The X2Rail-2 Context

The X2Rail-2 project aims to research and develop four selected key technologies to foster innovations in the field of railway signalling and automation systems, as part of Shift2Rail Innovation Programme 2 (IP2) strategy towards a flexible, real-time, intelligent signalling and traffic management system.

X2Rail-2 follows a holistic system approach to create the building blocks for Shift2Rail IP2. Thus, the outcomes at individual technology field will be combined to bring a benefit at system level.

This system approach will provide breakthrough innovation for the European railway area in the Command, Control and Signalling (CCS) domain.

X2Rail-2 is part of the overall IP2 programme and it is planned that it will be accompanied with ongoing and future IP2 member projects.

Shift2Rail influences the whole railway sector.

The Objectives of X2Rail-2

To reduce significantly the use of traditional train detection systems by means of the attainment of an absolute and **safe train positioning system** based on a multi-sensor concept, where a satellite based positioning system is the preferred technology.

To achieve the **safe on-board train integrity** in order to allow an application of new signalling train separation concepts, like moving block, based on the train self-localization rather than on traditional trackside train detection systems.

To propose suitable **formal methods** for requirement capture, design, verification and validation of railway CCS systems with standardized interfaces.

To improve **standardization and integration of traffic management** processes with the aim to achieve interworking and scalability within the choice of functional service module managed by the traffic management system.

All these objectives are planned to be accomplished in the context of **backward compatibility to ERTMS technologies**, notwithstanding the required functional enrichment of the future CCS system.
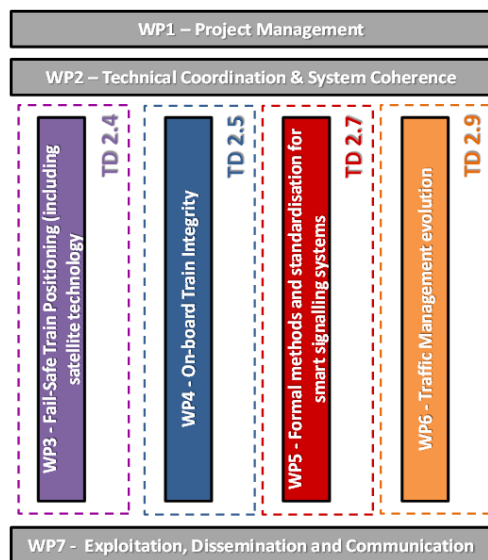

X2RAIL 2

Enhancing railway systems based on train satellite positioning, on-board safe train integrity, formal methods approach and standard interfaces, enhancing traffic management system functions

Organisational structure

- Technical Work Packages

  o WP3 Fail-Safe Train Positioning

  o WP4 On-Board Train Integrity

  o WP5 Formal Methods

  o WP6 Traffic Management Evolution

- Supportive Work Packages

  o WP1 Project Management

  o WP2 Technical Coordination and System Coherence

  o WP7 Exploitation, Dissemination and Communication

WP1 – Project Management
WP2 – Technical Coordination & System Coherence

WP3 - Fail-Safe Train Positioning (including satellite technology) TD 2.4	WP4 - On-board Train Integrity TD 2.5	WP5 - Formal methods and standardisation for smart signalling systems TD 2.7	WP6 - Traffic Management evolution TD 2.9

WP7 - Exploitation, Dissemination and Communication

X2Rail-2 is organised in four technical work packages and three supportive work packages.

X2Rail-2 is a fully European project.
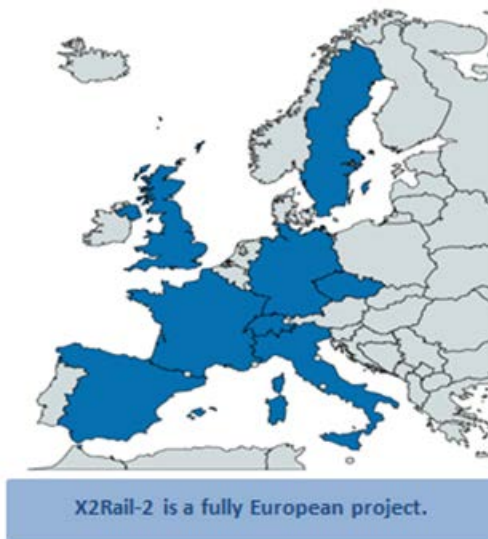
Facts & Figures

- Starting date: 01-Sept-2017

  o Duration: 36 Months (until 31-Aug-2020)

  o Total Budget: 30 M€

  o EU contribution: 13 M€

  o Participants contribution: 17 M€

- Number of participants:

  o 19 (+9 Linked Third Parties)

  o From 8 countries

- Covering all areas:

  o Railway Industry

  o Infrastructure Managers

  o Railway Undertakings

  o Research Centres

  o Communication & Software experts

Members from all around Europe

- Siemens AG

- Alstom Transport S.A.

- Ansaldo STS S.P.A.

- AŽD Praha s.r.o.

- Bombardier Transportation Sweden AB

- CAF Signalling S.L.

- Centro de Estudios e Investigaciones Tecnicas de Gipuzkoa

- Deutsche Bahn AG

- Deutsches Zentrum für Luft - und Raumfahrt e.V.

- Schweizerische Bundesbahnen SBB AG

- Fondation de Cooperation Scientifique Railenium

- Hacon Ingenieurgesellschaft mbH

- Indra Sistemas SA

- Nottingham Scientific LTD

- Mer Mec S.P.A.

- Network Rail Infrastructure Ltd.

- SNCF Reseau

- Thales Deutschland GmbH

- Trafikverket