



# eltic-Plus<sup>+</sup>

Smart Connected World



Celtic-Plus Proposers Day  
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## Connected Digital Infrastructure for Optimization, Maintenance and Upgrading of Vehicular Systems

*Pasqualina Potena, RISE SICS Västerås*

*pasqualina.potena@ri.se*

**BOMBARDIER**  
the evolution of mobility



**RI  
SE**



**MÄLARDALEN UNIVERSITY  
SWEDEN**

**JÄRNVÄGSKLUSTRET**



# Teaser

Vast amounts of data are generated within technical components in heavy vehicles, with only a limited share used remotely for diagnostics, maintenance and reliability growth.

Examples: electrical train propulsion systems, rock drilling rigs



The partners want to develop a **connected digital** infrastructure (methods for data sourcing, transmission, storage, safety/security, analysis) with the purpose of optimization, improved commissioning, maintenance, development and upgrading.

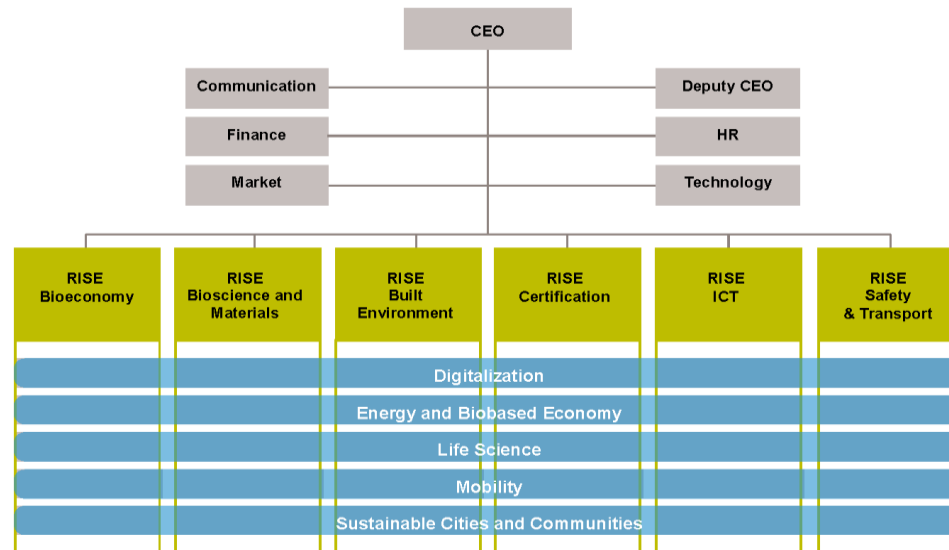
Challenges: data volume, data variety, latency, and dependability

# Organisation Profile



**RISE Research Institutes of Sweden** is fully owned by the Swedish state. RISE 2,200 employees support and promote all manner of innovative processes, and our roughly 100 testbeds and demonstration facilities are instrumental in developing the future-proofing of products, technologies, and services.

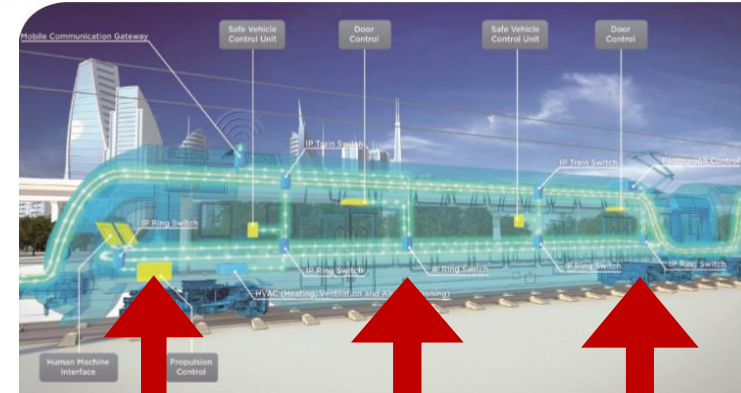
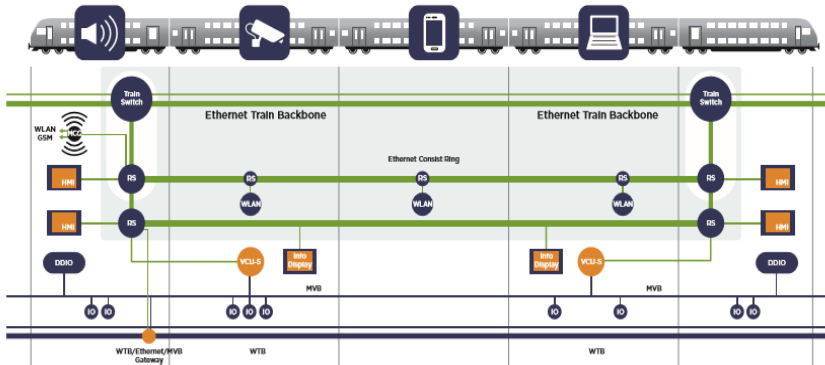
RISE is organized as six divisions:



**RISE SICS** (under the umbrella of the RISE ICT division) is a leading non-profit research institute for applied information and communication technology in Sweden, founded in 1985. It is funded by governmental research programs, industry and the EU. In 2017, RISE SICS had 202 employees (of which 76 have a Ph.D. and 32 are professors). Application areas, such as Internet of Things, Industrial Automation and Maintenance, Automotive and Rail, Telecom, Digital Health, Decision support and business intelligence and Data Centers.

# Proposal Introduction (1)

Example from Bombardier



**Variety:** diagnostic data, propulsion data, event logs, video streams, user content, position, adhesion, electric data,...

**Velocity:** Microsecond response time for safety-critical control systems

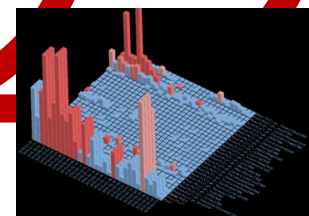
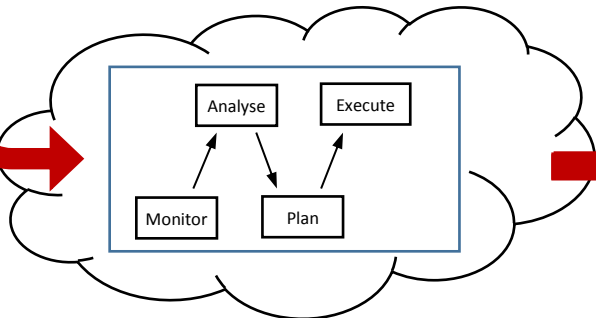
**Optimizations:** Online tuning of performance parameters

**Re-engineering:** Online validation of product performance



**Volume:** Gigabytes of data per hour

**Maintenance & Commissioning:** Deviation detection & condition-based maintenance



# Proposal Introduction (2)

## Expected Outcomes:

- Safe and secure vehicular communication system
- Big data & data analysis & connected vehicles
- 3G / 4G / 5G interconnected subsystems
- Digital systems for advanced operational diagnostics and condition-based maintenance
- Digital infrastructure between vehicles and stationary equipment for transmission, storage and processing of large data volumes

## Impacts:

- Reduced costs for validation, commissioning and maintenance and upgrades of existing fleets
- Reduction of transfer cost and increased transfer speed
- New performance-based services offered to customers





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# Partners



## Partners involved:

- Bombardier Transportation (large provider of propulsion and control equipment for trains)
- Atlas Copco Rock Drills (large provider of compressors, vacuum solutions and air treatment systems, construction and mining equipment, power tools and assembly systems)
- RISE SICS Västerås (res. institute)
- Mälardalen University
- Automation Region (incl. several SME:s)
- The railway cluster (incl. several SME:s)



## Expertise:

- Propulsion, High Voltage System, Auxiliary System and TCMS (train control and monitoring system)
- Diagnostics & fleet maintenance, optimization, machine learning, A.I.
- Quality Assurance, testing, verification and validation

## Looking for partners/consortia in:

- **Telecom, network and communication**
- Vehicular systems, Transportation
- Cloud platforms, big data, analytics

# Contact Info

For more information and for interest to participate please contact:



Pasqualina Potena  
RISE SICS Västerås  
+46 725 103725  
pasqualina.potena@ri.se  
Kopparbergsvägen 10  
SE-722 13 Västerås, Sweden



Markus Bohlin  
RISE SICS Västerås  
markus.bohlin@ri.se  
+46 70 787 66 08  
Kopparbergsvägen 10  
SE-722 13 Västerås, Sweden