

ON-
BOARD
ELECTRONICS

HASLERRail
PIXY

HASLERRAIL

General Presentation

Sécheron Hasler GROUP

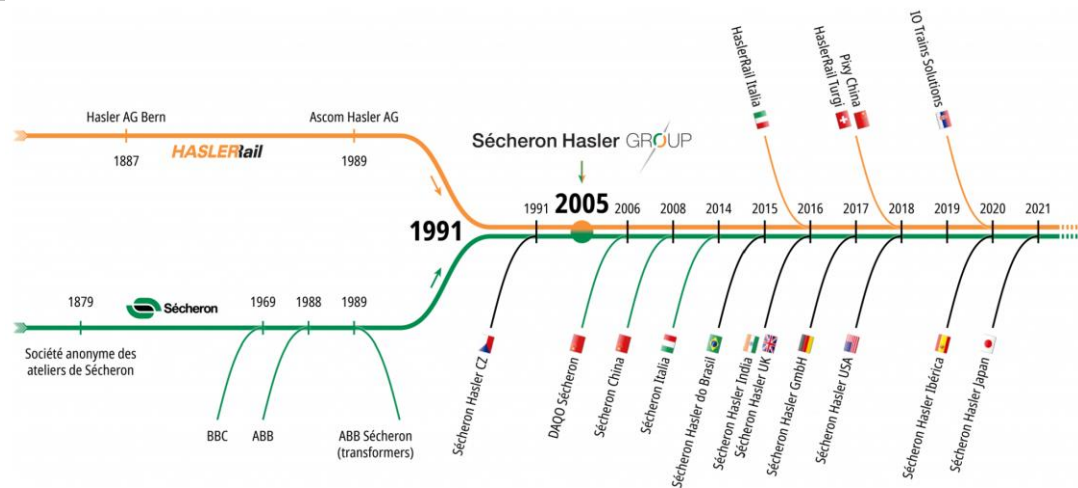


HASLERRAIL – GENERAL PRESENTATION

Introduction

HISTORY & KEY FIGURES

More than
140 years
of history



2022

1353
FULL TIME
EMPLOYEES

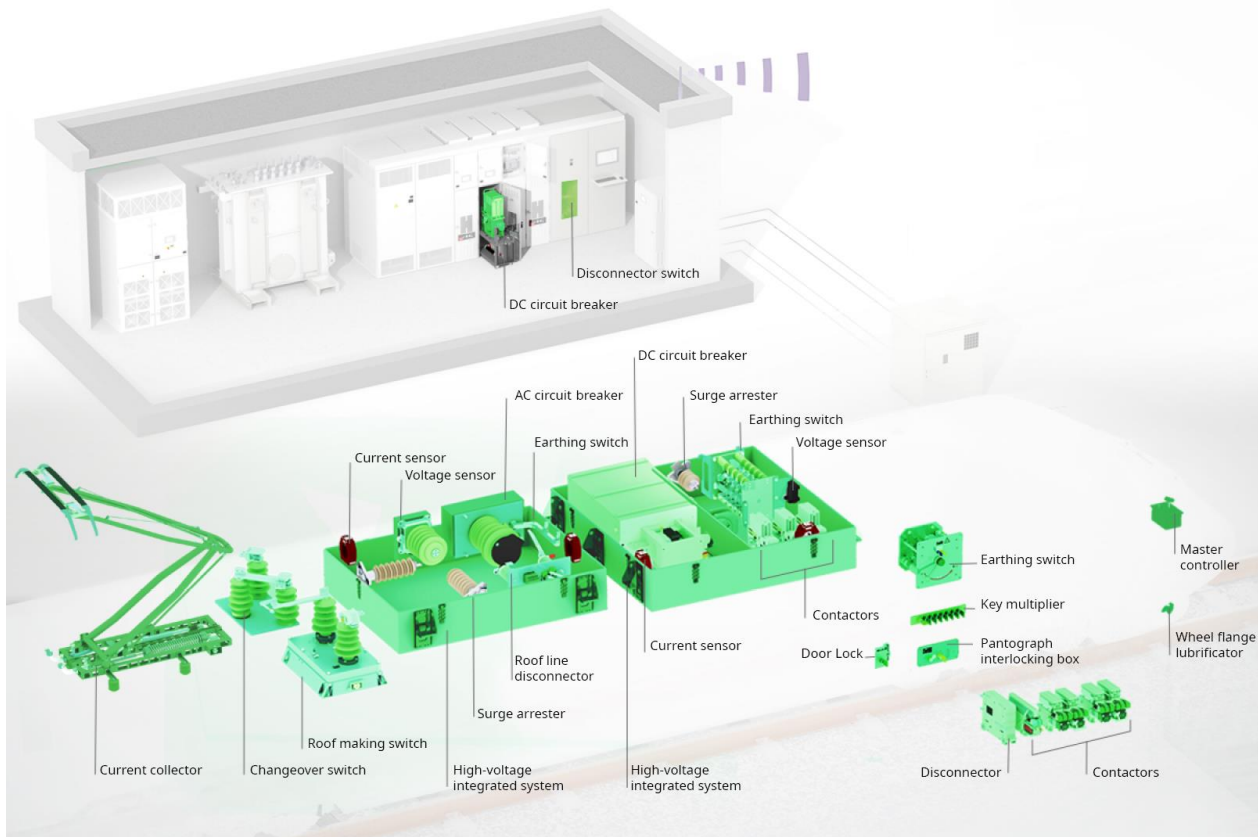
SALES

254 M CHF
= 235 M € *
= 282 M US\$ *

* Exchange rates
1 € = 0,9833 CHF
1 US\$ = 0,999 CHF

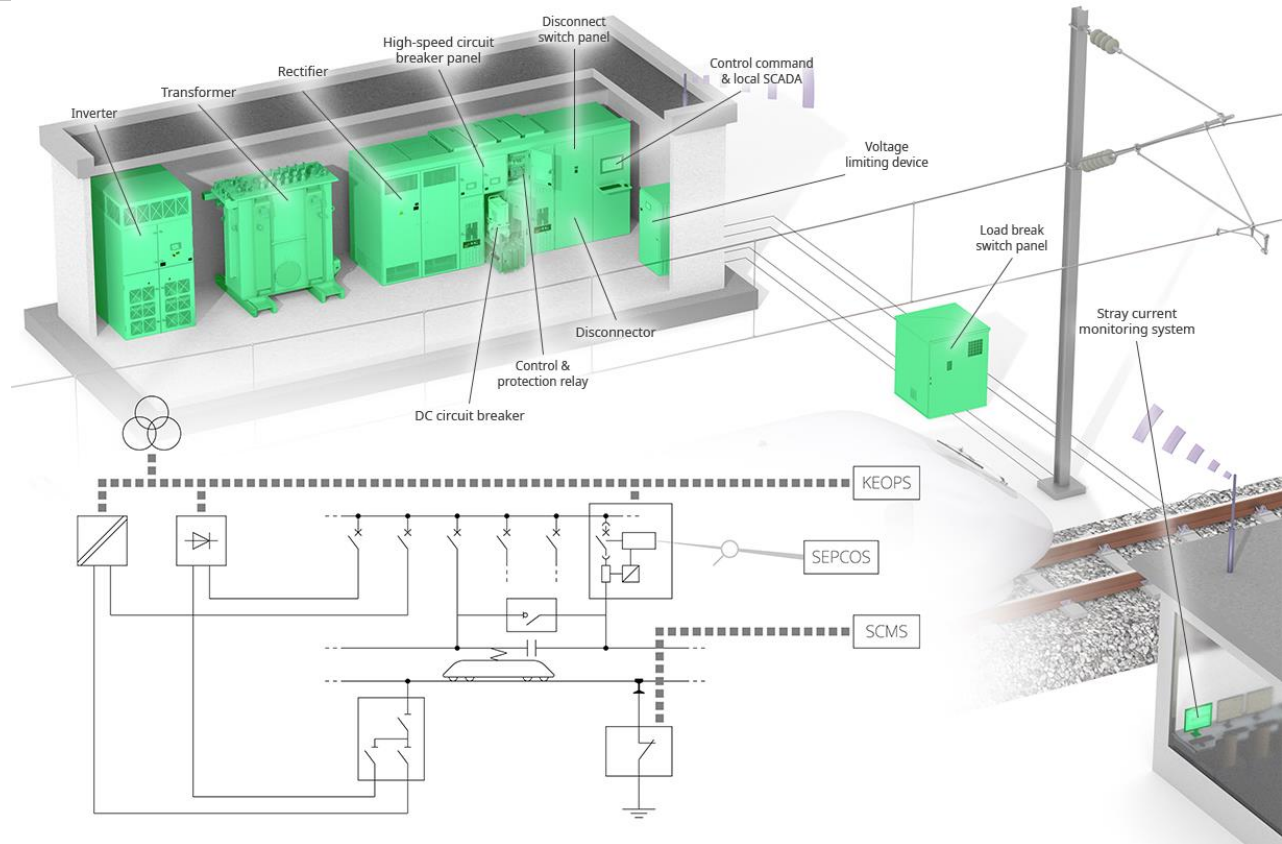
ELECTRICAL SAFETY SOLUTIONS

for Rail Vehicles &
DC Traction Power
Substations



TRACTION POWER SYSTEMS

for Rail
Transportation –
Electrification



ON-BOARD ELECTRONICS

- // Data recording
- // Safety functions
- // Rail data management solutions
- // Odometry
- // Cold Movement Detection
- // Energy metering
- // Mobile Gateway - GOCU
- // HMI/DMI mobile visualization solutions
- // Speed indicators
- // Badge reader
- // Video recording
- // Vehicle Control Units (VCU)
- // Remote I/O units
- // Gateways
- // Protection
- // Sensors



MAIN LOCATIONS



HEADQUARTERS

/// Sécheron SA



Geneva,
Switzerland

/// HaslerRail AG



Bern,
Switzerland

EUROPE

- /// **HaslerRail AG – Branch office**
Turgi, Switzerland
- /// **HaslerRail Italia**
Verona, Italy
- /// **Sécheron Hasler CZ**
Prague, Czech Republic
- /// **Sécheron Hasler GmbH**
Wetzlar, Germany
- /// **Sécheron Hasler Ibérica**
Madrid, Spain
- /// **Sécheron Hasler UK**
Manchester, UK

ASIA

- /// **Sécheron Office Japan**
Tokyo, Japan
- /// **Sécheron Hasler India**
Gurgaon, India
- /// **Pixy China**
Shanghai, China
- /// **Sécheron Hasler China**
Shanghai, China

AMERICAS

- /// **Sécheron Hasler do Brasil**
São Paulo, Brazil
- /// **Sécheron Hasler USA**
Pittsburgh, USA

WORLDWIDE PRESENCE

Close to you
in more than
40 countries
worldwide





over 135 years

1887 → 2024



SAIRA
ELECTRONICS

acquired in 2016

PIXY
MOBILE VISUALIZATION

acquired in 2018

HASLERrail Italia
from 2019

HASLERrail
from 2020

HASLERrail
PIXY

International Railway Industry Standard
A Quality Standard for the Railway Industry



ISO 9001:2015
Quality Management System



ISO 14001:2015
Environmental Management System

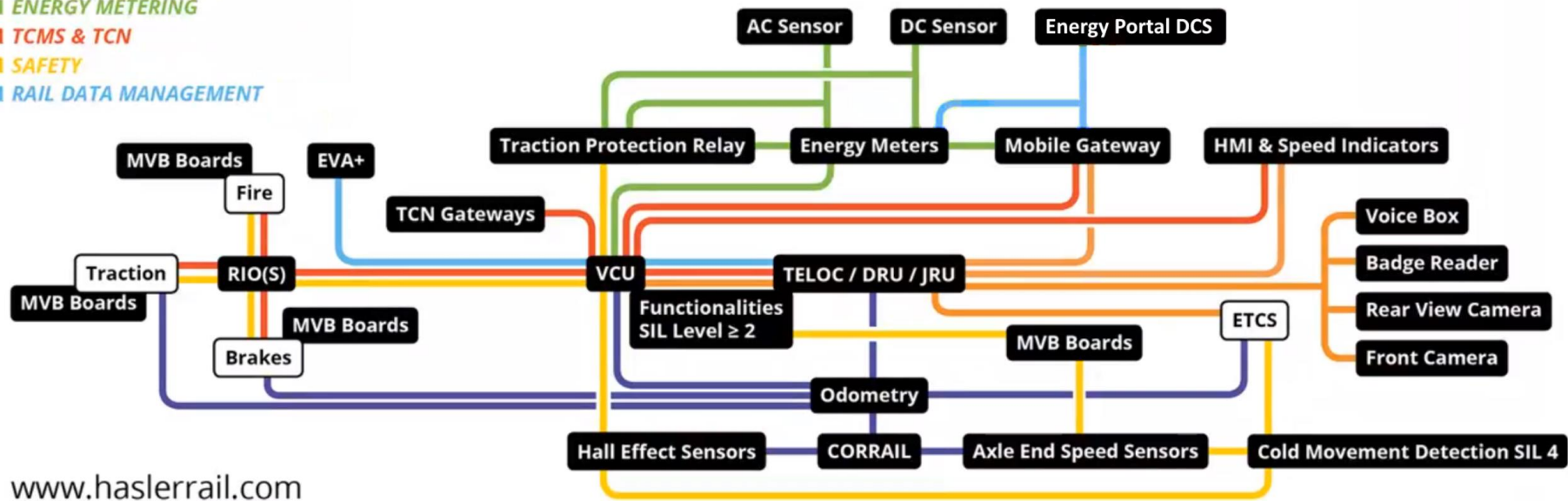


ISO 45001:2018
Occupational Health and Safety Management System



THE SYSTEM

- DATA ACQUISITION & RECORDING
- SPEED SENSING & ODOMETRY
- ENERGY METERING
- TCMS & TCN
- SAFETY
- RAIL DATA MANAGEMENT



www.haslerrail.com

REFERENCES – GLOBAL INTEGRATORS

THALES



ELECTROMOTIVE



LORAM



BOMBARDIER



vossloh



SIEMENS



ALSTOM



CAF



MATISA



STADLER



mermec group



AnsaldoSTS



A Finmeccanica Company



Globally, more than
100'000
units are in daily service



pesa
Pojazdy Szynowe
PESEA Bydgoszcz SA



Plasser & Thuermer



Kawasaki



NIPPON SIGNAL



MITSUBISHI ELECTRIC



HITACHI
Inspire the Next



TOSHIBA



HYUNDAI
Rotem



中国中车
CRRC



CG Power Solutions



CG Power Solutions



beml



tulomsas
Türkiye Lokomotif ve Motor Sanayi A.Ş.

REFERENCES – EUROPEAN OPERATORS MAINLAND

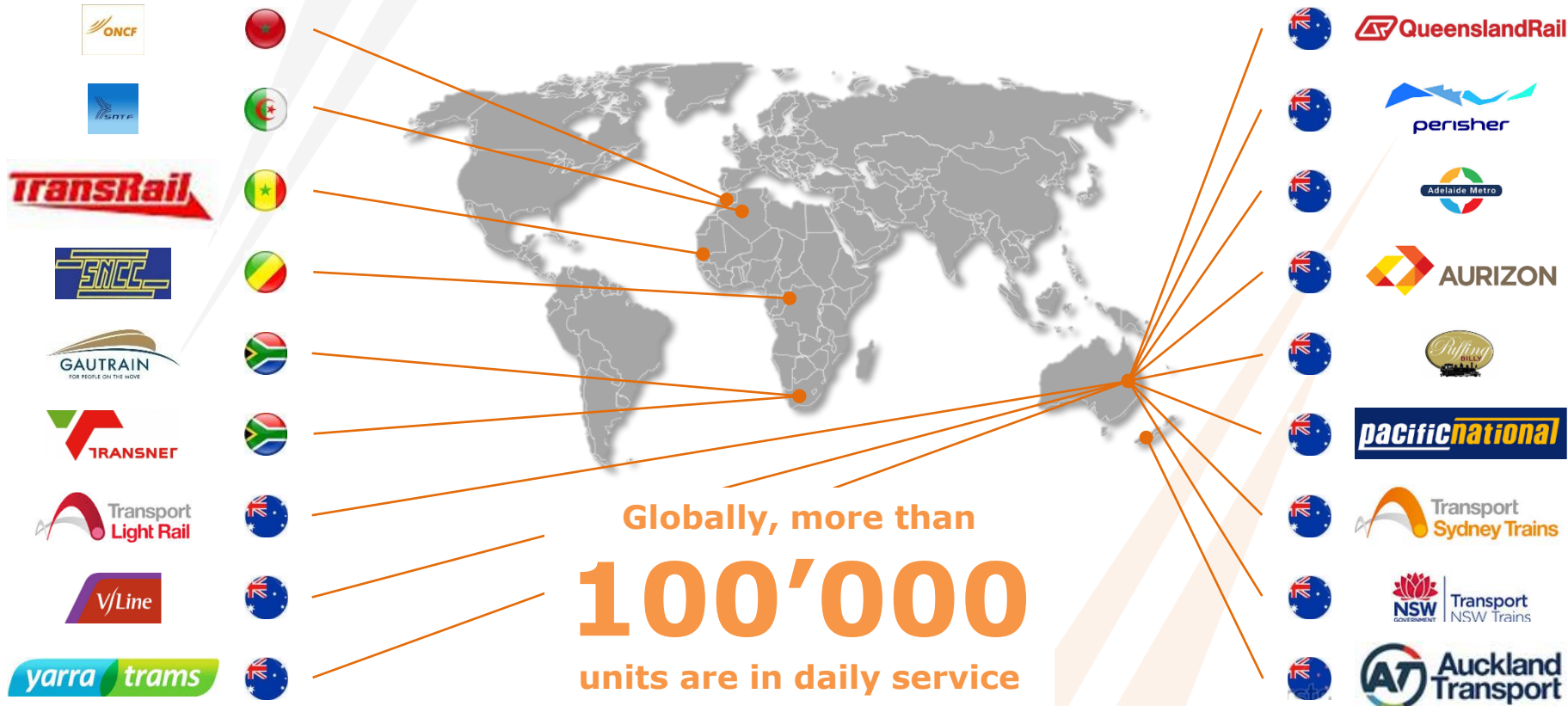
A world map with a grey background and white outlines of continents. Numerous orange lines radiate from a central cluster of orange dots in Europe, extending to various European countries. On the left side, there are logos and flags of rail operators: LÖNN (yellow lightning bolt), SNCF (blue stylized 'S'), DSB (red hexagon), VBK (red arrow), SSB (yellow text), DB BAHN (red square with white 'DB'), SBB CFF FFS (red rectangle with white cross), renfe (purple text), and TRENITALIA (green stylized 'T'). On the right side, there are logos and flags of rail operators: VR GROUP (blue circle with white 'V'), VY (black stylized 'VY'), SL (blue circle with white 'SL'), SJ (grey stylized 'SJ'), PKP (blue hexagon with white 'PKP'), TCDD (red circle with white crescent and star), ČD České dráhy (blue stylized 'CD'), MÁV (blue square with white 'MÁV'), and ÖBB (red circle with white 'ÖBB').

Globally, more than
100'000
units are in daily service

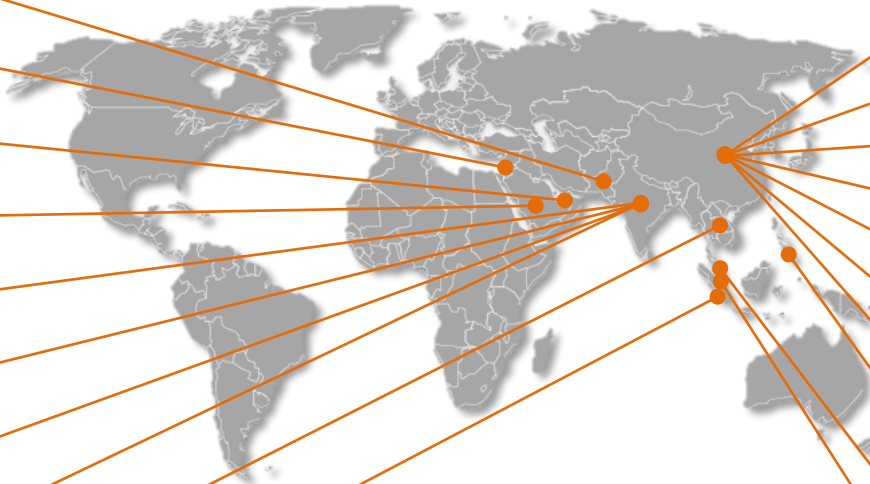
REFERENCES – OPERATORS IN UK & IRELAND



REFERENCES – OPERATORS IN AFRICA, AUSTRALIA, N. ZEALAND

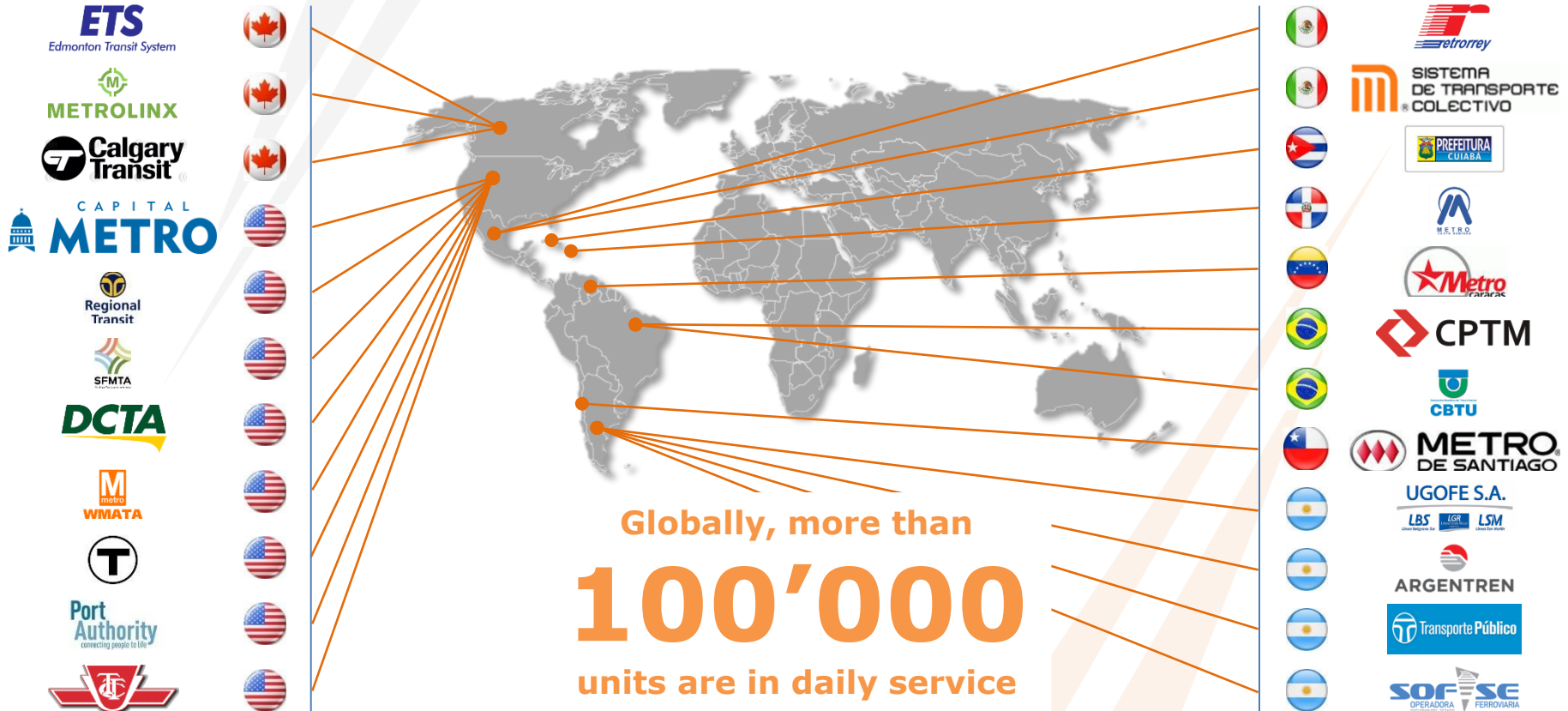


REFERENCES – OPERATORS IN ASIA



Globally, more than
100'000
 units are in daily service

REFERENCES – OPERATORS IN NORTH & SOUTH AMERICA



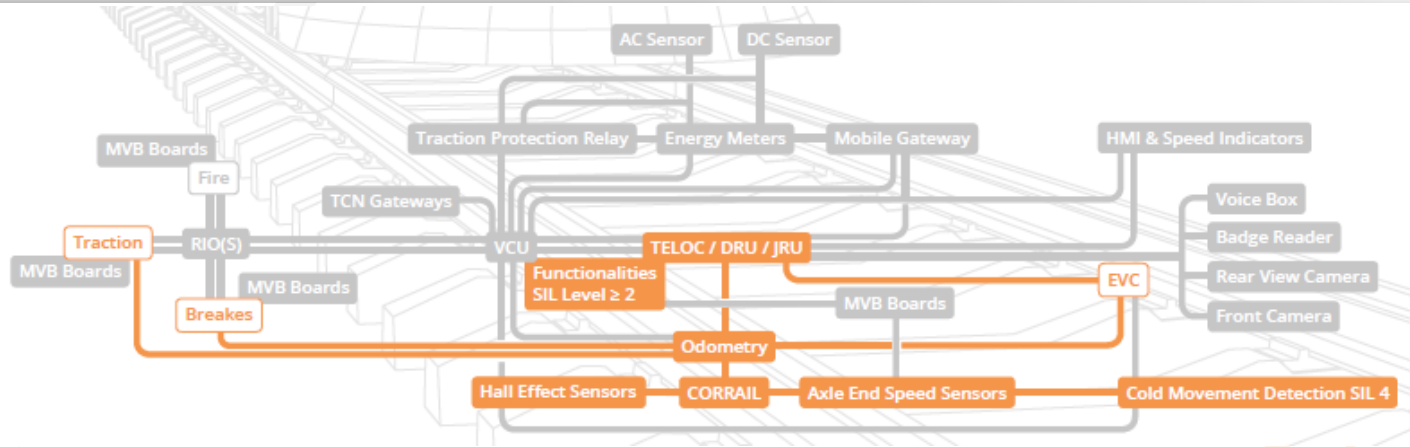
Globally, more than
100'000
 units are in daily service



HASLERRAIL – GENERAL PRESENTATION

Speed measurement and ETCS

SPEED MEASUREMENT AND ETCS



// Main products:

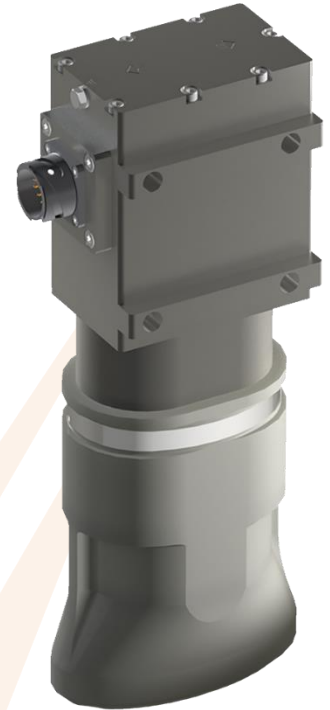
- // **Data acquisition by different sensors** (optical, hall-effect and CORRAIL)
- // **Cold Movement Detection**
- // **Juridical Recording Unit**
- // Signal transmission and data evaluation

// Main activities:

- // Engineering services linked to Specific Transmission Modules (**STM**)
- // Safety related components with **SIL certifications up to level 4**

Characteristics:

- // **Slip and slide free measurement** method
- // Measurement range 0.2 - 600 km/h
- // Distance measurement **precision >99.9%**
- // **No Filterbox requires**
- // **No re-adjustment of the sensor required,** even if the wheels are re-centered
- // Smart sensor with self diagnostics
- // Rugged algorithm with a innovation time less then 20ms
- // Optical signal pre-processing with high quality
- // **25x less drop-outs compared to a radar** system
- // Total field experience to date
> 3 Million km of track



Characteristics:

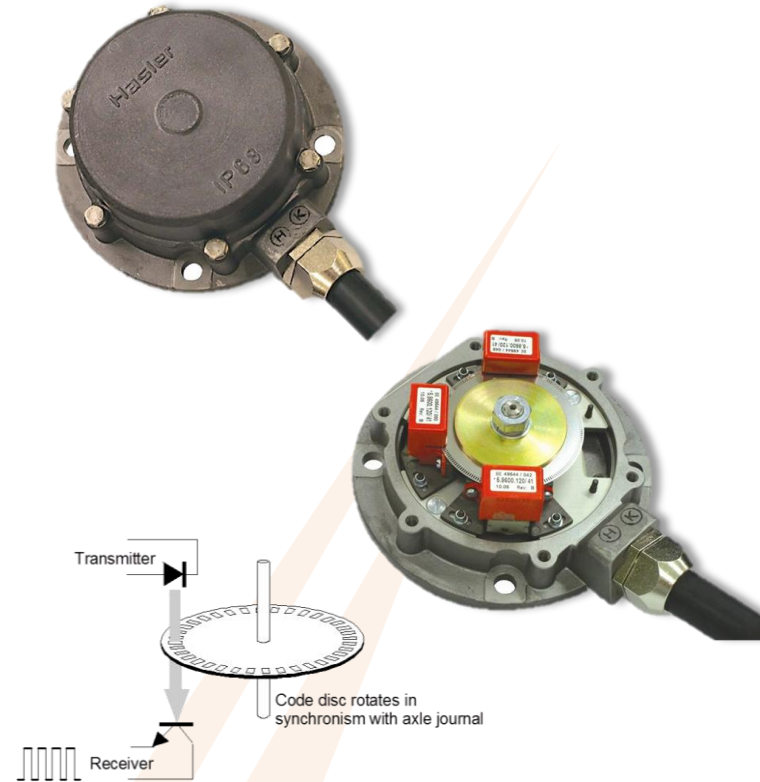
- /// **Slip and slide free measurement** method
- /// Measurement range 0.2 – 600 km/h
- /// Distance measurement **precision >99.9%**
- /// **No re-adjustment of the sensor required,** even if the wheels are re-centered
- /// Smart sensor with self diagnostics
- /// Rugged algorithm with innovation time less than 20ms
- /// State of the art MMIC technology
- /// Reliable measurements even on smooth surface (concrete, tarmack, slap track, level crossing etc.)



HASLER®OPG (OPTICAL PULSE GENERATOR)

Characteristics:

- Configurable mechanical interfaces
- Wide choice of mechanical coupling and adaptor parts, cable lengths, connectors, etc.
- Customer specific variants for new projects.
- Configurable signal outputs
- Wide choice of signal output characteristics, e.g. 12...24V voltage signal, 7-14mA current output, push-pull, 90°...120° phase shifts, etc.
- Up to 6 galvanically isolated channels.
- Reliable and worldwide proven in use since 1980
- High resolution optical sensors with up to 400 pulses per revolution.
- Robust mechanical design, tested beyond the EN 50155 standards.



ETCS JURIDICAL RECORDING UNITS (JRU)

ALSTOM

CAF

MERMEC
AN ANGEL COMPANY



BOMBARDIER

Hitachi Rail STS

THALES

SIEMENS

HaslerRail works with all UNISIG members

Multi use unit approach for ETCS

ETCS data JRU



National data
Maintenance data
Vehicle, train recordings

TELOC® – MULTI USE UNIT

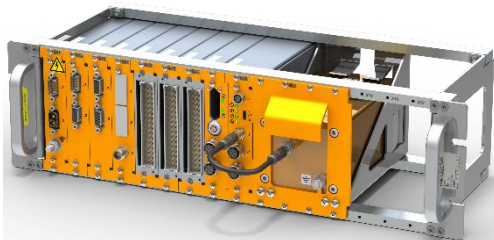


ETCS Structure

Property	Value	Val
EM_3	3	EMERGE ORDER [
▼ HEADER		10 fields
NID_MESSAGE	3	EMERGE ORDER [
L_MESSAGE	70.0	70
▶ DATE		3 fields
▶ TIME		4 fields
▶ TRAIN_POSITION		7 fields
Q_SCALE	1.0	1 [1]
▶ NID_LRBG		2 fields
D_LRBG	17212.0	17212
Q_DIRLRBG	0	Reverse
Q_DLRBG	1	Nomina
L_DOUBTOVER	4313.0	4313
L_DOUBTUNDEI	4313.0	4313
V_TRAIN	35.0	35 [7]
NID_DRIVER	00000000000000000000	0000000
NID_ENGINE	101	101
M_LEVEL	1	Level ST by NID_!
M_MODE	13	STM Na
▶ DATA		3
M_BRAKE_ORDER	1	Applcat

Multi use unit approach for ETCS

ETCS data JRU



National data
Maintenance data
Vehicle, train recordings

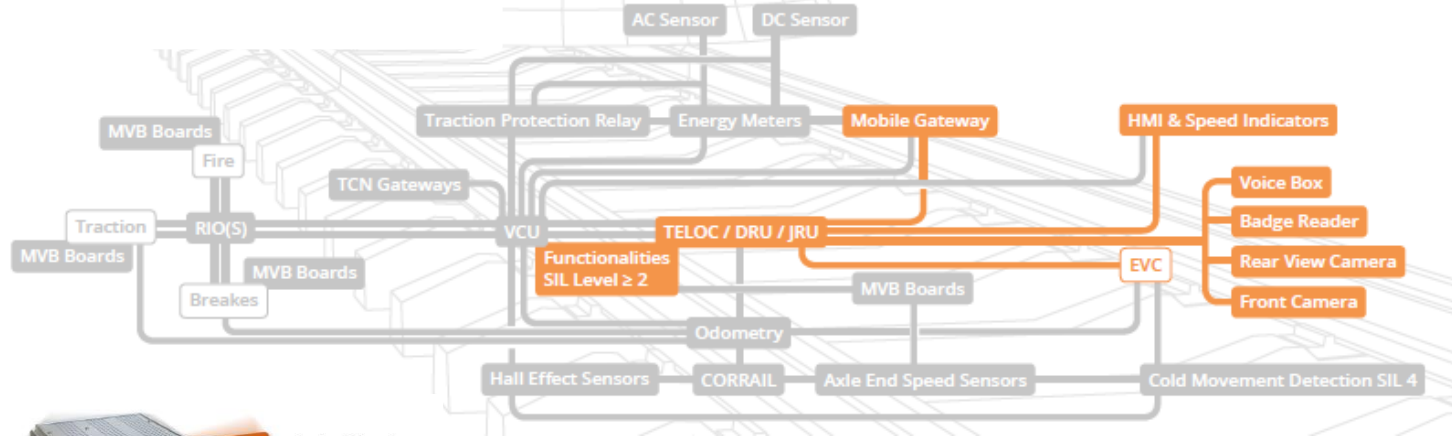


HASLERRAIL – GENERAL PRESENTATION

Data recording and safety



DATA RECORDING AND SAFETY



- // **Founded in 1887**
- // HaslerRail has always produced speed indication and data recording systems
- // Data Recording is no longer only used for post incident/accident data analysis
- // Now supports safety management during daily operations
- // Now supports drivers and fleet management

TELOC®4000 – GENERAL OVERVIEW



Teloc 4000 targets is to increase performance and flexibility of the previous generation and enable the definition of customer oriented configuration in order to reduce the NCR.



Customer oriented configuration set doesn't only improve the price of the device but allows the reduction of risk of delivery delay by enabling a specific sourcing that in this moment is highly critical.



TELOC 4000 is the main output of a set of product that would be based on the "TELOC PLATFORM", future energy, TCMS and security product from HR will be all based on the design of this platform.



Mechanical flexibility of the TELOC 4000 helps the replacement of existing generation of TELOC that are about to be obsolete.



TELOC®4000 - 4 PRODUCT HIGHLIGHTS



NO BACKPLANE: The Teloc 4000 doesn't implement a backplane, internal communication and power-supply are supported with the ETHERCAT technology which enables major flexibility and reduce the risk of overheating that a backplane based product normally have.



EXTENDEBILITY: The Hardware structure of the TELOC 4000 allow to extend existing configuration by simply adding a box to an existing rack.



SECURE BY DESIGN: The T4000 is designed following the described by the IEC62443-4-1 and include a set of security feature that makes it the best in class EVR from the security perspective.



DATA AVAILIBLITY: The T4000 integrates a WiFi/LTE interface that allows automatic data transfer on the ground or on the cloud without the need of an external MCG.

TELOC PLATFORM: BL FUNCTIONAL EVOLUTION

B
L
1

- Railway power supply range
- Quad core CPU
- GW feature (MVB-CAN)
- Fieldbus communication (MVB, ETH, CAN, IBIS, RS485)
- Mobile communication (LTE, UMTS, GSM, WIFI)
- Geo localization (GPS, GLONASS, Galileo, Beidou)
- Vehicle configuration
- Maintenance/service interface
- Digital I/O
- Analog I/O
- Mixed Digital/Analog I/O
- Odometry function
- Programmable logic control
- Data extraction
- Threat detection (on EVA+)
- TPM
- SecLog
- Driver safety device
- Safe speed transmission

B
L
2

- Remote I/O control
- Customer development framework
- MCG feature set
- PLC integration for customer usage
- RADIUS compatibility
- Secure boot
- Roll protection
- Speed Threshold
- Speed comparison for speed indicator
- Zero speed detection
- Platform clearance zone

Regular feature
Security feature
Safety feature

TELOC®4000 – COMPARED TO TELOC®3000

Characteristics:

Higher modularity

- TELOC®4000 has more flexibility with regards to Functions and Interfaces
- Easier maintenance – e.g. battery replacement

Less weight

- Non IEEE version – 10% less
- IEEE 1482.1:2013 – 30% less
- Smaller size – **depth 30mm less**

More mechanical freedom

- Size grows with functions
- Enables customized housing**
- Additional options for mechanical integration

NEW TELOC® GENERATION

- Ensures longer product availability

European (Non IEEE) version



IEEE 1482.1:2013 fully compliant version



CPM (CRASH PROTECTED MEMORY)



Two CPMs to meet worldwide requirements



- // CPM T3I 5.2621.032, ca.3.5 kg
- // **Internal mounting**
- // Complies with:
 - // IEC 62625-1, 4.3.1.7 Table 1 A and B
 - // GO/OTS 203, Part C
 - // GM/RT 2472 Issue 1 and 2
 - // IEEE Std. 1482.1 Part 4.5 – 1999

- // CPM T3E 5.2621.033, ca. 9 kg
- // **External mounting**
- // Complies with:
 - // **IEEE Std. 1482.1 Part 4.5 – 2013**
 - // FRA 49CFR229

SAFETY FUNCTIONS

Safety functions:

- Dead man control – **up to SIL4**
 - Driver safety device (DSD), SIFA
- Roll back protection – **up to SIL4**
 - Used for Mountain Railways, Metros
- Speed level control – **up to SIL4**
 - Overspeed detection
- Zero speed detection – **up to SIL2**
 - Used for Metros (Door open)
- Safe speed transmission – **up to SIL2**
 - Used for safe communication with other systems
 - and others...





HASLERRAIL – GENERAL PRESENTATION

EVA+ Rail data analytics

WEB-BASED TRAIN DATA ANALYTICS PLATFORM



EVA+

- Capture, process and store train data
- Catch events and alert staff

- Web API



GSM, WiFi



- Speed, distance & location
- Power\Brake handle position
- Doors open\closed and train protection systems (e.g. AWS)
- ETCS
- More...



Train data analysis



- Analyse events (e.g. emergency brake applications, SPADs, faults, etc.) and find root-cause
- Analyse journeys & driver performance to improve
- Create density maps of wheelslip, ADD, etc.
- More...



Software integration



- Network model
- Timetable management
- Work orders management
- More...

Train operators use EVA+ to



Reduce risk of incidents

By keeping engineers away from rolling stock and track

Optimise energy consumption, and reduce wear and tear

By improving driving technique

Speed up service recovery and improve timetable

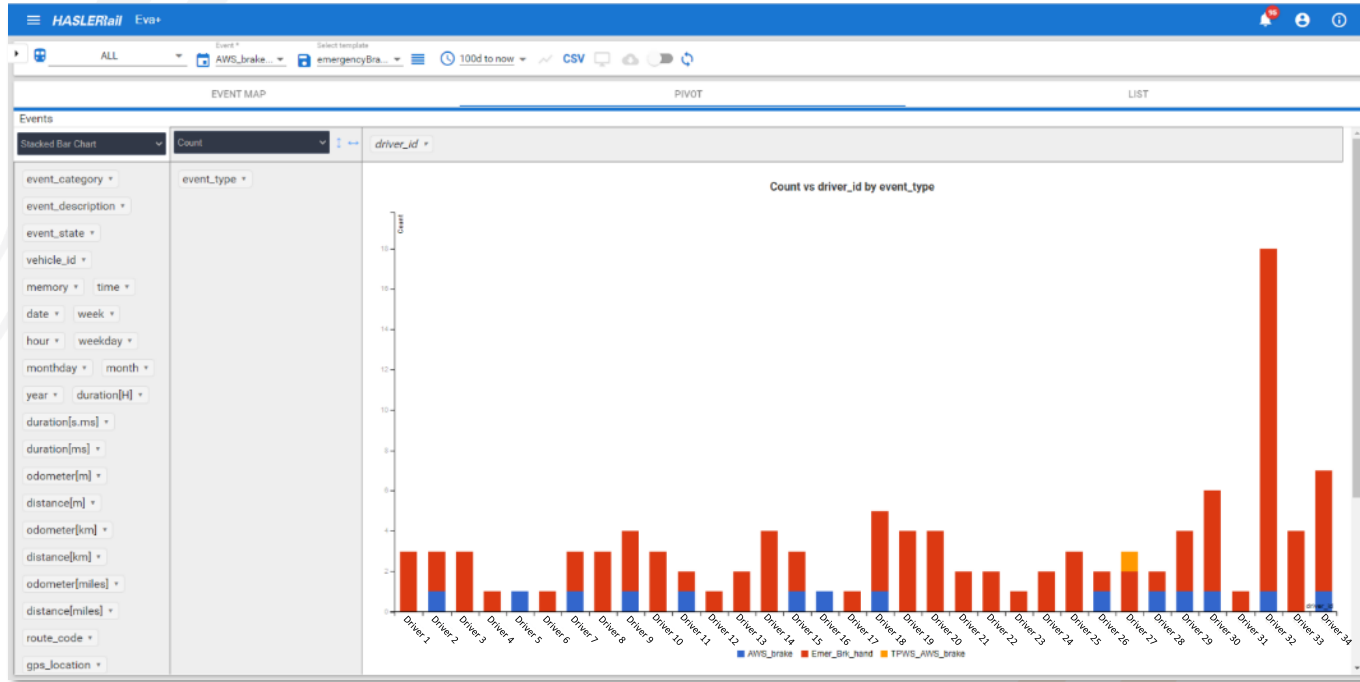
By getting real-time alerts, locating trains in real-time, and quickly finding root-cause

Comply with reporting rules and regulations

By converting and publishing TELOC© data on the fly

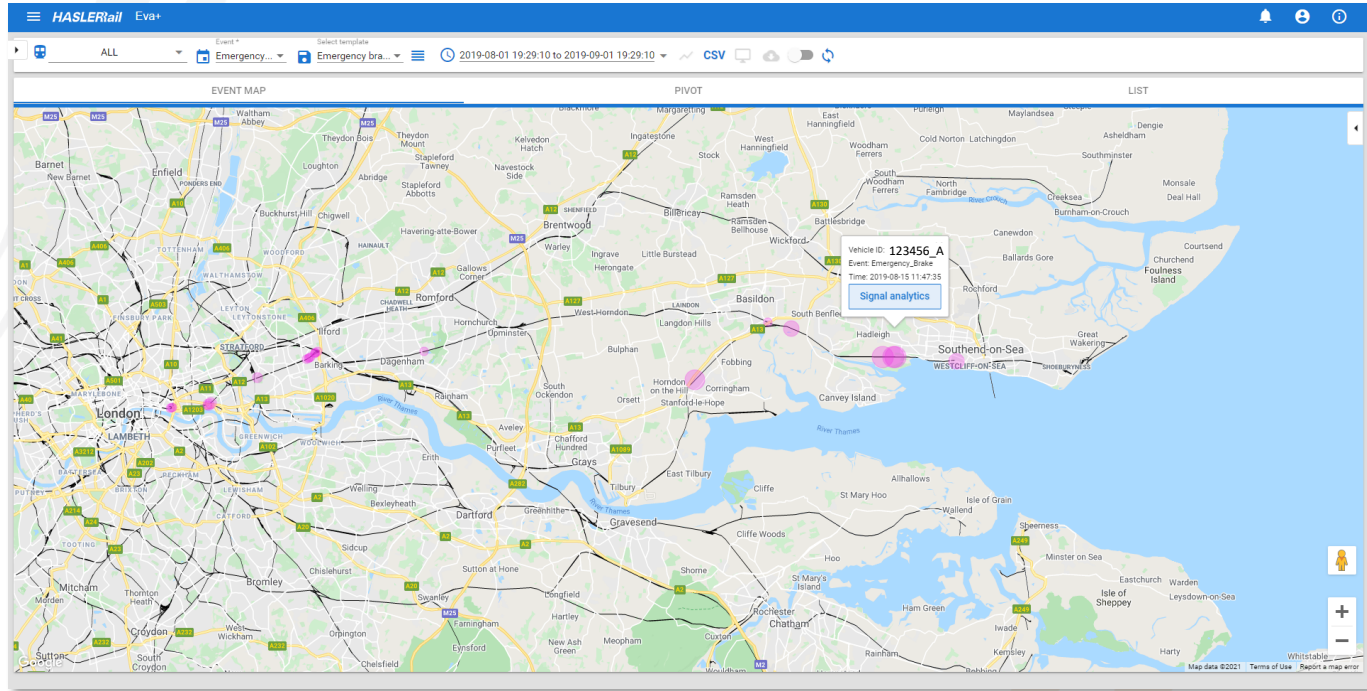
E.g.: DIS/ZTE: Italy, PZB/LZB: Germany, PTC: U.S.

USE CASE – OVERVIEW OF EMERGENCY BRAKE APPLICATIONS BY DRIVER



Number of emergency brake applications → Hints at potential to improve driving skills of one driver, or vehicle faults

USE CASE – MAP OF MOST SEVERE EMERGENCY BRAKE APPLICATIONS



Map of emergency brake applications → Quickly spot most severe cases to investigate

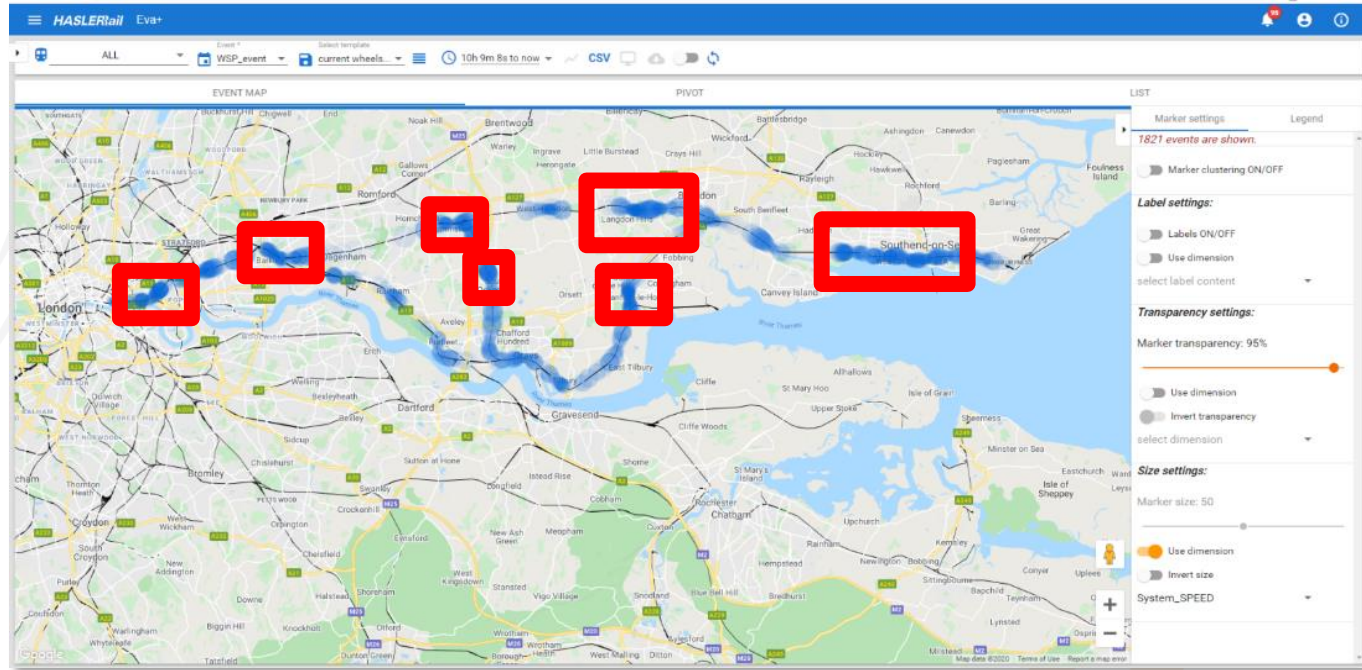


USE CASE – LIVE MAP AND IMMEDIATE ALERTS

The screenshot displays the HASLERrail Ev+ interface. On the left, a sidebar shows details for train 123456_A, including its type (Class357), speed (71), update time (2s), and composition. Below this, it lists 'Last signals' and 'Last events' such as AWS_brake, DSD_brake, Emer_Brk_hand, and Emergency_brake. The main area is a map showing the train's current location (123456_A) and other nearby trains. On the right, a notification panel titled 'Total 79 notifications. 50 shown.' lists various alerts with timestamps, such as 'Emer_Brk_hand : Emer_Brk_hand_A [123456_A]' and 'AWS_brake : AWS_brake [212110_A]'. A 'Set all as seen' button is visible at the bottom of the notification panel.

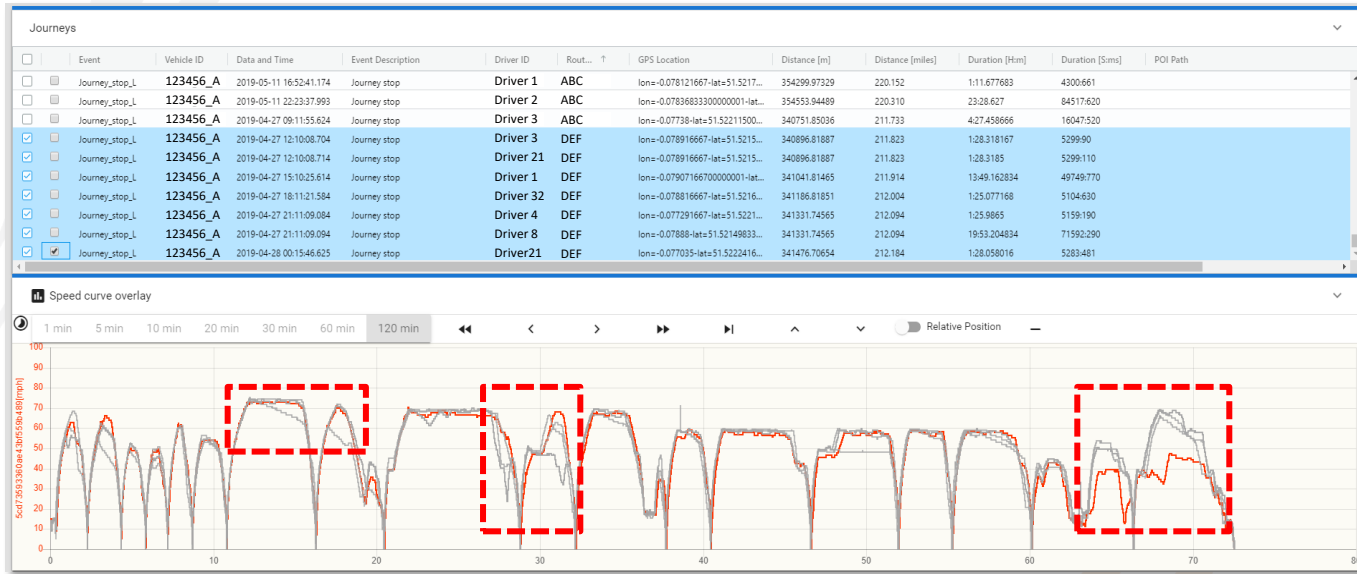
Real-time trains map (GPS / CBTC location) → Instantly locate vehicles and occurrence of events -> speed up driver support and resume service

USE CASE – HEATMAP OF WHEEL SLEEP AND SLIDE



Wheel slip and slide map → View network sections with highest density
→ indicates where to act first to increase wheel-track adhesion

USE CASE – JOURNEYS SPEED CURVE DEVIATIONS



Compare different journeys and spot deviations → Potential driver mistakes, engine-related issues or timetable drivability problems

USE CASE – ENERGY INEFFICIENT JOURNEYS

Similar journeys, different drivers → different driving styles

- Compare energy consumption
- Compare energy regeneration
- Compare drivers
- Hints at potential to improve driving skills of drivers



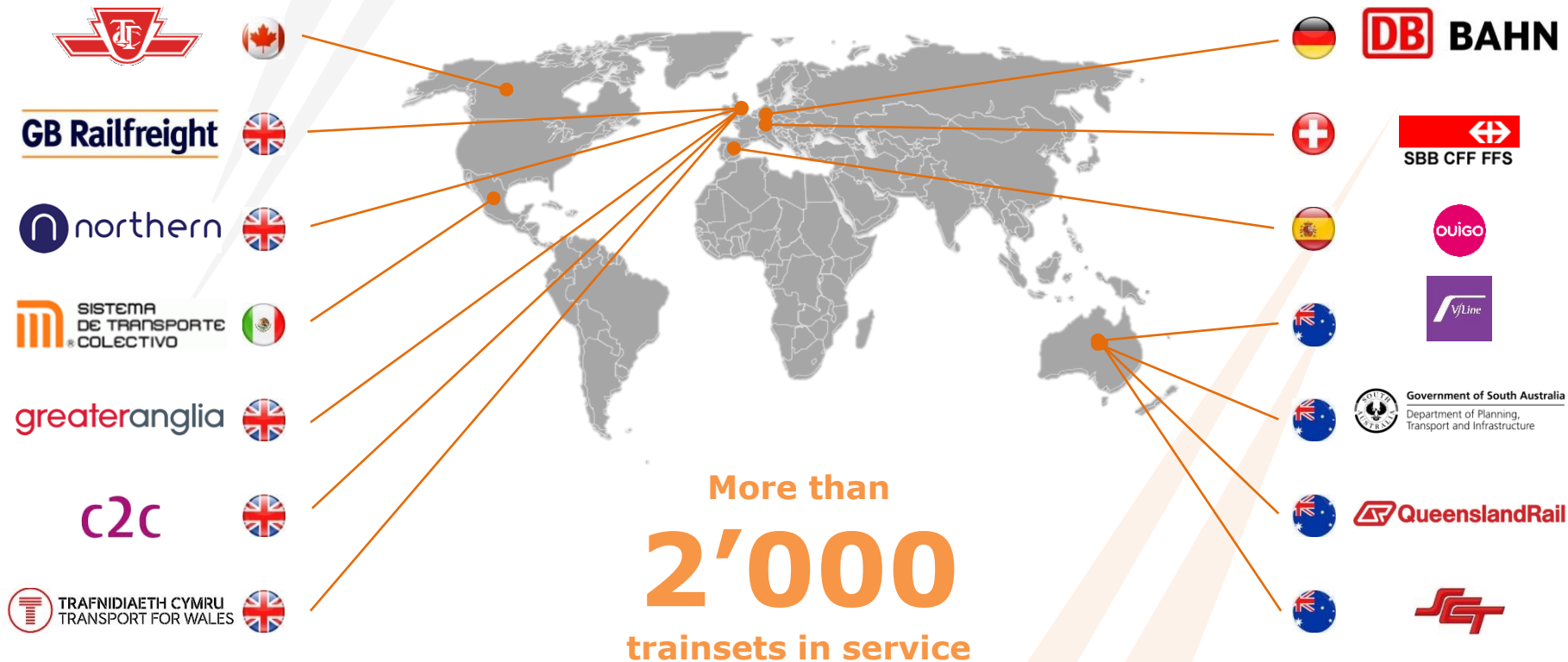
Summary document for the REM monitoring page [22/7/2020 00:00 - 22/7/2020 23:59]

Detection	lat	lon	Active energy		Detection speed 108 car_A	Distance 108 car_A	Active energy		Detection speed 108 car_B	Distance 108 car_B
			consumption 108 car_A	regeneration 108 car_A			consumption 108 car_B	regeneration 108 car_B		
22/7/2020 03:15	--	--	0.00	0.00	--	0	0.00	0.00	--	0
22/7/2020 03:16	--	--	2.11	0.00	--	0	2.09	0.00	--	0
22/7/2020 03:17	--	--	2.75	0.00	--	0	2.61	0.00	--	0
[...]										
22/7/2020 20:40	44.50765	11.32898	2.34	0.00	23.7	402	2.42	0.00	2.7	402
22/7/2020 20:41	44.50891	11.32408	2.55	0.01	24.2	414	2.58	0.00	2.4	414
22/7/2020 20:42	44.50946	11.32205	1.85	0.21	0.4	173	1.61	0.23	8	173
22/7/2020 20:43	44.50945	11.32207	2.13	0.00	0.0				0	0
			5.038.28	826.46	--	383	4.735.37	817.28	--	383.267

Summary document for the REM monitoring page [22/7/2020 00:00 - 22/7/2020 23:59]

Detection	lat	lon	Active energy		Detection speed 108 car_A	Distance 108 car_A	Active energy		Detection speed 108 car_B	Distance 108 car_B
			consumption 108 car_A	regeneration 108 car_A			consumption 108 car_B	regeneration 108 car_B		
28/7/2020 03:10	--	--	0.00	0.00	--	0	0.00	0.00	--	0
28/7/2020 03:11	--	--	2.28	0.00	--	0	2.16	0.00	--	0
28/7/2020 03:12	--	--	2.79	0.00	--	0	2.52	0.00	--	0
[...]										
28/7/2020 20:28	44.50706	11.33421	3.83	0.00	29.3	451	3.64	0.00	29.7	451
28/7/2020 20:29	44.5078	11.32808	2.42	0.00	29.4	494	2.46	0.00	29.2	494
28/7/2020 20:30	44.50873	11.3235	1.51	0.12	9.5	394	1.54	0.13	0	394
28/7/2020 20:31	44.50879	11.32317	1.40	0.00	0.2				0	0
			5.176.76	682.67	--	382	4.971.41	687.31	--	382.826

EVA+ REFERENCES





HASLERRAIL – GENERAL PRESENTATION

Conclusion

Marketing & Sales

Our **local sales team** are close to our customers to identify their needs and propose the **most valuable solutions** contributing to the success of their projects. Will an off-the-shelf solution not meet your requirements, we can come up with a **tailor-made** response.



Local Productions

In order to meet **specific market requirements**, and wherever possible, our local organization provides solutions and equipment with **local content integration**.



Engineering & Support

Our engineers and technicians provide our customers with a **strong support** and **dedicated services** throughout all equipment purchase and installation phases. It also includes **local engineering** for customized solutions.

Maintenance & After-Sales

Our qualified **local service point** supports our customers through the delivery of **original spare parts**, as well as the execution of **preventive maintenance and repair** of our equipment during its entire life time.

QUALITY APPROACH

- ✓ Customers needs are anticipated and addressed
- ✓ Quality management & strict application of working procedures
- ✓ Each single product is tested before leaving our Group factories
- ✓ Continuous increase of the added value of our products & solution through innovation
- ✓ Initiatives and sense of responsibility of our collaborators are encouraged
- ✓ Employees expertise level is constantly maintained and raised through continuous training
- ✓ **Sécheron, HaslerRail and Pixy certified according to ISO/TS 22163, ISO 9001:2015 standards**

ENVIRONMENT, HEALTH & SAFETY

- ✓ Efficient system to manage Environment, Health & Safety (EHS) issues, based on **ISO14001:2015 & ISO 45001:2018**
- ✓ Limit the impact of our business on the environment
- ✓ Protect people against professional accidents and diseases
- ✓ Applicable to all employees and partners involved in our business
- ✓ Applicable to all activities including R&D, supply chain, production, after-sales service, etc.
- ✓ **HaslerRail has received EcoVadis silver medal rating**

HUMAN RESOURCES

- / Highly qualified and motivated employees are our greatest asset
- / Stimulating and creative work environment
- / Flat hierarchy, strong direct communication channels leading to quick decision process
- / Strong sense of responsibility and entrepreneurial spirit of our employees contributing to the continuous raising of the company performances
- / Ambitious growth targets and rewarding work environment to support employees personal development

OUR VALUES

- / **Hands-on, entrepreneurial and results-oriented**
- / **Commitment to excellence and quality**
- / **Empowerment of the individual for personal growth**
- / **High integrity, responsibility and respect for the individual**
- / **Sustainable development**

CUSTOMER CARE

- / **Strong customer focus**
- / Large worldwide sales & service network
- / Qualified and trained technical staff on site to assist quickly and efficiently our customers
- / Strong customer support during all projects phases and equipment service life
- / Long field experience and profound technical expertise to propose the most valuable technical solutions
- / Standard portfolio or customized solutions

OUR STRATEGIC PRIORITIES

- / **Technological leadership of our solutions**
- / **Largest product ranges**
- / **Standard and customized solutions**
- / **Build long term relationships with our customers**
- / **Local market presence to support our customers**
- / **Highest quality and efficiency in the supply chain**
- / **In-house key capabilities to address our business**



THANK YOU FOR YOUR ATTENTION

HASLERRail

 **PIXY**

Sécheron Hasler GROUP

Smart. Safe. Swiss.