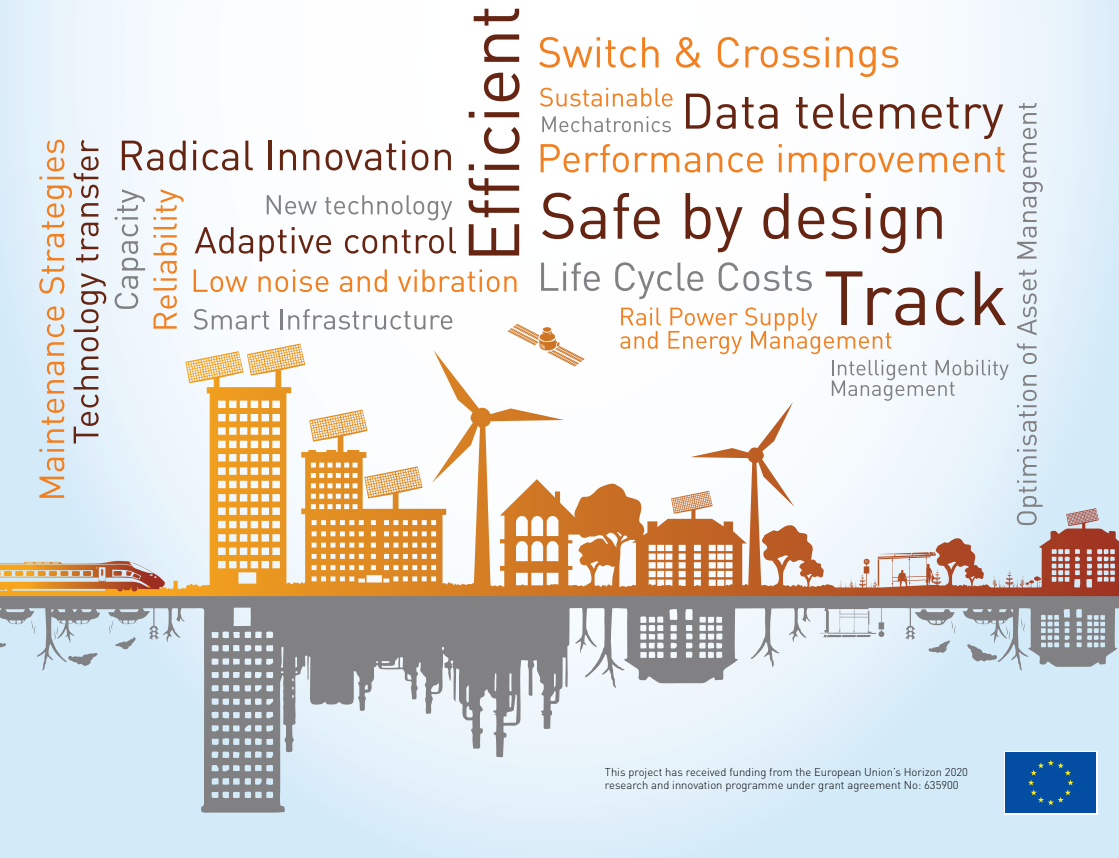
In2Rail

Innovative Intelligent Rail



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No: 635900

Project in a Nutshell

The In2Rail project is to lay the foundations for a resilient, consistent, cost-efficient, high capacity European network by delivering important building blocks that will enable the unlocking of the innovation potential that exists in the future Shift2Rail Programme.

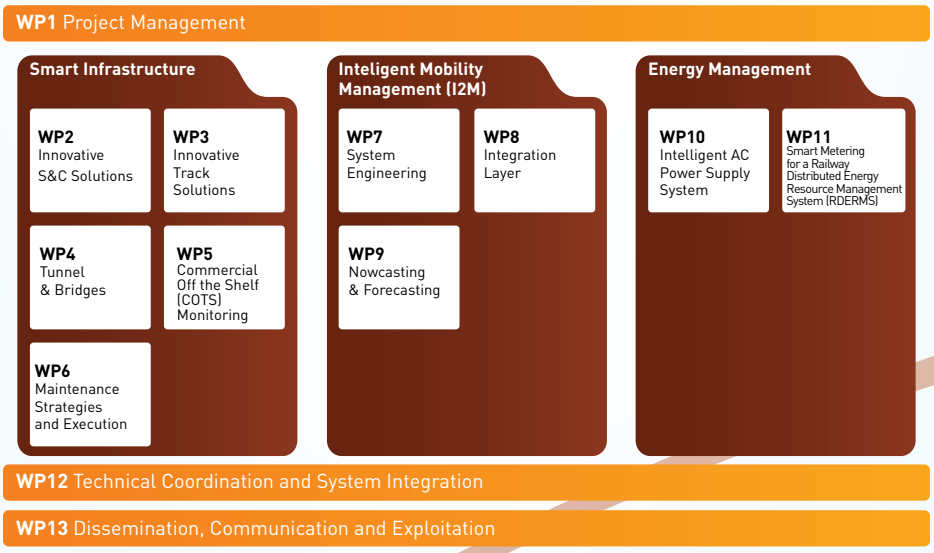
In2Rail is one of the lighthouse projects of Shift2Rail and will contribute to Innovation Programmes 2 and 3.

Specifcally In2Rail will explore innovative technologies and the resulting concepts embedded in a systems framework where infrastructure, information management, maintenance techniques, energy, and engineering are integrated, optimised, shared and exploited.

Project Organisation

In2Rail is structured around three technical sub-projects complimented by three transversal work packages:

- Three Technical sub-projects - **Smart Infrastructure, Intelligent Mobility Management, and Rail Power Supply and Energy Management**;
- Three transversal work packages – **Project Management; Technical Coordination and System Integration; and Dissemination, Communication and Exploitation** – provide the structure, governance, coordination, integration, and communication interfaces that will maximise the benefit of the research and innovation activities and ensure successful project delivery.



Project Objectives

In2Rail will make advances towards achieving the strategic objectives:

- Enhancing the existing **CAPACITY** fulfilling user demand of the European rail system;
- Increasing the **RELIABILITY** delivering better and consistent quality of service of the European rail system;
- Reducing the **LIFE CYCLE COST** (LCC) increasing competitiveness of the European rail system and European rail supply industry.

This will be achieved by the adoption of a whole system approach linking infrastructure re-design with asset maintenance, traffic and energy management, under the following work programmes:

Smart Infrastructure:

- Intelligent reliable infrastructure: integrated asset monitoring, self diagnostic and adjusting assets, efficient design and new materials, exploring mechatronic solutions, with an increased focus on data from low-cost, low-maintenance sensors;
- Better system resilience and a reduced need for maintenance through innovative infrastructure design, novel working methods and smarter use of data leading to reduced LCC and greatly improved availability;
- Overall reduction in carbon emissions, noise and vibration, and improved levels of sustainability.

Intelligent Mobility Management (I²M):

- A standardised approach to information management and dispatching system enabling an integrated Traffic Management System (TMS);
- An Information and Communication Technology (ICT) environment supporting all transport operational systems with standardised interfaces and with a plug and play framework for TMS applications;
- An advanced asset information system with the ability to 'nowcast' and forecast network asset statuses with the associated uncertainties from heterogeneous data sources.

Rail Power Supply and Energy Management:

- The design of a future AC Rail Power Supply System with minimised energy losses and optimised loads;
- The implementation of an efficient energy management system allowing understanding of energy flows within a railway system, a reduction of the energy consumption and cost, optimised asset management and enabling better use of the railway capacity.

Major Outcomes/Benefits/Impacts

Sub-Project – Smart Infrastructure	Innovative S&C Solutions – Optimised S&C with embedded sensor technology; self-inspecting, self-correcting and self- adjusting systems; redesigned S&C locking system; weather resilient features; mechatronic technologies
	Innovative Track Solutions – Optimised track system; 'Smart materials'; improved track geometry resilience; embedded safety systems and derailment protection; integrated slab and ballasted solutions; improved ballast LCC; reduced noise and vibration; new track system components and innovative construction techniques
	Tunnel & Bridges – New inspection, monitoring, repairing, strengthening and upgrading methods for structures; reduced traffic disturbance and improved efficiency
	Commercial Off The Shelf (COTS) Monitoring - New methods of wayside and onboard inspection and monitoring (track geometry and thermal stresses), increased automation reducing disruptions to traffic and asset management costs
	Asset Maintenance Strategies and Execution - Adaptive risk and condition based maintenance approach focussed on the underlying risks and failure modes; Optimised integrated maintenance activities focused on LEAN logistics
Sub-Project – Intelligent Mobility Management - I2M	Integrated approach to TMS/dispatching system and related information management – Generic framework for applications, ICT environment supporting all transport operational systems with standardised interfaces
	Advanced asset information system to support TMS/dispatching functionalities – real-time 'nowcasting' and forecasting network asset statuses from diverse data sources for risk based decisions
Sub-Project – Rail Power Supply and Energy Management	Intelligent AC Power Supply System – Smart AC power supply system demonstrator featuring optimised behaviour and configuration for high efficient operation and adaptable interfaces to power grid and rail operation
	Smart Metering - mapping different energy flows within a railway system on a synchronized time basis as a precondition for intelligent monitoring & integrated energy management

Contribution to Shift2Rail

The concept underpinning In2Rail is the universal adoption of a whole system approach to create the building blocks for Shift2Rail: Innovative technologies are explored and resulting concepts embedded in a systems framework where infrastructure, information management, maintenance techniques, energy and engineering are integrated, optimised and routinely shared and exploited across the transport sector. In2Rail is fully aligned with Shift2Rail in its objectives, approach and ambition, addressing early research and innovation priorities. In2Rail will make advances towards Shift2Rail objectives: enhancing the existing capacity fulfilling user demand; increasing the reliability delivering better and consistent quality of service; reducing the LCC increasing competitiveness of the EU rail system.

In2Rail shares the Shift2Rail objectives and will directly contribute to the achievement of the ambitions of Shift2Rail Innovations Programmes 2 and 3. In2Rail is also linked with other Horizon 2020 Mobility for Growth projects, specifically ROLL2RAIL and IT2RAIL.

Partners

Project coordinator

Facts and Figures

Total Budget:

€18
million

54
Partners

Duration:

36
Months

Project Start Date:
1st May 2015

Project End Date:
30th April 2018

Grant Agreement No: 635900

Contact us

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In2Rail is also working closely with other current European funded projects, specifically "Roll2Rail", "IT2Rail" and "INFRALERT".