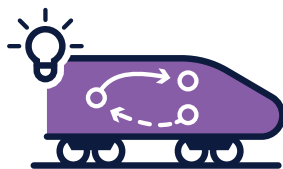


Reshaping the TCMS landscape

The Train Control and Monitoring System (TCMS) is the brain and the backbone of a train.

THE CHALLENGE

As train functions and passenger needs evolve, there is an increasing need for an updated TCMS architecture. However, there's a considerable technology gap between today's TCMS and the envisioned **Next Generation Train Control Monitoring System (NG-TCMS)**.












HOW DO WE DO THIS?

To help fill this gap, the Train Control and Monitoring System Technical Demonstrator (TD) was delivered. The demonstrator conducted an extensive amount of research, development, modelling, and testing – a process that ultimately resulted in several new NG-TCMS enabling technologies.

- Wireless TCMS
- Next generation Train Communication Network (NG-TCN)
- Functional Open Coupling (FOC)
- Function Distribution Framework (FDF)



KEY ENABLING TECHNOLOGIES

	Wireless TCMS	Next generation Train Communication Network (NG-TCN)	Functional Open Coupling (FOC)	Function Distribution Framework (FDF)
Description	Wireless train backbone, wireless consist network and standardised and secure train-to-ground (T2G) links	SIL4 communications to support the drive-by-data (DbD) concept	Communication mechanism that allows the coupling of two or more consists regardless of their manufacturer	Comprising of middleware that abstracts applications running on top of it from the underlying hardware and communications
Who benefits	 Railway operators  Suppliers	 Railway operators  Suppliers	 Railway operators  Suppliers  Infrastructure managers	 Railway operators  Suppliers



Systems using TCMS require their own set of electronic end equipment, adding extra weight and consuming valuable space



The key enabling technologies coming from the demonstrator bring change and pave the way towards a next generation TCMS (NG-TCMS)



THE BENEFITS OF NG-TCMS

NG-TCMS will:

- Replace legacy communication systems with **Ethernet** or **wireless** technologies
- **Simplify the overall network** architecture and replace conventional train lines
- Use **safety critical** functions up to safety integrity level (SIL) 4
- Use **time-critical functions** that require low latency and low jitter
- Create a single **network** to interconnect all on-board equipment, including TCMS, signalling, brakes, CCTV, and entertainment services
- Ensure **interoperability** between rail vehicles from different suppliers and operators



Did You Know?

TCMS require over **10 km** of cabling for each **20 m** railcar.



Fast Fact

Systems using TCMS require their own set of electronic end equipment, adding extra weight and consuming valuable space.



Key Finding

Different units cannot be coupled together, preventing interoperability between different vehicles and limiting operational flexibility.

WANT TO LEARN MORE?

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

