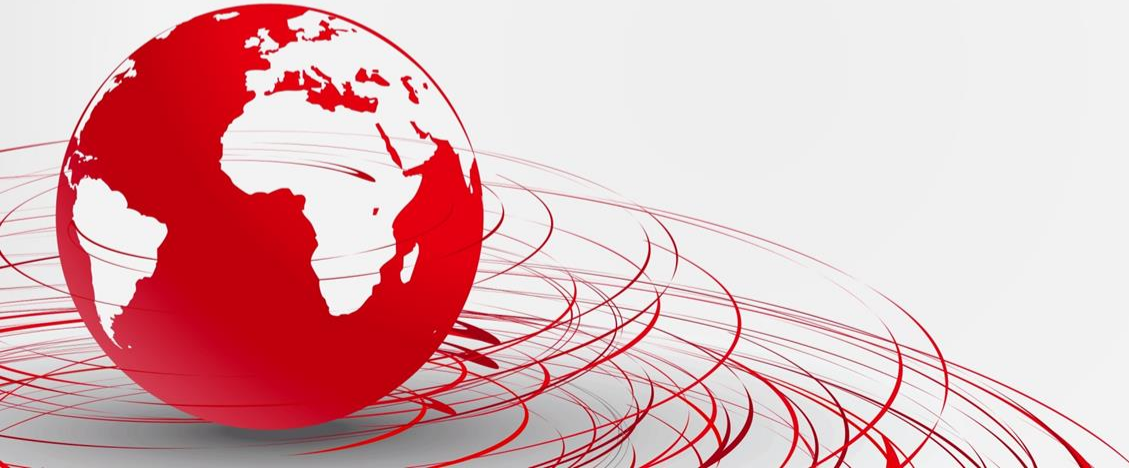# The "SICS approach"

An integrated and holistic approach for the total monitoring and measuring of the Railway Infrastructure

Naples, 23rd of November 2016
Rail Infrastructure Measuring & Monitoring

Giuseppe **AURISICCHIO**
President, MER MEC UK

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MER MEC Introduction

ROGER 400
SYRIA

ROGER 1000 K
SOUTH KOREA

GRUPOEFE
ROGER 600
CHILE

bhpbilliton
ROGER 800
AUSTRALIA

Transport
Sydney Trains
ROGER 800
AUSTRALIA

Transport
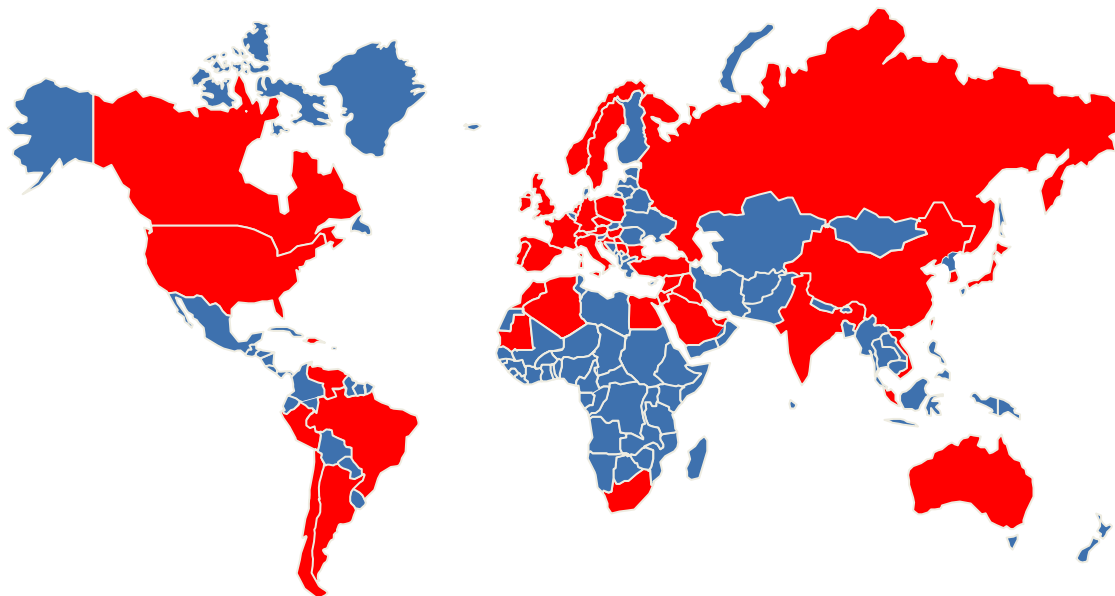Sydney Trains
ROGER 800
AUSTRALIA

Land Transport
Authority
ROGER 400
SINGAPORE

DR. FIND
SOUTH KOREA

1000+ Measuring Systems sold in 52 worldwide Countries

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Examples of MER MEC Train &Measuring Systems

- ❑ Track Geometry
- ❑ Full Rail Profile
- ❑ Third Rail Measurement
- ❑ Switch Measurement
- ❑ Rail Corrugation
- ❑ V-Cube (Track Machine Vision System)
- ❑ Track Video Surveillance
- ❑ Track Thermal Scan
- ❑ Tunnel and Clearance
- ❑ Catenary measurement systems
- ❑ Catenary Machine Vision System
- ❑ Train Localization System with DGPS
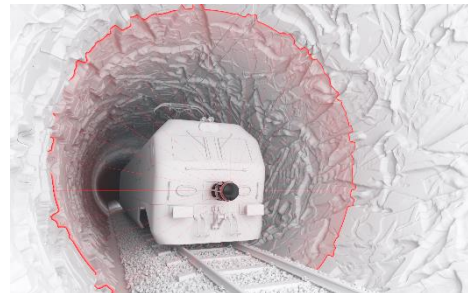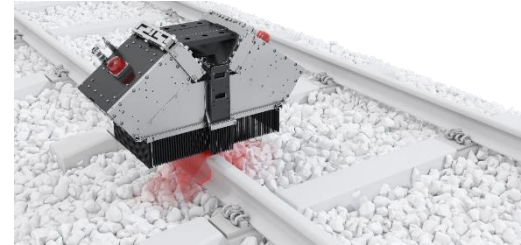
Agenda

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Goal of the Infrastructure inspection

Today by means of High Speed Measuring Trains and Measuring Vehicles it is possible to inspect, to measure and to monitor the Railway Infrastructure, not creating obstacles in the running of commercial trains and with the aim to collect condition data (diagnostic data).

Goal of the Infrastructure inspection

The adoption of **High Speed Measuring Trains** can be considered today a sort of "Best Practice", finalized to guarantee the highest level of safety, together with a high quality of the infrastructure. At the same time, it is also important, to take into account the **efficiency of the railway line**, in term of speed, capacity and reduction of maintenance costs.

The picture shows **DIAMANTE**, one of the High Speed Italian Measuring Train in the fleet

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The MER MEC "SICS" approach

The traditional approach, based on Measuring Trains or Vehicles having installed on board several diagnostic systems and just flowing condition data in database, is gradually being replaced by a more comprehensive and advanced approach, proposed by MER MEC, that can be defined as "SICS approach".

KKRI HSM
South Korea — KKRI

KTX
South Korea

IRIS 320
France — SNCF

RAME TRI
France — SNCF

CAF HT65000
Turkey — TCDD

ETR 500 Y1
Italy — RFI

DIAMANTE
Italy — RFI

ARCHIMEDE
Italy — RFI

NMT
UK — Network Rail

THSRC 700T
Taiwan

SENECA
Spain — adif

11 High-Speed Measuring Trains in operation worldwide, use MER MEC Technology

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The MER MEC "SICS" approach

"SICS" means:

- ❑ Synchronization / Integration of measured data
- ❑ Correlation for measures and defects
- ❑ Statistics on "Big Data"

"SICS" is an integrated and holistic approach overcoming all the limitations of the traditional approach and giving the high advantage to support the implementation of International Standards and to increase up to the top the safety of the Railway Infrastructure


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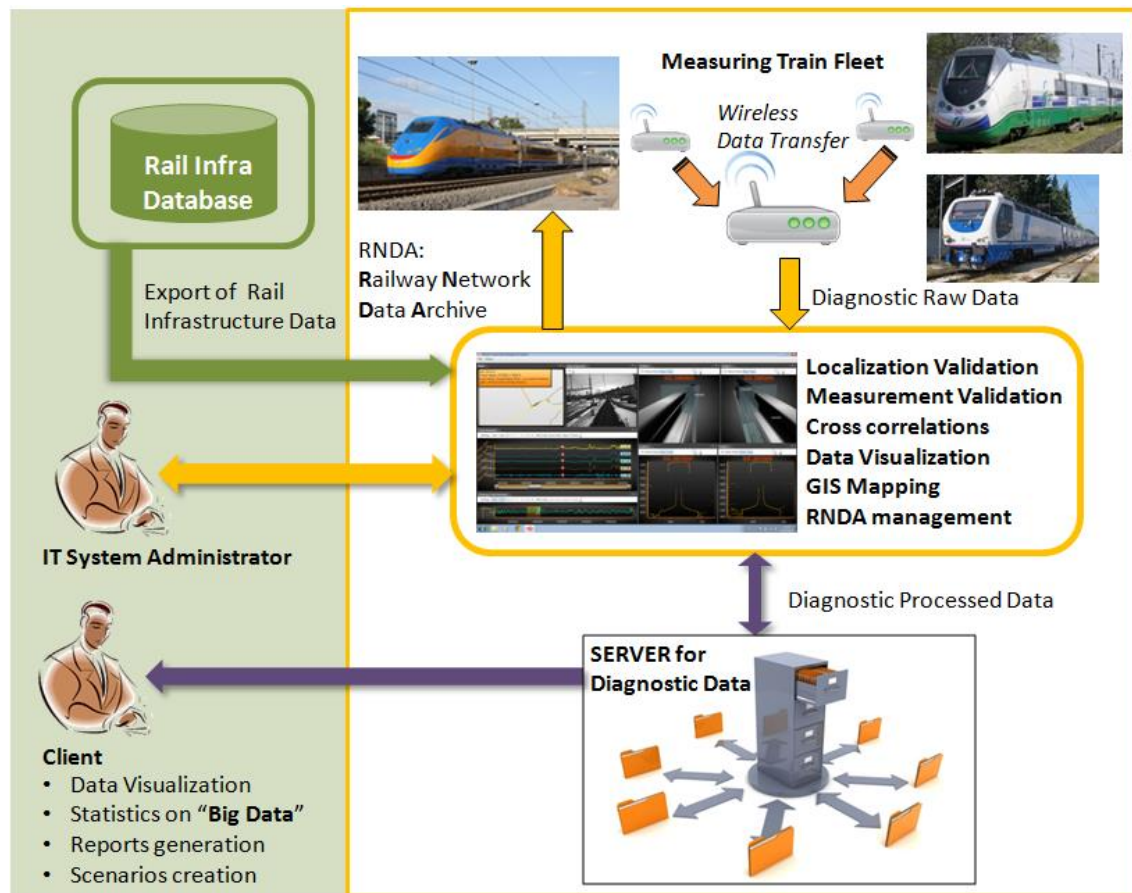
Synchronization / Integration of measured data

When we speak about High Speed Measuring Trains and measuring vehicles it's essential to emphasize that the integration of all the main measuring systems among them and with the rolling stock, the software and the decision support systems is today an essential requirement to perform complete, exhaustive, accurate and reliable measurement of the railway infrastructure.
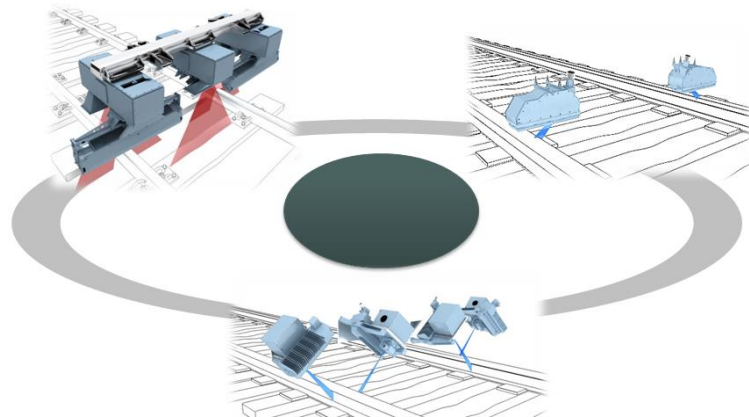

Thanks to the integration of the measuring systems, it's possible to obtain the perfect synchronization over space and time for the railway infrastructure measured data.

This is an essential requirement for the **highest quality measurements** !

Correlation for measures and defects

Having multiple sets of exhaustive, integrated, validated and synchronized data, gives the possibility to perform data analysis based on the:

"Measuring Train / Railway Infrastructure" System
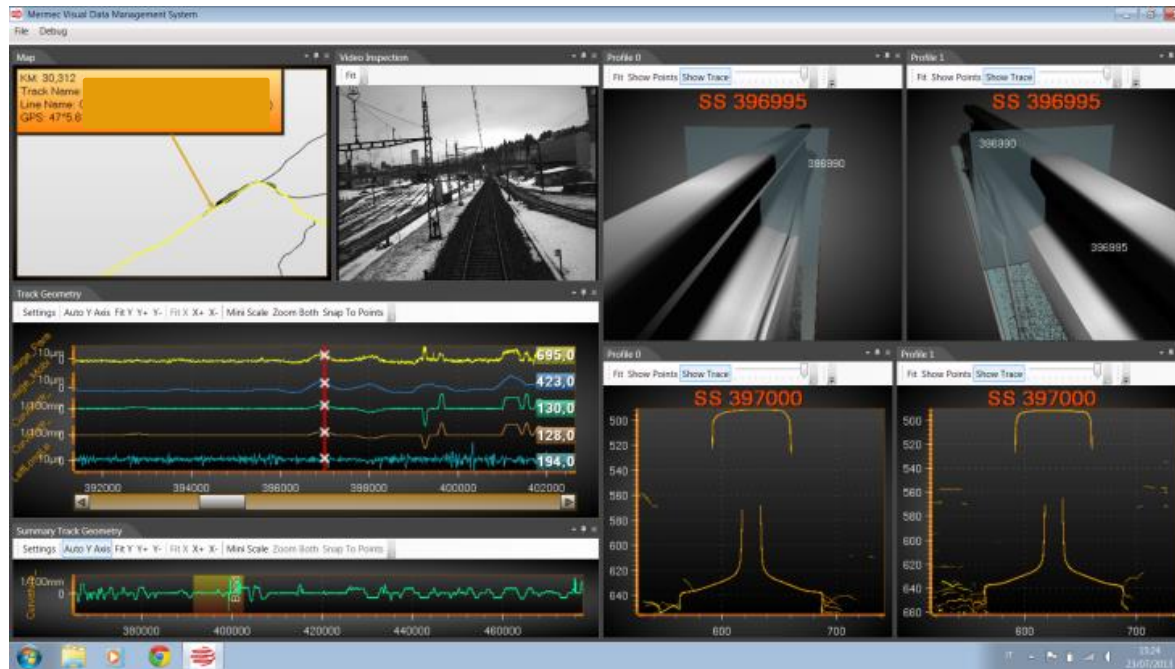
Today only the highest level of **cross correlation among the measured parameters** can give reliable and effective indications on the real state of the high speed infrastructure; single, isolated measurement can be useless and even meaningless.

Correlation for measures and defects
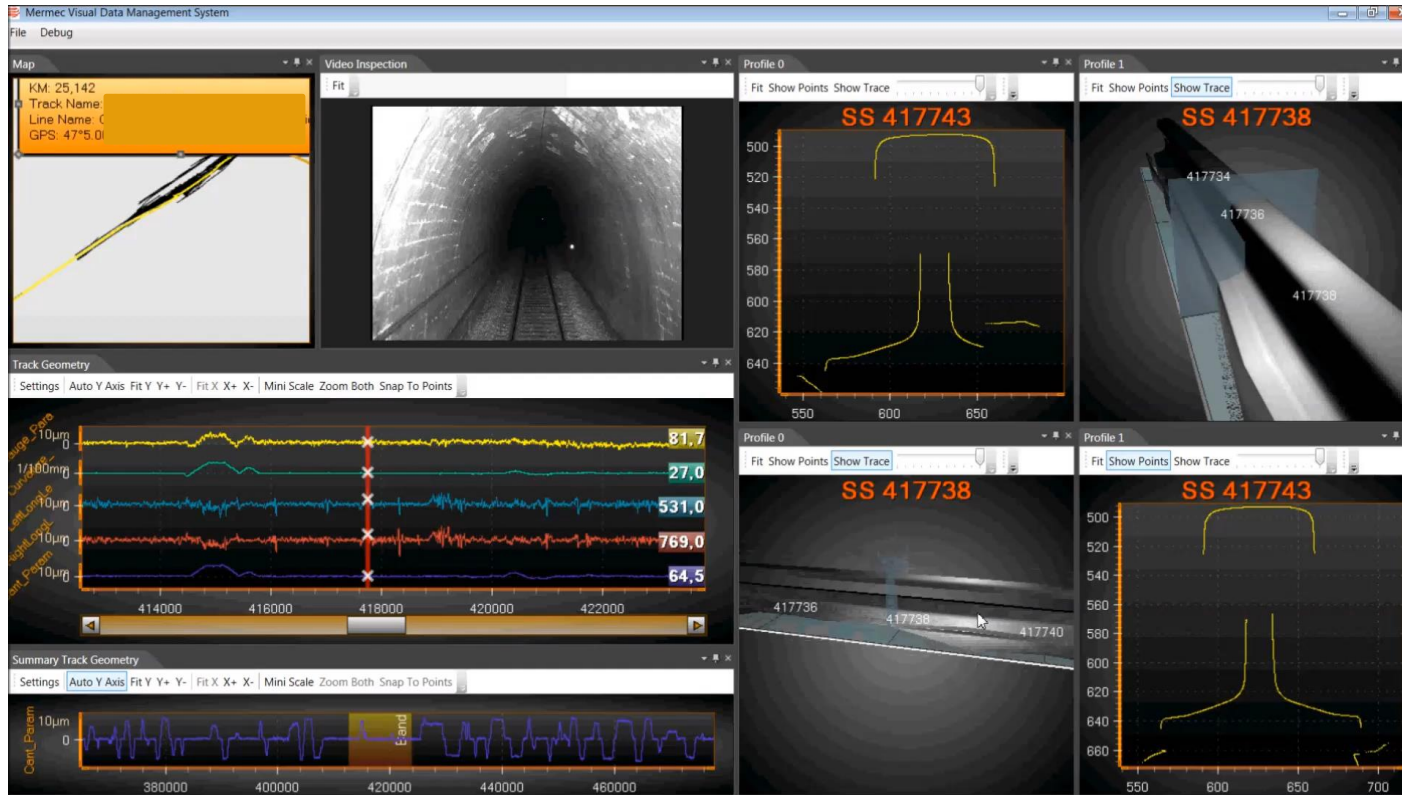
Measured data are validated, processed, cross-correlated, displayed and used to generate reports

Statistics on "Big Data"

The progressive implementation of the "Big Data Technologies" in the Railway Infrastructure measurement and monitoring allows the performing of completely new type of analysis, first of all the predictive analysis. Further more statistics on "Big Data" open new possibilities, like for example:

- The definition of the optimal frequency of measurement.

- A reliable and systematic trend analysis for defects.

- The GIS mapping, including the geo-referencing of the various railway "object" for mapping projection.

....and, not less important, a maintenance costs (and savings !) accurate calculation.

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Conclusions

The measurement and monitoring of the Railway Infrastructure, based on the "SICS" approach is characterized by:

- ❑ **Collection of exhaustive sets of high quality integrated, synchronized diagnostic data**

- ❑ **Data Analysis based on the "Measuring Train / Railway Infrastructure" System**

- ❑ **Implementation of the "Big Data" Technology**

This gives to the infrastructure managers the opportunity:

- ❑ **To promptly discover critical defects and anomalous or dangerous situations**

- ❑ **To optimize the planning of on-condition maintenance and to drive maintenance operations in the most efficient way**

- ❑ **To predict future events, like asset failures**

- ❑ **To introduce new predictive maintenance capabilities, making even greater difference in improving uptime, productivity, maintenance quality, and operational performance**

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Do You Have
Any Questions?

Thanks for your attention

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