VICE4RAIL
EGNSS - ERTMS

VICE4RAIL

HYBRID VIRTUALIZED TESTING FOR CERTIFICATION OF EGNSS IN RAILWAY TRAIN POSITIONING

PROJECT OVERVIEW

VICE4RAIL aims to promote the adoption of EGNSS for implementing efficient, resilient, and competitive ERTMS systems. The main goal is to contribute to an industry-approved certification procedure of EGNSS technologies by an innovative evaluation ecosystem coherent with the CENELEC norms, CCS TSI and relevant EU regulations. The focus is on scalability, cost-efficiency, and flexibility to validate technology-agnostic Advanced Safe Train Positioning (ASTP) solutions. These key factors are crucial in addressing the gaps that currently hinder the widespread adoption of EGNSS technologies.

A central innovation within the project is the HyVICE (Hybrid Virtualized Testing Certification Environment), which facilitates the validation of EGNSS technologies in the ERTMS ecosystem, consistent with the zero-on-site testing paradigm. The hybrid testing environment combines real-world data gathered from the RFI test circuit in Bologna San Donato with virtual simulations from the accredited ERTMS laboratory at CEDEX in Madrid. HyVICE will enable the validation of multi-sensor GNSS-based positioning devices in operational scenarios, offering a unique capability to assess threats caused by rare and difficult-to-replicate GNSS faults without the need for extensive and potentially not implementable field tests.

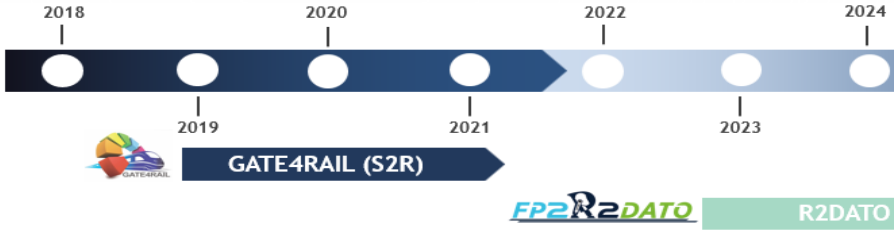
OBJECTIVES

The objectives of VICE4RAIL are designed to drive the integration and certification of GNSS technologies within the ERTMS framework, by keeping the same standard safety integrity level of current railway applications, ensuring the adoption of advanced, reliable and interoperable positioning solutions for the railway sector.

These objectives include:

- **Contribute to establish a standardized certification methodology**: Contributing to develop a harmonized European framework for certifying satellite-based train positioning systems, ensuring reliability, safety compliance, and regulatory alignment.
- **Develop HyVICE testing environment**: Integrate real-world and simulated testing to create a comprehensive and versatile evaluation platform for satellite positioning technologies in diverse railway operational scenarios.
- **Advance GNSS Integration into ERTMS**: Support the release of the new TSI introducing Hich Accuracy and High Integrity GNSS technology into the ERTMS standard, contributing to close certification gaps within the ERTMS ecosystem, and enable the early adoption of GNSS-based systems across Europe.

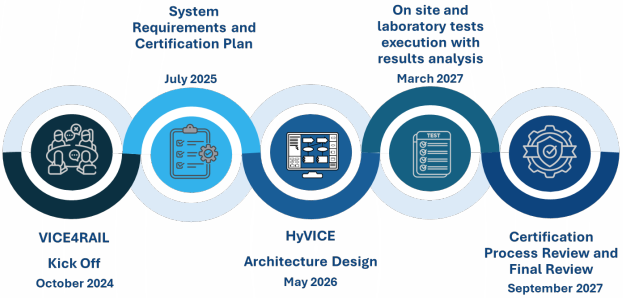
SYNERGIES



RTCM SC 134 STANDARD

ERTMS USER

ROADMAP



IMPACT

The VICE4RAIL project seeks to address existing gaps and accelerate the integration of GNSS-based solutions into the ERTMS framework across Europe, aligning with the objectives of the Europe Rail System Pillar and Flagship Project 2.

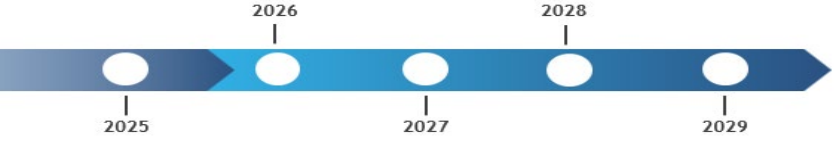
VICE4RAIL hybrid testing environment represents a new approach for evaluating and certifying railway technologies enhancing the realism of testing scenarios, speeds-up certification and ensures rigorous testing for assessing the safety integrity and interoperability of railway systems.

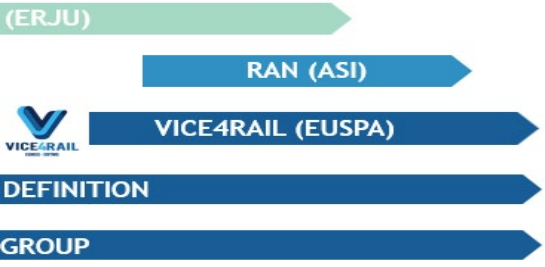
By improving the understanding and modelling of GNSS faults effects in a railway context, VICE4RAIL contributes to more accurate and reliable GNSS-based localization for trains to reach higher precision in planning train separation.

The impact of VICE4RAIL includes the potential to increase rail capacity by improving accuracy in train localization, reducing maintenance costs, and optimizing railway operations. The project's contributions will accelerate the transition towards a cost-effective, interoperable, and future-proof railway system across Europe.

SYNERGIES

The VICE4RAIL project is dedicated to fostering synergies among various rail transport initiatives, such as the ERTMS User Group (EUG) and the Europe's Rail Joint Undertaking FA2 R2DATO project, among others, to complement their activities on the roadmap for large-scale deployment of EGNSS-based ERTMS systems. Collaborations will be established with the RTCM SC 134 Standardization Committee which is releasing the high accuracy-integrity augmentation protocol and data formats for rail and other application sectors. Furthermore, VICE4RAIL will explore opportunities for creating synergies with other relevant initiatives and developments with Europe's Rail, EUSPA, ESA and ASI which have already planned programs to support the adoption of GNSS in ERTMS system. The contribution for the certification procedure will benefit from the expertise gained from the activities conducted on the Novara-Rho Pilot Line, commissioned by RFI to integrate GNSS positioning into the ERTMS.





TOTAL PROJECT VALUE
2.7 M

PARTNERS
9

DURATION
36 Months

PROJECT PARTNERS

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GRUPPO FERROVIE DELLO STATO ITALIANE

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EUSPA