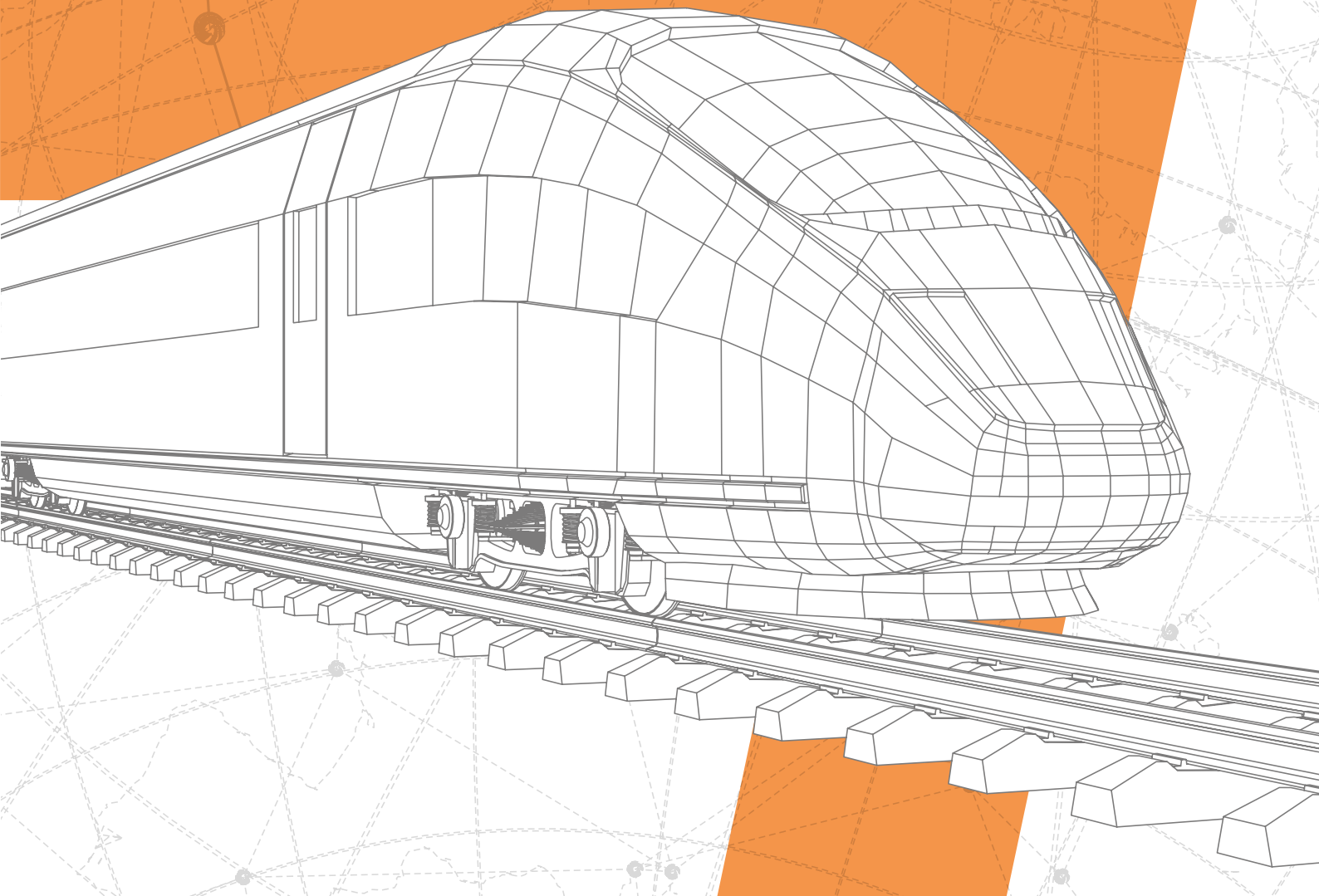


Data Acquisition
Safety Functions

**DATA RECORDING
AND SAFETY**

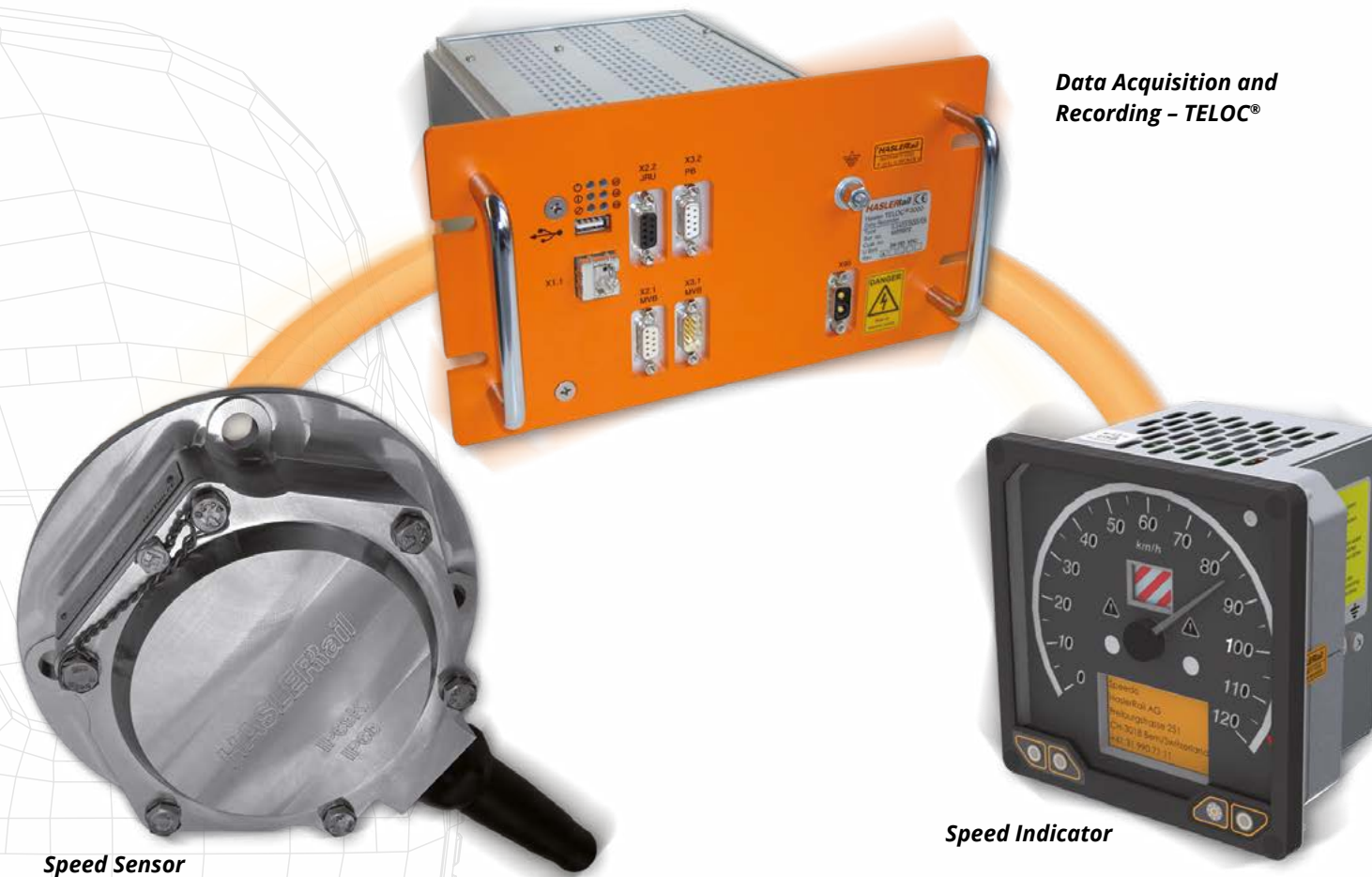


SYSTEM

DATA ACQUISITION AND RECORDING

Founded in 1887, HaslerRail has always produced speed indication and data recording systems – a fact underlined by the more than 40'000 mechanical and electronic systems in daily service all over the world today.

Since trains are more complex than ever, there is a barrage of information to gather which has either – in the case of signalling data (such as ETCS information) – to be handled instantly or has a more informative character and can be evaluated later on. Data Recording is no longer only used for post incident / accident data analysis; it's gone a step further and now supports safety management during daily operations as well as driver and fleet management.



Speed Sensor

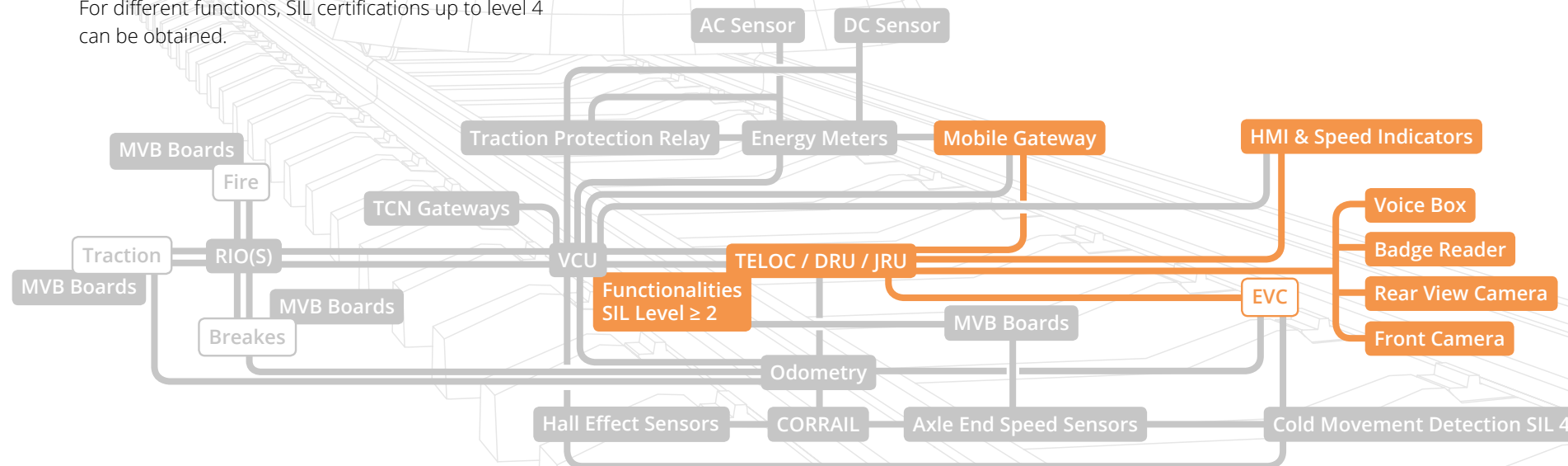
Data Acquisition and Recording - TELOC®

Speed Indicator

SYSTEM OVERVIEW

The Hasler® TELOC® system covers the entire speed chain – from data acquisition by different sensors to the actual data recorder, acquisition of data from third party systems, speed indication, signal transmission and data evaluation.

For different functions, SIL certifications up to level 4 can be obtained.



SAFETY

According to current EU legislation, new or modified devices with safety relevant functions have to be designed according to the EN 50126 standard in order to receive a defined Safety Integrity Level (SIL) certification. Safety-relevant information is often already available in the data recorder; therefore, it is sensible to use it to carry out safety-related functions such as roll protection, dead man function, Driver Safety Device (SIFA), speed threshold, etc. To assist our customers in the design of functions up to SIL4 level in new rolling stock or modernisation projects, HaslerRail has developed the Hasler® SABO Safety Board which also helps to simplify the certification process of an entire system.

ETCS JURIDICAL RECORDING UNITS (JRU)

The requirements for ETCS Juridical Recording Units (JRU) are defined in TSI OPE and CCS. TSI OPE defines that data pertaining to the running of a train must be recorded and retained for the purposes of supporting systematic safety monitoring as a means of preventing incidents and accidents, identification of driver, train and infrastructure performance in the period leading up to and, if appropriate, immediately after an incident or accident, enabling the identification of causes, and supporting the case for new or changed measures to prevent recurrence and recording information relating to the performance of both the locomotive / traction unit and the person driving.

PRODUCTS

TELOC®

TELOC® is part of a state of the art smart-tech equipment generation that satisfies the most demanding requirements. Due to the open architecture of the system, new functions can be integrated at hardware and at software level. The housing can be customised to the customer's requirements and is designed for a 19" rack. The TELOC® has been developed for use on all railway vehicles such as electric and diesel locomotives, high speed trains, electric and diesel multiple units and mountain railways as well as light rail vehicles, trams and metro trains.

TELOC® is certified to be used as a JRU (Juridical Recording Unit) for ETCS on-board installations in combination with national data recording. Crash protected memories are available that comply with different standards. Furthermore, it is possible to integrate safety functions up to SIL4 (EN 50126). Available functions include vigilance control, dead man function, SIFA, rollback-protection, roll-protection, speed monitoring, brake curve supervision, etc.



TELOC®

DATA TRANSFER

TELOC® systems can be connected to Mobile Gateways (routers) to send data to an off-board server. This makes data accessible to different interest groups.

DATA EVALUATION

Data recorders have often only been used for accident / incident investigation, i.e. data is recorded and viewed on rare occasions. Therefore, the analysis software tools used were focused on data visualization. Creating information with existing accident/ incident analysis software tools is a recurring and manual activity which requires training and specific domain knowledge and hence is slow and error-prone. Data analysis has to be automated in order to look at data continuously and in a uniform manner and to generate information out of recorded data. With this in mind, HaslerRail has developed its software tool Hasler® EVA+.

ADDITIONAL EQUIPMENT

HaslerRail offers different peripheral equipment such as:

- Pressure sensors
- Different speed indicators, e.g. moving coil instruments, Hasler® SPEEDO (step motor controlled with pointer feedback), displays
- RFID card reader to record driver number, access control, etc.

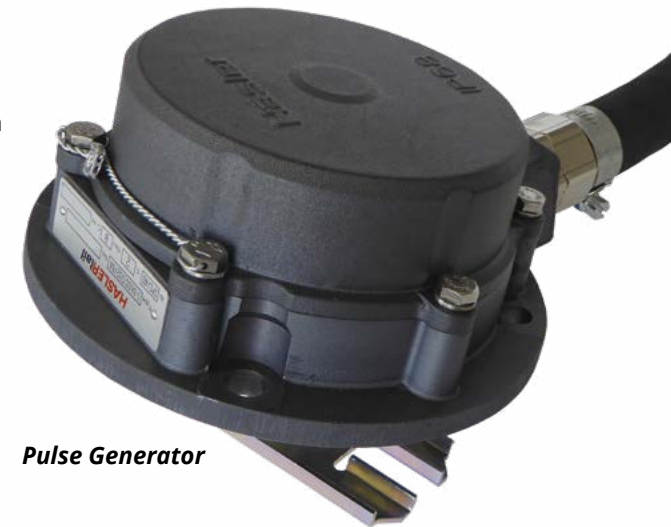
HaslerRail also offers service unit software to support the customer in commissioning and fault finding. Test equipment including bench test equipment is available on customer demand.

THE HASLER® PULSE GENERATORS

Pulse Generators are odometry devices which convert the rotational motion of an axle into electrical quadrature signals. The distinguishing feature of the safety Pulse Generator is its inherently safe design, which makes it eligible for the use in SIL4- systems.

The design of the Hasler Optical Pulse Generator has been made suitable to resist most extreme mechanical and thermal stress. The technology is based on an optical system that operates in the infrared range. It is possible to have two different frequencies per revolution and up to six electrically isolated sensors. The Pulse Generator delivers the signals for measuring and recording the speed and distance, for wheel slip and slide sensing, for various control and safety functions, train safety system, etc.

Due to its accuracy and reliability, Hasler Optical Pulse Generators are used for different signalling applications like ETCS and CBTC.



Pulse Generator

VOICE AND VIDEO

HaslerRail developed a cab voice recording system for its TELOC® system a decade ago and it is in successful use on various trains. After an incident / accident it can be useful to hear and / or see what happened during the final minutes. With the new powerful TELOC® system it is also possible to record camera pictures. The camera(s) can either be installed inside the drivers' cab in order to record the driver's actions as well as his or her track view or it can be installed anywhere in the vehicle's front (e.g. in a headlight) in order to see possible events below the driver's natural line of sight.



Video Camera



Voice Box

SUCCESS STORIES

PLUG AND PLAY REPLACEMENT OF PRE-EXISTING DATA LOGGERS FOR QUEENSLAND RAIL'S TILT TRAIN

OVERVIEW

Queensland Rail's pre-existing data recorders were a part of an older generation, supplied through the train manufacturing process. With these recorders, data retrieval was a strenuous, lengthy and not always successful process. This pushed Queensland Rail to seek a cost effective means to replace the existing event recorders with a reliable and proven alternative – the Hasler® TELOC® 1500.

THE CHALLENGE

The following factors had to be considered:

- Minimal or no disruption to scheduled services: All work on the trains was to be carried out overnight and only one train was available per night
- No rewiring or reworking was permitted
- Recorder dimensions must be identical to the previous solution

- All existing event recorder functionality must be kept
- Future proofing

IMPLEMENTATION

Due to the short timeframe to commission the units – as access was only available during the night, it was critical to get the replacements right, as QR could not operate the trains without an event recorder.

Every challenge was overcome with in-house state of the art bench testing in HaslerRail's laboratories in Berne, Switzerland and over two nights, the Hasler® TELOC® 1500 were successfully commissioned onsite.



NEW YORK CITY TRANSIT R211 TELOC® IEEE AND FRA COMPLIANT EVENT RECORDER, DOPPLER RADAR SPEED SENSOR AND SPEED INDICATOR

HaslerRail signed a contract with Kawasaki Railcar for delivery of the next generation Event Recorder System for the New York City Transit R211 project. The overall project quantity for Kawasaki is 1610 Rail Cars incl. options.

The HaslerRail scope of delivery consists of Event Recorder (IEEE 1482.1-2013), Doppler Radar Speed Sensor and the Speed Indicator. The scope fulfills the Buy America Act (BAA) requirements.

The NYCT R211 project further strengthens the HaslerRail presence in the US market. HaslerRail has today approximately 2'000 systems in service all over the US, some of the operators are DCTA, LACMTA, MBTA, NJT, SFMTA, ST, TEXRAIL, WMATA.



BOMBARDIER TRAXX WITH TELOC® 3000 JRU FOR ETCS AND NATIONAL DATA

HaslerRail's TELOC® data recorders are all capable of any recording combination: ETCS only, National Data only or combined ETCS and National Data solutions. Bombardier TRAXX (Transnational Railway Applications with eXtreme flexiBility) locomotives are equipped with a HaslerRail TELOC® 2500 or TELOC® 3000 JRU which complies with current TSI OPE and CCS and includes National Data as well. Since the locomotives are used for cross-border traffic all over Europe, a certification in the different countries is needed. Data can then be made available via wireless transfer if requested by the customer. The evaluation software Hasler® EVA+ allows the analysis of ETCS and National Data in one graphical overview and from more than one vehicle at the same time. Combined with GPS information (when available) events can be shown on a map.



P. Christener

YOUR GLOBAL PARTNER WITH LOCAL SUPPORT



- Headquarters and Offices
- Agencies

HASLER*rail*

HaslerRail AG
Freiburgstrasse 251
3018 Berne
Switzerland

T +41 (0) 31 990 71 11
F +41 (0) 31 990 72 27
info@haslerrail.com
www.haslerrail.com

Sécheron Hasler **GROUP**

Smart. Safe. Swiss.