

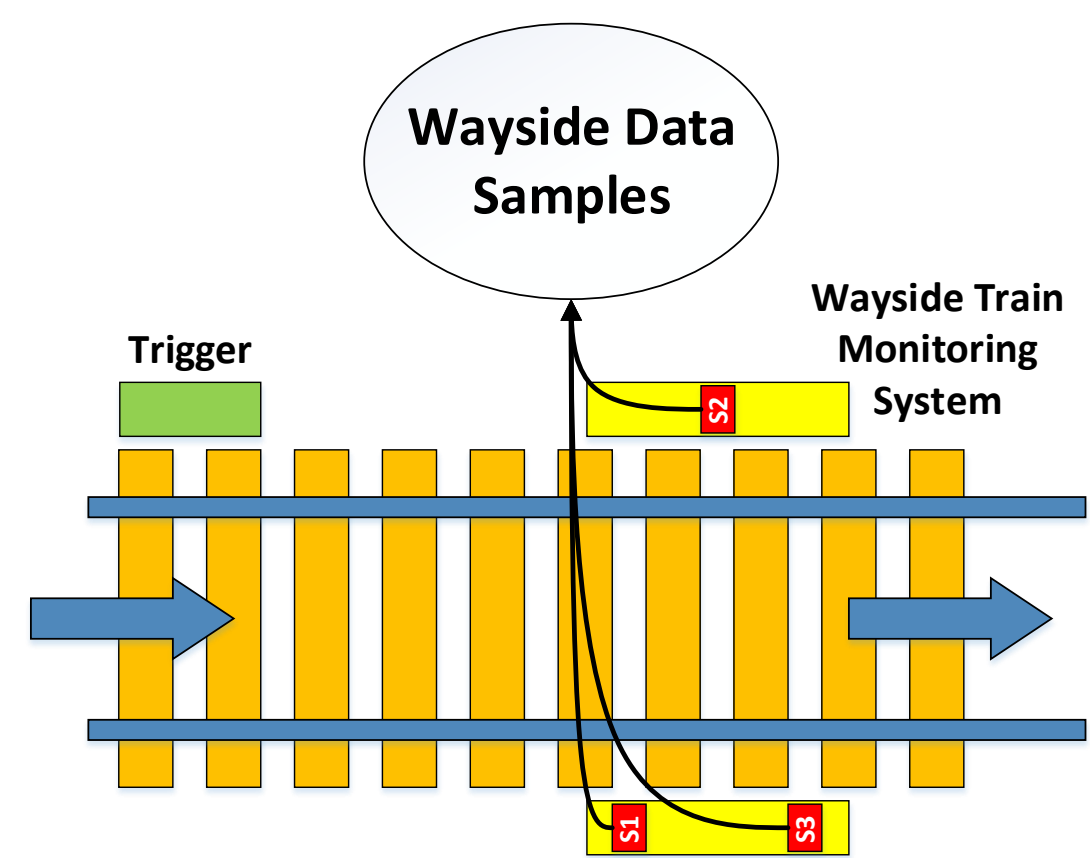
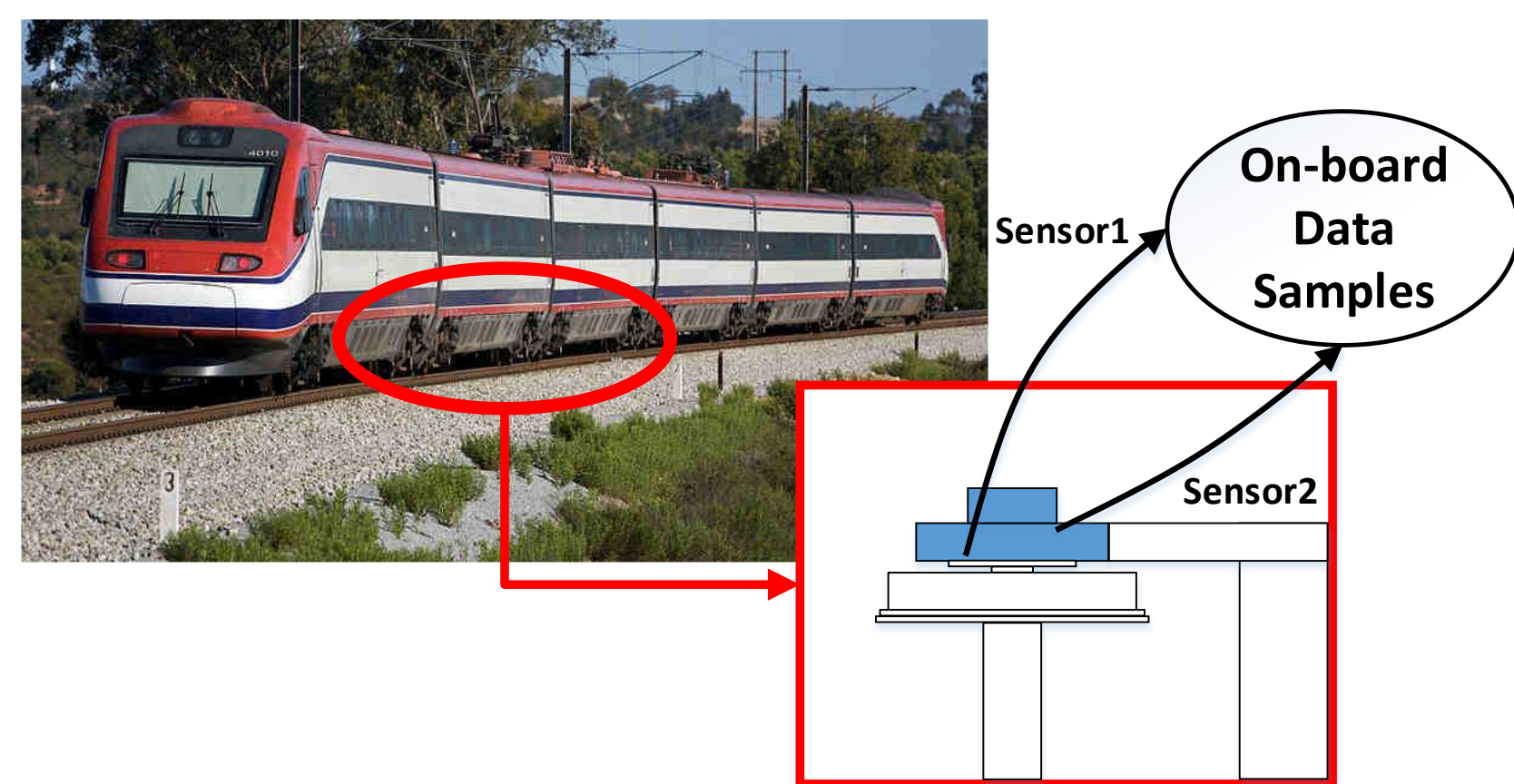
# A SaaS Data Fusion Tool for Railway Axle Bearing Monitoring



Emanuele Fumeo, Alessandro Ghio, Davide Anguita – *University of Genoa*  
Stefano Terribile, Elisa Massara, Nadia Mazzino – *Ansaldo STS S.p.A.*

## The problem

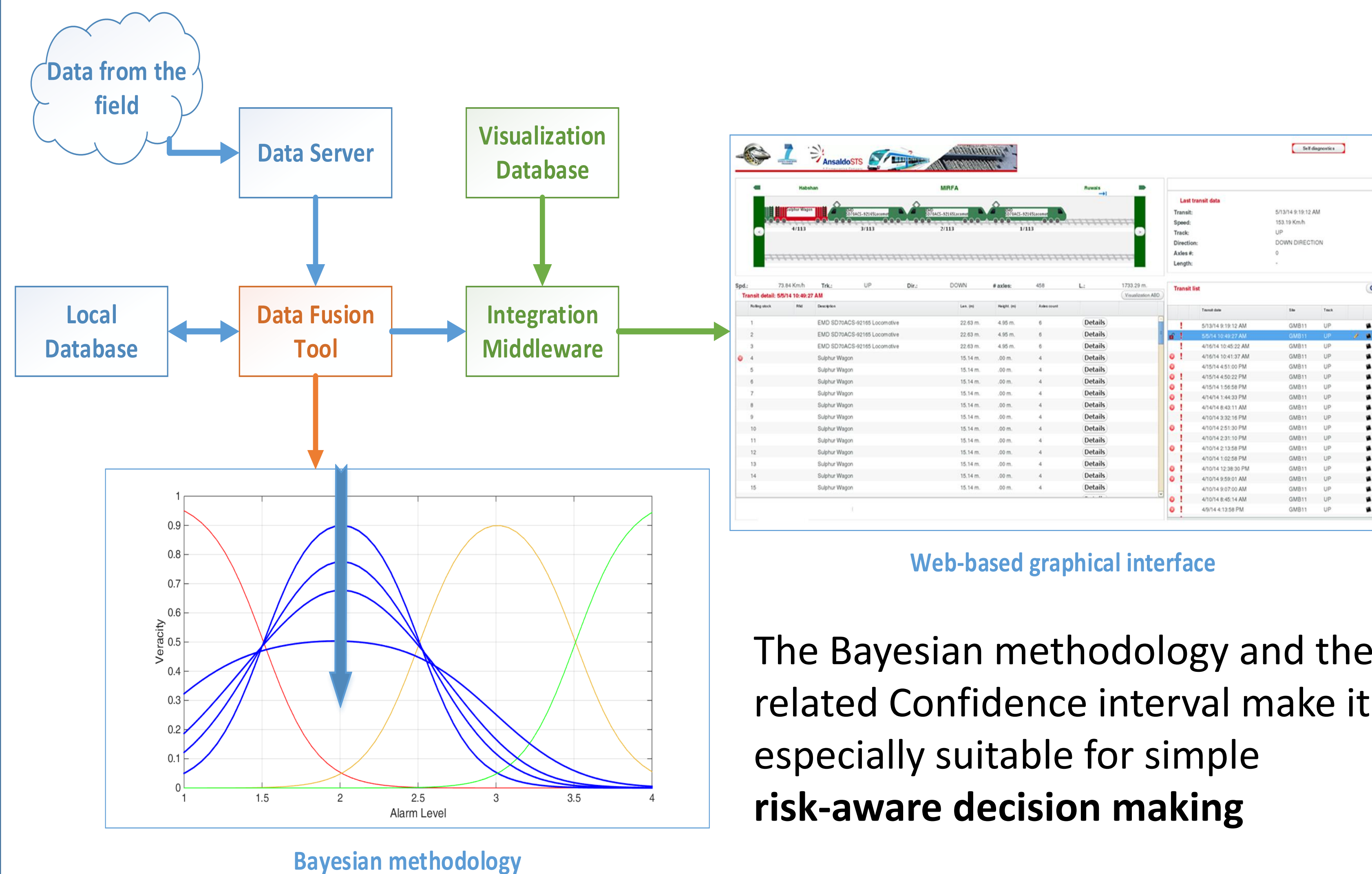
- **Condition Based Maintenance (CBM) on axle bearings** with multiple heterogeneous sensors
- Increasing amount of **data** collected from **both wayside and on-board** train monitoring systems



- **The goal: maximizing added value by fusing data** belonging to different sensors/systems so to extract high level patterns

## Proposed Solution

- An innovative **Software-as-a-Service (SaaS) Data Fusion Tool** based on a probabilistic Bayesian framework
  - Accurate estimation of occurrence probability of failures
  - Confidence Interval of the above-mentioned risk
- An **Integration Middleware** between the Data Fusion Tool and the HMI
- A user-friendly **web-based graphical interface**

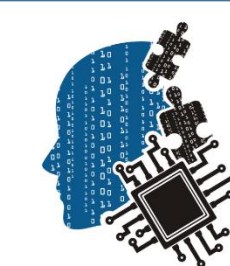


## Conclusions

- The proposed solution exploits both wayside and on-board data in order to prevent accidents, as well as to plan maintenance operations in advance, catching the final objectives of improved sustainability and safety, and reduced life cycle cost
- The system is able to help decision makers taking the best possible decisions. The latter ones span from raising alarms and stopping trains, if necessary, down to maintenance planning, limiting disruptions to the service offered to the customers
- The graphical interface allows to verify the presence of alarms in a user-friendly fashion, showing potential alarms as well as punctual monitoring and diagnosis of assets in a railway network or line
- Future works will include further research on risk analysis topics for railway transportation systems

## Acknowledgements

This research has been conducted in the context of the European research project MAXBE «Interoperable Monitoring, diagnosis and maintenance strategies for AXle BEarings», belonging to the Seventh Framework Programme (FP7) cycle of research initiatives



SMART LAB  
[www.smartlab.ws](http://www.smartlab.ws)

## Contacts

[Emanuele.Fumeo@edu.unige.it](mailto:Emanuele.Fumeo@edu.unige.it)  
SmartLab @ DIBRIS, University of Genoa  
Via Opera Pia 11A, 16145, Genova, Italy