Europe's Rail

Co-funded by the European Union

The digitalisation of Europe's railways starts with a dependable communications backbone

Having a robust and dependable communication backbone is the key to achieving the digitalisation of Europe's railways.

Helping to build this backbone is EU-Rail.

The initiative delivered a portfolio of technical demonstrators that help advance the dependable communication and signalling needed to enable advanced train management and control systems.

Adaptable communications for all railways

Define and demonstrate a communication system for the advanced traffic management and control that will be used in future railway systems and ensure backward compatibility with existing systems.

Key Finding

Possible business cases exist for (temporarily) using cellular infrastructure as part of a railway communication backbone.

Next steps

The results of the work done by Shift-2-Rail is being taken to the next step by Europe's Rail, where further activities are expected to be done around ACS, linked to the GigaBit Train. Prototypes are to be developed addressing specific use cases around regional lines, in addition to exploring how the ACS concept could feed a future evolution of FRMCS.

Did You Know?

The shared use of private (railway) communication infrastructure and public communication networks is a possible way of ensuring quality of service and reliability in signalling and communication during the interim period while a network-wide private (railway) communication system is built.

Cybersecurity

Define approaches for protecting the railway system from third party threats and attacks.

Key Finding

A better understanding of risks and security threats is essential to achieving a flexible, advanced traffic management system.

Fast Fact

When it comes to the safe and reliable operation of railway networks, cybersecurity is simply non-negotiable. This is particularly true for systems that demand higher levels of flexibility and more efficient traffic management.

Did You Know?

Infrastructure operators and train operators can use security by design guidelines – where all systems are designed and implemented with cybersecurity as a core consideration – to help protect such high-risk assets as the signalling and data communication between trains, between train and trackside, and along the track side

On-board train integrity

Developed and prototyped an innovative on-board solution that autonomously locates the train's tail, enables wireless communication between the tail and the front cab, and safely detects any interruptions to the train.

Key Finding

Due to its impact on safety, efficiency, and automation, train integrity will be crucial to the advanced traffic management and control systems used in future railways.

Fast Fact

By providing accurate data on train positions, train integrity can prevent collisions and other accidents. It can also enable optimised scheduling, increase capacity, and ensure smoother and more efficient rail traffic.

Did You Know?

Train integrity underpins the effectiveness and reliability of advanced rail traffic management and control systems.

Traffic management system

Develop and demonstrate new approaches to enhance traffic operations through automated integration and exchange with other rail services.

Key Finding

Much of the operational complexity found in advanced traffic management systems can be accommodated within a future management system.

Fast Fact

A dependable integration layer that manages the exchange of sensor and control data is at the core of the system and directly relies on the communication subsystem.

Did You Know?

The system will use real-time status and performance data coming from both the network and trains, supported by wireless communication, to effectively manage both regular and disrupted situations. To achieve this, it will feature a scalable, interoperable, and standardised communication structure within an integrated rail management system.

CONCLUSION

A robust communication backbone is needed to carry the data that advanced signalling and automated train operations demand. EU-Rail is developing adaptable communication systems, cybersecurity measures, on-board train integrity solutions, and traffic management systems to address this need.

Who Benefits

Infrastructure managers

Railway operators

Suppliers

Final users

WANT TO LEARN MORE?

Solutions developed by Shift2Rail, Europe's Rail's predecessor programme

rail-research.europa.eu