What's new on ENERGY METER

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EN50463:2017 STATUS

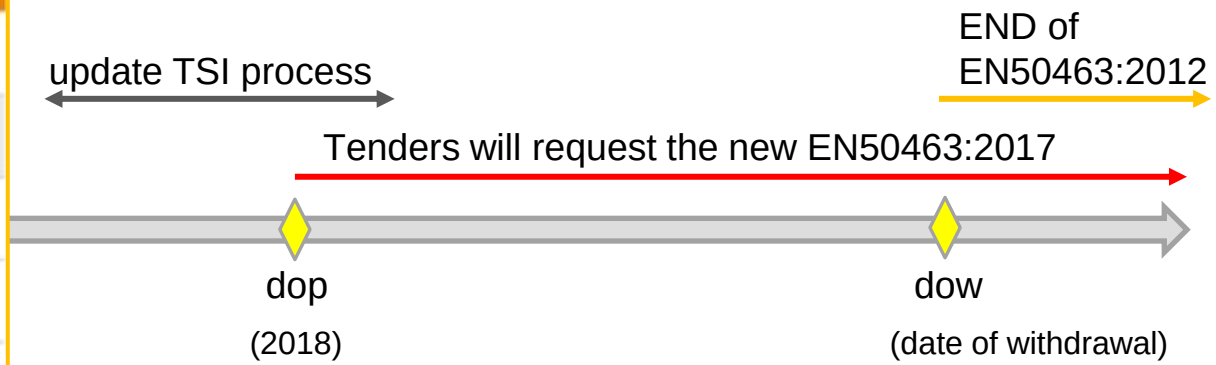
fprEN50463-2017 Approved 31-03-2017 (**FprEN:** Draft European Standard for formal vote)

Implementation Scenario

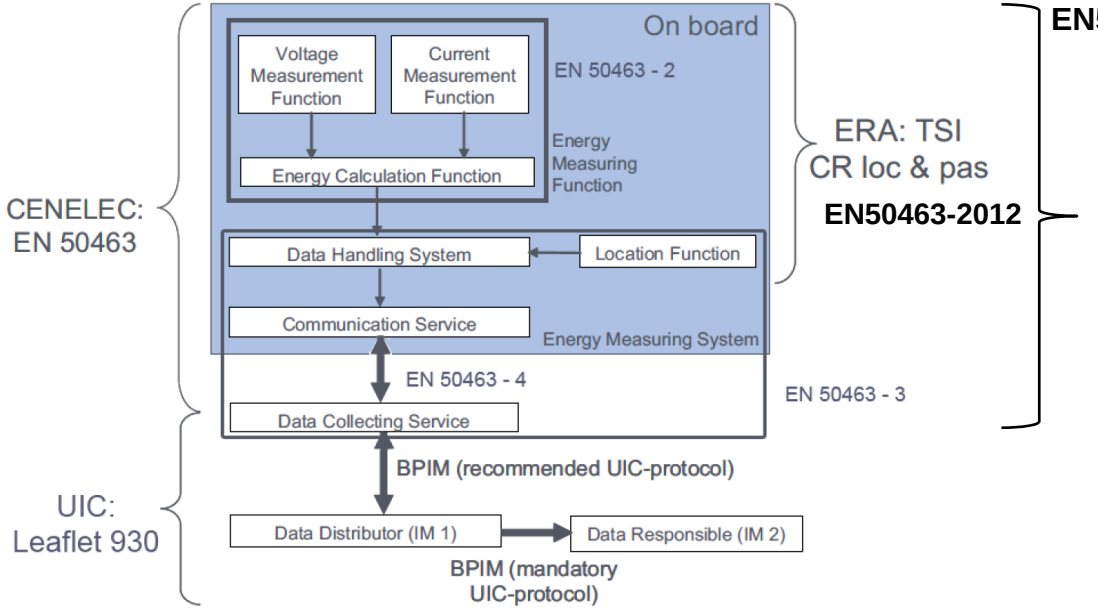
CENELEC process

Implementation Dates	
date of Ratification (DOR) (1)	2017-05-08
date of Availability (DAV) (2)	2017-06-30 (7)
date of Announcement (DOA) (3)	2017-10-02 (7)
date of Publication (DOP) (4)	2018-01-01 (7)
date of Withdrawal (DOW) (5)	2018-01-01 (7)

From Cenelec website



New EN50463 ON-BOARD vs ON-GROUND



Relationship between EN 50463, TSI and UIC Leaflet 930

Differences:
EN50463-1 minor changes
EN50463-2 minor changes
EN50463-3 changes for adapt to EN50463-4
EN50463-4 major changes
EN50463-5 changes for adapt to EN50463-4

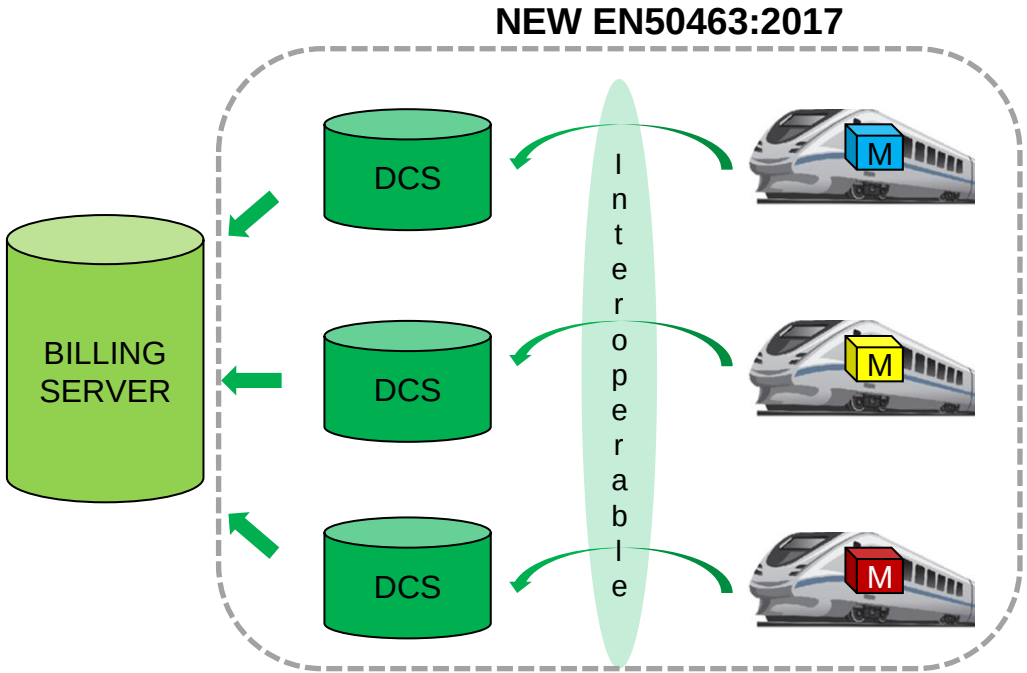
CIESSE RAILware team worked as active member in Cenelec WG11 for the EN50463:2017

EN50463-4 MAJOR CHANGES

Main goal is to define interoperability from EMS and DCS with:

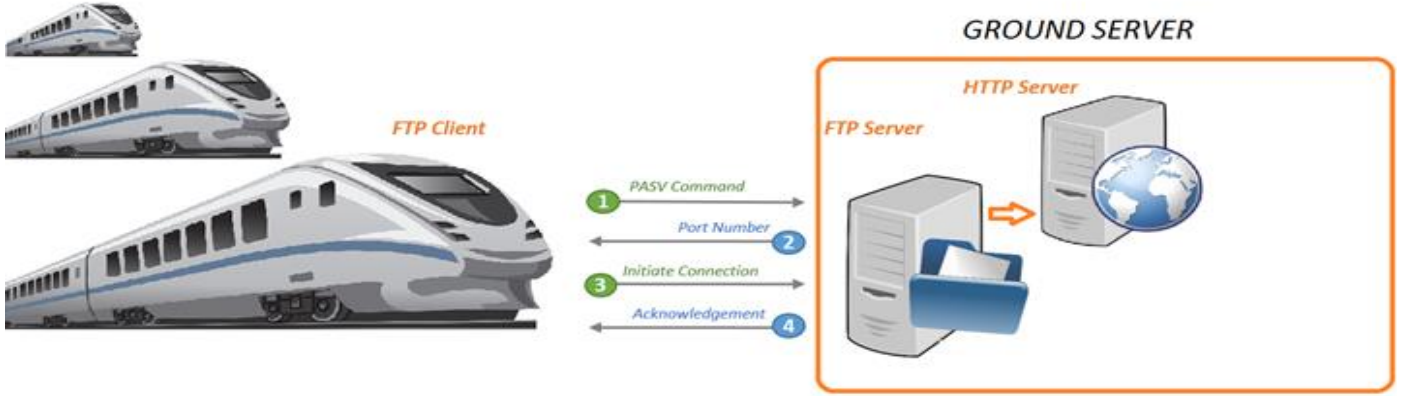
- New, more structured XML data format
- CEBD file protected with digital signature method RSA-SHA256
- Standardization of communication protocols (MAILBOX over FTP)
- Separating billing data from maintenance data (Reading Block)
- Added maintenance services
- Support for multiple DCS (Data Collection System)

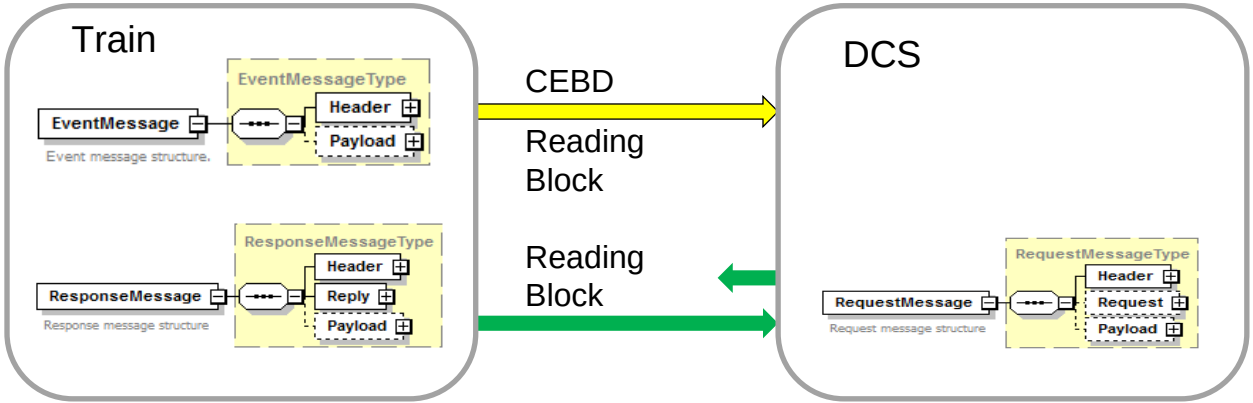
Train to Ground communication via EN50463-2017



passive FTP with
Integrity verification
through XMD5
Mailbox message structure

Train to Ground communication via EN50463-2017

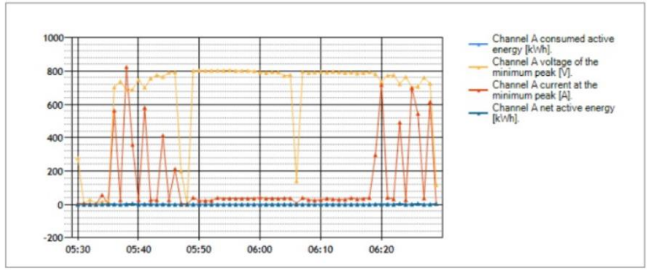




CEBD mailbox (with Energy data payload with XMD5 verification
Or
Reading block
Or
Event

Impacts and Benefits of the new EN50463:2017

- DCS can accept communication from different meters available on the market
- Energy data CEBD is secured using digital signature method RSA-SHA256 and the Mailbox message (that include CEDB) is protected with integrity verification through XMD5
- Extend capabilities with custom application data (advanced diagnostics, reporting) using Reading Block
- EMS is better integrated to train IEC61375
- Energy Meter needs to be improved (in Hardware and in Software) in order to implement the new features: XML schemas, digital signature, multiple DCS…
- Energy and Maintenance data specified
- Device diagnostic using “Event”

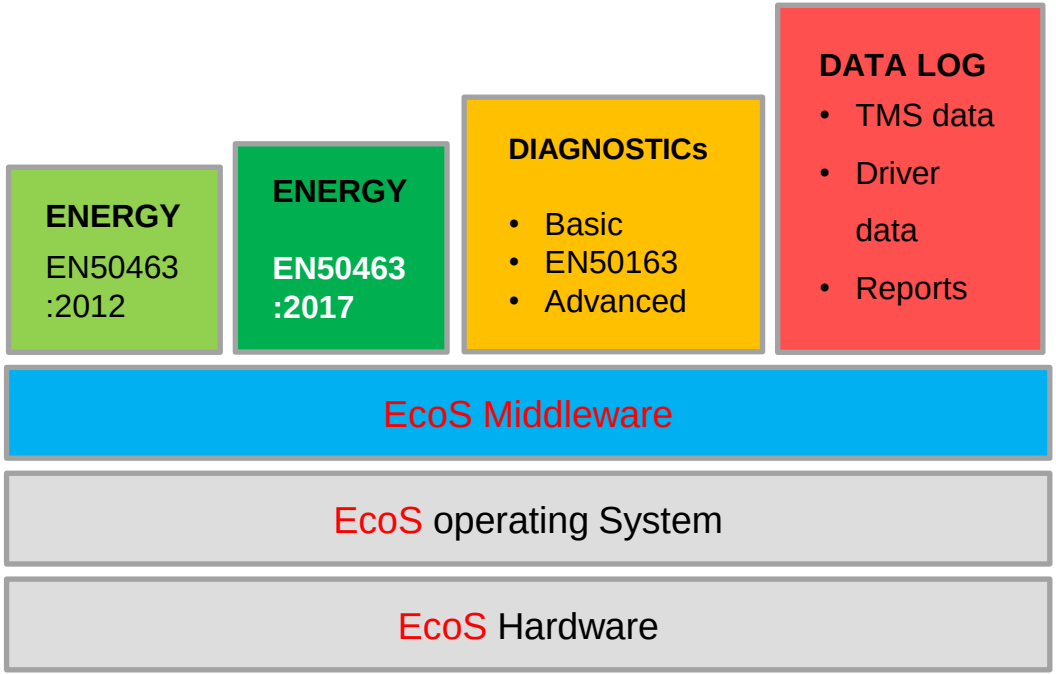


Ecos Platform Overview

EcoS®

EcoS is a platform for:

- Energy measurement **EMS**
- Integrated diagnostics **OHLD**
- Data Logging **LOG**
- Train to ground **COM**
- Data handling **DHS**

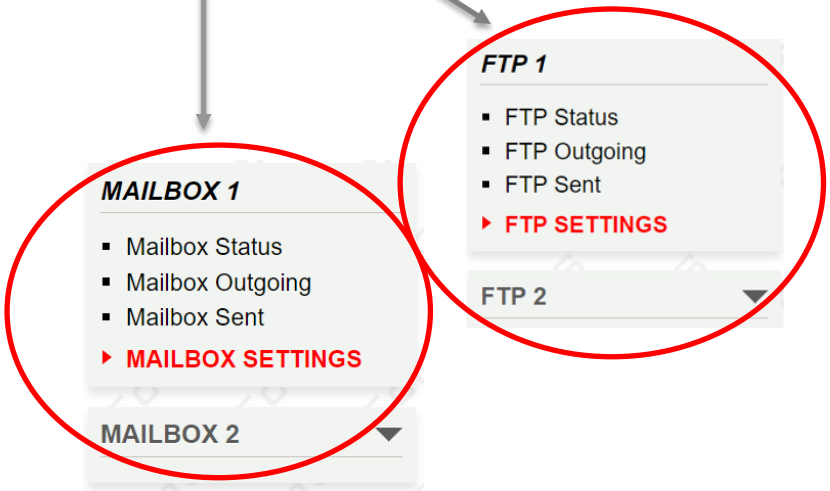


EcoS EMS ready for EN50463:2017

EcoS EMS will implement **both** standards & data files

Configurable by web interface:

- EN50463: 2012
- EN50463: 2017

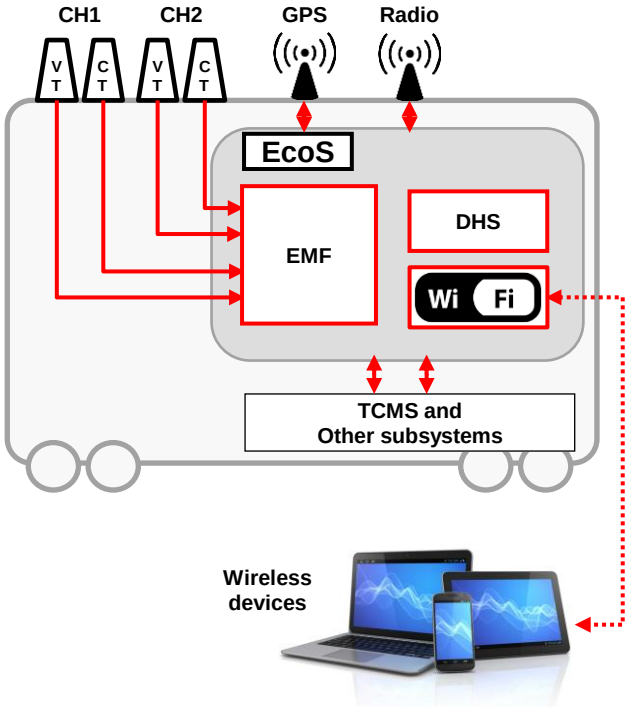


EcoS EMS ALL-IN-ONE

EcoS → ALL-IN-ONE in a small BOX

EMF + DHS

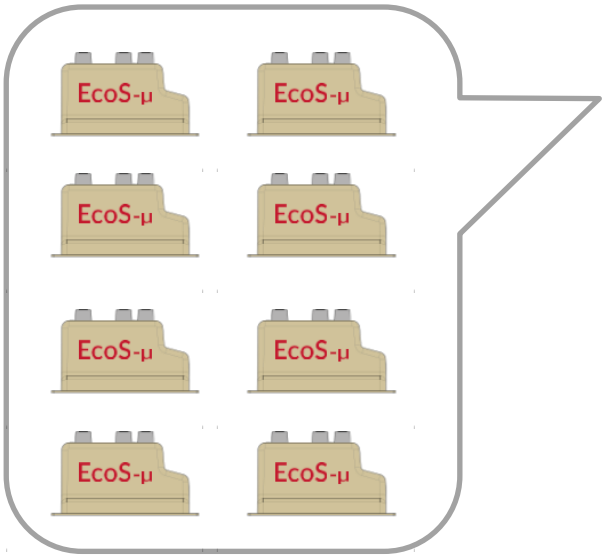
- EN50155, wide range 24V-110V
- Four DC/AC inputs channels (V/C)
- TCMS and Maintenance Ethernet interfaces
- Integrated WiFi Access Point and Interface
- GPS and TCMS localization and time sync
- Radio interfaces (2G/3G/4G)
- IP54 case with anti-tampering



EcoS µ distributed measurement

EcoS µ A family of smart meters-sensors designed for railway applications on trains with 3kV DC (750V, 1500V, 3000V) tractions

Smart meter



VFM + CFM + ECF

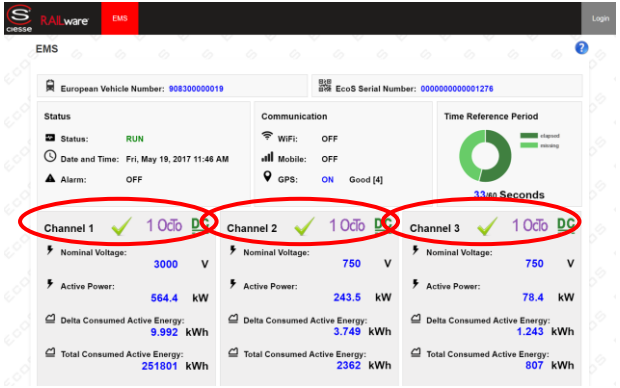
DHS/COM

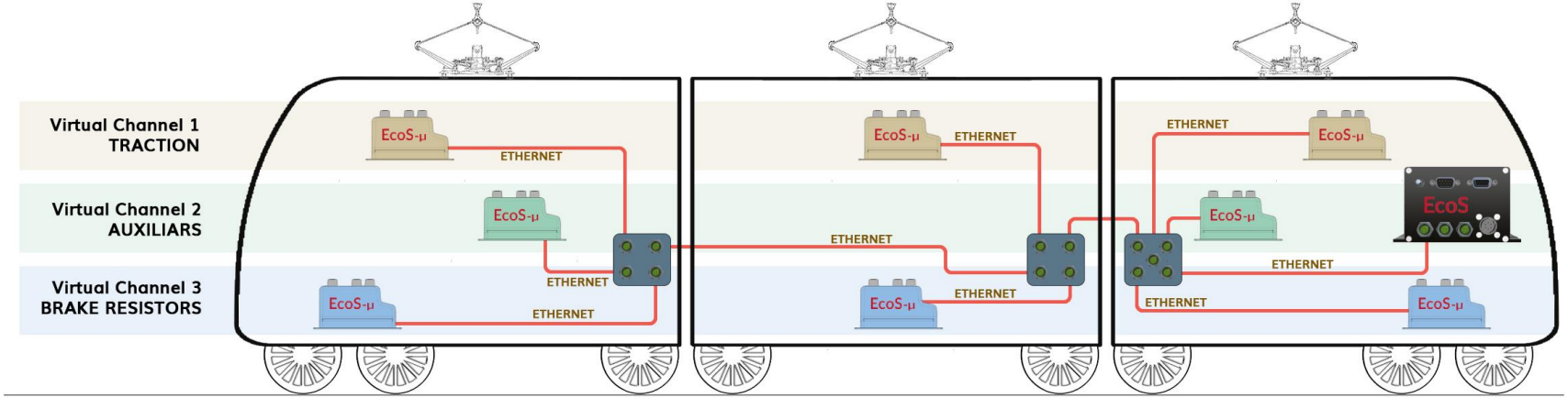
EcoS µ solution (smart meter & train DHS)

- Up to eight distributed channels (V/C)
- Combined Voltage/Current sensor and Energy calculation
- Digital interface to DHS & TCMS

EcoS µ

Automatic calculation of energy at train level on virtual channels

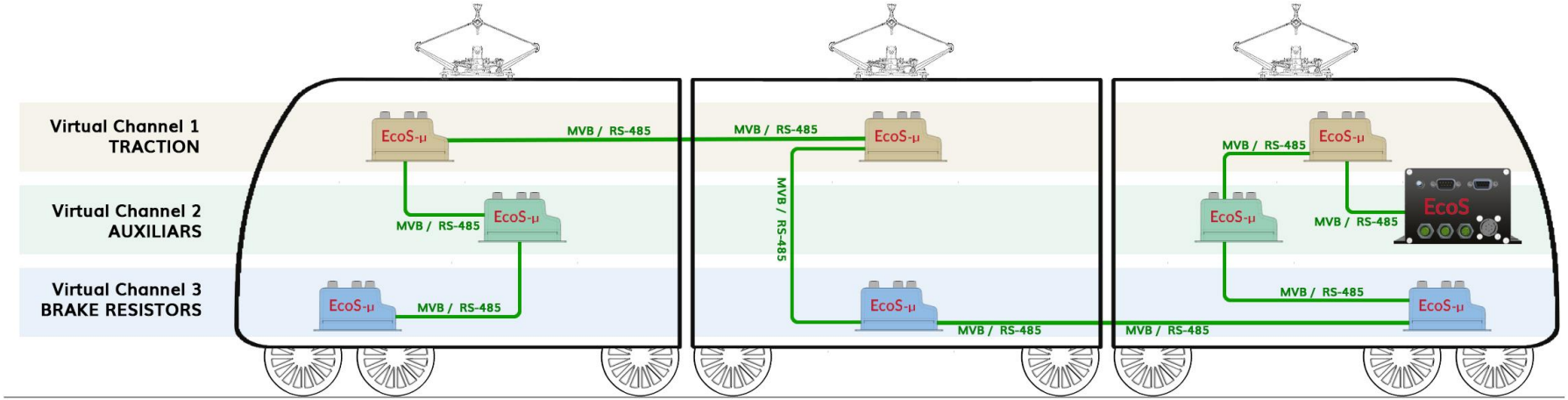




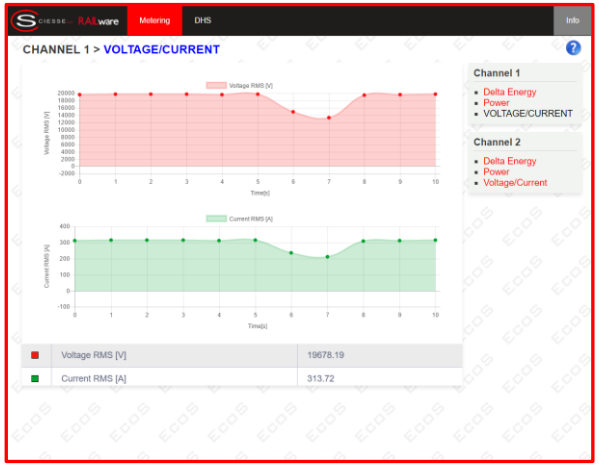
EcoS µ

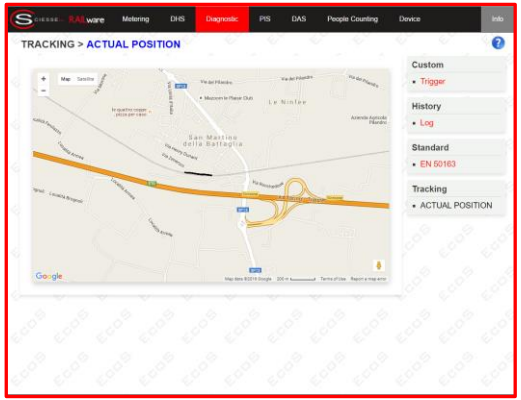
Automatic calculation of energy at train level on virtual channels

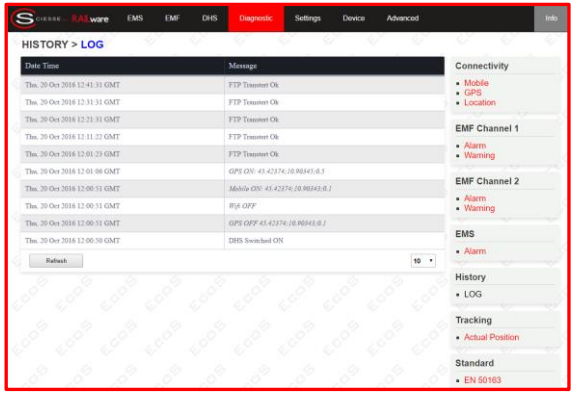
EcoS µ Smart meter



REAL TIME MONITOR OF MEASUREMENTS







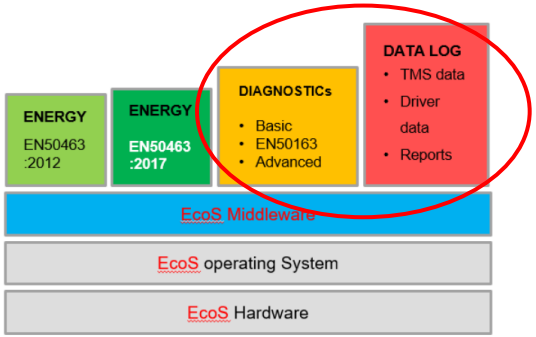
Different views:

- Metering
- DHS
- Alarm & Warnings
- Maps

OHLD: Catenary Diagnostics

Features OHL diagnostic (OverHead Line)

- Real-time catenary voltage monitor
- Triggers on EN 50163 §4.1 values (programmable)
- GPS and odometry event tagging
- Log event registration (datalogger)
- Real time diagnostic to TCMS
- Log access from Web interface and FTP

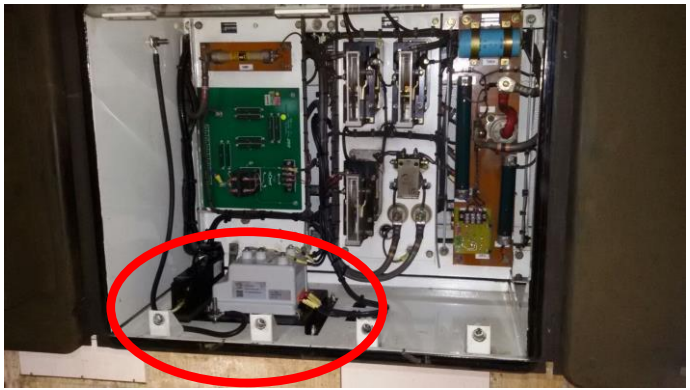


Over Head Line diagnostics

Standard of reference EN50163-2004

Quality Analysis of voltage, current and frequency

Data recording of variables out of ranges



EMF CHANNEL 1 > ALARM

Alarm	Status
Highest Permanent Voltage (Umax1)	NOT ACTIVE
Highest Non Permanent Voltage (Umax2)	NOT ACTIVE
Lowest Permanent Voltage (Umin1)	NOT ACTIVE
Lowest Non Permanent Voltage (Umin2)	NOT ACTIVE
Frequency Out of Limits	NOT ACTIVE
Lowest Long Term Undervoltage (Umin3)	NOT ACTIVE
Out of Range	
Invalid Calibrations	

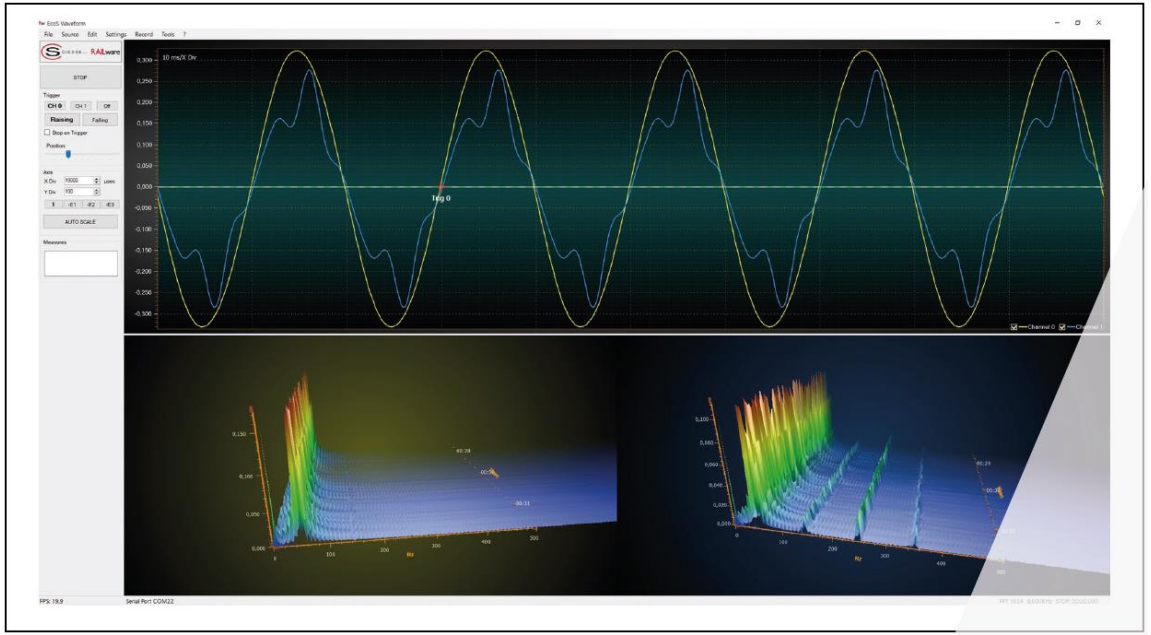
EMF CHANNEL 1 > WARNING

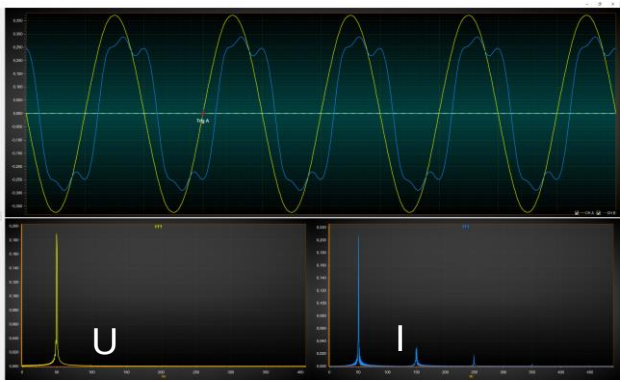
Warning	Status
Highest Permanent Voltage (Umax1)	NOT ACTIVE
Lowest Permanent Voltage (Umin1)	NOT ACTIVE
Highest Non Permanent Voltage (Umax2)	NOT ACTIVE
Lowest Non Permanent Voltage (Umin2)	NOT ACTIVE
Over Current	NOT ACTIVE
Lowest Long Term Undervoltage (Umin3)	NOT ACTIVE
Frequency Highest Than 1%	NOT ACTIVE
Frequency Lowest Than 1%	NOT ACTIVE
Frequency Highest Than 4%	NOT ACTIVE
Frequency Lowest Than 4%	NOT ACTIVE
Channel Out of Range	NOT ACTIVE
Pantograph Down	ACTIVE
Total Harmonic Distorction Over	NOT ACTIVE

Real Time FFT Analysis

Advanced diagnostic is an indipendent process from Energy calculation

- THD
- Harmonics detection
- Catenary quality analysis
- Pantograph bouncing
- Custom DSP algorithm





MEASUREMENT, DIAGNOSTICs, SAVING

EcoS + OcTo sensor & EcoS µ

EcoS EMS

EcoS µ Smart meter

EcoS OHLD

EcoS COM / DHS

EcoS CLOUD

OcTo 4 KV DC Voltage/Current sensor

DC

OcTo-VI4 indoor

Voltage and current sensor:
- Indoor installation
- Diagnostic output

OcTo-VI4 roof

OcTo-VI25
(DC and AC)

Voltage and Current Sensor:
- Integrated shunt
- Roof mounting
- Diagnostic output

AC

OcTo-vi 25kv

Voltage and Current Sensor
Diagnostic output

OcTo 25 KV AC V/I sensor

THANK YOU for Your attention

More details about **EcoS** and
EcoS μ at the booth.

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Thanks

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