

THE FUTURE OF MODERN RAIL TRANSPORTATION

# Trainguard 100/200/300 OBU





# Reliability for the future

## Powerful, flexible, extensible



Make optimal use of existing infrastructure and simultaneously enhance efficiency and punctuality in long-distance, freight and regional traffic: Requirements for modern rail transportation are growing more demanding all the time. Siemens Mobility has been closely involved in the technical standardization of the European Train Control System (ETCS), a process initiated to help meet these requirements, since the outset. ETCS is a standardized Europe-wide train control system that monitors speed on the tracks and ensures vehicles are braked safely in hazardous situations. The aim is to replace the more than twenty different national train control systems currently in use with ETCS to facilitate seamless traffic across national frontiers with no technical barriers. ETCS is a key technology that provides the basis for Automatic Train Operation (ATO). It offers tangible benefits not just for passengers but for

your company as well: Used in combination with ATO, it can increase throughput by up to 30% and punctuality by up to 15% - and you can expect potential energy savings of up to 30% too.

We are spearheading the digitalization of the railway to ensure it has a successful, sustainable and environmentally friendly future. Market leader Siemens Mobility is your reliable partner for the introduction of ETCS in accordance with the latest Technical Specifications for Interoperability (TSI) standard.

Join the digital transformation to attain greater efficiency and help position the railway as a sustainable, intelligent and safe means of transport. The transformation has begun.

# Seamless operation across national frontiers worldwide

Europe has committed to ETCS. The requirements, for tracks and vehicles alike, are set down in binding form in the TSI. Our TSI-compliant on-board equipment incorporates over 70 years of experience in the train control field.

Our powerful *Trainguard 100/200/300 OBU* train control system ensures you high reliability and availability and excellent sustainability. With over **6,000** instances spread over more than **50** countries around the world we can boast a total of more than **420** million kilometers traveled in commercial operation.

Trainguard offers the following benefits as well as meeting Europe's requirements and transportation mandates reliably and in full:



- Improved all-round rail operations with ATO over ETCS
- Suitable for use across national frontiers and with vehicles from any manufacturer
- High-performing product range
- Flexible retrofitting and upgrades thanks to modular design for the different ETCS levels
- ETCS track-independent proof of compliance
- Vast experience in the train control field





# Sustainability for companies and the environment

We are thoroughly familiar with the ever greater and more complex challenges emerging as a result of climate change and the increasing global population. The rail industry too needs to up its game in response, with the delivery of increased transport capacities and reductions in resource consumption both essential. A strong rail transportation sector can play a significant role in combating climate change. We have combined ETCS with Automatic Train Operation (ATO) to help bring these potential benefits within reach. ATO provides benefits above and beyond the interoperability, safety and sustainability ensured by ETCS. ATO over ETCS enables your rail vehicles to optimize performance and braking characteristics automatically, increasing energy efficiency and capacity by up to 30% and punctuality by up to 15%.

The result is smooth, automated operation providing real and lasting improvements in both punctuality and traffic flow. Our system makes it possible to run more vehicles on the same track. ATO over ETCS makes rail traffic safer too thanks to the system's ability to detect hazardous situations faster and thereby reduce the associated risks.

## Lower costs throughout the lifecycle

Our ETCS on-board equipment is maintenance-free, making time-consuming, resource-intensive routine maintenance and periodic checks a thing of the past. This means you can enjoy permanently lower operating, material and labor costs while simultaneously helping to protect the natural environment.

ETCS, which has become the standard modern solution for train control, in combination with ATO provides the basis for highly automated, sustainable and energy-optimized rail transportation. We have already successfully paved the way for ATO over ETCS in commercial operation in accordance with the European standard.



Siemens is your dependable partner for ATO projects worldwide



## Thameslink program, UK

- World's first commercial ATO over ETCS application in mainline (2018)
- Increased capacity for London's north-south inner-city link
- Ability to run up to 24 trains per hour on existing tracks



## ATO demonstrator for SBB, Switzerland

- First train to run with ATO over ETCS in compliance with the UNISIG standards
- GoA2 successfully tested in a joint project with SBB (two phases, 2018/20)
- Proof of compliance for standardized interfaces and interoperability (subset 125, 126, 130)



## Digital S-Bahn Hamburg, Germany

- Blueprint for ATO over ETCS in Germany in cooperation with DB AG and S-Bahn Hamburg
- Implementation of highly automatic train operation based on European standards (TSI)
- Driverless turnback (GoA4 feature)

oilo 2021  
railway general mobility award

# Capable and reliable across national frontiers

Different vehicle types, different train control systems and increasing transport distances: The *Trainguard 100/200/300 OBU* interoperable ETCS on-board equipment creates new freedoms in international rail transportation. Tried, tested and approved for use with more than 15 different National Train Control (NTC) systems, our ETCS on-board equipment ensures your vehicles are ready for use on the conventional rail network as well, even where lines have yet to be upgraded with ETCS. For unrestricted mobility.

- Authorization received
- Authorization pending





# The right solution for every ETCS level



**Future-proof**  
with the latest  
ETCS Baseline



**The most  
compact**  
onboard unit on  
the market



**Scalable solution**  
for all types of rail  
vehicle



**Maintenance-free**  
onboard unit and low  
lifecycle costs



**ATO-ready**  
for rollout in Europe  
and worldwide

Benefits of Trainguard  
100/200/300 OBU

Not only is the *Trainguard 100/200/300 OBU* ETCS on-board equipment maintenance-free, but it also has low power consumption and high scalability. Our high-performing product range covers all ETCS levels for a wide range of different vehicle types from high-speed and regional trainsets to locomotives and special vehicles. The system comprises the following installed components:

## ETCS onboard components



- |  |   |
|--|---|
| <b>1</b> ETCS central unit               | <b>6</b> GPS antennas                   |
| <b>2</b> Automatic Train Operation (ATO) | <b>7</b> Driver Machine Interface (DMI) |
| <b>3</b> Juridical Recording Unit (JRU)  | <b>8</b> Radar sensor                   |
| <b>4</b> National ATP systems            | <b>9</b> Odometer pulse generator       |
| <b>5</b> GSM-R antennas                  | <b>10</b> ETCS Eurobalise antenna       |

### Intelligent architecture

The compact, modular design of our ETCS on-board equipment represents another advantage. Whether you opt for delivery in a dedicated train control cabinet, a functional unit for your own ready-planned switchgear cabinets or installation in special mounting spaces, fitting all the necessary hardware components in your vehicle requires a high level of precision. Our strength in this area permits us to integrate the system flexibly with any vehicle technology.

### Moving with the times

We ensure that you are prepared for the digital future of rail transportation. We install our ETCS on-board equipment not only on new vehicles but also on all types of existing vehicles. Take advantage of our ETCS Retrofit portfolio and receive tailored retrofitting solutions to bring your rail vehicles up to the latest standards in advanced signaling and safety technology, extending their useful life and making sustainable use of existing resources.

Extend the functional range of your vehicles whenever your business requires it. Our *Trainguard 100/200/300 OBU* ETCS on-board equipment helps you to remain flexible and future-proof in the long term.

## Our product portfolio



### ETCS central unit

Trainguard 100/200/300 OBU

### Automatic Train Operation (ATO)

ATO over ETCS per P44  
ATO over ETCS per subset 130 (GoA2)  
ATO over ETCS per (GoA3/4)

### Juridical Recording Unit (JRU)

including CPMM  
mREC  
Teloc  
RedBox

### National ATP systems

Integration reference from >15 NTCs and legacy systems

### GSM-R antennas

3G-Edge  
4G/5G

### Driver Machine Interface (DMI)

Single display with keys  
Single display with touch input  
Double display with touch input

### Odometry system

GPS antennas  
Odometer pulse generator  
Radar sensor  
• SRRII/SRIII radar  
• DRS05S1 radar

### ETCS Eurobalise antenna

# Experience ETCS LIVE

## Training and tests under real conditions

Equipping vehicles with ETCS can bring up a range of questions, from the performance of interoperability tests with all ETCS vehicle and lineside components to specific staff training courses. Our universal answer is: *Tranguard ETCS LIVE*. Our *Tranguard ETCS LIVE* system allows you to train and test staff in operational situations in real time and under realistic conditions.

It was actually designed for prototyping and architecture approval in pending ETCS projects as well as for training purposes and can therefore be used for movements on tracks that are under maintenance or have yet to be completed. Real ETCS engineering data can be imported to verify project-related test results for relevant commissioning and data test procedures.



### How track-independent proof of compliance works

Benefit from intelligent Radio Block Center (RBC) simulations for track-independent ETCS rollout. Our mobile RBC simulation can test ETCS Level 2 on any track even if it is not actually equipped with ETCS. The missing ETCS trackside equipment is replicated by a simulated RBC, which is fitted in the vehicle in advance using plug-and-play technology. Reference points are created along the track using mobile track balises. This makes it possible to plan and perform test and acceptance runs flexibly with ETCS Level 2.



## Pioneers in the train control field

Siemens Mobility has been closely involved with the relevant national and European committees from the outset to help shape the course of authorization and standardization projects in accordance with TSI. We consequently have long-standing relationships with certification and assessment bodies and their experts, who are also active in the drafting of future TSI versions. We are prepared for future TSI releases and have developed future-proof products ready for topics such as the Future Railway Mobile Communication System (FRMCS) and ETCS Level 3: Our products are paving the way for unrestricted mobility.

### Everything from a single source

We strive for excellence in our projects and are always there when you need us, from the initial contact to clarification of the pertinent requirements right through to successful vehicle authorization. We can help you to develop your business sustainably and make it efficient in both a national and an international context.

Drawing on our vast experience with complex major projects, an international team of experts will guide your project to a successful conclusion with a maximum of transparency and an uncompromising attitude to quality.

We can also provide you with long-term finance and comprehensive consulting services and work with you to produce meticulously tailored solutions. We have a particular focus on international development programs and can help you integrate financing options more effectively into your investment decisions.

### Shaping the future together

Our great strength is that we understand your business, share your passion for mobility and welcome the opportunity to collaborate with you on devising solutions for the many challenges of our age. That, indeed, is what we are all about. Together we can make mobility smoother, more sustainable, more reliable and, above all, safer.

## Your benefits at a glance



### Lean and multifunctional setup for any project

- ✓ Original ETCS components realized virtually on a PC platform with their original engineering data
- ✓ Optional use of real components
- ✓ Creation and execution of any required operating scenario
- ✓ Complete track topologies with multiple trains traversing them
- ✓ Portable system design



### Customer-specific adaptation

- ✓ Large range of existing train types and railway lines, optional modeling and integration of customer objects
- ✓ Various national train control systems
- ✓ Automatic or manual control of vehicles
- ✓ ETCS Level 1 or Level 2 with the latest Baseline release



### Multiple applications

- ✓ Function and data tests
- ✓ ETCS showcase and marketing support
- ✓ Driver training or general training with ETCS
- ✓ Support with commissioning

**Siemens Mobility GmbH**

Otto-Hahn-Ring 6  
81739 Munich  
Germany

[siemens.com/mobility](https://www.siemens.com/mobility)

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