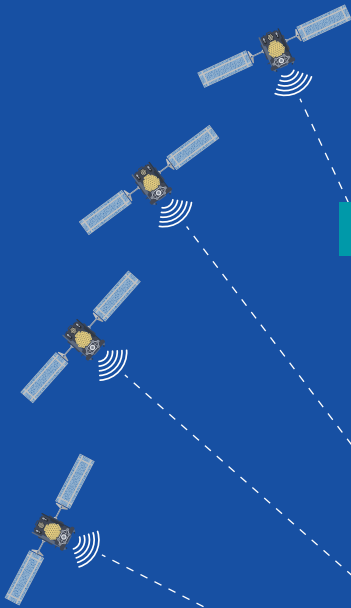




**CERTIFIABLE
LOCALISATION UNIT
WITH GNSS IN THE RAILWAY
ENVIRONMENT**



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 870276



PRESENTATION

With the digitalisation of transport services, train localisation in real time has become increasingly important for the European railway sector. At present, determination of the position of the train for signalling purposes is based on trackside equipment such as track circuits or axle counters, which are physical elements mounted at specific intervals along the railway track.

The signalling systems on-board the train also use the train odometry to control the speed and carry out the movement authority of the train by estimating the braking curve to protect dangerous points on the network (e.g. closed block, curves, speed limit).

The European rail would benefit from the use of the European satellite navigation Galileo system (E-GNSS) to enable a significant reduction of trackside equipment and to improve localisation performance. Also, the use of the regional augmentation system EGNOS will bring the necessary reliability to the train localisation unit for the GNSS constellations GALILEO and GPS. However, fusion with other sensors will be necessary to mitigate the impact of local effects on GNSS performance.

Capitalising on the achievements of EC and GSA funded projects, key European railway companies have decided to team together and collaborate through the CLUG project for the proof of concept of a "Certifiable Localisation Unit in the railway environment".

The CLUG project will perform a mission analysis/needs identification and a preliminary feasibility study of an on-board localisation unit with the following characteristics:

- Failsafe on-board multi-sensor localisation unit consisting of a navigation core (IMU, tachometer, etc.) brought in reference using GNSS, track map and a minimal number of reference points;
- On-board continuous localisation system that provides location, speed and other dynamics of the train;
- Operational and interoperable across the entire European rail network;
- Compatible with the current ERTMS TSI and with its future evolutions.



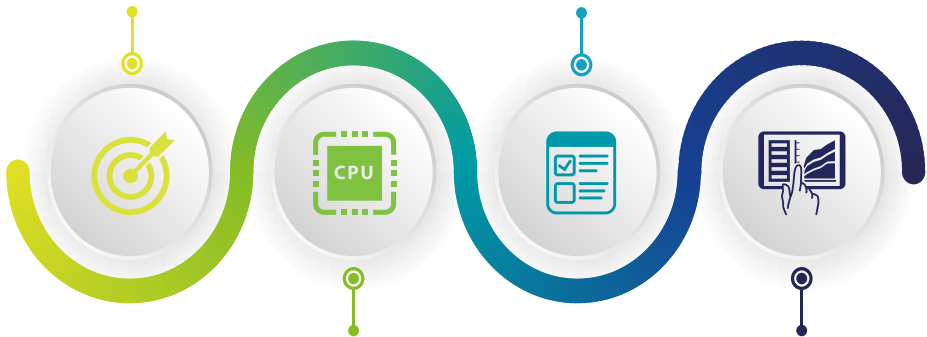
MAIN OBJECTIVES

MISSION REQUIREMENTS AND DEFINITION

A “top down” approach establishes needs, objectives, and top-level functional and performance requirements of the train localization unit

DEVELOPMENT OF PROCESS AND TOOLS FOR CERTIFICATION OF LOCALISATION UNIT

Initial development of tools and processes for the qualification and certification of a train localisation unit



ARCHITECTURE DEFINITION AND ALGORITHM PROTOTYPE DEVELOPMENT

Identification system concepts that meet the requirements that have previously been defined + analysis of the current and future EGNSS services

DEMONSTRATION OF THE FEASIBILITY OF A MULTI-SENSOR APPROACH

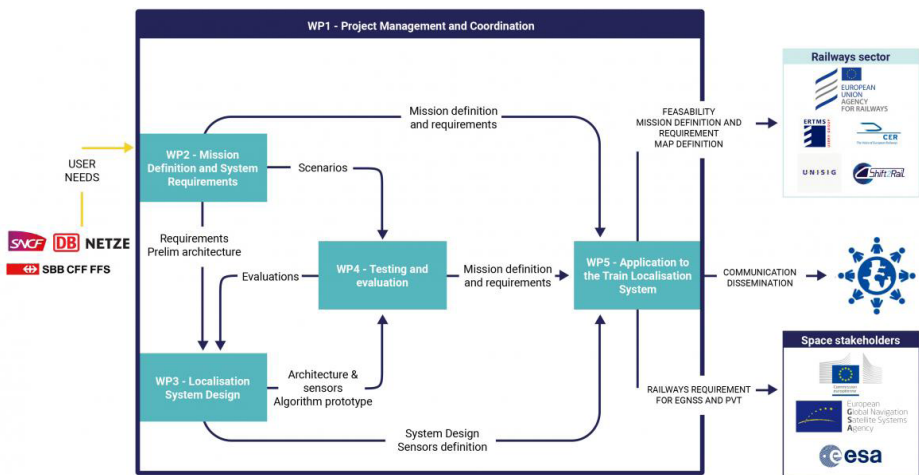
Test prototyped architecture and algorithms in various modes to determine whether requirements are supported using real world data



WORKBREAKDOWN AND STUDY LOGIC

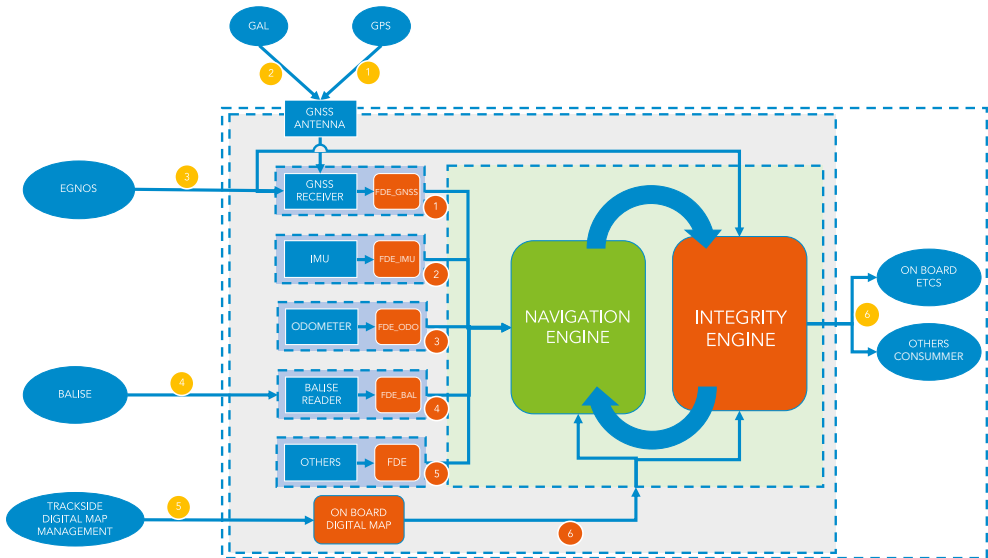
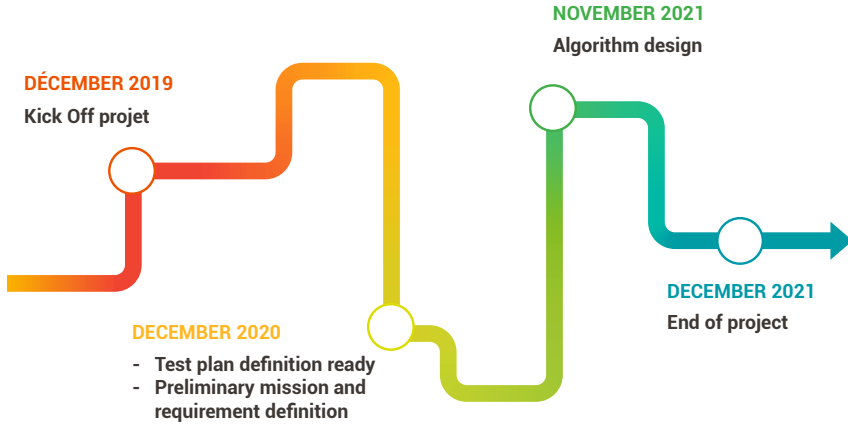
The project has been structured around 5 work packages

WP1	Project Mangement and Coordination	To ensure the coordination between consortium members and across activities ; to manage the administrative issues of the project
WP2	Mission Definition and System Requirements	To define the system needs, the operational scenarios and the high-level system requirements
WP3	Localisation System Design	To elaborate a Localisation System design following a system engineering
WP4	Testing and evaluation	To test and evaluate the performance of localisation solutions consisting of different receivers and sensors, combined by fusion algorithms, using real world data
WP5	Application to the train Localisation System	To exploit, summarise, disseminate and communicate the project outcomes





KEY MILESTONES



Revised milestones dates due to Covid-19



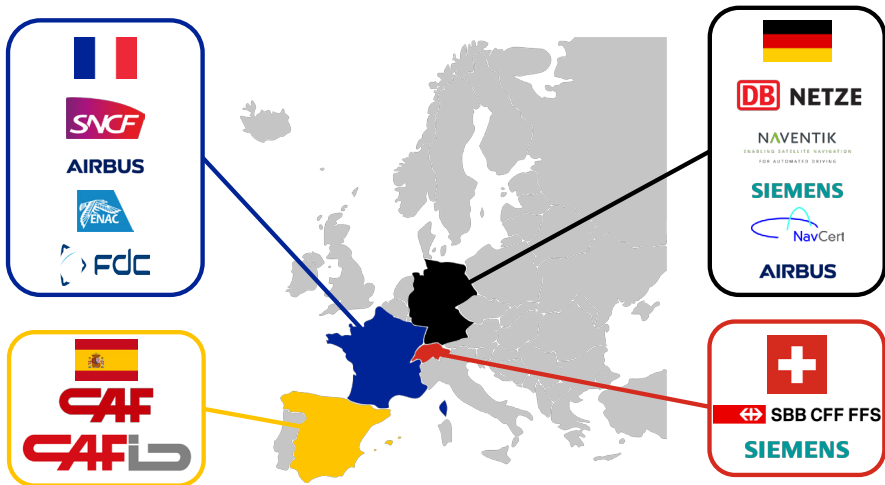
CONSORTIUM TEAM

The consortium is built to bring together all the complementary profiles needed to cover the objectives of the project: railways (SBB, DB, SNCF), Space & GNSS industry with aeronautical references (Airbus Defense and Space), railway industries (Siemens, CAF), localisation experts (FDC, Naventik), certification company (Navcert) and Research organisation (ENAC).



PARTNERS





www.clugproject.eu
 #CLUGProject



SNCF is a state-owned société anonyme with share capital of €1,000,000,000.
 SNCF is entered in the Bobigny Commercial and Companies Register under No. 552 049 447 and under Siret No. 552 049 447 76279.