertaking:

- Under “Who we are”, where for example you can find our founding regulation setting the objectives, or our internal functioning.

To discover our R&I programme:

- Under “Who we are”, where for example you can find Our Multi-Annual Work Programme
- Under “Our R&I Programme”, you can find our three pillars and Shift2Rail
- Under “Projects&Solutions”, where for example you can find our ongoing and past projects and a catalogue of available solutions

To participate in our R&I activities:

- Under “Calls”, where for example you can find our calls for proposal

To stay informed:

- The section on our website “News and Event”, where for example you subscribe to our newsletter

Q & A

Closing Words by the EU-Rail Executive Director

Giorgio Travaini

Thank you

White Atrium Building, 2nd Floor
Avenue de la Toison d’Or 56-60
B1060, Brussels - Belgium

www.rail-research.europa.eu

Europe's Rail

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