

## PROJECT MEMBERS

PROJECT COORDINATOR



TECHNICAL LEADER



PROJECT PARTNERS



**Ardanuy**



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### PROJECT WEBSITE

[www.astrail.eu](http://www.astrail.eu)

### PROJECT TWITTER ACCOUNT

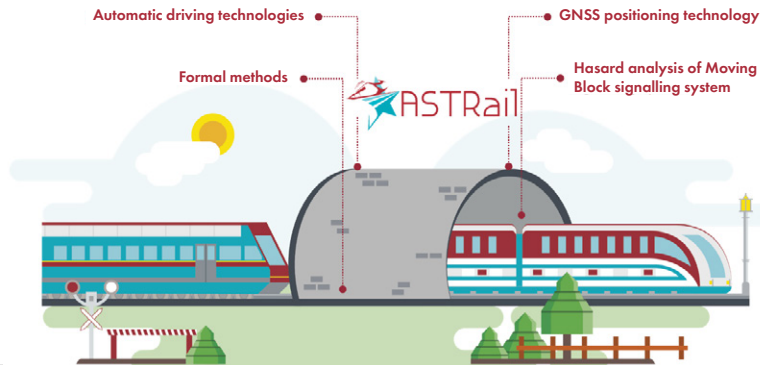
[www.twitter.com/S2R\\_ASTRail](https://www.twitter.com/S2R_ASTRail)



**SA**tellite-based **S**ignalling  
and Automation Sys**T**ems on **R**ailways along  
with Formal Method and Moving Block validation



## PROJECT OVERVIEW



In the last years, several breakthrough technologies have become available and many of them have a huge potential for the transformation of transports: as a result, some sectors, especially the automotive one, are rapidly evolving. In the case of railway transport, innovation needs to be introduced at a slower pace, because strict safety requirements have to be fulfilled.

A promising way to accelerate the evolution of railways is to leverage the experience matured in other transportation domains. This still requires significant effort, mainly to:

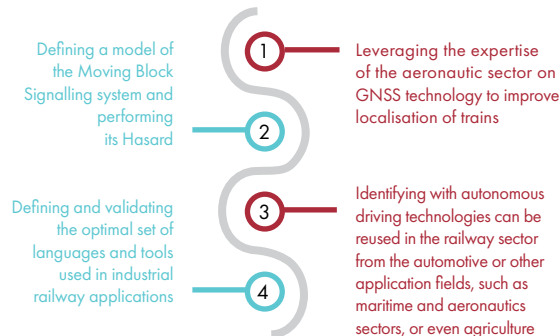
- adapt the existing solutions to the target context
- carefully evaluate and validate the innovations in the railways.

The enhancement of ERTMS is looked upon as the key for increasing the competitiveness of the European railway industry.

**Moving Block System (MBS), Automatic Train Operation (ATO) and Satellite positioning GNSS** are strategic for the evolution of ERTMS. Formal Methods can validate and make safer the introduction of such innovations.

## OBJECTIVES

ASTRail addresses the following specific technical objectives:



In a holistic perspective, the overall objective of the ASTRail project is to leverage different enablers for the common goal of improving the railway signalling and automation systems.

The ASTRail approach takes into careful account safety and performance and investigates the cutting edge technologies, scientific approaches and methodologies available from other fields, such as avionics or automotive.

The ASTRail rationale is organised into 4 strongly dependant technical work streams: 1) GNSS technology into the ERTMS Signalling System, 2) Hazard Analysis of the railway system of Moving Block Signalling system, 3) Automatic driving technologies and 4) Formal Methods to be applied in the railway field.

## IMPACT AND LINKS

The ASTRail proposal fits the rich Shift2Rail (S2R) framework: as such, it reflects the S2R Work Programme and encompasses objectives from the S2R Multi-Annual Action Plan (MAAP).

As part of S2R eco-system, ASTRail will contribute to the MAAP objectives and closely cooperate with the S2R actors and projects.

In a top-down approach, the expected ASTRail impacts reflecting the S2R framework are:

1. Work Programme level "Smart, green and integrated transport"
  - a. Resource efficient transport that respects the environment
  - b. Better mobility, less congestion, more safety and security
  - c. Global leadership of the European transport Industry
2. S2R MAAP level:
  - a. Develop, integrate, demonstrate, and validate innovative railway technologies and solutions with the objective to improve the competitiveness and attractiveness of the European Railway Sector
3. S2R IP2 objectives
  - a. Line capacity increase
  - b. Operational reliability increase
  - c. Railway system life cycle cost reduction
  - d. Maintain the highest level of safety
  - e. Reduce costs (CAPEX and OPEX)
  - f. Strong integration of different technologies and systems not yet largely applied in the railway field
4. Technical Demonstrator (TD) level
  - a. TD2.2 Railway network capacity
  - b. TD2.3 Moving Block
  - c. TD2.4 Fail-safe Train Positioning
  - d. TD2.7 Formal methods for smart signalling systems

## ASTRAIL IN A NUTSHELL



**1.8M€**  
Total Project Value



**6**  
Partners



**24**  
Months Duration

## EXPLOITATION PERSPECTIVES

