Digitale Schiene Deutschland

September 2024 | Berlin

DSD@InnoTrans
General information

Informational material

Expectations of politics and society require far-reaching technological innovations in the rail system.

Digitale Schiene Deutschland

- **Passenger numbers doubled** by 2030
- **25% increase** in freight transport market share
- Make a significant **contribution to climate protection**
- Significantly **increase punctuality**
- Move toward the **Germany-wide** integrated **regular-interval timetable 'Deutschlandtakt'**

- To meet these expectations, we must **increase rail capacity**
- **Technological innovation** and the **digitalisation of the rail system**, in addition to physical expansion, are the most important tools we have to increase capacity
- Digitale Schiene Deutschland's mission is to make these tools **usable for the rail network**

Digitale Schiene Deutschland for a modern railway system

The decarbonization of transport and climate change are the driving forces behind Digitale Schiene Deutschland. In the future, increasing amounts of people and goods are supposed to be transported. However, Germany's rail infrastructure largely consists of outdated technology that needs renovation. The rail network is reaching its limits – delays and cancellations are the result.

The mission of the Digitale Schiene Deutschland is to use technological innovations to increase the performance, and particularly, the capacity of the existing rail system. Digitalized network operation based on the European Rail Traffic Management System ETCS, Digital Interlockings and a traffic management system supported by artificial intelligence form the new technological pillars of the digital railroads.

This will enable trains to run fully automatic and at higher frequencies. Responses to disruptions are much faster. Operations are more robust thanks to standardized technology. Maintenance costs are reduced due to the elimination of failure-prone technology such as signals. Because of this trains can reliably reach their destinations on time.

The digitisation of the railway system requires new, cross-sector and cross-border partnership models

Digitale Schiene Deutschland

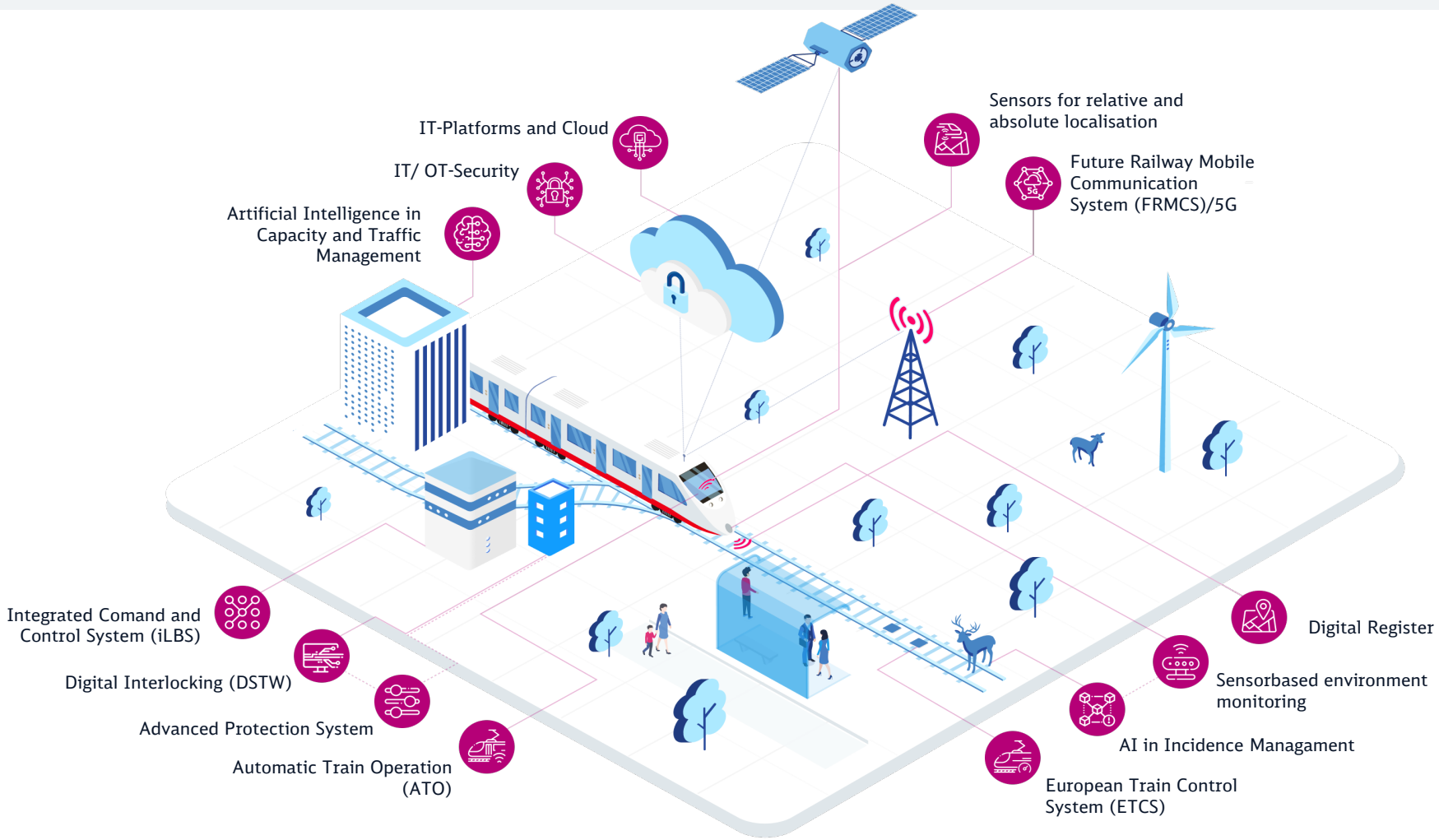
Digitale Schiene Deutschland = Sector Initiative

So far…	In the future
From classic relationships between client and contractor…	… to **development partnerships** with industry and joint piloting in projects
DB as a mere user of technologies…	… becomes an **active co-developer**
From closed systems…	…to **open platforms**
Not only the latest technologies of the railway sector are considered….	… but also, technical solutions from **other sectors**
Historically evolved national railway systems with different technical standards…	… are being aligned within the framework of **standardisation** and **harmonisation** at European level

The vision of Digitale Schiene Deutschland is completed by the interaction of new technologies.

Digitale Schiene Deutschland

**In future, trains should run and react fully automatically - even in the event of malfunction.
To achieve this, we need to develop innovative and new technologies .**



In two steps to the vision of Digitale Schiene Deutschland

Digitale Schiene Deutschland

Digital Basis (Stage 1 Plus)

Basic digitisation of the infrastructure

- Equipping the infrastructure with ETCS L2 without signals (oS) and digital signaling technology (DSTW)
- Introduction of an integrated control and operating system
- Equipping vehicles with digital technologies

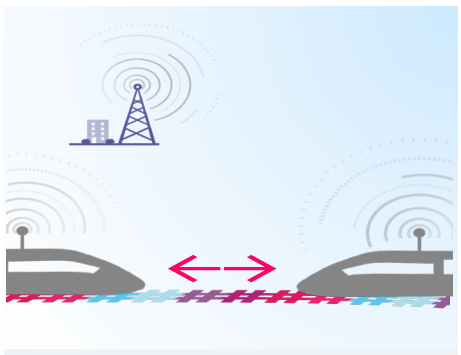
Highly automated driving

- Introduction of GoA 2-operations:
  - Trains drive, brake and stop automatically
  - Train operation is stable and predictable
  - Train operator remains on board and intervenes in case of irregularities

Further Digitisation (Stage 2)

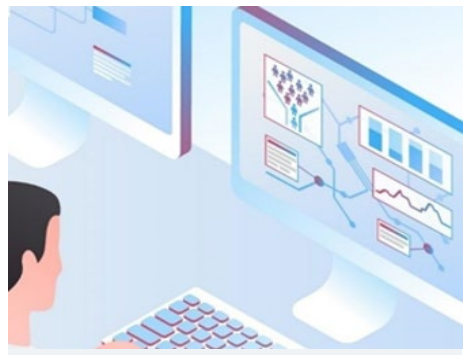
Fully automated driving

- Introduction of GoA 4-operations :
  - Trains run fully automated and are aware of their surroundings
  - Trains react automatically to disruptions
  - Driverless driving is possible



Driving at the optimal distance

- Introduction of a train centric protection logic
- Allows driving at optimal distance (Moving Block)
- Allows more trains to run on the same track



Intelligent capacity planning and traffic control

- Timetables are recalculated in seconds by AI in the event of deviations
- Automated capacity planning occurs throughout Germany
- Increases network utilization and reliability

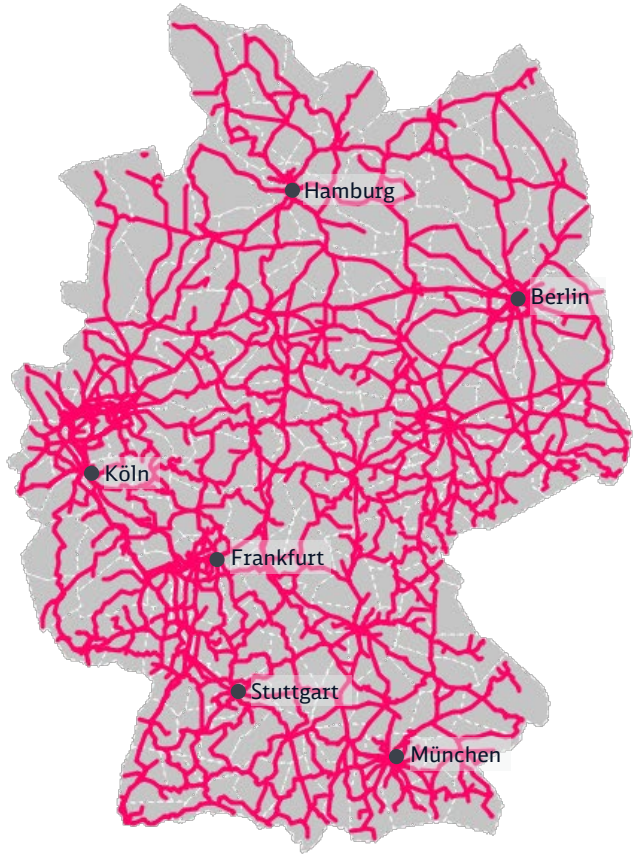
Future Railway Mobile Communication System (FRMCS) based on 5G technology

Schematic diagramm of the Digitale Schiene Deutschland rollout

Digitale Schiene Deutschland

Status quo implimentation

Conclusion DSD rollout



Inventory technology

planning and renovation

commissioning of DSD technologies

Infrastructure:

planning and conversion of sections – **focus** on **starter package** and **high-performance corridors**

Vehicles:

Equipping vehicles with **ETCS** and components for **automatic driving (GoA 2)**

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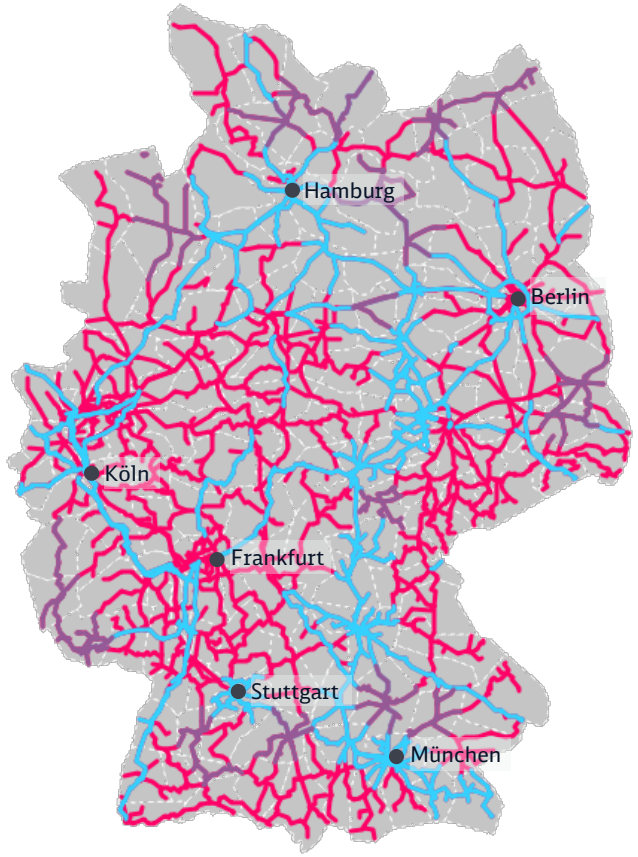

Inventory technology

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Infrastructure:
Commissioning of starter packages and high-performance corridors including **equipping DSD technologies** as well as the **start of planning and conversion** across the country

Vehicles:
First **vehicles** are **equipped corresponding** to the **infrastructure**

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Infrastructure:
Commissioning across the country including **equipping DSD technologies** and further progress in **planning and conversion**

Vehicles:
More vehicles are **equipped corresponding** to the **infrastructure**

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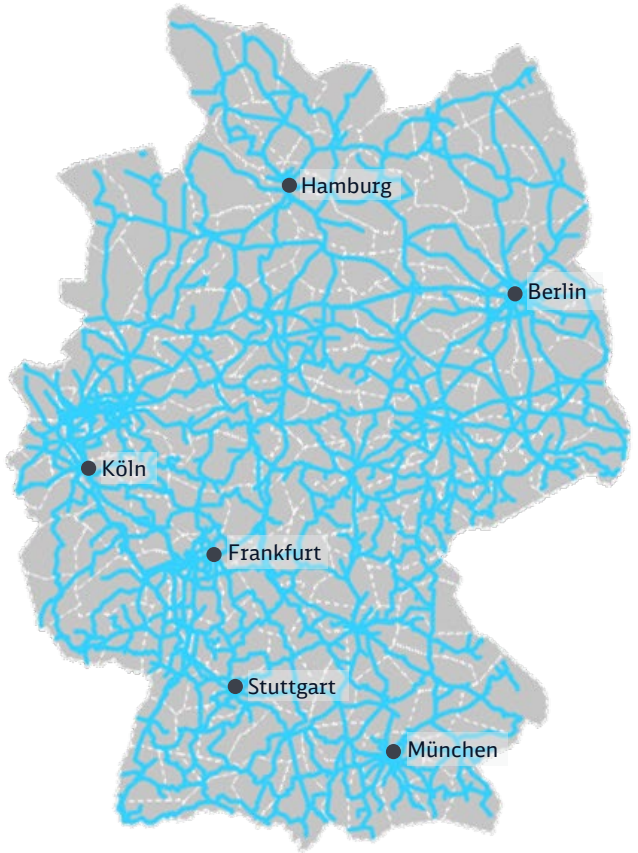

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Infrastructure:
Commissioning of all **33.000 km of tracks with DSD technologies**

Vehicles:
Approx. 13.500 vehicles of all traffic types are equipped with **ETCS** an are ready for **automated driving (GoA 4)**

Digitale Schiene
Deutschland

More information is available at www.digitale-schiene-deutschland.de/en

Thank you.

Digitale Schiene Deutschland