



Driving innovation on railways



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Key objectives

- Achieve the **Single European Railway Area** through the removal of remaining technical obstacles holding back the rail sector in terms of interoperability;
- Radically enhance the **attractiveness and competitiveness of the European railway system** to ensure a modal shift towards rail;
- Help the European rail industry to retain and consolidate its **leadership on the global market** for rail products and services.

What are the challenges?

Rising traffic demand, congestion, security of energy supply and climate change are some of the major issues that the European Union and the wider world are facing. Tackling these challenges will require the railway sector taking on a larger share of transport demand in the next few decades. The European Commission is working towards the creation of a Single European Railway Area and has promoted a modal shift from road to rail in order to achieve a more competitive and resource-efficient European transport system. However, the share of rail on the European freight and passenger transport markets is still not satisfactory. In addition the leadership of the European railway industry is being challenged by new entrants to the market, especially those from Asia offering attractive products at low acquisition costs.

The best response to these competitive challenges is through EU research and innovation to help rail play a new, broader role in global transport markets, both by addressing pressing short-term problems that affect rail business operations, and by helping the sector to achieve a stronger market position.

What is the Shift2Rail Joint Undertaking?

The Shift2Rail Joint Undertaking (S2R JU) is a new public-private partnership in the rail sector, providing a platform for cooperation that will drive innovation in the years to come. The S2R JU will pursue research and innovation activities in support of the achievement of a Single European Railway Area and improve the attractiveness and competitiveness of the European rail system.

Activities are organised around five key Innovation Programmes (IPs): cost-efficient and reliable trains, including high-speed trains and high-capacity trains; advanced traffic management & control systems; cost-efficient and reliable high-capacity infrastructure; IT solutions for attractive railway services; technologies for sustainable & attractive European freight. There are also five cross-cutting themes: Long-term needs and socio-economic research; Smart materials and processes; System integration, safety and interoperability; Energy and sustainability; Human capital.

S2R JU has twenty eight Members: the European Union, represented by the Commission, and: Aerfitec consortium, Alstom Transport SA, Amadeus IT Group SA, Ansaldo STS S.p.A, AZD Praha s.r.o., Bombardier Transportation GmbH, CFW consortium, Construcciones y Auxiliar de Ferrocarriles, Deutsche Bahn AG, DIGINEXT, EUROCC consortium, Faiveley Transport, HaCon Ingenieurgesellschaft mbH, Indra Sistemas S.A., Kapsch CarrierCom AG, Knorr-Bremse GmbH, MER MEC S.p.A., Network Rail, Siemens Atkiengesellschaft, Smart DeMain consortium, SmartRaCon consortium, SNCF, Railenium Swi'Tracken consortium, Patentes Talgo S.L.U., Thales, Trafikverket, Virtual Vehicle Austria consortium+, ensuring full representation from supply industry to infrastructure managers and railway undertakings, as well as research organisations, SMEs and actors from outside the sector.

Four Shift2Rail 'lighthouse projects', In2Rail, IT2Rail, and Roll2Rail, and Smart Rail were launched in May 2015 to blaze the trail for the diverse and intensive rail research activities to be carried out by the Shift2Rail Joint Undertaking:

1. In2Rail, a 36 month project, is setting the foundation for a resilient, consistent, cost-efficient, high capacity European rail network. In2Rail will feed into the Shift2Rail IP2 (Advanced Traffic Management & Control Systems) and IP3 (Cost Efficient and Reliable High Capacity Infrastructure) to deliver smart infrastructure, intelligent mobility management, and improved rail power supply and energy management.
2. IT2Rail, a 30 month project, is the first step towards the long term Shift2Rail IP4 "IT Solutions for Attractive Railway Services". Through the introduction of radical new technologies and solutions, European citizens' global travel interactions will be transformed into a fully integrated and customised experience, rendering the entire European transportation system a natural extension of citizens' work and leisure environments, across all modes, local and long-distance, public and private.
3. Roll2Rail, a 30 month project, is setting the foundation for many of the technologies that will be continued within Shift2Rail's IP1: "Cost-efficient and reliable trains, including high capacity trains and high-speed trains". Roll2Rail aims to develop key technologies that will overcome hurdles to innovation in rolling stock development and forms part of a longer-term strategy to revolutionise the rolling stock of the future.
4. Smart Rail, a 36 month project, aims at improving rail freight services offered to shippers, focusing on five main aspects: reliability, lead time, costs, flexibility and visibility. The project focuses on innovative solutions and their implementation in the rail freight sector by testing them in three *Continuous Improvement Tracks*, along specified rail corridors. The outcome of this project is expected to contribute to Shift2Rail IP5 "Technologies for Sustainable & Attractive European Rail Freight".

What results and benefits do we expect?

Shift2Rail will contribute to:

- Cutting the life-cycle cost of railway transport (i.e. costs of building, operating, maintaining and renewing infrastructure and rolling stock) by as much as 50 %;
- Doubling railway capacity;
- Increasing reliability and punctuality by as much as 50 %.

The initiative will help boost the competitive edge of the rail supply industry, opening new market perspectives and offering significant employment and export opportunities. Railway undertakings, infrastructure managers and public transport operators will also benefit from innovations that drastically reduce infrastructure and operating costs. This should also help to reduce the subsidies paid out by national governments – estimated at €36-38 billion in Europe in 2012¹. Passengers and freight service users will benefit from a step change in the reliability and quality of services. Improved competitiveness and attractiveness of rail services, combined with increased capacity, will help rail take on an increased share of transport demand, thereby contributing to the reduction of traffic congestion and CO₂ emissions. Citizens' health and wellbeing will also benefit thanks to reduced noise pollution from rail.

¹ "Study on the Cost and Contribution of the Rail Sector", European Commission, 2015

How much will it cost?

The estimated budget of the S2R JU will be at least €920 million (for the period 2014-2020). The EU's share of the funding, amounting to a maximum of €450 million, will come from the Horizon 2020 programme: of which up to 70% will be allocated to the JU Members and at least 30% will be allocated by way of competitive calls for proposals and calls for tenders to non-JU Members. To access this funding, the JU Members will have to commit to a contribution of at least €470 million. Additional funding, complementing the Horizon 2020 funds, may be allocated from other EU instruments, such as the Connecting Europe Facility, to support actions for the deployment of innovative outcomes of the S2R Joint Undertaking.

How will it be managed?

Within the S2R JU, all Members will be involved in the decision-making processes and share responsibilities. The JU sets out its research and innovation priorities in a strategic Master Plan. S2R Multi-Annual Action Plan provides a further, long-term investment plan that concretely identifies the projects, milestones and deliverables to achieve the Master Plan objectives. The main bodies of the S2R JU are the Governing Board, in charge of strategic decision-making, and the Executive Director, responsible for day-to-day management. Steering Committees have been established for each of the Innovation Programmes to provide the relevant technical input in particular for the development of the calls for proposals. The JU also has two advisory bodies: a Scientific Committee and a States' Representatives Group.

