



Position Paper

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The need for a successor of Europe's Rail Joint Undertaking

Summary

For railway undertakings and infrastructure managers, a successor to the current EU-Rail framework is a prerequisite for safeguarding long-term investments, achieving interoperability, accelerating digital and climate transformation, and delivering a competitive Single European Railway Area (SERA).

In the absence of a coordinated European innovation and deployment platform, fragmentation will persist, costs will rise, and Europe's rail system will struggle to meet strategic mobility, climate and competitiveness objectives. A renewed Joint Undertaking under the next Framework Programme is therefore a structural necessity—not merely a continuation of past policy, but a foundation for Europe's future rail system.

Introduction

From the perspective of railway undertakings and infrastructure managers, the continuation of a dedicated European Rail Joint Undertaking under the next EU Research & Innovation Framework Programme is not optional—it is structurally necessary to deliver a functioning Single European Railway Area and to safeguard the value of unprecedented public and private investments in rail.

Given the recent discussions on the continuation of the EU-RAIL Joint Undertaking, Europe's rail operators and infrastructure managers underline the urgent need to ensure the rationale behind the need for a successor of the present Joint Undertaking in form of a Treaty based (article 187) institutionalized partnership is fully understood, and why such a format is necessary.

Specifically, the following six benefits can only be delivered by an EU-RAIL Successor in the form of an institutionalized partnership, whereas without such a format, the sector risks falling short to meet European mobility, climate and competitiveness objectives.

1. Protecting and Leveraging Massive Capital Investment

Railway undertakings and infrastructure managers are implementing multiannual investment programmes worth several hundred billion euros across infrastructure, rolling stock, freight corridors, urban nodes and digital systems. At EU level, completion of the TEN-T Core and Extended Core Network alone requires €866 billion by 2040. These investments have asset life cycles of 30–100 years and depend on stable technical specifications and interoperable system architectures.

A successor to Europe's Rail Joint Undertaking is essential to ensure that research, innovation and pre-deployment activities effectively contribute and create benefit to these capital programmes. This includes developing commonly defined technology and deployment roadmaps and plateaus for migration from fragmented legacy systems to European deployment.

Therefore, without a collaborative and coordinated framework for European innovation, operators risk stranded assets, incompatible subsystems and suboptimal technology choices that increase lifecycle costs.

Academic work is needed for the activities ensuring the transfer from the low-medium TRLs (4-5) to the higher TRLs of the technologies, lowering the risk of their implementation for rail needs. Such support will improve the trajectory for technological deployment and investments matching today and tomorrow's socio-economic challenges.

2. Delivering Interoperability and Completing the Single European Railway Area (SERA)

To date, operational rail in Europe remains fragmented across national standards, legacy signalling systems and divergent technical rules. Past experience demonstrates that uncoordinated national innovation leads to technical divergence, higher procurement costs and barriers to cross-border operations.

EU-RAIL Joint Undertaking has made a significant contribution to and laid the groundwork for a joint vision towards SERA in the sector. Continued support for this framework is essential to sustain alignment among infrastructure managers, railway undertakings, urban operators, freight stakeholders, the supply industry, and academic and research actors. Such cooperation is key in advancing harmonised system architectures, common

specifications and large-scale cross-border demonstrators in order to prepare for a fully functional, interoperable, and operationally resilient ERTMS, FRMCS and DAC rollout across Europe.

Furthermore, a coordinated European approach is vital to view rail as a single, integrated system rather than a collection of isolated national or technical frameworks, ensuring that the gap between research and actual large-scale market deployment is effectively bridged. This system-level integration is indispensable for achieving a competitive and fully interoperable Single European Railway Area and for enabling seamless passengers and freight services across borders.

3. Enabling Large-Scale Deployment of Transformative Technologies

Operators face systemic challenges: automation, digital capacity management, AI-driven optimisation, advanced communications, data spaces, cybersecurity, climate resilience and energy efficiency. The scale and complexity of these future technologies, advanced technologies for ERTMS and DAC, the Future Railway Mobile Communication System (FRMCS), will absolutely require sustained coordination and governance at the European level. These are not incremental upgrades but architecture-level transformations affecting core assets such as signalling, traffic management, rolling stock interfaces, maintenance regimes and workforce skills.

These transformative technologies, supported by the Horizon Europe funds, should be based on jointly defined interfaces and operate in an interoperable, modular, and interchangeable manner, follow efficient, replicable, and reusable testing and certification processes, supporting modularity.

To prepare and accelerate faster and massive deployment on an EU scale, it is important to experiment not only the technology but their integration in the real time environment, and the associated processes that allow humans and organisations to operate the new system. From an operator perspective, it is equally critical to ensure that these solutions effectively address real operational challenges such as accessibility, passenger flow management, incident handling and coordination with other transport modes, where the tangible impact on service quality is realised. Demonstrated full-scale deployment ability is necessary before standardisation to secure that a new solution behaves properly and delivers the expected measurable benefits, including complex operational scenarios such as peak demand, service disruptions and multimodal coordination

Beyond the need to look at collaboration and standardisation, predeployment will reduce risks related to compatibility: in a full-scale deployment, integration issues can be identified and fixed to secure that solutions can work with local railway legacy but are also ready for evolution.

Research area should allow to develop the maturity of candidate technology such as:

- Uptake of AI based solution for operation and maintenance
- Assessment and use of technology solutions for geolocation (for instance photonic motion sensing for the short-medium term, Quantum for the long term), and optimization of several processes.
- Optimisation of asset management, robotization
- Consolidation of rail system data, sharing within the sector, exchange with other transport modes and industries

- Digital and automated system
- New solutions to secure resilience and recovery after attack and climate incidents (supported by economic research evaluation allowing the right investment choices)
- Explore collaborative cybersecurity and needs for post quantum cryptography,
- Innovative approach to support military mobility
- Decarbonisation and Alternative Propulsion Systems

A successor to EU-Rail must provide:

- Common operational concepts and reference architectures
- Harmonised technical specifications
- Validation in real operational environments
- Structured and collaborative engineering approach from R&I to pre-deployment and industrial roll-out

Fragmented national pilots cannot achieve system compatibility at European scale. A Joint Undertaking facilitates their integration on a continental scale and uniquely combines regulatory alignment, industrial standardisation and operational validation—critical to market maturity and mass deployment.

It should be supported by the 4 policy windows of the European Competitiveness Fund, with adequate support regarding clean transition, resilience and security, to accelerate the implementation of results supported by Horizon Europe actions, offering a coordinated and integrated way towards all over Europe implementation, for a harmonised European railway system.

4. Supporting Strategic EU Priorities

Rail is a strategic enabler of EU policy objectives: climate neutrality, energy security, military mobility, high-speed connectivity and competitive logistics chains. Urban rail systems alone carry over 30 billion passengers annually, while the broader rail sector employs nearly 900,000 people and contributes significantly to EU GDP.

The recently announced ambition to develop a European high-speed rail network by 2040 further increases the urgency of coordinated system innovation across Europe. High-speed, regional, suburban, freight and military corridors must be technologically coherent. This cannot be delivered through short-term or fragmented R&I instruments; it requires long-term programme continuity beyond 2027.

5. Ensuring Cost Efficiency and Industrial Competitiveness

From an operator perspective, interoperability and standardisation directly reduce procurement and maintenance costs. Common European specifications increase economies of scale for suppliers, shorten authorisation processes, accelerate the digitalization of the rail system and reduce integration risk. This collaborative framework is essential not only for advancing technology but also for maintaining European industrial

leadership against growing competitive pressures from rapidly advancing non-European players.

A stable successor framework — adequately funded for R&I, a minimum budget of €3 billion, of which half will come from Horizon Europe/FP10 and the other half from industry contributions, plus €15 billion for pre-deployment funding via the European Competitiveness Fund (ECF), national and private investments — provides predictability for operators' investment planning relatively to the technological maturity level and strengthens Europe's rail supply industry in global competition by accelerating market uptake.

Supported by the right allocation of financial resources, operators, being infrastructure managers or railway undertakings, are ready to invest from research and innovation to predeployment, if demonstrators, pilot implementations, their validation, performance assessment up to certification, are rightly considered, accelerating an effective operational readiness.

6. Providing the right Governance

Rail innovation should encompass the challenge of its various stakeholders, rail operators which bear operational risk and long-term asset responsibility, suppliers which shall compete on a global level, the Sector which must answer a growing mobility demand. A partnership ensures inclusive governance between the European Commission and private investors being operators, industry, academic and research actors. A partnership allows the involvement of the EU Agency for Railways, urban transport authorities, freight actors and academics.

By aligning design targets with evolving needs, operational feasibility, safety requirements and real-world deployment constraints, the governance model will effectively support an increase of rail modal share and the competitiveness of the European rail industry.

Ensuring an effective operator investment in the programme of work, thus leading to involvement in the governance (especially for the definition and validation of use cases) is of importance to ensure that developed solutions will be operationally viable, cost-effective and aligned with real service constraints throughout their lifecycle.

About CER

The Community of European Railway and Infrastructure Companies (CER) brings together railway undertakings, their national associations as well as infrastructure managers and vehicle leasing companies. The diverse and comprehensive membership made up of long-established bodies, new entrants and both private and public enterprises, covers the large majority of the rail infrastructure network, rail freight business and rail passenger operations in EU, EFTA and EU accession countries. CER represents the interests of its members towards EU policy makers and transport stakeholders, advocating rail as the backbone of a resilient, competitive, and sustainable transport system in Europe. For more information, visit www.cer.be or follow us on social media.

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