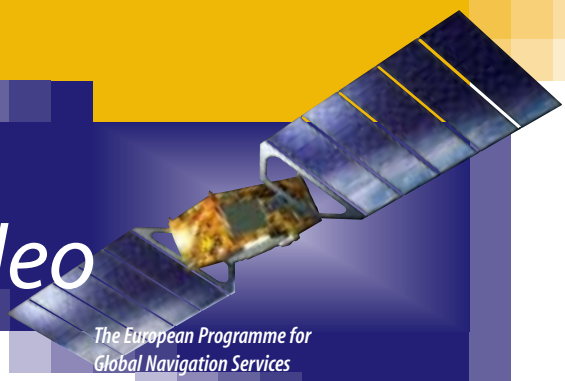


Galileo

The European Programme for Global Navigation Services

Rail Applications

Revitalising the railways is one of the priorities defined in the European Commission White Paper on Transport. The share of freight transport by rail has declined from 21% in 1970 to 8% in 1998. To reverse this trend, the rail sector must improve its competitiveness – and Galileo will help it to do that.

The number of traction units in Europe is estimated at 30 000 (140 000 worldwide) on 165 000 km of tracks (928 000 km worldwide). This makes the rail sector of primary importance for Galileo.

Some examples of practical uses of Galileo

Train control

Galileo is foreseen to become an instrument for safety-related train control functions, which in Europe are standardised in the European Rail Traffic Management System (ERTMS). The high safety requirement in the Rail sector can be satisfied by a hybridisation of Galileo receivers with other sensors such as odometers, balise and gyroscopes. The introduction of satellite navigation within the European Train Control System (ETCS)/ERTMS will help mainly to improve performance on high-density lines and reduce costs on low-density and regional lines. Galileo can contribute to high safety levels worldwide, particularly where there is no trackside equipment. All over the world, many railway lines are not equipped for train control. Increasing transport load on railways without complete signalling equipment means that the number of errors is also rising. A full set of signalling equipment is, however, uneconomic for these lines.

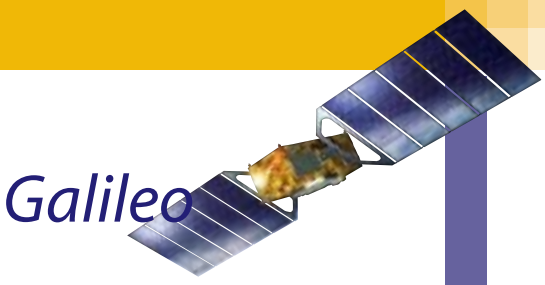
Galileo, combined with communication services, will offer railway operators a supervision system that gives the locomotive driver and his cental station an additional means for monitoring operations.

Fleet management and goods tracking

For all transport modes, fleet management is an important tool for improving the logistics and performance for both passengers and goods transportation. For freight traffic, knowing the location of goods in transit is important to customers for confidence in timely delivery. The goods can be tracked if they are connected with the carriers (e.g. traction unit identification).
Additionally, Galileo will help to organise rolling stock, improve rolling stock maintenance, enable effective goods tracking, simplify route pricing and supervise track usage.

Passenger information

Information about train arrival and departures times, especially when there are delays, is important for maintaining a good service. On-board passenger information is also essential. Knowing the position of the train can also provide additional services to passengers, such as connection and tourist information.



Equipping engines and carriages with Galileo receivers will allow operators to track their vehicles and efficiently provide their clients with up-to-date information.

Energy optimisation

Currently, rail movement is generally not optimised for energy consumption. A driver normally controls the train according to a speed-profile table, which generally defines the allowed speed depending on track distance travelled. However, drivers often change speed without concern for saving energy. For example, they brake sharply before a tunnel instead of using regenerative braking at the appropriate distance before the tunnel. In order to save energy, the first question is to know the train's position with respect to its environment. Satellite navigation provides a cost-effective means for providing that information.provide their clients with up-to-date information.

Track survey

Surveying track status is an important task for ensuring safe passage for trains. A good survey needs accurate position determination and synchronisation between the positioning system and other testing/ inspection systems. Traditional techniques for determining the position of trains, such as track circuits, do not have sufficient accuracy, so other means, such as geodetic survey, have to be put in place. Galileo will offer an economic and efficient alternative to these traditional geodetic survey methods.

Galileo will have a primary role for all of the above applications, owing to its core characteristics of certification, operational transparency and service guarantee, derived from its civil nature. In addition, the real-time navigation performance integrity monitoring ('integrity flags') over the service area makes the Gsalileo system suitable for all safety-of-life requirements.

Galileo Benefits

By integrating Galileo with other technologies, the Rail community can benefit from:

– increased performance of transport by rail and facilitated transfer of transport from road to rail

– reducing or even avoiding some trackside equipment and having a more economical solution for Train Control

– high positioning accuracy for efficient track survey

– a unique tool that contributes to many different functions

How is Galileo different from other systems?

√ Galileo is specifically designed for civil and commercial purposes

√ increased accuracy, service guarantees, certification and liability of the service operator

√ traceability of past performance and operation transparency

√ increased availability of signals in demanding environments

Galileo: The European Satellite Navigation Programme is a joint initiative of the European Commission and the European Space Agency. Galileo will offer positioning and timing services worldwide.

For additional information, please contact the Galileo Joint Undertaking: JU@galileo-pgm.org or visit the websites http://www.europa.eu.int/comm/dgs/energy_transport/galileo/ http://www.esa.int/navigation/galileo/

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