

EUROPE'S RAIL Joint Undertaking

Flexible, sustainable and integrated EU railway network

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Programme Manager

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Founding Members



 **28**
MEMBERS

 **412**
PARTICIPANTS

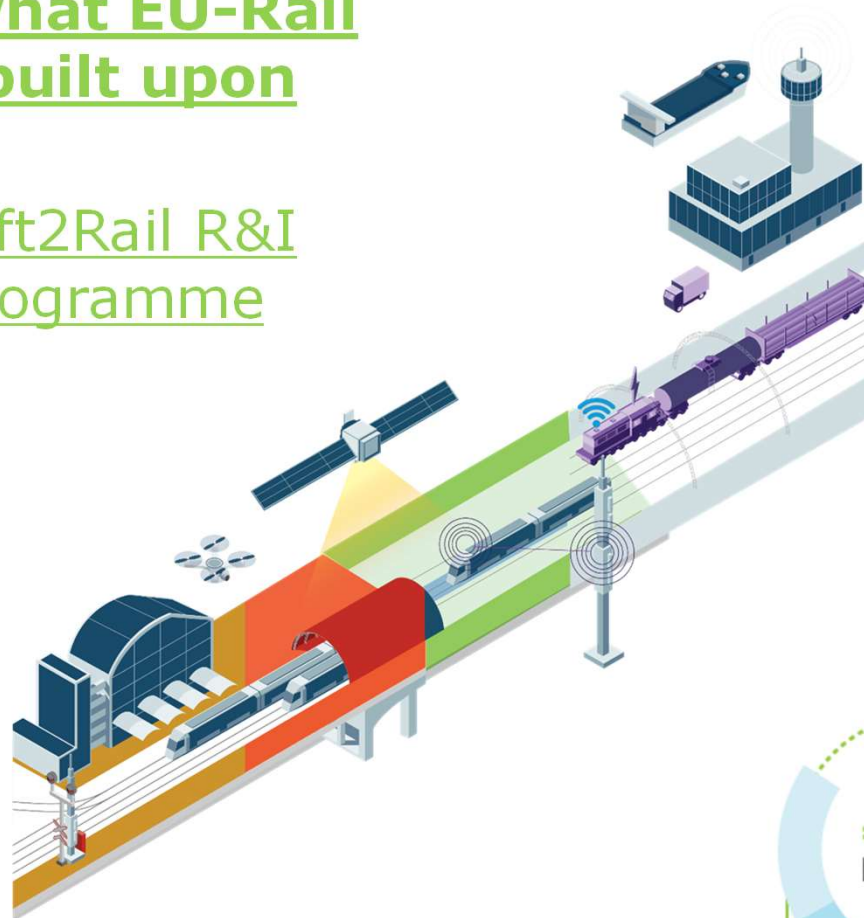
 **29**
COUNTRIES

 **109**
SMEs

 **113**
RESEARCH CENTRES
AND UNIVERSITIES

On what EU-Rail is built upon

Shift2Rail R&I programme



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

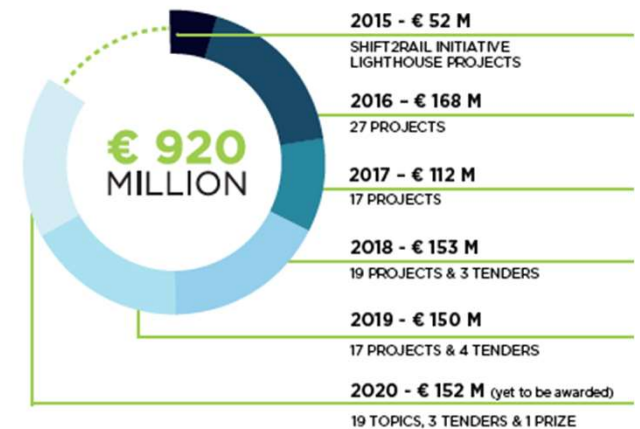
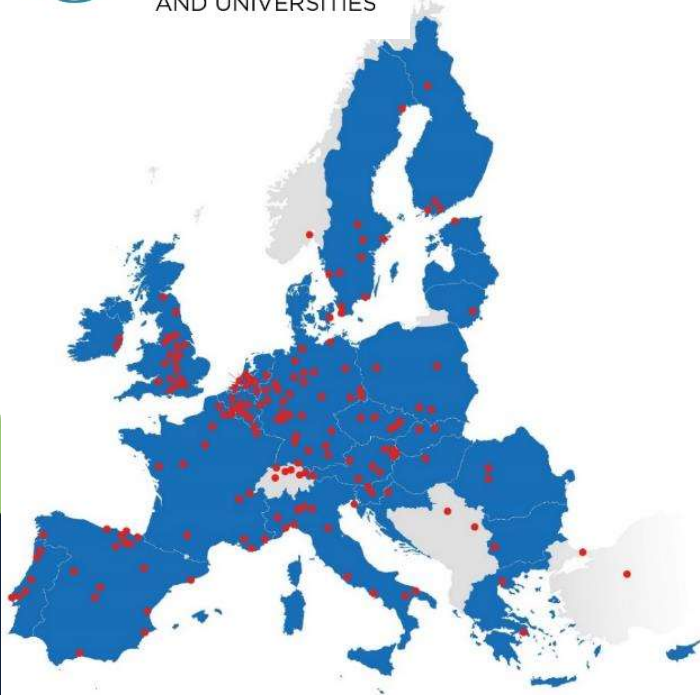
IP2 Advanced Traffic Management and Control System

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



What is about EU-Rail?

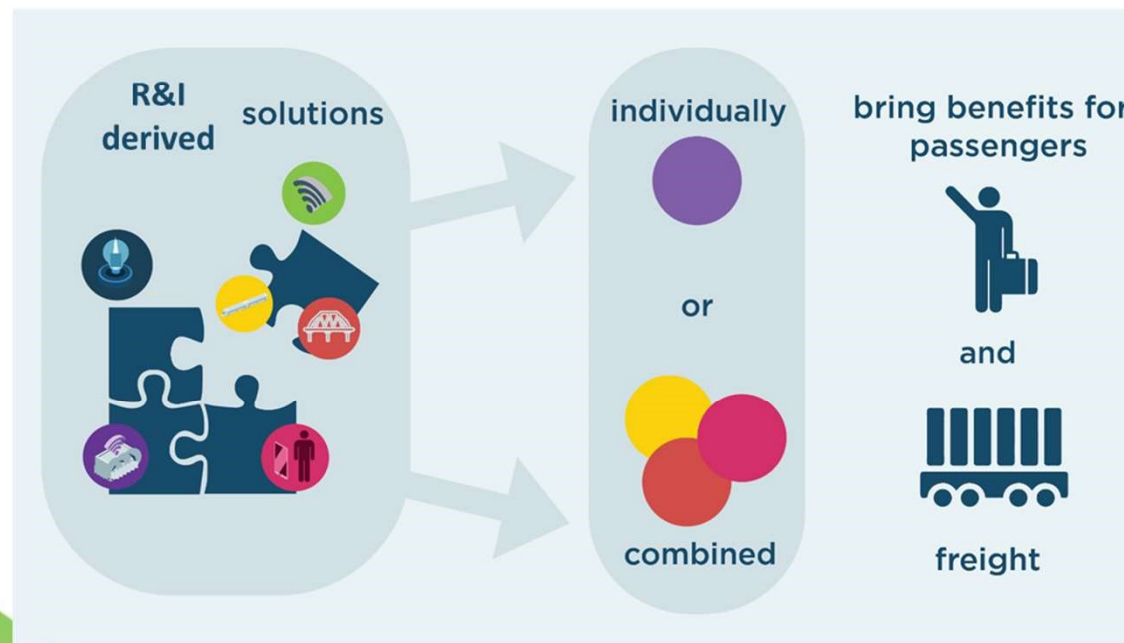


VISION

To deliver, via an integrated system approach, a high capacity, flexible, multi-modal, sustainable and reliable integrated European railway network by eliminating barriers to interoperability and providing solutions for full integration, for European citizens and cargo

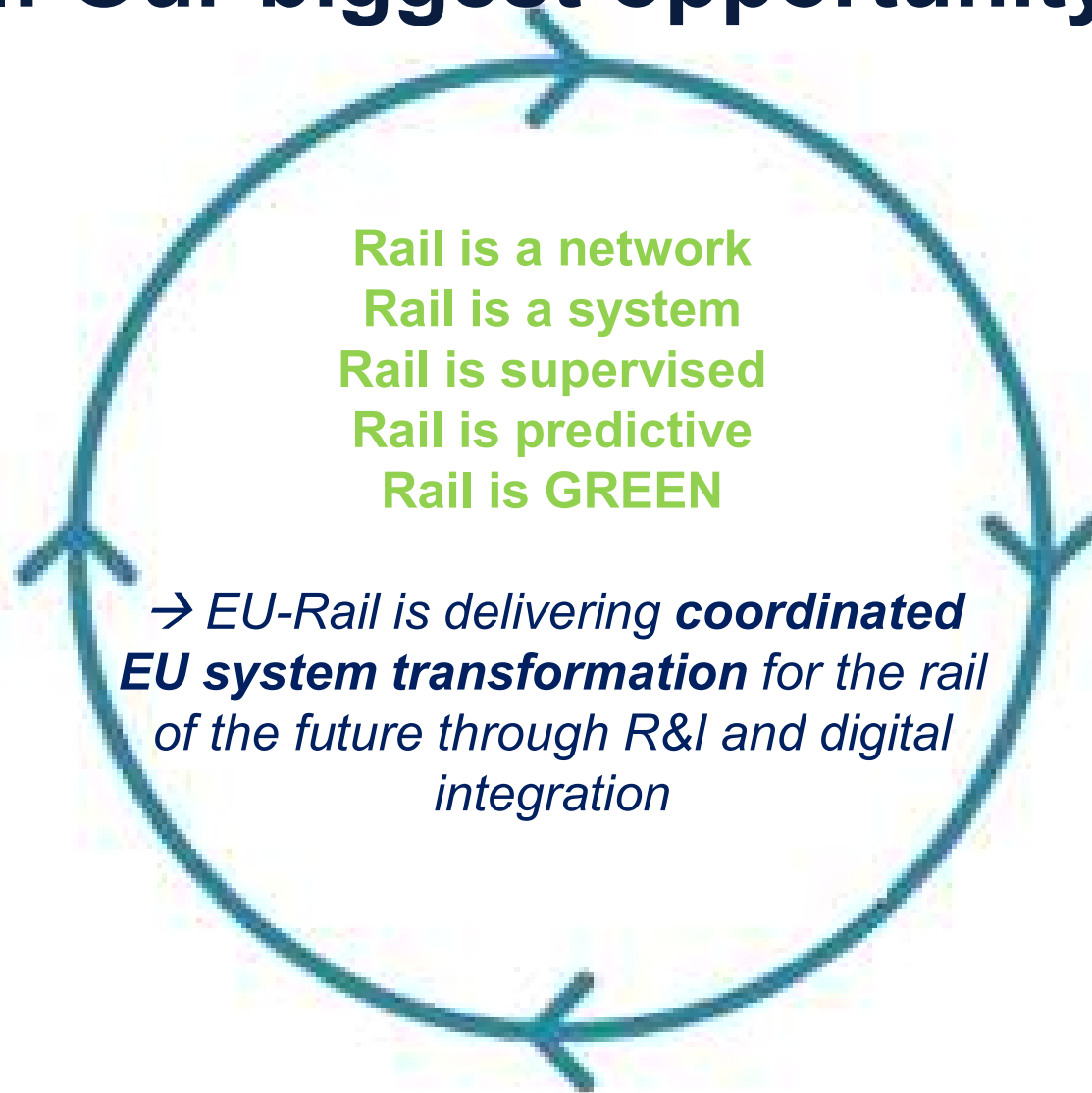
EU-Rail MISSION

- To make railway an everyday mobility through **USER FIRST** Research & Innovation

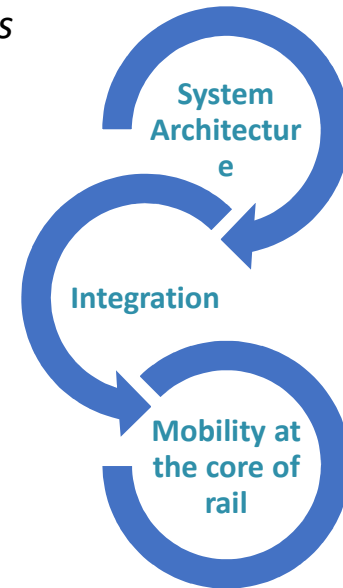


Rail: Our biggest opportunity

digital twin



autonomous decisions



system management and interoperability

data driven processes

EU-Rail expected system impacts from the Programme



- Meeting evolving customer requirements



- Improved performance and capacity



- Reduced costs



- More sustainable and resilient transport



- Harmonised approach to evolution and greater adaptability

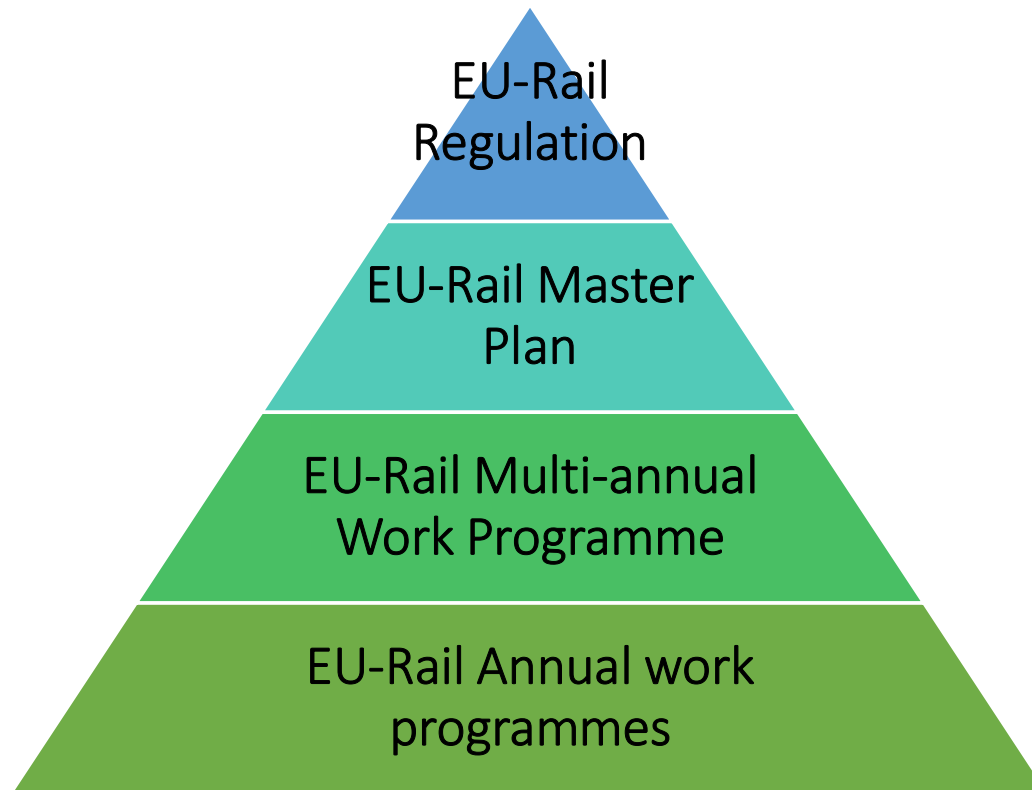


- Reinforced role for rail in European transport and mobility



- Improved EU rail supply industry competitiveness

The Programme approach



<https://rail-research.europa.eu/about-europes-rail/europes-rail-reference-documents/europes-rail-key-documents/>



DELIVER AN **INTEGRATED EUROPEAN RAILWAY NETWORK** BY DESIGN



DEVELOP A **UNIFIED OPERATIONAL CONCEPT AND A FUNCTIONAL SYSTEM ARCHITECTURE** FOR INTEGRATED EUROPEAN RAIL TRAFFIC AND CCS/AUTOMATION



DELIVER A **SUSTAINABLE AND RESILIENT RAIL SYSTEM**



DELIVER A **COMPETITIVE, GREEN RAIL FREIGHT** FULLY INTEGRATED INTO THE LOGISTICS VALUE CHAIN



DEVELOP A **STRONG AND GLOBALLY COMPETITIVE EUROPEAN RAIL INDUSTRY**

EUROPE'S RAIL: ONE INTEGRATED R&I PROGRAMME

SYSTEM PILLAR

OPERATIONAL CONCEPTS

FUNCTIONAL SYSTEM ARCHITECTURE

A SINGLE COORDINATING BODY FOR THE WHOLE SECTOR EVOLUTION

OPEN INTERFACES TO OTHER TRANSPORT MODES AND BUSINESSES

SYSTEM REQUIREMENT SPECIFICATIONS

INNOVATION PILLAR

TECHNOLOGICAL AND OPERATIONAL SOLUTIONS FOR SERVICES OF FUTURE

FLAGSHIP PROJECTS

LARGE-SCALE DEMONSTRATIONS

EXPLORATORY AND FUNDAMENTAL R&I

1

EUROPEAN RAIL TRAFFIC AND MOBILITY MANAGEMENT

Manage and improve rail traffic at EU level

Adjust rail traffic management in function of the mobility demand

2

DIGITALISATION & AUTOMATION IN TRAIN OPERATIONS

ATO implementation

Digital train operations

3

SUSTAINABLE AND DIGITAL ASSETS

Integrated assets testing & life-cycle framework

Zero-emission, silent rail system

4

COMPETITIVE, DIGITAL, GREEN RAIL FREIGHT

New digital customer interaction & innovative rail freight services

Multimodal and rail freight innovation integration

5

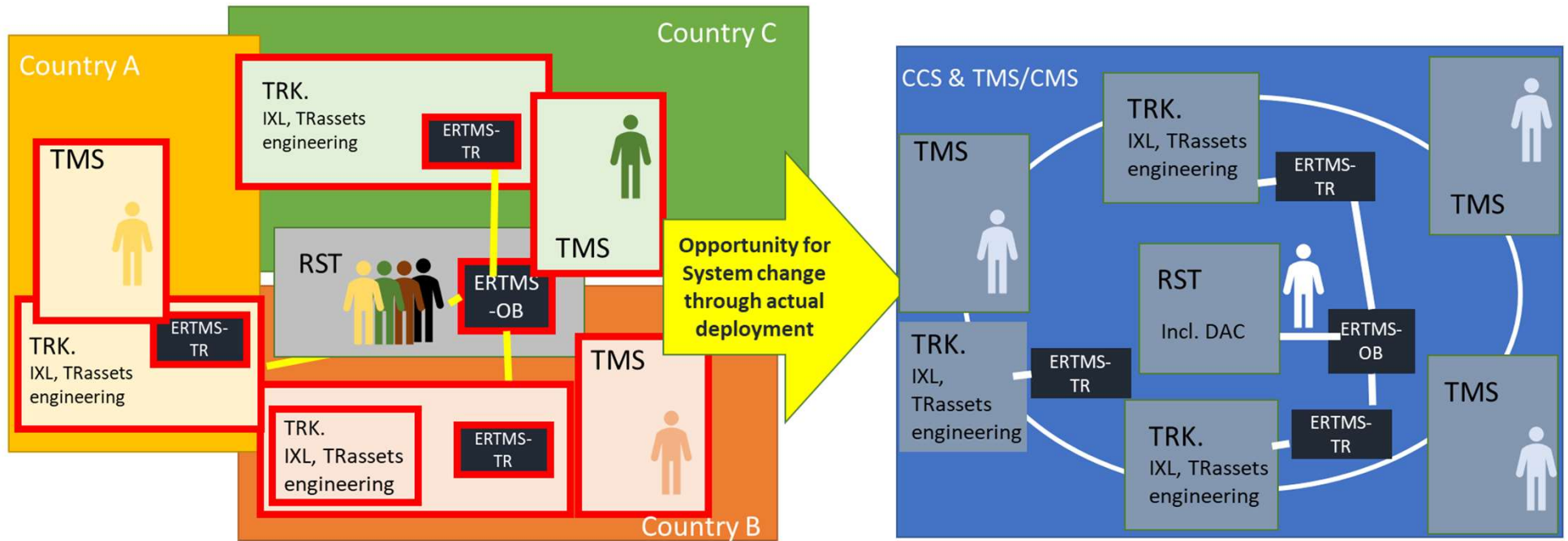
REGIONAL RAIL SERVICES IN LOW DENSITY AREAS

New system approach to regional rail services in low density areas

DEPLOYMENT GROUP

FUTURE SOLUTIONS DEPLOYED IN A COORDINATED AND CONSISTENT WAY AT EUROPEAN LEVEL, TAKING INTO ACCOUNT ALTERNATIVE ROLLOUT SCENARIOS, BEHAVIOURAL AND ORGANISATIONAL CHANGES, SYNERGIES WITH OTHER MODES OF TRANSPORT

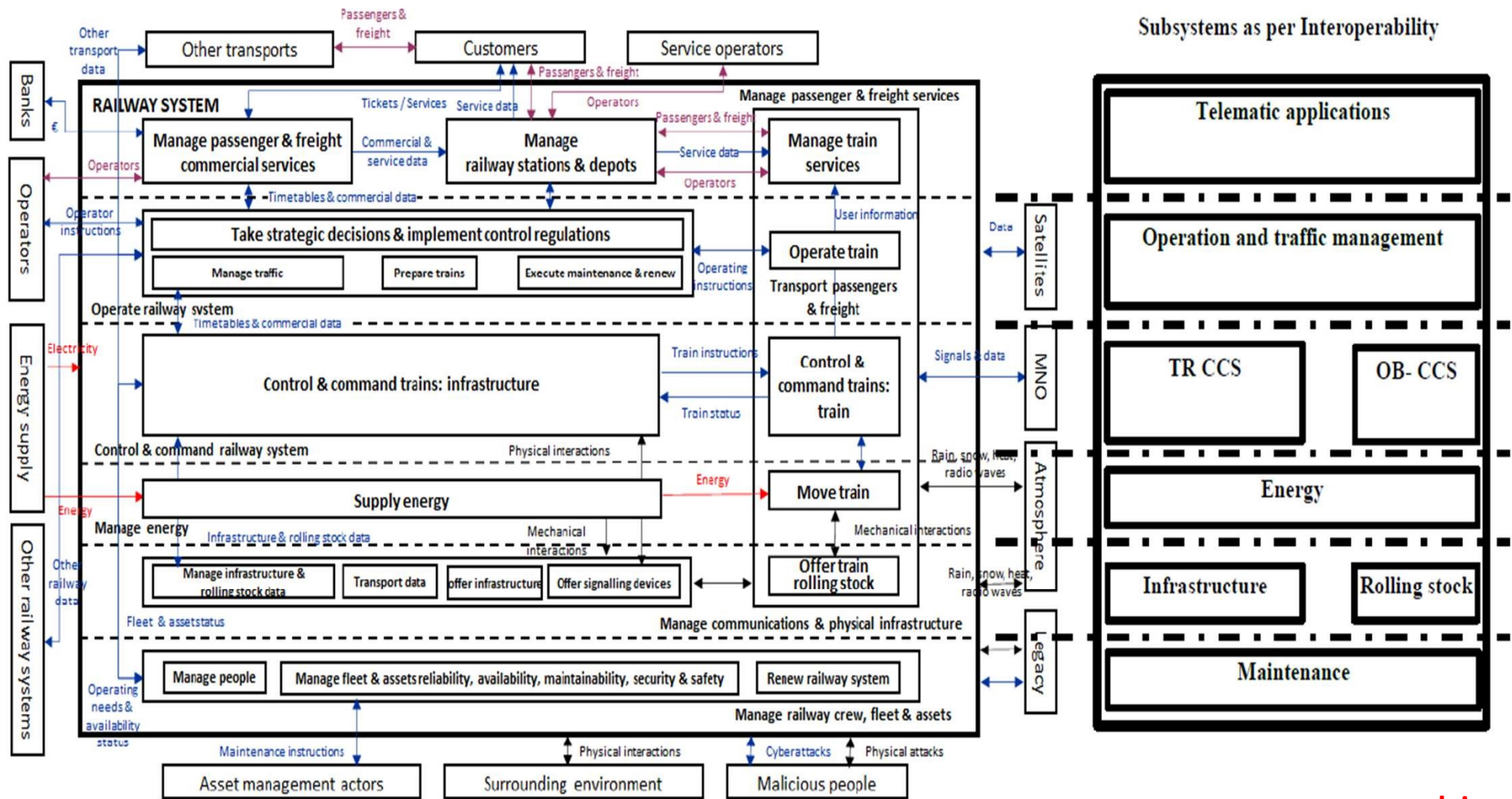
System Pillar



System Pillar is the opportunity for the sector to converge on the evolution of the Railway system - operational concept and system architecture

System Pillar

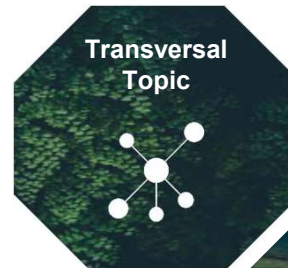
domains of the railway system and their alignment with sub systems



Innovation Pillar

Network management planning and control & Mobility Management in a multimodal environment

Network management planning and control (new processes and automation for decision support) & rail management in a multimodal environment (real-time demand-driven operations, including demand from other transport modes)



Digital Enablers

Provide Digital Twins Design toolbox for design as well as for validation, verification and test + a Federated dataspace where all digital elements of the system can play together in a coherent and interoperable way

Digital & Automated up to Autonomous Train Operations

Digital "Automated & Autonomous" Train Operations building upon the next gen Automatic Train Control based on ERTMS + enhancements on TCMS for integration at the on-board level



Innovation on new approaches for guided transport modes

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

Intelligent & Integrated asset management

Knowledge from the digital transformation will feed back into the design, construction, manufacturing as well as into operation and maintenance processes.



+ Exploratory Research and other activities



Regional rail services / Innovative rail services to revitalise capillary lines

Decreasing cost while offering a high quality of service and operational safety + increase customer satisfaction and attractiveness

A sustainable and green rail system

Innovative solutions and services based on leading edge technologies to minimize the overall energy consumption and environmental impact of the railway system



Sustainable Competitive Digital Green Rail Freight Services

Digitalization and automation of operational functions (e.g. DAC) and processes as well as increasing the efficiency of the immaterial (information/data) layer of transport in logistic

Innovation Pillar

- Core of the programme, Horizon Europe **Grants for Research & Innovation**
- Call 2022-1: 50 % of overall programme value
- Call 2025/2026 to cover around 30% of the research and innovation activities of 6 Flagship Areas
- Call 2027 to cover the remaining part of 6 Flagship Areas activities to be performed until 2031

First Call for Proposals: 2022-1

- Projects worth €390 million, against €234 million funding
- Opening: 10 March 2022; Deadline: 23 June 2022
- 6 Destinations / Flagship Areas
- Currently in Grant agreement preparation

Destination 1: Network management, planning, and control & mobility management in a multimodal environment and Digital Enablers

- Dynamic real-time traffic management
- Managing traffic on demand supporting door-to-door services
- Connecting TMS to relevant subsystems that influence traffic
- Capacity optimization and automatic management of cross-border traffic
- Integrate rail with other transport modes
- Digital Twin environment, Conceptual Data Model (CDM) and Federated Dataspaces

Destination 2: Digital & Automated up to Autonomous Train Operations

- European Next Generation **Automatic Train Control**, building on harmonised, adaptable and scalable trackside and onboard CCS+ system architecture.
 - building upon radio-based ERTMS or above
 - incorporating the latest technological advances
 - enabling full optimisation of performance in line with Traffic Management improvements
- Delivering scalable **automation in train operations**, up to GoA 4
 - fully unattended train operations: setting a train in motion, driving and stopping the train, opening and closing doors, remote train control and recovery operations in the event of disruptions.

Destination 3: Intelligent & Integrated asset management

- Asset Management integrated with
 - Traffic Management Systems (TMS): optimized decisions
 - Rolling stock: monitoring for planning interventions, workshops
 - Infrastructure: Big Data for prescriptive interventions, minimising dangerous situations and service disruptions
- Digital Twins for design, maintenance, upgrade and renewal interventions. Artificial Intelligence for simulations and predictions.
- Long-term Asset Management: Life Cycle Cost (LCC) models
- Design & Manufacturing: Eco-friendly production of resilient assets (e.g. additive manufacturing)
- Robotics for interventions and construction, for a safer and more automated railway environment

Destination 4: A sustainable and green rail system

- Alternative energy solutions for the rolling stock
 - High performances Batteries Electric Multi-Unit (BEMU) train
 - Hydrogen hybrid trains: production, storage and refuelling
- A holistic approach to energy in rail infrastructure: Rail Power Smart Grid
- Sustainability and resilience of the rail system: noise& vibration ...
- Electro-mechanical components: braking, pantograph and suspensions
- ...

Destination 5: Sustainable Competitive Digital Green Rail Freight Services

- Full Digital Freight Train Operation
 - Demonstration in 2025 w/ DAC Type 4 & 5 incl. Energy and Data Supply, Hybrid Coupler and automated brake test
 - Preparing further development of Full Digital Freight Train incl. Distributed Power, EP-Brake for Demonstrators in 2027 and 2030
 - Development of systems and solutions for automated shunting operation
- Solutions for Seamless freight
 - Real-time data management and processing to improve cross-border timetable planning, timetable management and train path ordering
 - Development of standardised railway checkpoints to automate handover controls using e.g. sensors, videogates and handhelds
 - Dynamic yard/terminal management systems

Destination 6: Regional rail services / Innovative rail services to revitalise capillary lines

- **Regional Railway System (CCS & Operations) Demonstration**
 - integrated Operations Control Center covering interlocking, radio blocking and TM
 - simple on-track radio network (FRMCS)
 - Specific TMS for regional lines
 - safe environment perception solutions
- **Assets Demonstration**
 - cost-efficient wireless, energy self-sufficient wayside components (e.g. switches, level crossings)
- **Suitable customer services**
 - cost-efficient on-board information on regional multimodal services (e.g. carsharing)
 - passenger congestion rate monitoring, flow optimization application, low-cost passenger information system

Innovation Pillar activities (2)

- In addition, EU-Rail will launch calls for proposals on a regular basis to **explore new areas** of rail research and innovation or perform studies and other relevant activities that would contribute to the achievement of its Programme

Ongoing Call for Proposals: 2022-2

- Projects worth €35.8 million, against €14.7 million funding
- Deadline: 14 December 2022 at 17:00 CET.
- Destination 7 and Exploratory Research

APPLY HERE!

<https://rail-research.europa.eu/participate/call-for-proposals/ongoing-call-for-proposals/>

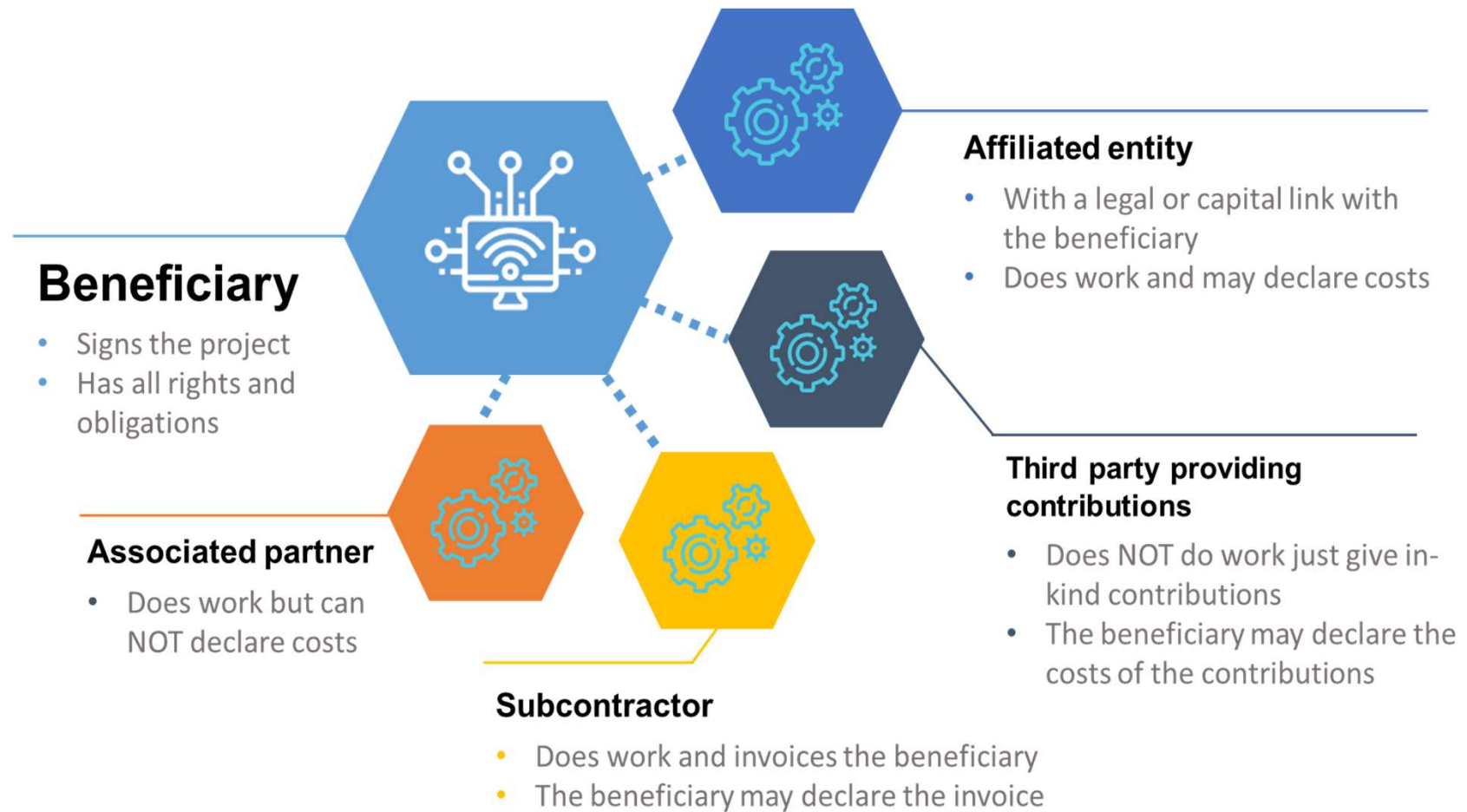
Destination 7: Innovation on new approaches for guided transport modes

- Conceptual development of automated multi-modal mobility-systems (“moving infrastructures”)
- Technological development of Maglev derived systems
- Hyperloop industrial roadmap and pilot

Exploratory Research and other activities

- New railway station concept for green and socially inclusive smart cities
- Bridge dynamics
- Building a community of scientific research and enabling a network of PhD (academia teaming with industry)
- European value chains for rail supply
- Standardised offer/contract management for agile access to rail freight and multimodal services in the EU
- Digitalisation and automation enabling new railway services for passengers and freight
- DAC migration roadmap towards deployment

How can I participate in the grant agreement?



Affiliated entities



Article 187 (1)(b) of the EU Financial Regulation:

Entities *'that have a link with the beneficiary, in particular a legal or capital link, which is neither limited to the action nor established for the sole purpose of its implementation'*.



Affiliated entities in Horizon Europe = Linked third parties in Horizon 2020

(alignment of labelling/definition in the corporate context)

Associated Partner (AP)



- Inherited and derived from the '**International partner**' status in H2020 MGA
- **Corporate terminology** and status with the following features:
 - AP mentioned in Art. 9 and implements action tasks listed in Annex I
 - But without receiving EU funding (costs are not eligible)
 - The beneficiaries must ensure that some of MGA obligations also applied to AP (*i.e. Articles 11 (proper implementation), 12 (conflict of interests), 13 (confidentiality and security), 14 (ethics), 17.2 (visibility), 18 (specific rules for carrying out action), 19 (information) and 20 (record-keeping)*)

Who is eligible for funding?



EU COUNTRIES

- Member States (**MS**)
- Overseas Countries and Territories (**OCTs**) linked to MS.



NON-EU COUNTRIES

- Countries associated to Horizon Europe (**AC**)
- **Low and middle income** countries: See [HE Programme Guide](#).
- Other countries when announced **in the call or exceptionally** if their participation is **essential**



SPECIFIC CASES

- Affiliated entities established in countries eligible for funding.
- EU bodies
- International organisations (IO):
 - International European research organisations are eligible for funding.
 - Other IO are not eligible (only exceptionally if participation is essential)

Upcoming events

- TRA 2022, 14-17 November, Lisbon
 - stand in the European Village showcasing some of the latest innovations coming from the R&I programme
 - Participation to panel discussions and events
- Rail Live 2022, 29 November – 1 December, Malaga
 - stand with key information about Europe's Rail
 - Participation to panel discussions, presentations and keynote speeches
- Europe's Rail Innovation Days, 7-9 December, Online
 - Expert led technical sessions across several days
 - Latest results and progress of the Shift2Rail projects

Full list of events: <https://rail-research.europa.eu/events/>



Thank you!

www.rail-research.europa.eu

