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Ingenuity for life

Automatic Train Operation

Solutions for automated driving
for high- and low-density mainline,
freight and regional traffic

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ETCS and ATO are perfect partners for safe automatic train operation

Driver advisory and automation technologies can achieve huge increases in energy efficiency or track capacity, depending on the selected optimization criteria. The automatic train operation system (ATO) developed by Siemens Mobility works closely together with the European Train Control System (ETCS).

ETCS ensures safe adherence to headways with regard to movement authorities and monitors speed levels. Today's partially automated railway system therefore provides an excellent foundation for subsequent solutions for automatic train operation.

Key benefits at a glance

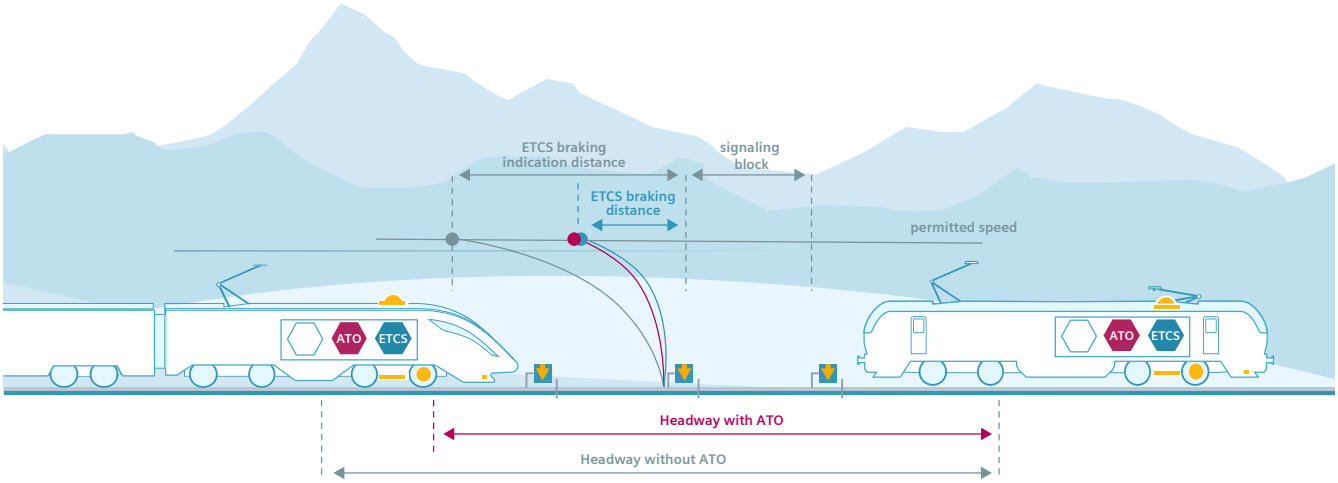
Boosted infrastructure and transport capacity
by decreasing headways

Improved timetable stability and punctuality
by means of consistent driving behavior

Energy savings
by means of an optimized driving strategy

Reduced mechanical wear and tear and less noise
by means of homogeneous driving with less braking

Increased passenger comfort
by means of smoother, homogeneous driving



Connection to Traffic Management System is key to optimum train control with a high benefit

The ATO system controls the vehicle's traction system and brakes and thereby automates starting, accelerating, cruising, coasting, braking and stopping the train. In order to do so, the system is connected online with the trackside Traffic Management System (TMS). The TMS continuously transmits the latest information, so that the optimum speed profile can be calculated at any given time. Based on this speed profile, the optimal driving strategy is calculated. Then the system converts the information into exact commands for the traction and braking systems. This ensures that all the vehicle's acceleration and braking procedures are executed based on optimized speed profiles as well as up-to-date track and timetable data.

On-board ATO system

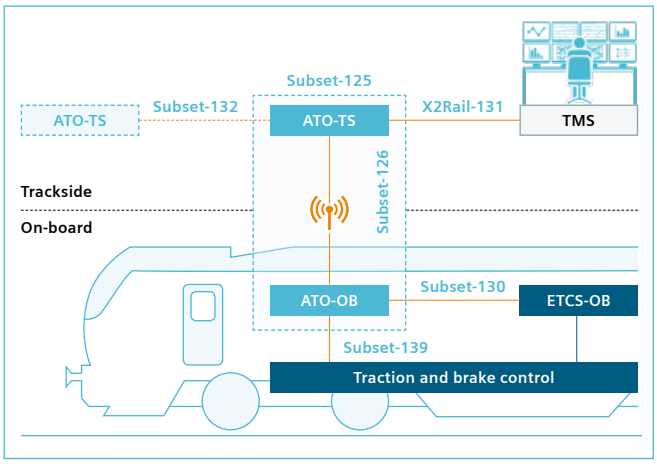
The on-board ATO system (ATO-OB) continuously calculates the optimum speed profile based on the available data on the infrastructure, track and timetables and controls the traction and braking systems for automated train runs.

Trackside ATO system

The ATO trackside system (ATO-TS) collects both static and dynamic data on the infrastructure, tracks and timetables from the existing TMS (Traffic Management System) and transfers the data to the ATO-OB.

ATO is standardized as „ATO over ETCS" for interoperable operations

ATO is an essential goal of European standardization activities. While striving for harmonization, ATO principally needs to fulfill the same requirements for interoperability as ETCS. A vehicle equipped with ATO needs to be able to drive on all tracks that are equipped according to their specifications.



Thameslink – the world's first commercial ATO application in mainline rail services with ETCS

For the north-south line going through the heart of London (Thameslink Project) Siemens Mobility is providing a combination of rolling stock, an ETCS signalling system and ATO to allow for automated driving in this highly demanding core section. Implementing the ATO system brings one particular feature into focus: the optimization of headways. This is possible, because all trains move exactly according to the same optimal speed profile. Only this makes the demanded capacity achievable for a service with 24 trains per hour, track and direction.

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