

AŽD

European Train Control System



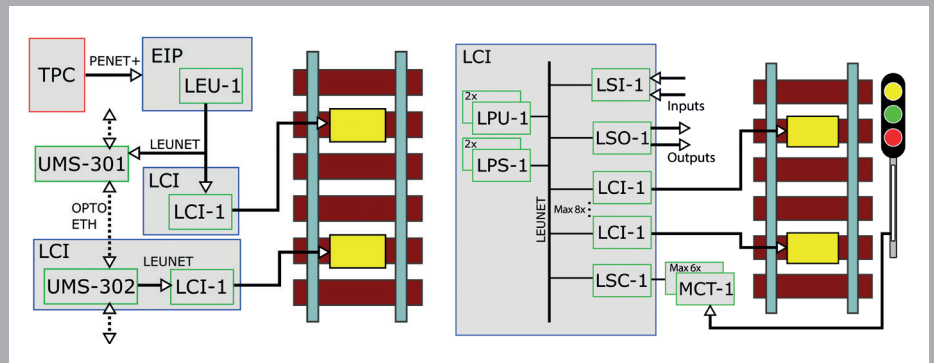
ETCS - the European Train Control System is the most advanced and the only train control system within the Single European Railway Area. AŽD is the manufacturer of all ETCS trackside components for both L1 and L2 levels developed according to the latest specifications of version 3.6.0 (BL3 R2).



ETCS TRACKSIDE TrainSwing LEA-1/LEA-2

L1 Level

The LEU line unit (Lineside Electronic Unit), which is implemented as a control panel of the EIP electronic panels (object controllers) and can be operated as an integral part of electronic interlocking system StationSwing ESA (TrainSwing LEA-1) or as a stand-alone system (TrainSwing LEA-2), is the basic component in the L1 level.

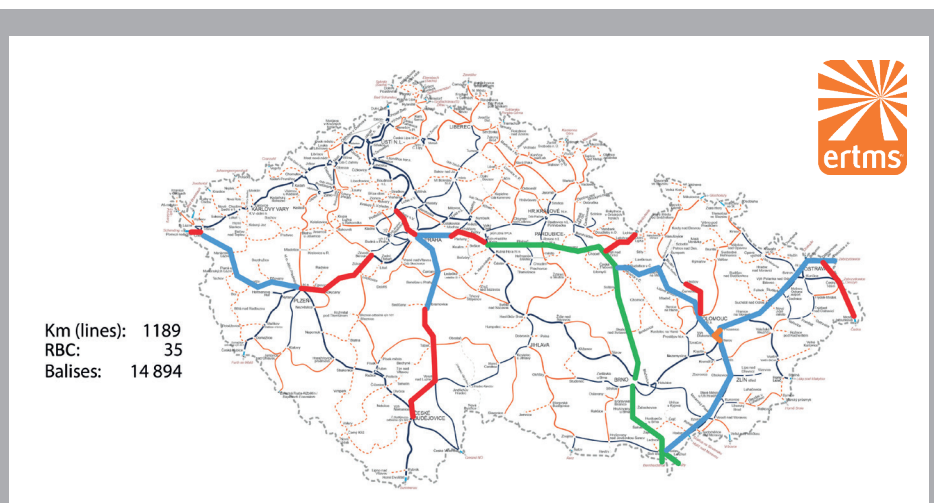


The installation of the TrainSwing LEA system providing ETCS L1 functions is currently taking place on projects in the Czech Republic as part of the application of the ETCS STOP system on secondary lines or abroad when the standard ETCS L1 application is deployed.

TrainSwing REA-11

L2 Level

In the L2 level, TrainSwing REA-11 Radio Block Centre of RBC type is the basic component. It provides the complete functionality of the trackside part of ETCS system, is capable of two-way communication with the electronic interlocking system and fully communicates via standard GSM-R network interfaces with vehicles equipped with on-board parts of ETCS. AŽD has already delivered dozens of RBC installations that are operated on the network of Czech Infrastructure Manager.



By the end of 2021, 20 RBCs had been put into operation on more than 800 km of lines. During 2022 and 2023, this number will be increased to 35 RBCs and almost 1 200 km of lines will be equipped.

ATO OVER ETCS

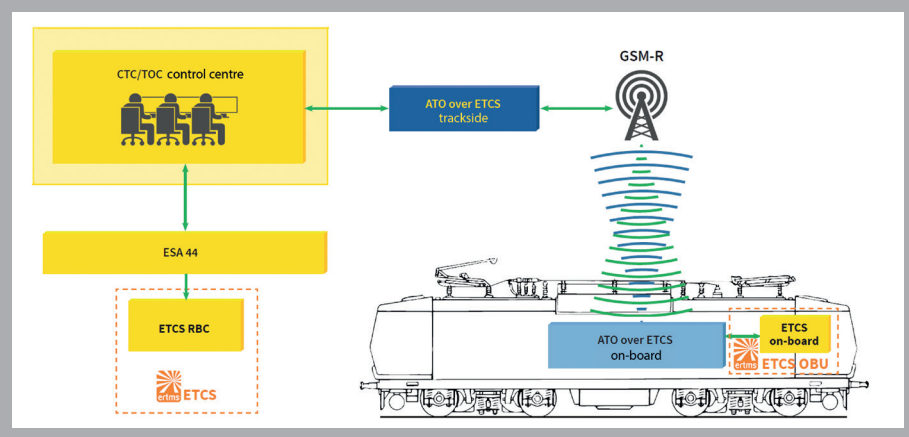
DriveSWing DRS-10



Automatic Train Operation

ATO over ETCS is an Automatic Train Operation System (ATO) interoperability project guaranteed by the European Union Agency for Railways. Its aim was to define standards for a new generation of ATO for deployment in all segments of rail transport (high-speed, long-distance, suburban and freight). Development of ATO over ETCS by AŽD was based on more than 30 years of experience in the development and delivery of the DriveSWing AW-10 system.

The data from the dispatcher's Control Centre is transmitted to the train in the same way as for ETCS, i.e. via GSM-R. Conversely, the train then sends its exact location, speed and estimated arrival at selected points on the line to the Control Centre, which allows better planning, for example, trains crossover or overtake. AŽD provides both the on-board and trackside parts of this fully interoperable ATO over ETCS system.



INSTALATION OF OBU ETCS SYSTEM



OBU ETCS installation

In cooperation with CAF Signalling, AŽD provides the installation of on-board parts of ETCS into the vehicles of carriers operating on the infrastructure of Railways Administration. Within the framework of the so-called „retrofit project”, the retrofiting is provided to standard construction traction vehicles, units, motor and control cars and special vehicles. The retrofiting includes integration with existing vehicle control system, supplementing the national Automatic Train Protection System (ATP) in the STM function and, in

case of the customer’s requirements supplementing the Automatic Train Operation system (ATO) integrated with the ETCS OBU via functions according to the ATO over ETCS (AoE) specifications.

AŽD has provided, is currently providing or is preparing with its partners ETCS installations for vehicles:

- MVTV 2.0, MVTV 2.2, MVTV 2.3, EM100, MTW100.013, MTW100.506 (Infrastructure Manager, CZ)
- 844, 841, 841.2, 842, 954, 750.7 (Czech Railways, a.s.)
- OCPD001 (Elžel)
- DV GPK (ŽSR-Slovak Railways)

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