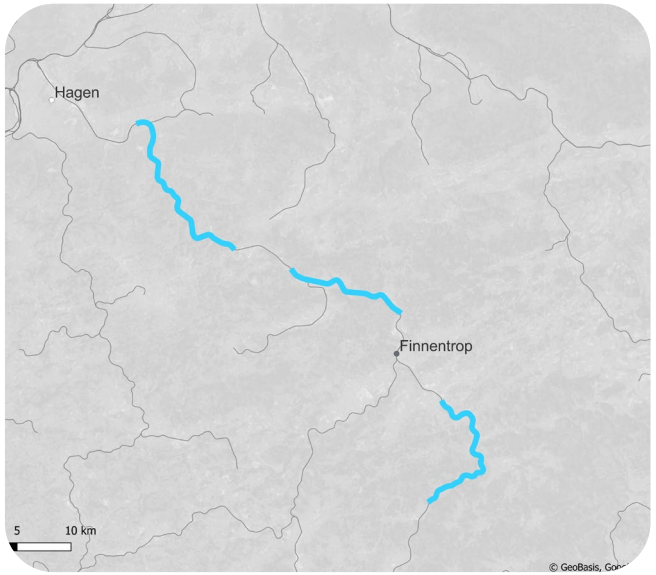
Implementation project



Technologies

ESTW

More Info

Finnentrop

Fast-Track Program (SLP)

Finnentrop is one of the SLP's Cluster 1 projects and was successfully commissioned after around one and a half years. This is the first complete commissioning in the SLP. Three interlockings which were between 30 and 50 years old, were replaced with modern Simis-D interlocking technology. The interlockings were connected to the existing central electronic interlocking in Finnentrop, which was technically upgraded.

Start
2020

End
2022

Route data

Route from -to:	Letmathe - Welschen-Ennest
Route lenght:	45 km

Planned measures

Interlocking(s):	1 ESTW-Z, 3 ESTW-A	
Scope of Equipment:	385 km cables	235 signals
	73 point machines	15 level crossings
	9 signal booms	

Implementation project

Technologies

ESTW iLBS

More Info

Kleve-Kempen

Fast-Track Program (SLP)

Kleve-Kempen is the SLP's first Cluster 1 project. In less than two years, interlockings were replaced with modern electronic interlocking technology on the left bank of the Lower Rhine between Kleve and Kempen. Scheidt & Bachmann GmbH installed a total of eleven electronic interlockings (type ZSB 2000) on the approximately 54 kilometers of track, which are now operated from the six interlockings

Start
2020

End
2022

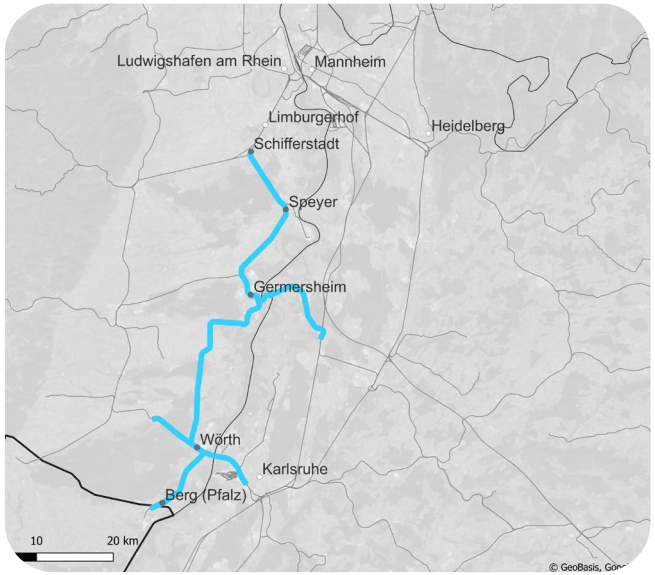
Route data

Route from -to:	Kleve - Kempen
Route lenght:	54 km

Planned measures

Interlocking(s):	11 ESTW-A	
Scope of Equipment:	175 km cables	170 signals
	30 point machines	76 level crossings
	1 signal booms	

Implementation project



Technologies

ESTW **iLBS**

More Info

Wörth-Germersheim-Speyer

Fast-Track Program (SLP)

The Wörth-Germersheim-Speyer line is a Cluster 1 project and was successfully put into operation in 2022. The seven old interlockings were replaced by modern ESTW L90 interlocking technology from Thales Deutschland GmbH. This replaced the largest mechanical interlocking still in operation in Germany – the interlocking in Wörth am Rhein.

Start
2020

End
2022

Route data

Route from -to:	Speyer - Wörth
Route lenght:	41 km

Planned measures

Interlocking(s):	11 ESTW-Z, 4 ESTW-A
Scope of Equipment:	346 km cables 111 point machines 5 signal booms 283 signals 40 level crossings

Implementation project

Technologies

ESTW iLBS

More Info

Ansbach-Triesdorf

Fast-Track Program (SLP)

Ansbach-Triesdorf is the fourth Cluster 1 project. The company Alstom Transport Deutschland GmbH (formerly InoSig GmbH) is replacing the approximately 55-year-old interlockings at Ansbach and Triesdorf stations with modern B950 electronic interlockings. The new central interlocking with an integrated control station is being built in Ansbach, from which the signallers will also control the new technical module in Triesdorf electronically from spring 2025.

Start
2020

End
2025

Route data

Route from -to:	Ansbach - Triesdorf
Route lenght:	44 km

Planned measures

Interlocking(s):	1 ESTW-Z, 1 ESTW-A
Scope of Equipment:	322 km cables 84 point machines
	192 signals 1 level crossing

Implementation project

Technologies

DSTW iLBS

More Info

Zwieseler Spinne

Fast-Track Program (SLP)

The Cluster 2 project Zwieseler Spinne is digitising the lines around Zwiesel in the Bavarian Forest with modern signalling, interlocking and level crossing technology. The company Pintsch GmbH is replacing the six interlockings with PinMovio digital interlocking technology.

Route data

Route from -to:	Bayerisch Eisenstein - Grafling
Route lenght:	76 km

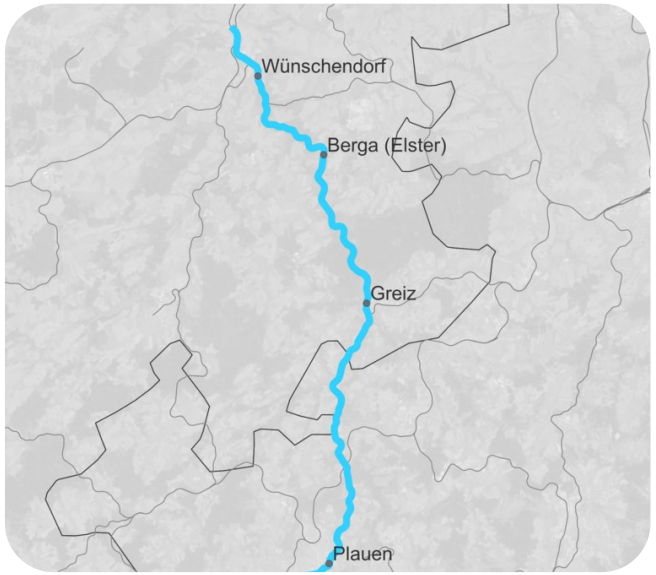
Planned measures

Interlocking(s):	1 DSTW-ZE incl. 4 additional GFK	
Scope of Equipment:	204 km cables	124 signals
	23 point machines	15 level crossings

Start
2020

End
2024

Implementation project



Technologies

ESTW iLBS

More Info

Gera-Weischlitz

Fast-Track Program (SLP)

Gera-Weischlitz is one of the Cluster 2 projects. On the line between Gera and Weischlitz, Hitachi Rail STS Deutschland GmbH is renewing a total of twelve interlockings. A digital interlocking in Plauen and seven technical modules (so-called track field concentrators) will be built at these locations. Commissioning is scheduled for December 2025.

Start
2020

End
2025

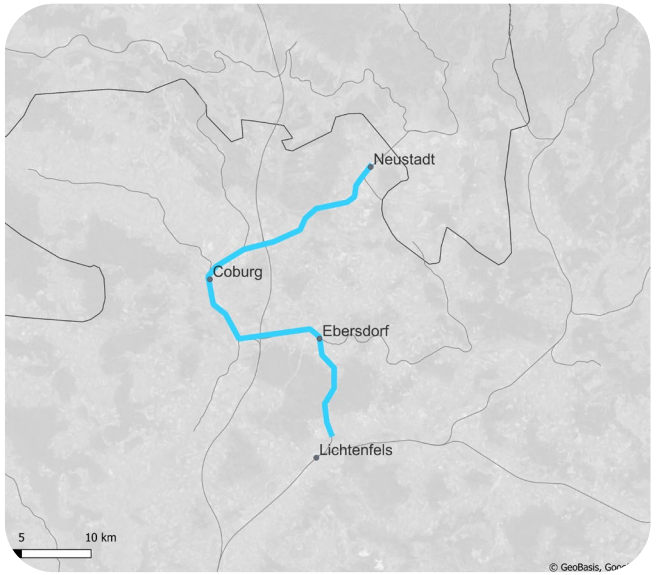
Route data

Route from -to:	Gera - Weischlitz
Route lenght:	52 km

Planned meassures

Interlocking(s):	1 DSTW-ZE, 7 GFK
Scope of Equipment:	60 km cables 11 level crossings 221 control units (signals & point machines)

Implementation project



Technologies

DSTW iLBS

More Info

Lichtenfels-Coburg-Sonneberg

Fast-Track Program (SLP)

Lichtenfels-Coburg-Sonneberg is the third Cluster 2 project that runs through Thuringia and Bavaria. The existing nine interlockings will be renewed on the approximately 45 km long line between Lichtenfels, Coburg and Sonneberg. To this end, Alstom Transport Deutschland GmbH is building a central digital interlocking as well as five electronic technical modules The line will continue to be operated from Coburg. Commissioning is scheduled for summer 2025.

Start
2020

End
2025

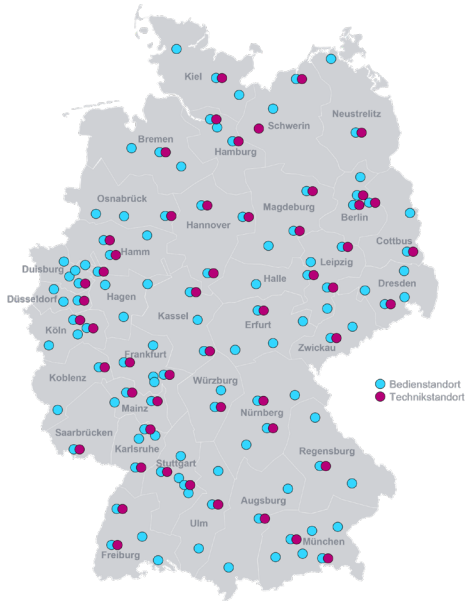
Route data

Route from -to:	Lichtenfels - Sonneberg
Route lenght:	45 km

Planned actions

Interlocking(s):	1 DSTW-Z, 5 ESTW-D	
Scope of Equipment:	40 km cables	51 signals
	10 point machines	26 level crossings
	1 signal boom	

Implementation project



Technologies

- IT-Plattformen & Cloud
- iLBS
- DSTW
- FRMCS
- IT/OT Security

More Info

Operations Control Strategy

Infrastructure project

The Digitale Schiene Deutschland is fundamentally redesigning the management of rail operations and setting the course for the future of digital control and safety technology (DLST: Digitale Leit-und Sicherungstechnik): With the so-called Operations Control Strategy, 94 operational centers and 52 technical systems centers are being set up throughout Germany in order to be able to operate in a more modern, decentralisied and flexible manner in the future.

Planned actions

Scope of equipment:	94 operational centers 52 thechnical systems centers

Start
2019

End
2034

Implementation project

Technologies

DSTW

IT/OT Security

More Info

Digital Interlocking Meitingen-Mertingen

Infrastructure project

As the first digital interlocking on a Deutsche Bahn high-speed line with line speeds of up to 200 km/h, the Meitingen-Mertingen digital interlocking (DSTW) replaced two relay interlockings.

Route data

Route from - to:	Nurenberg - Munich
Route length:	approx. 25 km

Planned actions

Interlocking(s):	Replacement of two old interlockings by a DSTW	
Scope of equipment:	25 basic switches tecWatch	131 signals OT Security concept
Planned speed:	up to 200 km/h	

Start
2019

End
2024

Implementation project

Technologies

DSTW **IT/OT Sicherheit**

More Info

Digital Interlocking Koblenz-Trier

Infrastructure project

As DB InfraGo AG's first digital interlocking (DSTW) in the central region, the Koblenz-Trier digital interlocking is one of three planned pre-series projects for digital control and safety technology (DLST).

Route data

Route from - to:	Koblenz - Trier
Route length	approx. 69 km

Planned actions

Interlocking(s):	Replacement of 10 old interlockings by a DSTW	
Scope of equipment:	83 switches 11 level crossings Fibre optic (FO) cabling in the track field	270 signals Design integrated operating station (DiB)
Planned speed:	up to 120 km/h	

Start
2019

End
2025

Implementation project

Technologies

Digital Interlocking (DSTW)

IT/OT Security

More Info

Digital Interlocking Warnemünde

Infrastructure project

The existing relay interlocking in Warnemünde has been replaced by a digital interlocking (DSTW). It is the first digital interlocking in the long-distance and conurbation network in Germany that also controls long-distance passenger trains.

Start
2018

End
2019

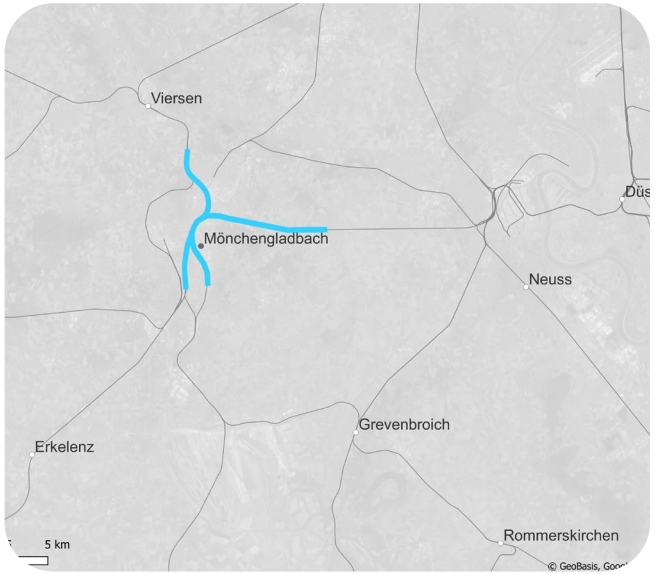
Route data

Route from - to:	Rostock-Bramow - Warnemünde
Route length:	approx. 9 km

Planned actions

Interlocking(s):	Replacement of the relay interlocking by a DSTW	
Scope of equipment:	46 signals 15 railway overpasses Fibre optic (FO) cabling in the track field	22 switch operators IT Security in follow-up construction stage
Planned speed:	up to 120 km/h	

Implementation project



Technologies

DSTW

IT/OT Security

ETCS

More Info

Digital Inerlocking Mönchengladbach

Infrastructure project

In the city Mönchengladbach in North Rhine-Westphalia, the existing relay interlocking technology is being replaced by a digital interlocking and ETCS Level 2 is being introduced.

Start
2020

End
2029

Route data

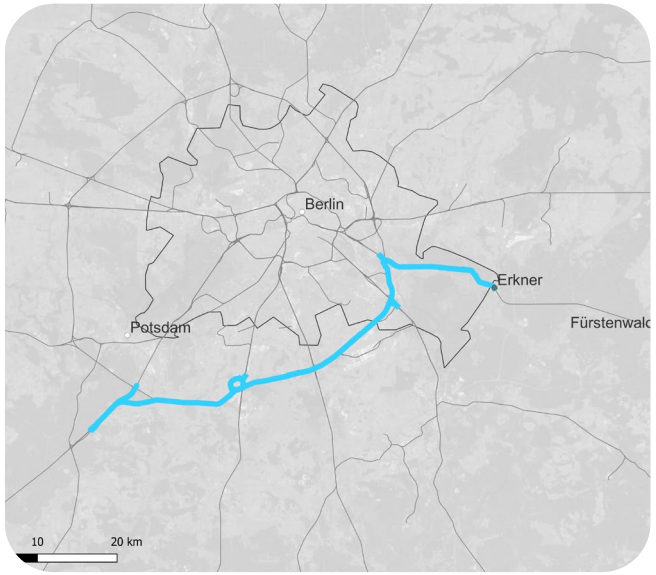
From: Viersen-Helenabrunn/ Mönchengladbach-Gneicken/ Korschenbroich
To: Möchengladbach/ Möchengladbach-Bonnenbroich/ Rheydt

Route length:	17 km

Planned actions

Interlocking(s):	1 DSTW	
Scope of equipment:	1 RBC	533 balises
	164 signals	231 point machines
ETCS:	Level 2 with signals	

Implementation project



Technologies

ETCS

More Info

Erkner – Seddin

Infrastructure project

The line between Erkner and Seddin is to be equipped with ETCS in order to establish interoperability of the control and safety technology between the EU countries. The ETCS equipment of the neighboring project “Border crossing Poland: Poland – Frankfurt/Oder – Erkner” will be extended to the Seddin marshalling yard. The line is part of the Trans-European Transport Network.

Route data

Route from - to:	Erkner - Seddin
Route length:	110 km

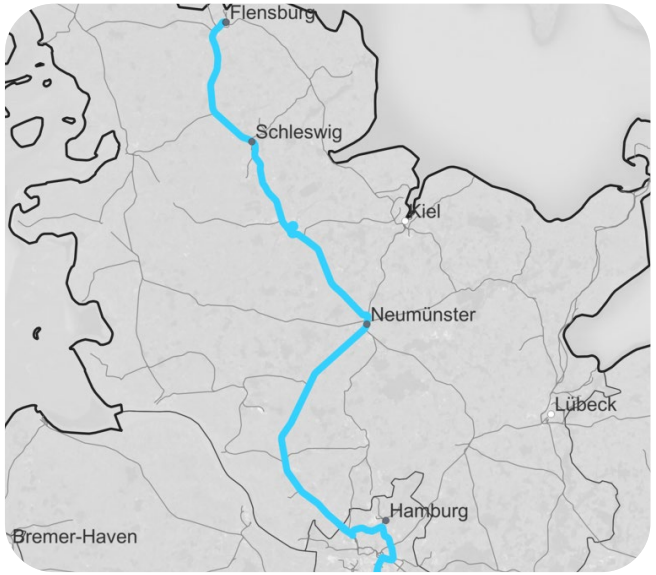
Planned actions

Interlocking(s):	19 interlockings	
Scope of equipment:	3 RBC	670 balises
	80 ETCS stop makers	15 ETCS block licence plates
Planned speed:	120 – 160 km/h	

Start
2019

End
2030

Implementation project



Technologies

ETCS

iLBS

DSTW

FRMCS

IT/OT Securtity

More Info

Flensburg – Maschen

Infrastructure project

The core of the project is to equip the Flensburg – Maschen section with ETCS Level 2. 216 kilometers of track will be equipped with modern control and safety technology. The aim is to make the line passable with ETCS from Denmark to Europe's largest marshalling yard in Maschen.

Start
2019

End
2030

Route data

Route from - to:	Flensburg - Maschen
Route length:	52 km

Planned actions

Interlocking(s):	1 DSTW-ZE, 7 GFK
Scope of equipment:	7 RBC
ETCS:	Level 2 with signals

Implementation project

Technologies

DSTW

ETCS

iLBS

More Info

Belgium – Aachen – Düren

Border crossing Belgium

The 46 km long track between Düren and Aachen as far as the Belgian border will be equipped with ETCS and digital interlockings.

Start
2021

End
2029

Route data

From: Düren network district Aachen/Köln-Deutz)
To: Aachen – Grenze BE

Route length:	46 km

Planned actions

Interlocking(s):	2 DSTW, 4 ESTW-A	
Scope of equipment:	1 RBC	1 level crossing
ETCS:	Level 2 with signals, Level 2 without signals	

Implementation project

Technologies

ETCS

More Info

Padborg – Flensburg

Border crossing Denmark

The line in the area of the German-Danish border crossing will be equipped with ETCS Level 2 on the basis of the existing ESTW. The route section is highly relevant for the European freight transport network and the project will provide it with transnational and modern control and safety technology.

Route data

Route from - to:	Padborg - Flensburg
Route length:	15 km

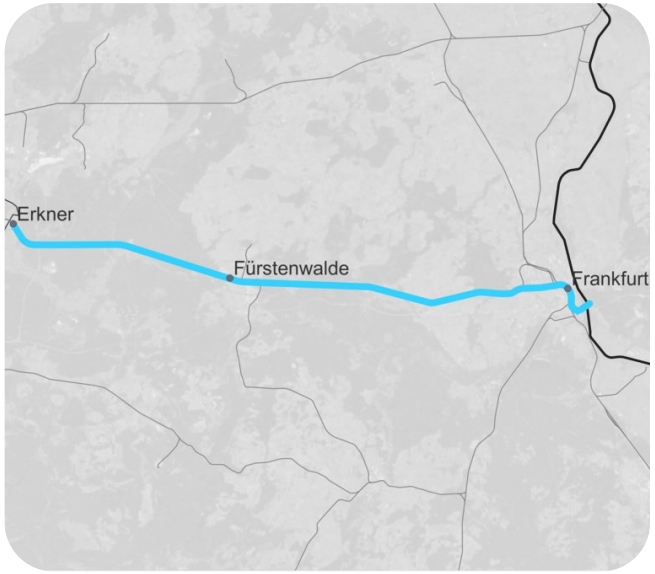
Planned actions

ETCS	Level 2 with signals

Start
2017

End
2028

Implementation project



Technologies

ETCS

More Info

Poland – Frankfurt/Oder – Erkner

Border crossing Poland

The border connection line from Poland via Frankfurt/Oder to Erkner is to be equipped with ETCS in order to establish the cross-border interoperability of control and safety technology that is important for competitive rail freight traffic. As an elementary axis of the Trans-European North Sea – Baltic corridor, this will promote transit traffic between Western and Eastern Europe.

Start
2017

End
2030

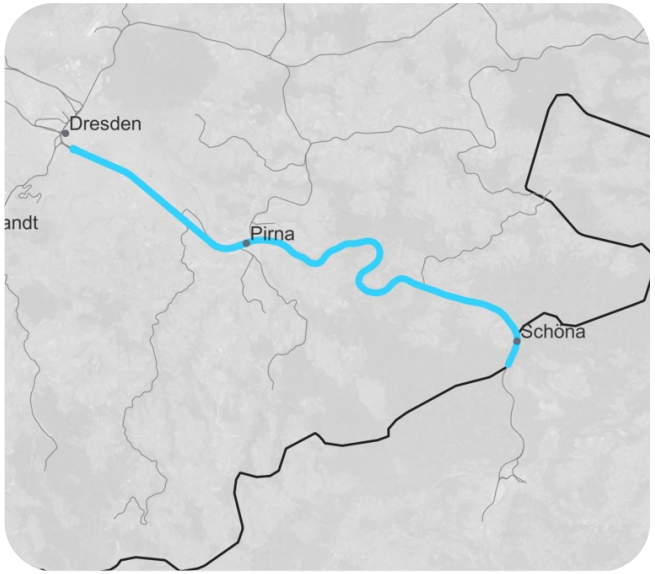
Route data

Route from - to:	Frankfurt/ Oder Grenze - Erkner
Route length:	70 km

Planned actions

Interlocking(s):	10 interlocking
Scope of equipment:	2 RBC ca. 1100 balsises ca. 150 ETCS stop markers
ETCS:	Level 2 with signals

Implementation project



Technologies

DSTW

ETCS

iLBS

More Info

Dresden – Schöna – Czech Republic

Border crossing Czech Republic

ETCS is being implemented on the Saxon route from Dresden via Schöna to the Czech border. The existing ESTW will be replaced by modern DSTW.

Start
2020

End
2030

Route data

Route from - to:	Dresden – Grenze D/ CZ
Route length:	51 km

Planned actions

Interlocking(s):	7 DSTW
Scope of equipment:	1 RBC
ETCS:	Level 2 without signals

Implementation project

Technologies

ETCS

More Infos

Schirnding – Marktredwitz

Border Crossing Czech Republic

The introduction of ETCS is planned on the route between Arzberg-Schirnding and the Czech border. This first requires the modernisation of the existing control and safety technology. Among other things, this includes the installation of an electronic interlocking (ESTW: Elektronisches Stellwerk).

Start
2020

End
2025

Route data

Route from - to:	Marktredewitz – Grenze CZ
Route length:	15 km

Planned actions

Interlocking(s):	1 ESTW-A	
Scope of equipment:	1 RBC 87 km cables 47 signals 3 level crossings	ca. 250 balises ca. 20 ETCS stop markers 18 point machines
ETCS:	Level 2 with signals	

Implementation project

Technologies

IT/OT Sicherheit

ETCS

iLBSiLBS

Mehr Infos

Venlo – Viersen

Border crossing Netherlands

On the Dutch border between Venlo and Viersen in North Rhine-Westphalia, ETCS Level 2 is being introduced and the associated renewal of the existing technology.

Start
2019

End
2028

Route data

Route from - to:	Grevenbroich – Kaldenkirchen (Grenze NL)
Route length:	117 km

Planned actions

Interlocking(s):	2 ESTW-UZ, 1 ESTW-A	
Scope of equipment:	2 RBC 8 km cables	1948 balises 50 signals
ETCS:	Level 2 with signals	

Implementation project

Technologies

ETCS iLBS

More Info

Halle/Leipzig – Berlin (VDE 8.3)

Infrastructure project

The 185 km long upgraded track Leipzig/Halle – Berlin (VDE 8.3) will be equipped with ETCS. This involves the technical adaptation of the interlocking on the route.

Route data

Route from - to:	Berlin – Leipzig / Halle
Route length:	185 km

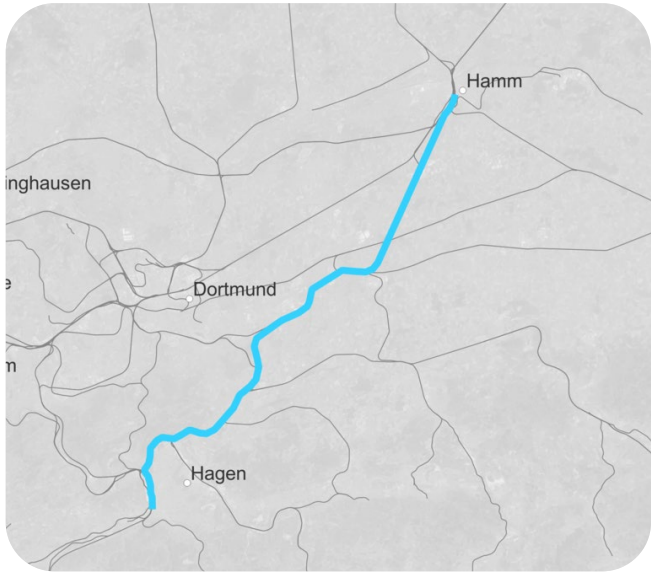
Planned actions

Interlocking(s):	16 ESTW-A	
Scope of equipment:	4 RBC	ca. 4.000 balises
ETCS:	Level 2 with signals	

Start
2017

End
2035

Implementation project



Technologies

ETCS DSTW

More Info

Hagen – Unna – Hamm

High-performance network corridor

The high-performance network corridor from Hagen via Unna to Hamm plays a key role in connecting NRW to northern Germany. As part of this project, a DSTW is now being built on the Hagen network and ETCS equipment is being installed along the entire route.

Start
2023

End
2028

Route data

Route from - to:	Hagen – Hamm
Route length:	56 km

Planned actions

Interlocking(s):	1 DSTW Hagen, ESTW Hamm	
Scope of equipment:	2 RBC	558 signals
	13 level crossings	163 point machines
ETCS:	Level 2 with signals	

Implementation project

Technologies

ETCS

More Info

Hagen – Wuppertal – Köln

High-performance network corridor

On the high-performance corridor from Hagen via Wuppertal to Cologne, a total of 68 kilometers of track between Solingen and Wuppertal-Vohwinkel will be equipped with ETCS.

Start
2023

End
2026

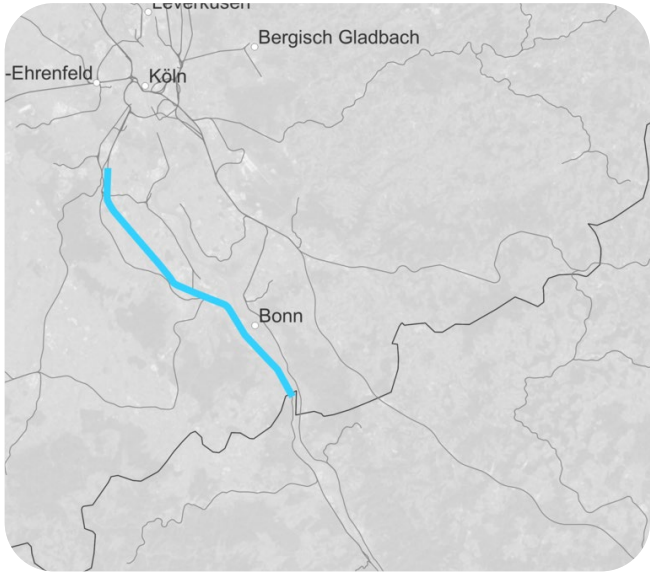
Route data

Route from - to:	Solingen – Wuppertal
Route length:	68 km

Planned actions

Interlocking(s):	2 ESTW-UZ (software upgrade)	
Scope of equipment:	2 RBC 13 level crossings 500 balises	459 signals 138 point machines
ETCS:	Level 2 with signals	

Implementation project



Technologies

ETCS DSTW

More Info

Hürth/Kalscheuren – Koblenz

High-performance network corridor

The high-performance corridor from Cologne via Bonn to Koblenz plays a key role in connecting NRW to southern Germany. As part of this project, a DSTW is now being built in Bonn and ETCS equipment is being installed on the route from Hürth/Kalscheuren to Koblenz.

Start
2023

End
2028

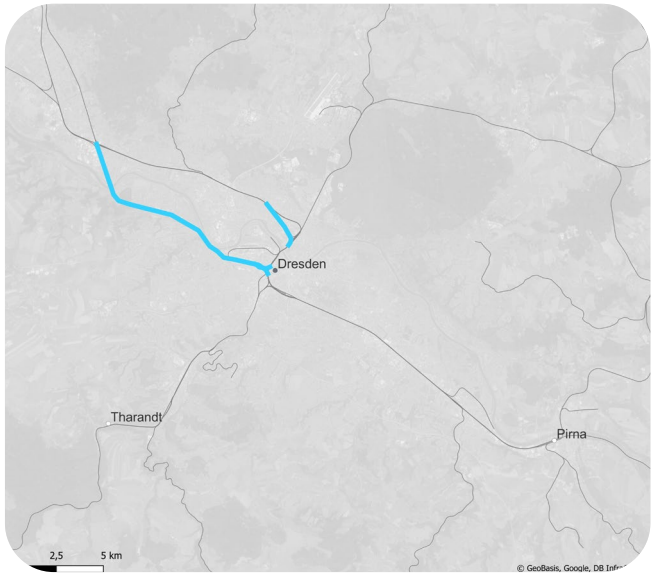
Route data

Route from - to:	Hürth/ Kalscheuren – Bonn
Route length:	37 km

Planned actions

Interlocking(s):	1 DSTW	
Scope of equipment:	200 signals 194 point machines	18 level crossings
ETCS:	Level 2 with signals	

Implementation project



Technologies

ETCS iLBS DSTW

More Info

Dresden node

Infrastructure project

Closing the gap in the Dresden node: ETCS and DSTW will be introduced on two routes to ensure seamless accessibility with these technologies.

Start
2020

End
2030

Route data

Route from - to:	Dresden - Dresden
Route length:	18 km

Planned actions

Interlocking(s):	DSTW
Scope of equipment:	1 RBC
ETCS:	Level 2 with signals, Level 2 without signals

Implementation project

Technologies

ETCS

iLBS

DSTW

IT/OT Sicherheit

Mehr Infos

Ingolstadt node

Infrastructure project

At the Ingolstadt node in Upper Bavaria, a modern DSTW is replacing the previous RSTW and ESTW. The node is also being equipped with ETCS.

Route data

Route from - to:	Ingolstadt Main Station – Ingolstadt North
Route length:	12 km

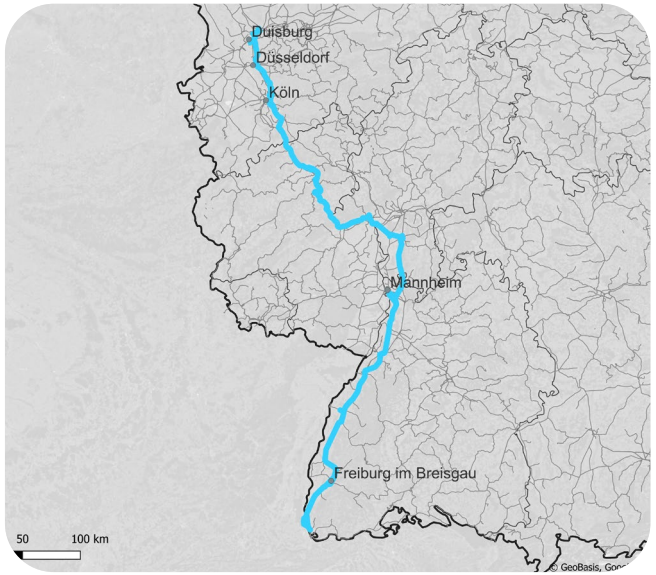
Planned actions

Interlocking(s):	2 GFK (DSTW)
Scope of equipment:	1 RBC

Start
2023

End
2030

Implementation project



Technologies

ETCS

iLBS

DSTW

IT/OT Sicherheit

More Info

corridor Rhine-Alpine

Infrastructure project

As an important north-south axis, the corridor Rhine-Alpine links important seaports and economic areas in Europe and is part of the Trans-European Transport Network. The Federal Republic of Germany is obliged to equip the approximately 1,600 km long German section of the corridor with ETCS by 2040.

Route data

Route from - to:	Oberhausen - Haltingen
Route length:	1.600 km

Planned actions

Interlocking(s):	ca. 25 ESTW, ca. 10 DSTW	
Scope of equipment:	32 RBC	ca. 40000 balises
Planned speed: 100 – 200 km/h		

Start
2018

End
2035

Implementation project

Corridor Scandinavian-Mediterranean (ScanMed)

Strater package

By equipping the Corridor ScanMed with ETCS, an interoperable rail network will be created in the heart of Europe, enabling trans-European transit. This pioneering project connects important cities and economic areas in Germany with Scandinavia and the Mediterranean and thus marks a milestone in the expansion of cross-border traffic safety using ETCS. The Corridor ScanMed is part of the starter package.

Start
2020

End
2023

Technologies

ETCS iLBS DSTW

Route data

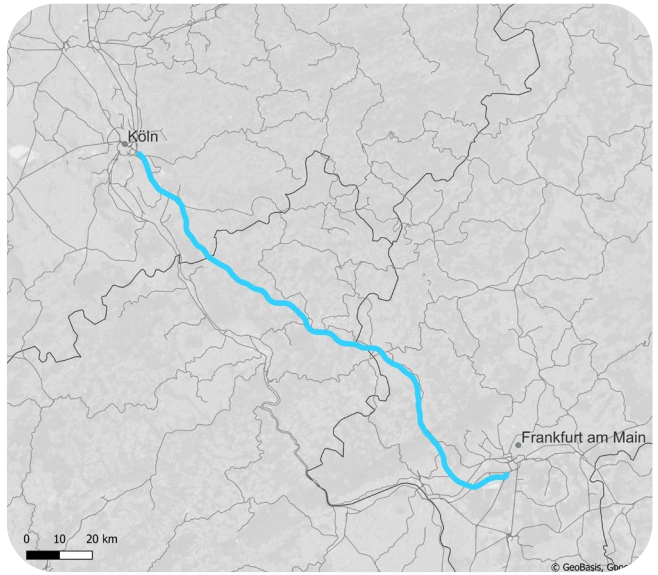
Route from - to:	Padborg (Grenze DK) - Kiefersfelden und Freilassing (Grenzen AT)
Route length:	5000 km

Planned actions

ETCS:	Level 2 without signals
Interlocking(s):	ETCS-compatible interlockings, preferably DSTW
Scope of equipment:	More details will follow

More Info

Implementation project



Technologies

ETCS

iLBS

DSTW

IT/OT Sicherheit

More Info

High-speed line Köln-Rhein/Main

Starter package

The Cologne-Rhine/Main high-speed line is one of the three projects in the starter package. 20 years after the construction of the approximately 180 km long route, an upgrade is now due: the digitalisation of the LST. This involves the introduction of ETCS and the modernisation of the interlocking.

Route data

Route from - to:	Cologne - Frankfurt am Main
Route length:	300 km

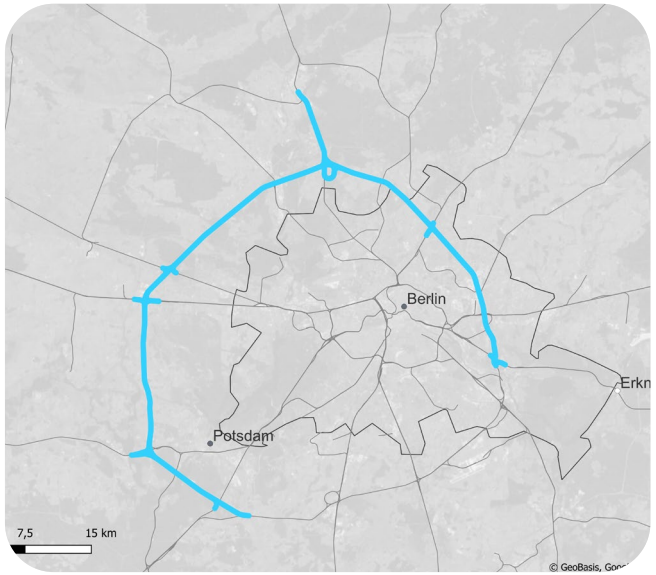
Planned actions

Interlocking(s):	2 DSTW
ETCS:	Level 2 without signals
Scope of equipment:	3 RBC

Start
2019

End
2030

Implementation project



Technologies

ETCS

More Info

Berliner outer ring gap closure

Infrastructure project

The Berlin outer ring is to be fully equipped with ETCS in order to close the gaps between the approaching lines. In conjunction with the surrounding projects, this will enable extensive interoperability of the control and safety technology. Three Trans-European Transport Network corridors run over the Berlin outer ring, which emphasises the great importance of the project for European rail freight transport.

Start
2020

End
2030

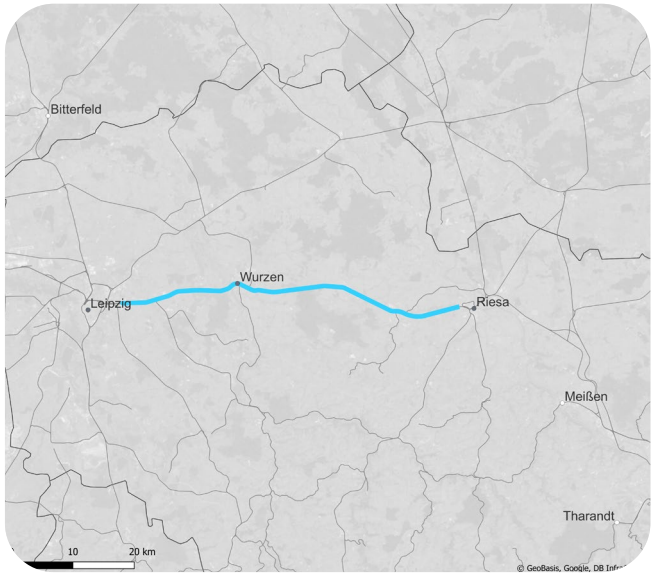
Route data

Route from - to:	Berlin Eichgestell - Saarmund
Route length:	135 km

Planned actions

Interlocking(s):	8 ESTW-A, 3 ESTW-UZ
ETCS:	Level 2 with signals
Planned speed:	120 km/h

Implementation project



Technologies

ETCS **iLBS** **DSTW**

More Info

Leipzig – Riesa gap closure

Infrastructure project

In the Leipzig - Riesa section, ETCS is being introduced and the associated replacement of ESTW with DSTW. This enables seamless traffic with these technologies.

Route data

Route from - to:	Leipzig - Riesa
Route length:	60 km

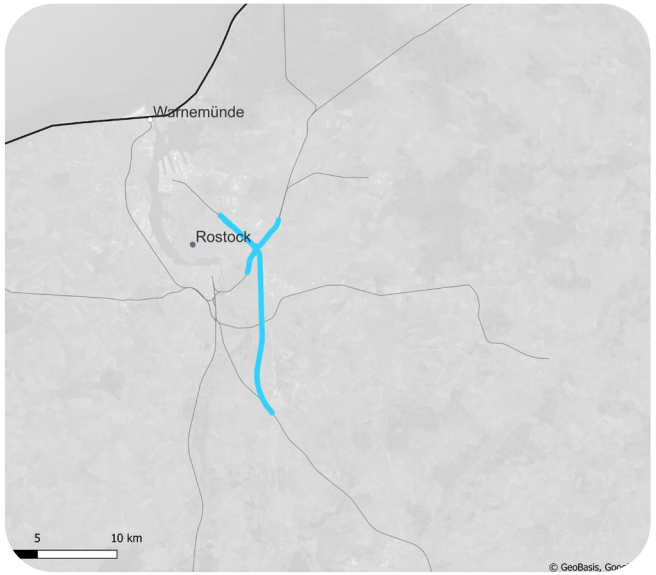
Planned actions

Interlocking(s):	7 DSTW
ETCS:	Level 2 with signals
Planned speed:	120 km/h
Scope of equipment:	1 RBC

Start
2019

End
2030

Implementation project



Technologies

ETCS

More Info

Rostock seaport – Kavelstorf gap closure

Infrastructure project

In order to enable consistent interoperability of control and safety technology in rail freight transport, the Rostock seaport – Kavelstorf section is being equipped with ETCS. This is an ETCS gap closure between the Rostock – Berlin line and the Rostock seaport.

Start
2018

End
2030

Route data

Route from - to:	Rostock seaport - Kavelstorf
Route length:	27 km

Planned actions

Interlocking(s):	1 ESTW-Z	
ETCS:	Level 2 with signals	
Planned speed:	120 km/h	
Scope of equipment:	1 RBC	ca. 500 balises
	ca. 50 ETCS stop markers	ca. 90 signals
	ca. 60 point machines	

Implementation project

Technologies

IT-Plattformen & Cloud

ETCS

DSTW

iLBS

IT/OT Sicherheit

More Info

Nürnberg – Passau – Border

Infrastructure project

On the eastern axis of Bavaria, from Nuremberg via Passau to the Austrian border, around 220 km of the control and safety technology is being digitised. This includes equipping the line with ETCS.

Route data

Route from - to:	Passau - Nürnberg
Route length:	220 km

Planned actions

Interlocking(s):	19 DSTW (12 upgrades & 7 new builds)
ETCS:	Level 2 with signals
Planned speed:	160 km/h
Scope of equipment:	4 RBC

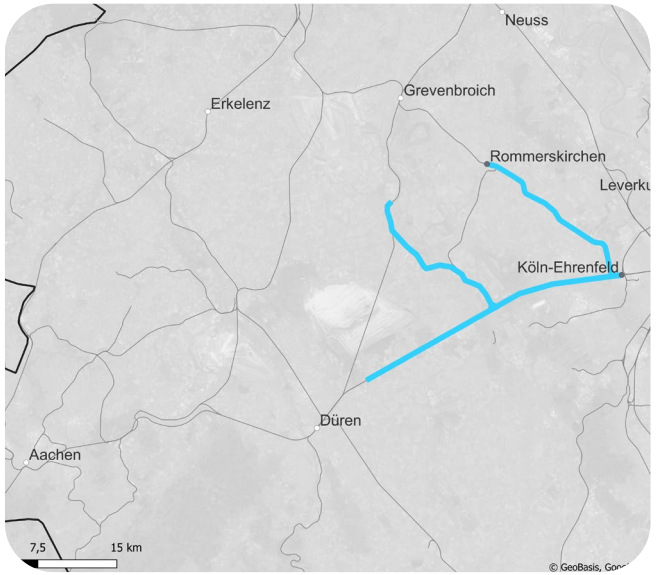
Start

2017

End

2030

Implementation project



Technologies

ETCS **iLBS** **DSTW**

More Info

Rommerskirchen – Cologne-Ehrenfeld

Infrastructure project

ETCS is being introduced on the North Rhine-Westphalian track between Rommerskirchen and Cologne-Ehrenfeld. The existing electronic interlocking (ESTW) in Cologne-Ehrenfeld must be replaced by a modern digital interlocking (DSTW).

Route data

Route from - to:	Cologne-Ehrenfeld – Rommerskirchen, Bedburg, Düren
Route length:	106,4 km

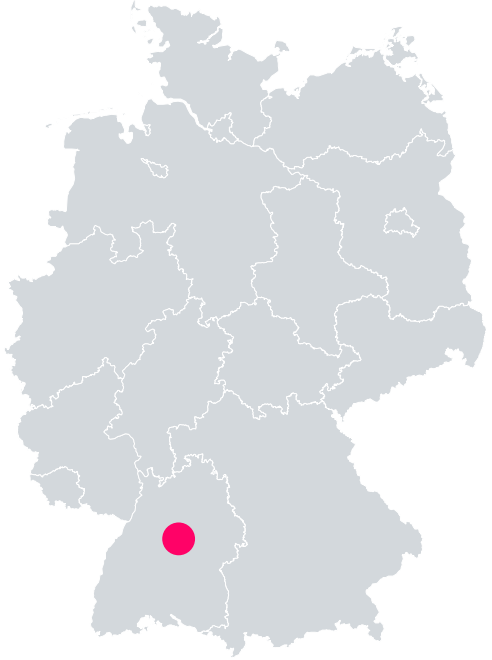
Planned actions

Interlocking(s):	1 DSTW	
ETCS:	Level 2 with signals, Level 2 without signals	
Scope of equipment:	1 RBC	3 level crossings

Start
2023

End
2029

Pilot- & Development Projects



Technologies

- ETCS
- Digital Register
- FRMCS
- Sensors for Localization

More Info

Advanced Digital Infrastructure

Development Project

Together with European partners, Digitale Schiene Deutschland is developing "Advanced Digital Infrastructure", a new, train-oriented train protection system. Trains can then run at individual intervals depending on their current speed and length.

Start
2022

End
2030s

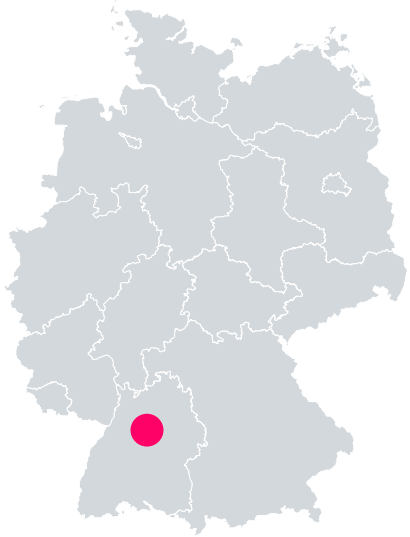
Benefit

Increased line capacity thanks to denser train sequencing and running in "moving block" logic

Faster project planning and adaptation thanks to the elimination of block logic and the introduction of generic safety logic

Optimum adaptation to the current operating situation and thus more flexibility and higher operational efficiency thanks to geometric safety logic

Pilot- & Development Projects



Technologies

ETCS

FRMCS

Digital Register

CTMS

ATO

More Info

Automated Rail@DKS

Pilot Project

The pilot project “Highly automated driving in the Stuttgart area” is the first to implement comprehensive ATO GoA2 operation. The trains run independently, with train drivers only intervening in the event of danger. The S-Bahn and regional transport network (approx. 500 kilometers of track) will be equipped with the necessary trackside components. In addition, a total of approx. 480 vehicles will be equipped with ATO technology.

Benefit

With “ATO over ETCS”, highly automated driving in the Stuttgart area is fully interoperable

Precise adherence to timetables thanks to the travel profile provided by the ATO technology reduces delays

High-precision driving and stopping with ATO saves a significant amount of energy, while driving more gently reduces maintenance costs

Overall, operational stability increases and fewer faults occur

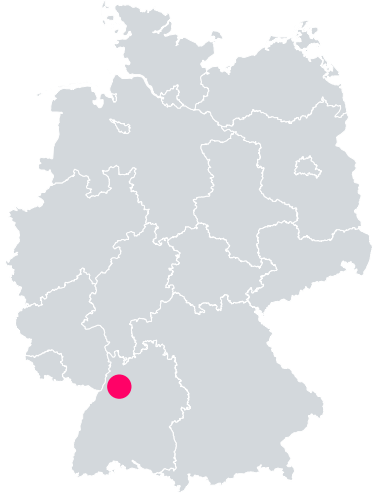
Start

2021

End

2030

Pilot- & Development Projects



Technologies

- Digital Register
- Sensors (Localization)
- Sensorik (Environment)
- ATO
- IT Platforms & Cloud

More Info

AutomatedTrain

The “AutomatedTrain” cooperation project automates the preparation and shutdown of trains as well as train dispatching and stabling. In the stabling facility, the train is automatically prepared and drives without a train driver to the first platform. There, the train driver takes over. At the end of the operating day, the train runs from the last platform back to the stabling facility without a driver.

Benefit

The labor-intensive preparatory and shutdown services of the train driver are eliminated -> personnel capacity becomes available

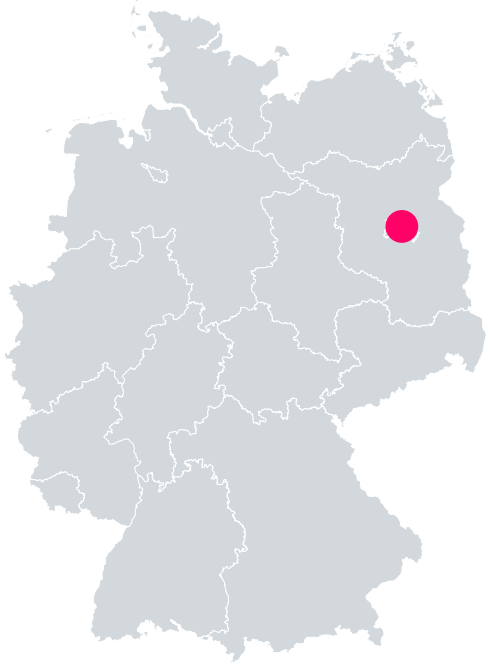
Highly automated, driverless dispatching and stabling make vehicle deployment less dependent on personnel

Overall, highly automated, driverless driving is an important response to the shortage of skilled workers

Start
2021

End
2030

Pilot- & Development Projects



Technologies

CTMS

Digital Register

ATO

ADI

More Info

Capacity & Traffic Management System

Development Project

An intelligent traffic management system is an important building block for the digitalization of network and train operations. In the event of disruptions to operations, a new AI-based "Capacity & Traffic Management System" (CTMS) will optimize train traffic in a matter of seconds.

Start
2019

End
open

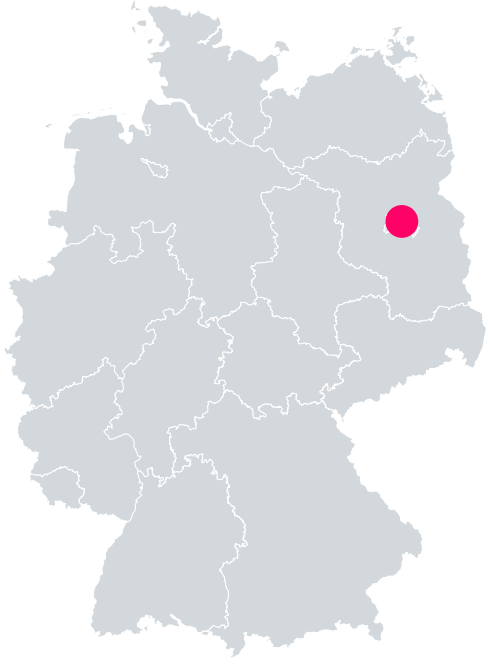
Benefit

Increase capacity and operational quality by optimizing timetable changes in (near) real time.

Automated execution of timetable changes and integration of timetable and construction planning leads to faster response to disruptions

Increased robustness and stability through scheduling with a network-wide focus - resulting in fewer secondary delays

Pilot- & Development Projects



Technologies

ETCS

Digital Register

Integrated Control and Operating System

More Info

CLUG

Development Project

The CLUG project (Certifiable Localization Unit with GNSS) is investigating the extent to which the GNSS global satellite navigation system can contribute to train detection and be integrated into the current standard (ERTMS - ERTMS/ETCS - European Train Control System).

Start
2019

End
2025

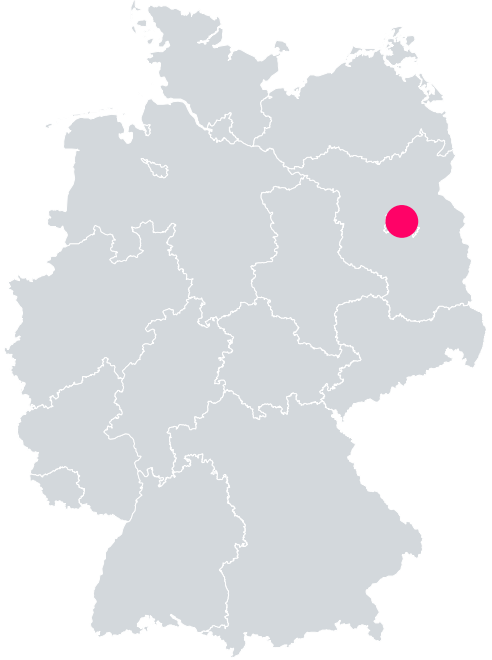
Benefit

GNSS improves the accuracy and performance of train-based localization

The number of failure-prone trackside infrastructure elements is reduced, leading to fewer breakdowns

Development of a Europe-wide standard for train detection with all the advantages for a common European railroad area

Pilot- & Development Projects



Technologies

- **IT Platforms & Cloud**
- **FRMCS**
- **IT/OT Security**

More Info

Safe Computing Platforms

Development Project

The digitalization of the railroad system requires platform technologies that are not only protected against cyber attacks and highly scalable but must also be able to perform safety-critical calculations. The necessary “safe computing platforms” for a secure cloud edge continuum are being developed in collaboration with other railroads and industry partners.

Benefit

Common European standards create a large, attractive market for manufacturers

Modular systems enable broad market integration and the adoption of proven solutions from other sectors

A standardized certification and approval process based on standardized platform technology ensures flexibility and safety in rail operations

Start
2021

End
2026

Pilot- & Development Projects

Technologies

IT Platforms & Cloud

CTMS

Sensoric for Environment Perception

Mehr Infos

Data Factory

Development Project

A data factory is used to systematically generate, process and make available large volumes of necessary data for the various use cases of the digitalized rail system. One prominent use case is the training of systems that work with artificial intelligence (AI).

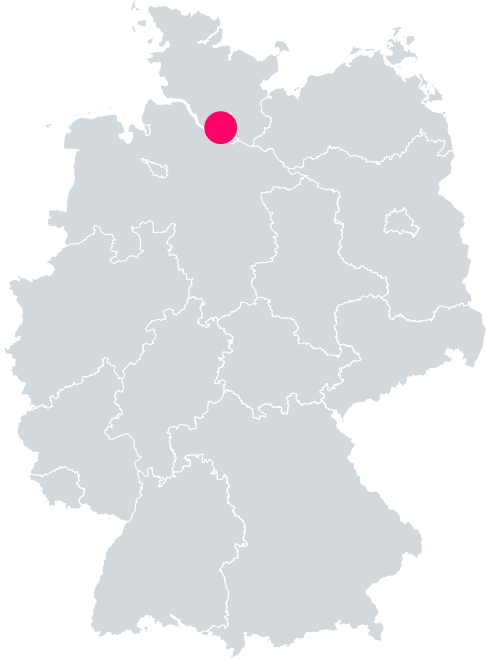
Start
2022

End
open

Benefit

- Training of AI software for environment perception and obstacle detection during train movements
- Enabling the use of sensor-based perception systems for on-board route monitoring by the train
- Basis for the realization of fully automated driving
- Cloud connection for the realization of a European networked data factory

Pilot- & Development Projects



Technologies

ETCS FRMCS ATO

More Info

Digitale S-Bahn Hamburg

Development Project

The Digital S-Bahn Hamburg is the first project to be implemented as part of the "Digitale Schiene Deutschland" sector initiative. For the first time, highly automated driving (ATO GoA2) was implemented on the basis of the European Train Control System ETCS ("ATO over ETCS").

Start
2018

End
2021

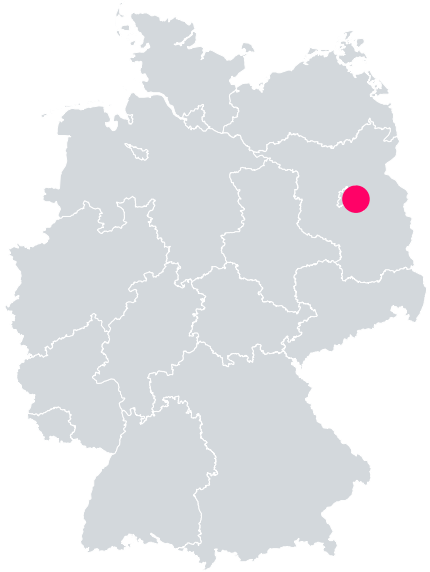
Benefit

The frequency on the same route can be significantly shortened without building a meter of new track.

Stable, reliable operation in everyday use

Greater energy efficiency thanks to automated acceleration and braking

Pilot- & Development Projects



Technologies

- IT-Plattform & Cloud
- Digital Register
- ATO
- AI (Incident)
- Sensors (Enviroment)

More Info

Digital twin for incident simulation

Development Project

A digital twin is a highly realistic 1:1 reproduction of the track environment and enables the training and testing of AI software. In the future, fully automated driving will require the sensors at the front of the train to detect objects in the track environment. An Artificial Intelligence (AI) then evaluates these in terms of their criticality. It decides whether they are regular or irregular objects that could pose a danger.

Benefit

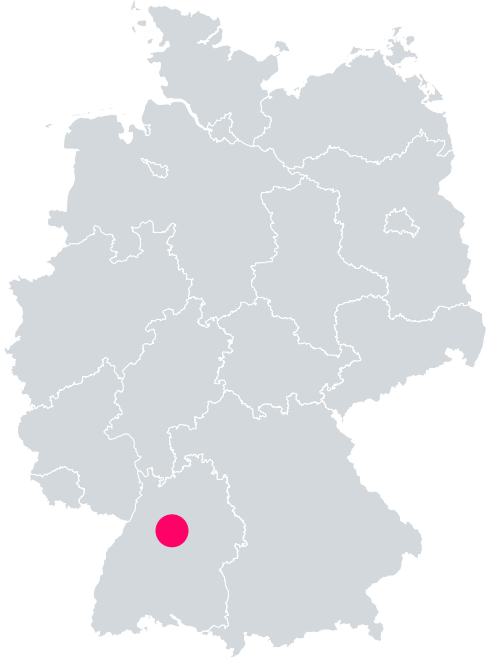
Optimum response of AI software to incidents: Even rare and dangerous incidents can be simulated safely.

With highly realistic 1:1 simulation, real field tests with train paths and vehicles that are difficult to obtain can be significantly reduced.

Start
2021

End
2026

Pilot- & Development Projects



Technology

Advanced Digital Infrastructure

More Info

Digital Register

Development Project

Standardized data bases and a central data source for digital infrastructure data are essential for the new systems of digital rail operations. Data is stored, updated and processed uniformly in the so-called digital register.

Start
2018

End
open

Benefit

Standardized data basis and central data source for highly accurate and up-to-date infrastructure data for digital application of rail operations.

It contains 3D data and topology data for the entire rail infrastructure and all track-related facilities, which are provided centrally and updated on an ongoing basis.

The DR data is the basis for high-resolution digital maps (HD maps) of the rail network, which are required for numerous digital applications like ATO, ADI or CTMS.

Pilot- & Development Projects

Technologien

IT/OT Security

AI (Capacity)

iLBS

More Info

Digital Railway Test Field

Development project

The aim of the Digital Railway Test Field is to set up a real-life laboratory site on the Erzgebirge railway network. It is to be made available for research and development throughout the sector. This will enable projects to be put into operation more quickly.

Route data

Line from –to:	Annaberg – Buchholz Süd bis Schwarzenberg
Route lenght:	24,6 km

AI (Incident)

Sensors (localisation)

Sensors (enviroment)

APS

DSTW

ATO

FRMCS

IT-Plattforms & Cloud

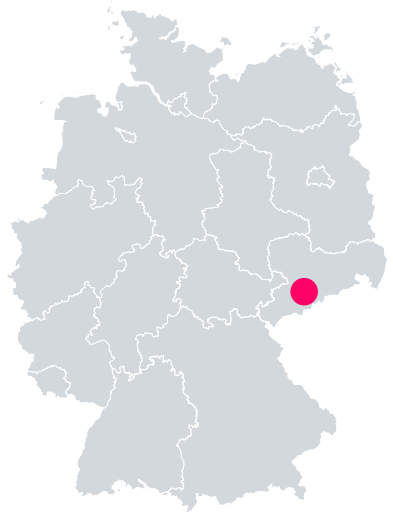
ETCS

Digital Register

Start **2018**

End **2025**

Pilot- & Development Projects



Technologies

IT-Plattforms & Cloud

Digital Register

iLBS

DSTW

ETCS

More Info

Consistent Digital Data Management in CCS Planning

Development Project

The D3iP project acts as an acceleration measure for the rollout of DSTW and ETCS by standardising and digitalising the planning process and speeding it up as much as possible through future end-to-end digital data management.

Start
2022

End
2028

Benefit

Automated recording of the existing infrastructure and data processing in the sense of Building Information Modelling (BIM)

(Partial) automation of planning processes and technical support for specialist audits

Digital transfer of planning results

Pilot- & Development Projects

Technologies

APS FRMCS

More Info

FRMCS/5G Test Network

Development project

The existing 2G-based train radio GSM-R (GSM - Railway) no longer meets the high requirements of digital applications in terms of bandwidths and latency times. 5G will form the basis for an efficient and flexible " Future Railway Mobile Communication System (FRMCS)".

Construction	Operation
Start	Start
2018	**2021**
End	End
2021	**2026**

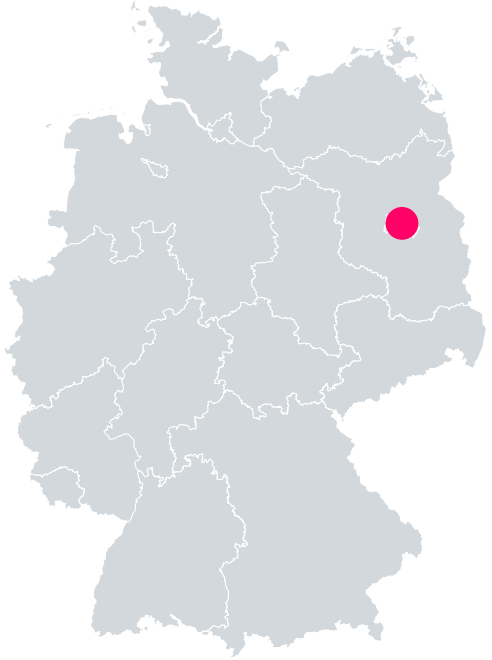
Benefit

Fulfilment of higher requirements for data exchange between train and track using the 5G-based FRMCS radio system.

Tailoring the FRMCS radio provision to the specific requirements of digital railway system applications.

Additional functionalities, including authentication, group communication and video transmission.

Pilot- & Development Projects



Technologies

Artificial Intelligence in Incident Management

Sensors for Environmental Perception

More Info

KI-MeZIS

Development Projects

The project develops and tests AI methods in condition monitoring and needs-based maintenance of rail vehicle structures/”KI-Methoden in der Zustandsüberwachung und bedarfsangepassten Instandhaltung von Schienenfahrzeugstrukturen (KI-MeZIS)”. Impact detection is a key component in enabling fully automated, driverless driving. It ensures that collisions and impacts at the front of the train as well as rollovers are correctly categorised and appropriate reactions for automated driving are derived.

Benefit

Detection of impact events using sensors on the front of the train and chassis. Derivation of appropriate measures with the help of AI.

Utilisation of recorded sensor data for strategic maintenance.

Sensor data can be used by industry to optimise the design of future vehicles.

Start

2021

End

2024

Pilot- & Development Projects

Technologies

ETCS

Digital Register

FRMCS

Sensors for Relative and Total Localization

More Info

Moving Block Demonstrator

Development Projects

"Moving Block Demonstrator" is a demonstrator project as part of the ERJU Innovation Pillar (R2DATO) for a train-oriented safety logic (based on the ADI concepts), which, among other things, enables driving in the "moving block". The safety logic combines the functionalities of RBC and signal box in one system.

Objectives

Demonstrate the feasibility of the underlying architecture and the approach of a generic safety logic.

Demonstrate the advantages of a train-oriented safety logic (in comparison with a block-centric solution).

Passfähigkeit zu ETCS ausgerüsteten Zügen demonstrieren.

Demonstrate the flexibility of the system regarding the use of train- and track-side inputs for localization.

Demonstrate driving in the "moving block", both in the form of simulation and field tests in the Digital Test Field in the Ore Mountains.

Start
2022

End
2026

Pilot- & Development Projects

Technologies

- IT-Plattform & Cloud
- Digital Register
- Sensors for localisation
- Sensors (enviroment)
- AI (Incident)

More Info

Sensors4Rail

Development Projects

In the Sensors4Rail project, an integrated system consisting of sensor-based environment perception, localization and a digital map was tested for the first time. This makes it possible to detect obstacles - an important prerequisite for fully automated, driverless driving in the future.

Benefit

The results of the project and its numerous test drives are being incorporated into the specification and development of the next generation of sensors for environmental perception, localization and digital maps.

Raw sensor data is important real data for the continuous further development of the system through repeated training of the used neural networks and is required to train AI for driverless, fully automated driving (GoA4).

Building on the results of the Sensors4Rail and Digital S-Bahn Hamburg projects, the AutomatedTrain research and development project was launched in July 2023, in which fully automated dispatching and parking of trains are to be tested and qualified for approval in operation.

Start
2019

End
2023