

European railways benefit from innovative platform for simulating and evaluating on-board positioning systems

April 19 2016



The ETCS aims to introduce a single harmonised system of signalling, control and train protection that would replace the many incompatible safety systems that currently exist on European railways, particularly on high-speed rail lines. It is an EU legal requirement that all new, upgraded or renewed tracks and rolling stock within the European rail network should adopt ETCS.

Implementing ETCS

However the rollout of ETCS, which is divided into four distinct levels (ETCS 1-4), has been a major concern for train manufacturers and

railway infrastructure managers. This has been due to a variety of reasons, including various interpretations in the specification of the system's behaviour, available laboratory certification procedures not being able to fully address all of the system's needs, long and expensive field-testing, and other technical difficulties.

The EATS project aimed to develop new on-board location systems by combining Global Navigation Satellite Systems (GNSS), Universal Mobile Telecommunications System (UMTS) and Global System for Mobile Communications – Railway (GSM-R) technologies, as well as including multi-antenna configurations on the train. This would allow for the migration from ETCS level 2 to level 3 which would improve the overall efficiency of European [railways](#).

Utilising ATLAS

To design, implement and evaluate the new location systems, EATS has utilised the innovative ATLAS (Advanced Train LocAtion Simulator), which is modular, extensible and highly configurable. It allows for the configuration of the train to be analysed together with the on-board location systems and even for the train's route to be studied. Moreover, it provides a powerful performance evaluation tool that allows visualising the results of hundreds of simulations at a glance.

ATLAS comprises of four key modules: the ATLAS Route Simulator that calculates the global positioning and/or velocity of each receiver and sensor contained in the train, using a specific train model and track layout; the ATLAS Input Generator, which uses the data from the Route Simulator and generates the input sources with configured errors for the algorithms to be tested in the Position Estimator; the ATLAS Position Estimator, the module responsible for testing different location algorithms; and finally the ATLAS Performance Analyser that allows the user to compare and contrast the behaviour of each positioning

configuration carried out, and thus to select the most favourable or convenient.

EATS used ATLAS and its four specific modules to automate the testing of different antenna distributions applied to a train model under several performance zones. In addition to this, positioning algorithms and different technologies used for positioning have been tested to allow the comparison of their performance and suitability for the railway sector.

By developing innovative on-board positioning systems, the project will contribute to improving both the safety and the efficiency of the European railway network by facilitating a quicker rollout of the ETCS at a time when passenger and freight numbers are rapidly increasing across Europe.

More information: For more information please see the project website: www.eats-eu.org/index.html

Provided by CORDIS

Citation: European railways benefit from innovative platform for simulating and evaluating on-board positioning systems (2016, April 19) retrieved 5 May 2024 from <https://phys.org/news/2016-04-european-railways-benefit-platform-simulating.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.