



## General Project Overview

1st Open Workshop  
Brussels (Belgium) 16.11.16

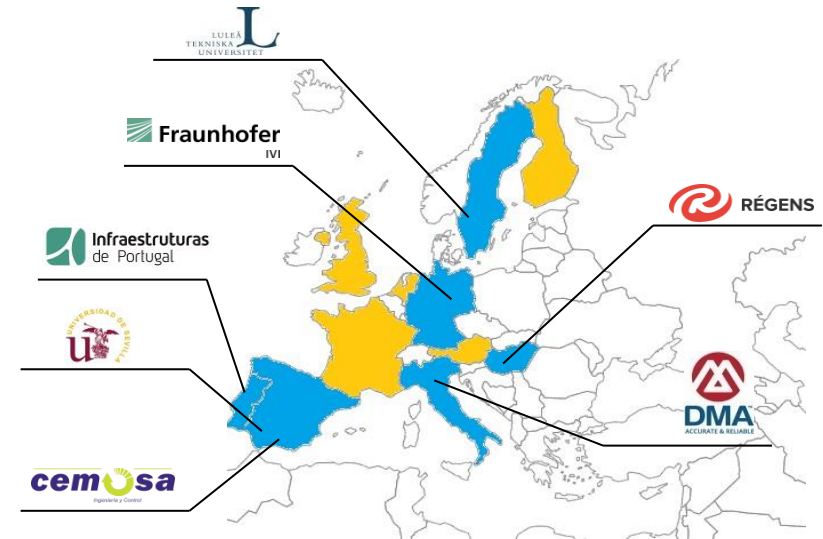
Noemi Jiménez-Redondo



# Facts & Figures

- 7 partners from 6 EU countries

- 2 technology SMEs: Régens, DMA
- 1 Industry: CEMOSA
- 3 research organisations: Fraunhofer IVI, University of Seville, University of Lulea
- 1 public body: Infraestruturas de Portugal



- 7 EAB Members from 7 countries

- Mr. Henk Samson (Strukton Rail, the Netherlands)
- Mr. Pascal Rossigny (CEREMA, France)
- Mr. Gerhard Eberl (ASFINAG, Austria)
- Mr. Antonio Perez de Arenaza (ACCIONA, Spain)
- Mr. Werner Dorfmeister (HPE, Germany)
- Mr. Karo Komonen (Finish Maintenance Society, Finland)
- Mr. Tom Tivey (Network Rail, UK)

- Duration: 36 months
- Budget: 3M€
- Funded by H2020 Programme



# Motivation: transport systems and social and economic development

Transport systems is core in socio economical development



# Motivation: European transport networks

- Our transport networks are well developed

Size in thousands Km (2012)	EU 28	USA	Japan	China	Russia
Road Network (paved)	5,000	4,258	983	3,610	1038
Motorway network	73.2	92	8.1	96.2	50.9
Rail network	2,153	205.5	20.1	97.6	85.6

Source: ERF  
Statistics Year  
Book 2016

- but our **transport demand is already higher than our capacity** → **Congestion** problems (high economic, social, environmental costs)
- and **will keep on increasing** as so requires our 'growing' (hopefully) economies

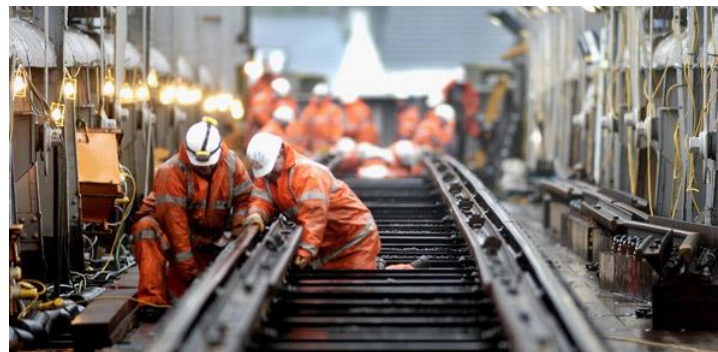




# Motivation: European transport networks

The problem: European **transport capacity** needs to be **enlarged**

- But...**budget** and land restriction
- Besides...as our transport network is reaching its limit capacity, **maintenance need increases** while the **time slots** for such maintenance interventions **decrease**



# The Challenge



Increase transport capacity at reduced budget and land availability



**Optimise the performance** of existing infrastructure **to enhance its capacity** to meet society needs

**Fewer, faster and better planned interventions**



- Low cost and low intrusive **sensor technology**
- **Huge amount of data** available for land infrastructure linear system
- But...**no** technologies and tools to reach **full potential** of the available data

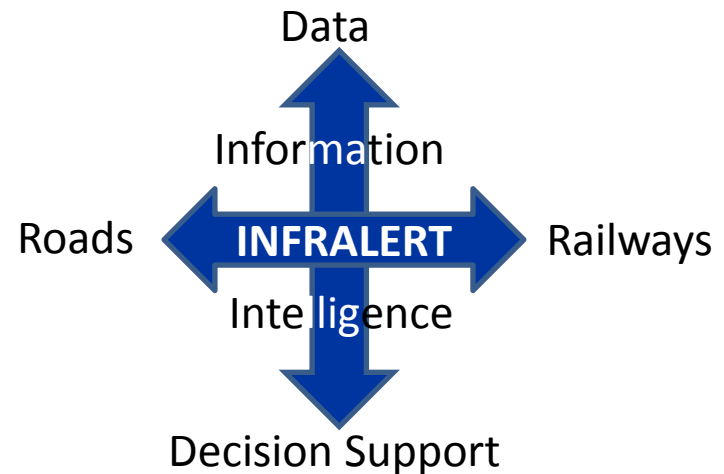
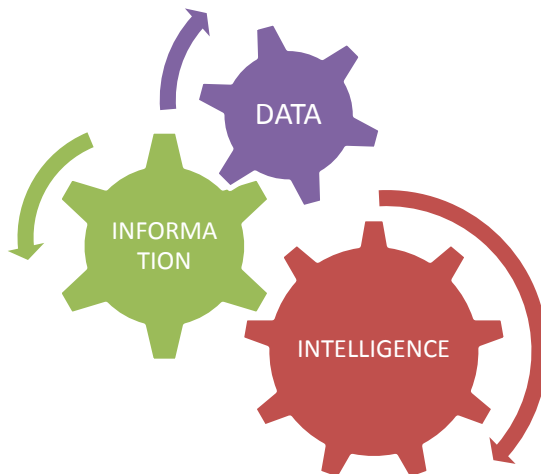
## MAIN GOAL

- ✓ To develop and **expert based information system** to support and automate infrastructure management
- ✓ From **measurements to maintenance**
- ✓ Suitable for linear infrastructure and applied in particular to **roads and railways**



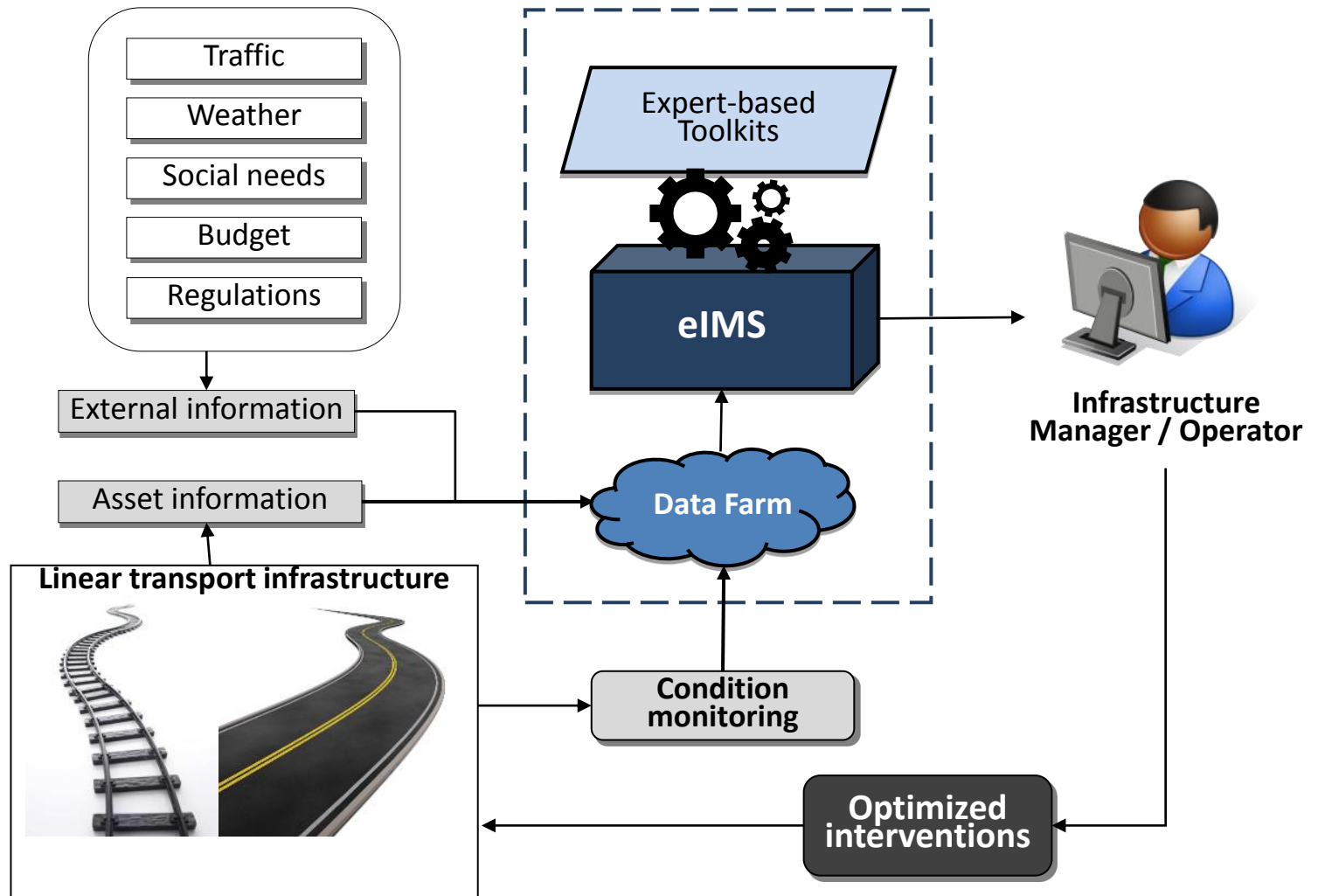
# Major Challenges

- Developing the **information technologies** and **standard procedures** applicable to linear transport systems in general
- Developing **expert-based toolkits** built on artificial intelligence and optimisation techniques to **support decision making** in maintenance planning, renewal and new construction of infrastructures
- Integrating all previous models and tools in a **cloud-based framework compatible** with existing **asset management** systems



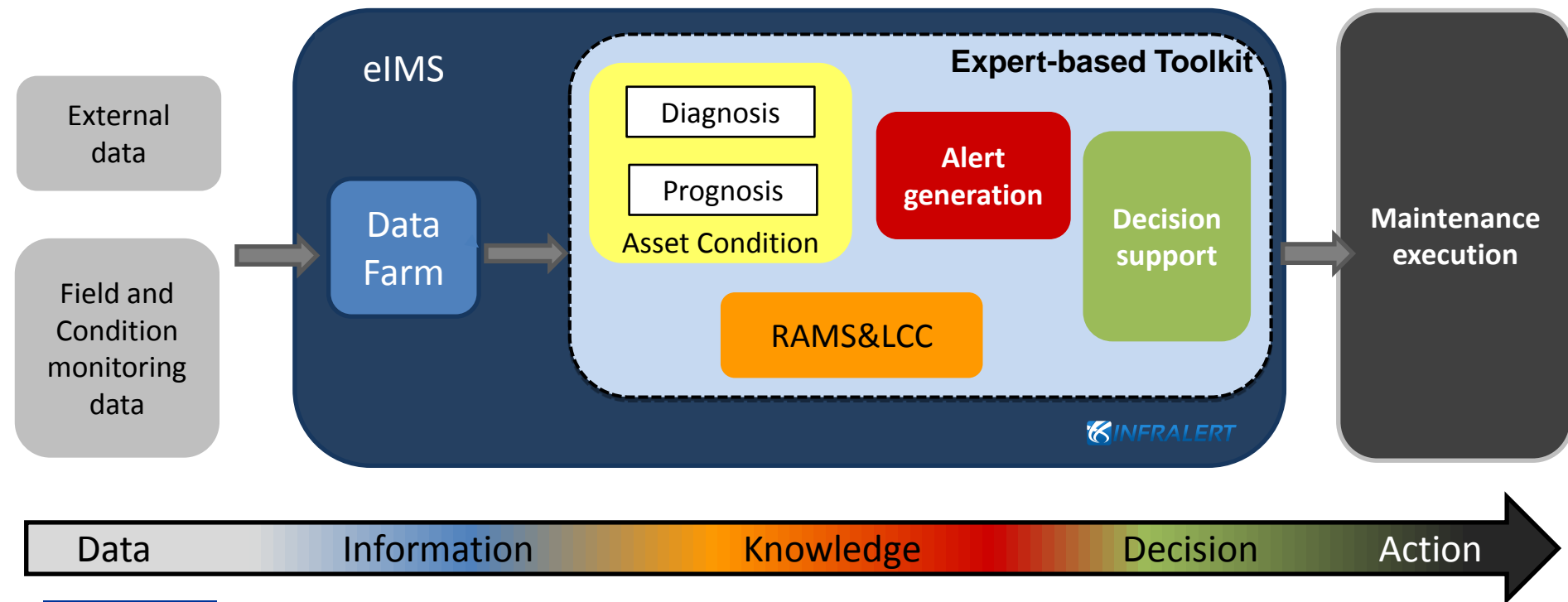


# The concept

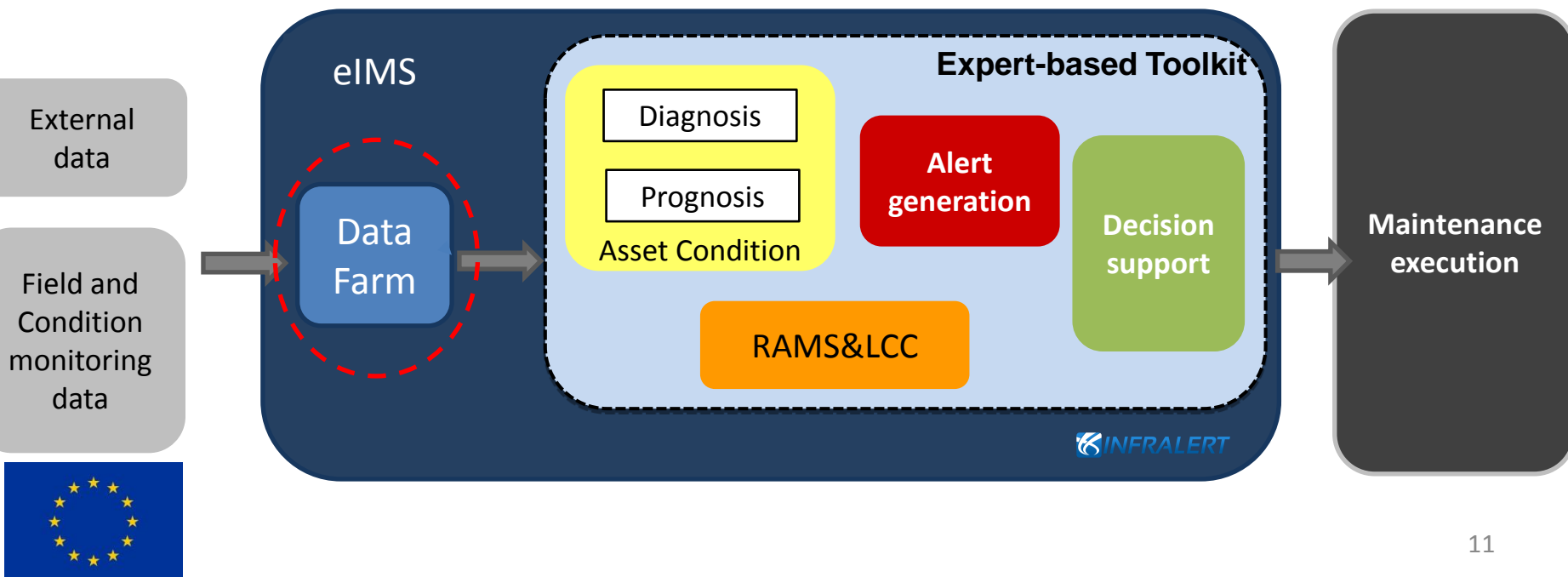


# The concept

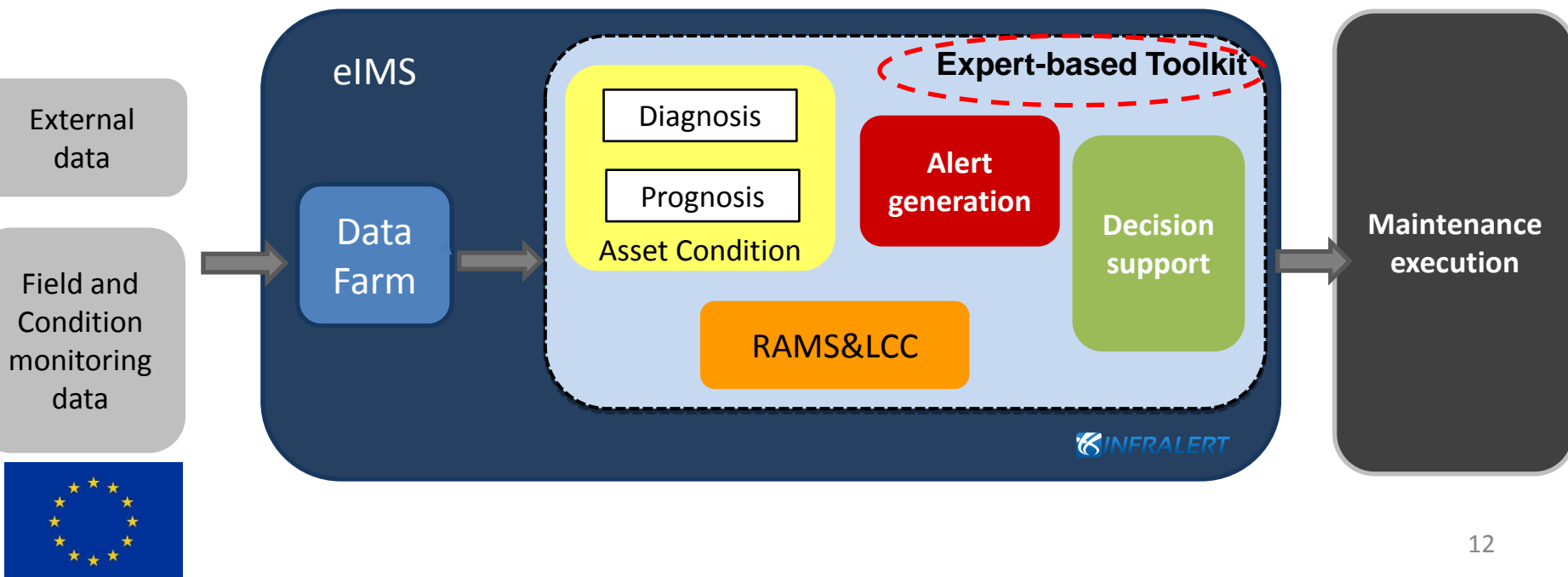
INFRA ALERT develops an **expert-based Infrastructure Management System** which **coordinates and integrates** all the processes from measurements to **Maintenance & Renewal** and support long term strategic investment decisions



1. A tool for the collection and organisation of condition monitoring data stored in external databases → **The Data Farm**



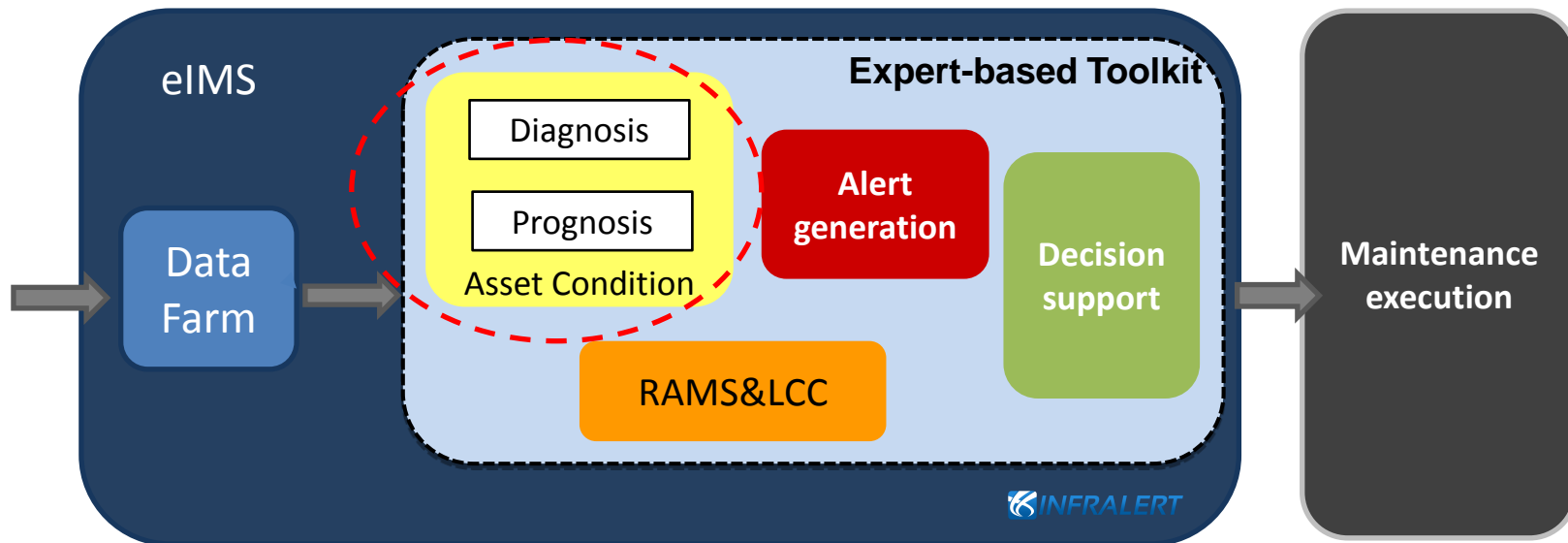
2. A toolkit to process information, achieve knowledge and support decision making → **The Expert-based Toolkit**





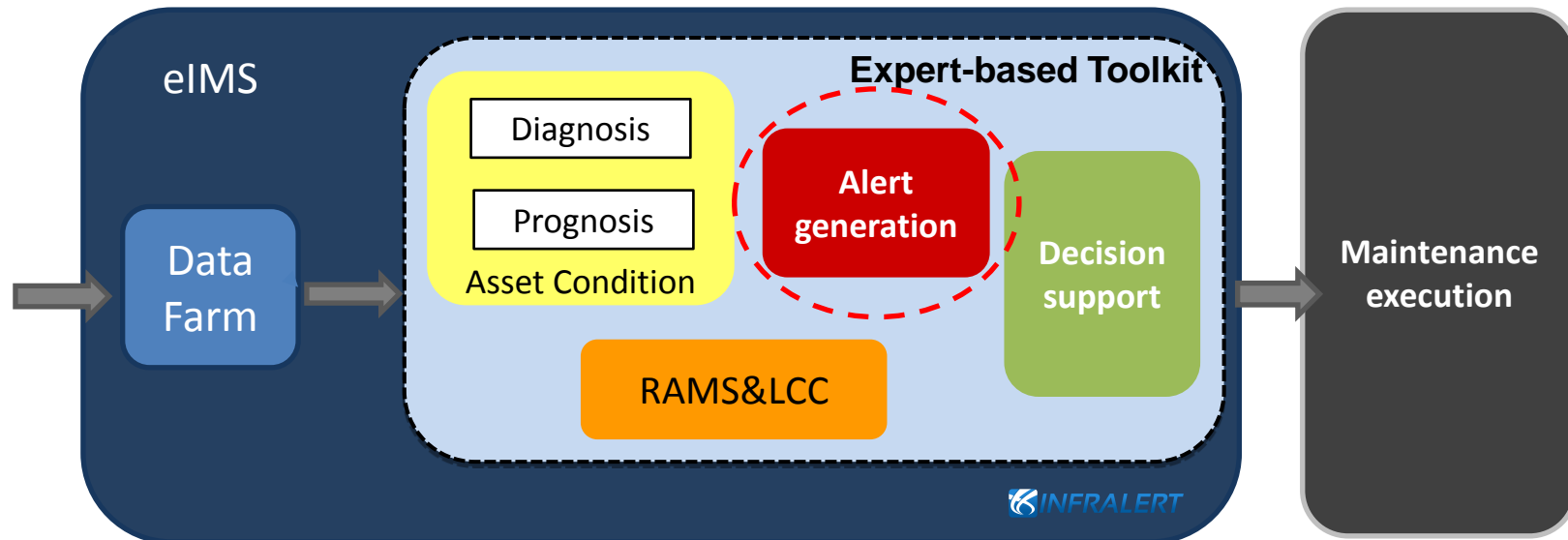
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- ❑ An automated Health Assessment and Prediction tool to perform accurate nowcasting and forecasting → **The Asset Condition toolkit**



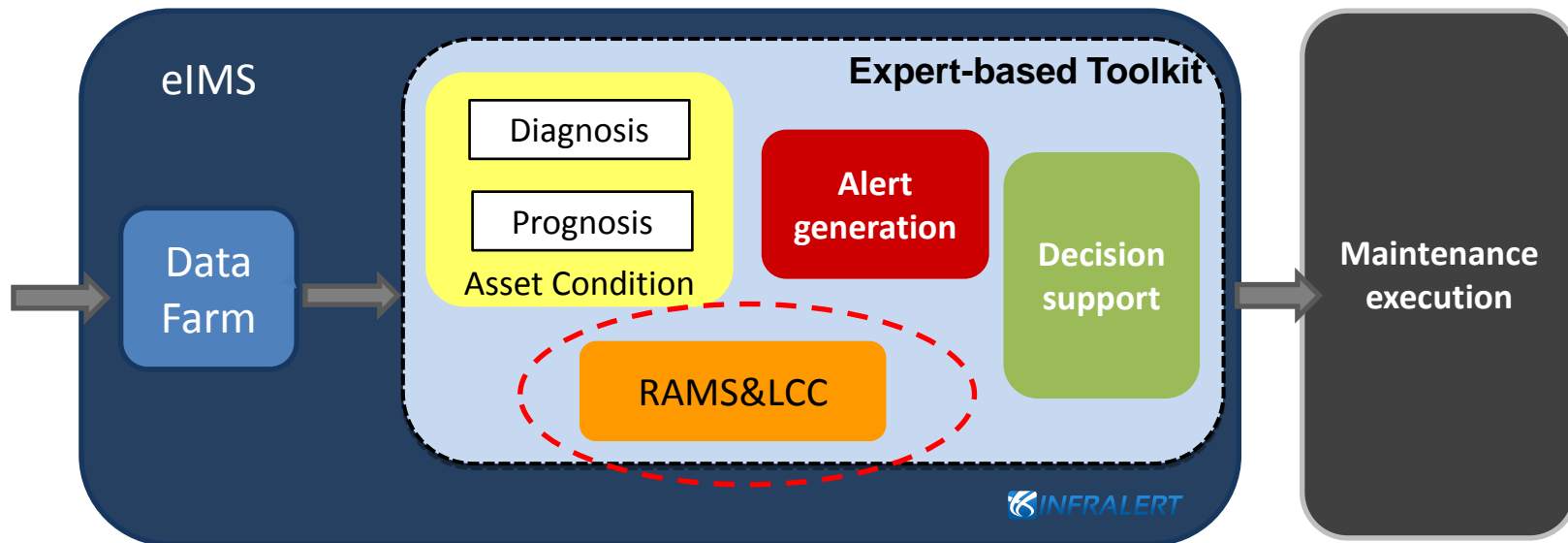
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- ❑ An Alert management system which analyses present and future asset condition data, as well as historical maintenance actions, in order to extract and manage maintenance alerts → **The Alert Generation toolkit**



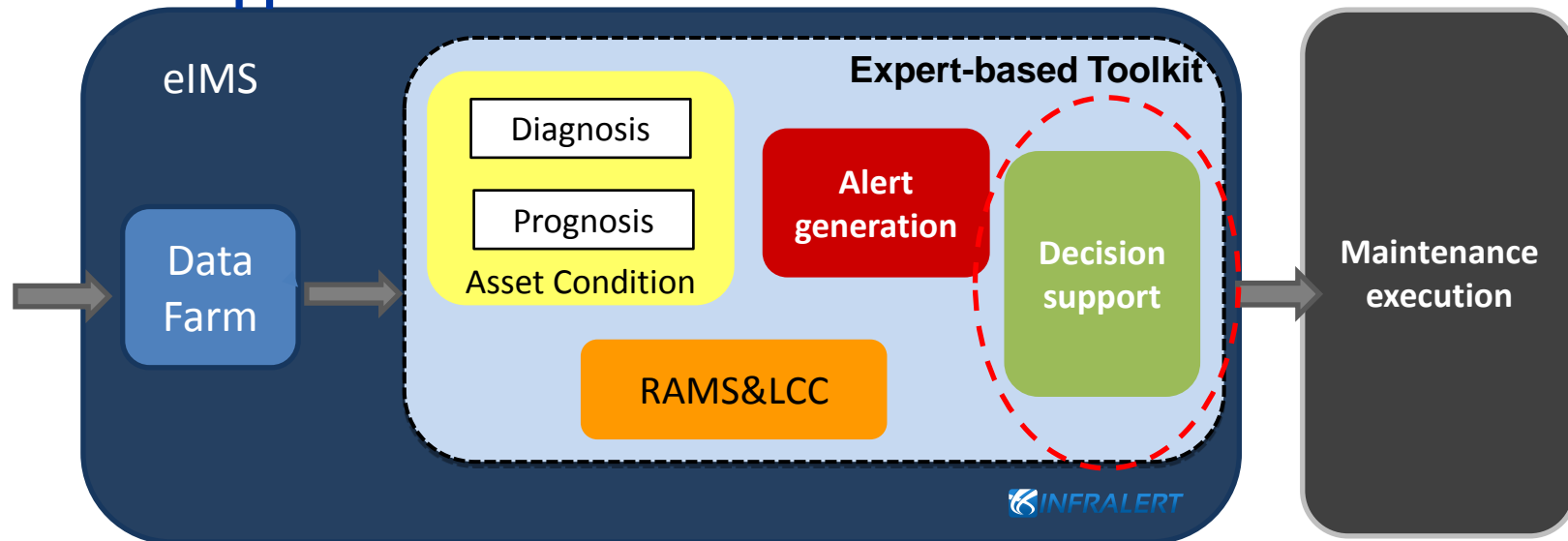
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❑ Methods and tools to evaluate and forecast RAMS parameters and LCC dynamically → **The RAMS&LCC Analysis toolkit**



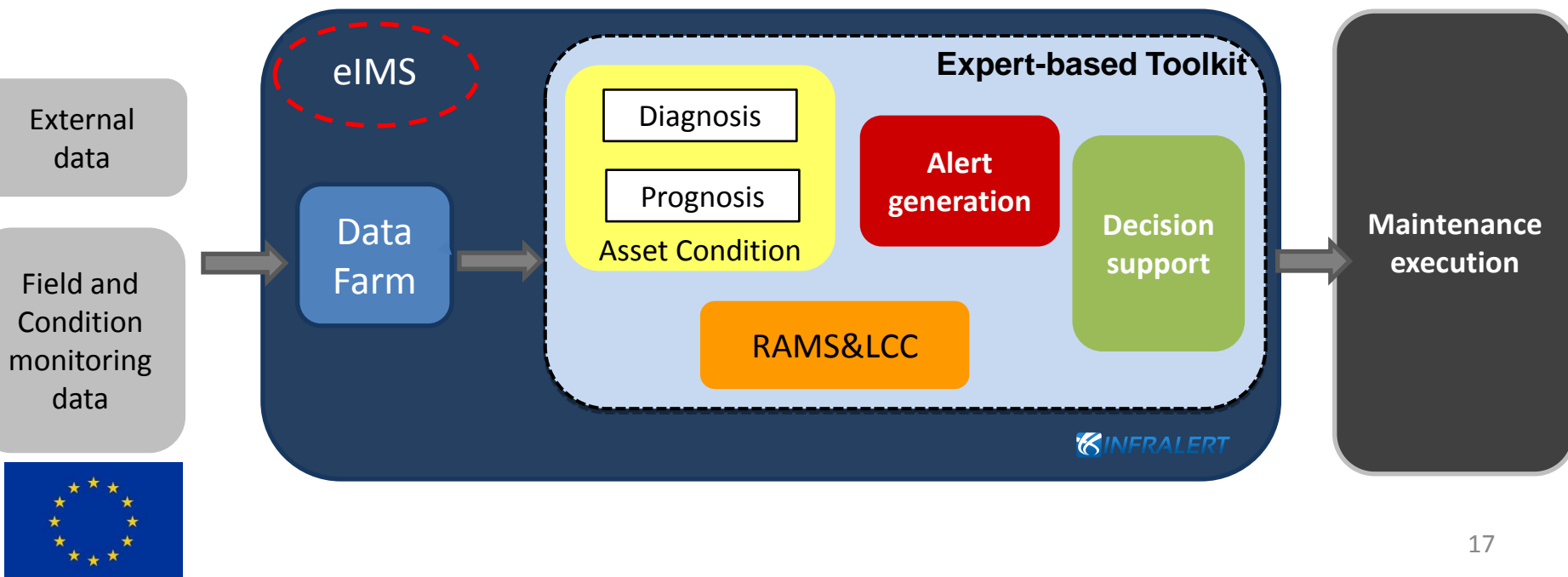
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- ❑ Decision support tools for interventions planning on the tactical and operational level, as well as the generation and analysis of new infrastructure construction long-term scenarios → **The Smart Decision Support toolkit**





3. A cloud-based system which hosts the expert-based toolkits and includes all the necessary integration and communication layers  
→ **The eIMS**

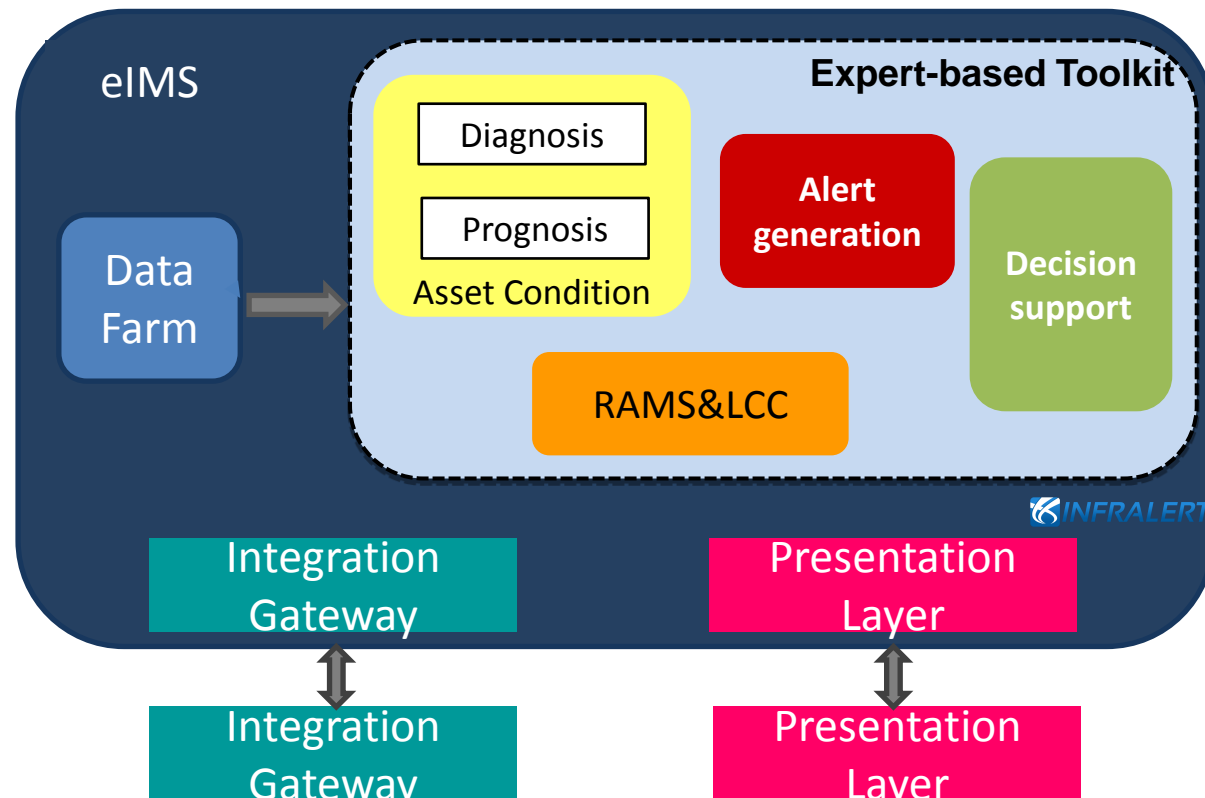


## Modular concept

The system will be developed in a modular architecture, consisting of several plug-in modules within a common framework: the eIMS

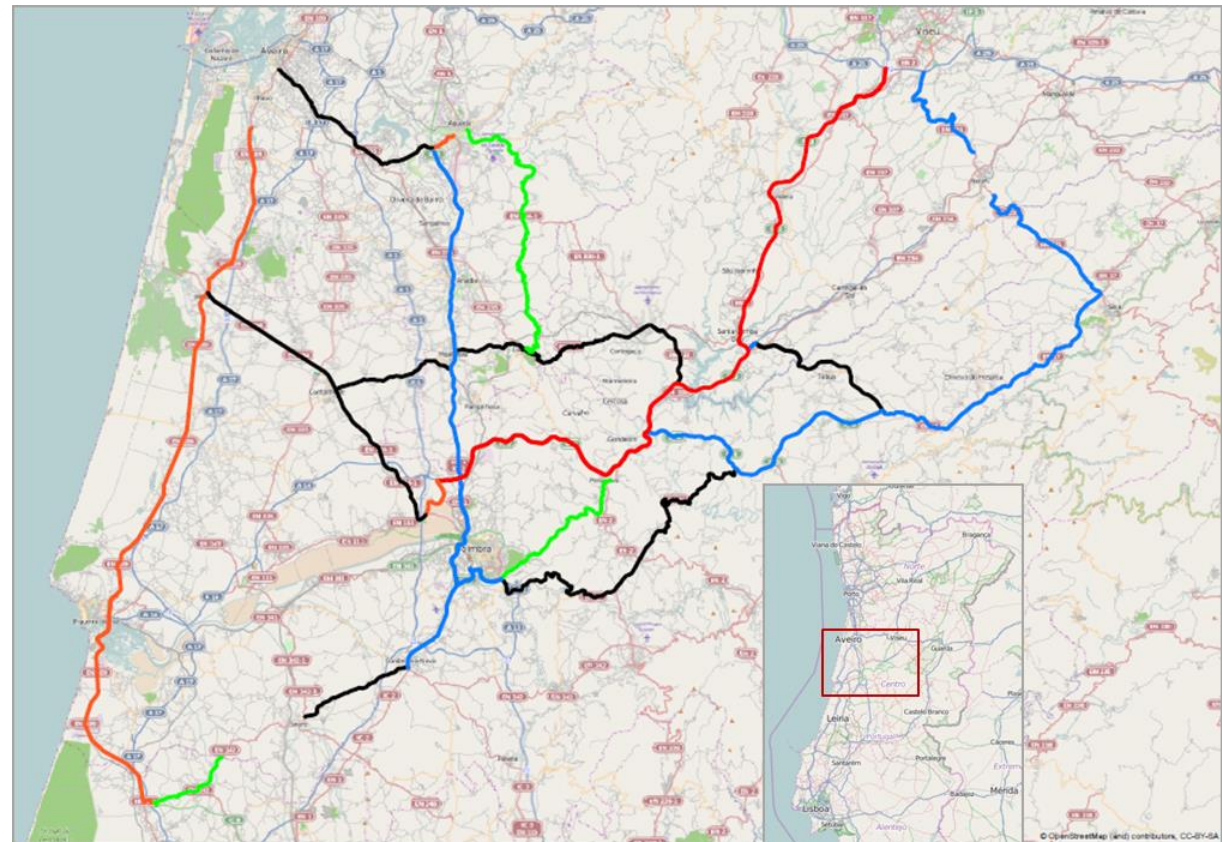
## Advantages

1. Flexibility: Adaptable to any kind of linear assets and user needs.
2. Scalability: Adaptable to changing requirements and processing capabilities.
3. Interoperability: Compatible with existing infrastructure asset management system.
4. Easy to implement: 100% cloud-based



# The demonstration pilots

- A meshed road network in Portugal (c/o Infraestruturas de Portugal)

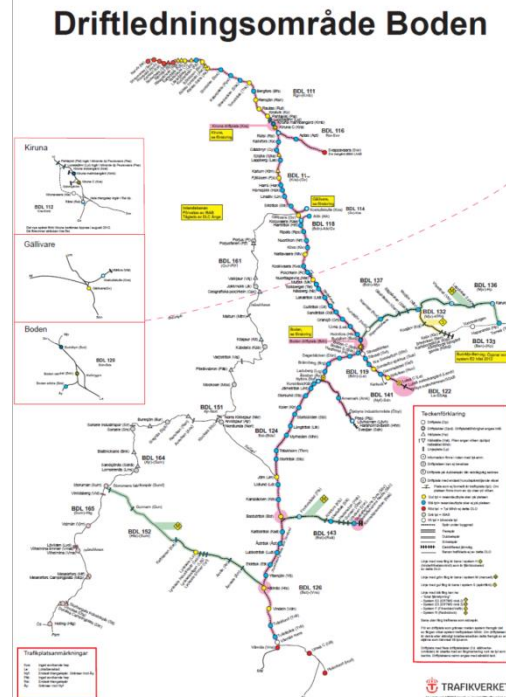


- Principal Itineraries
- Complimentary Itineraries
- National Roads
- Regional Roads
- Other Roads



# The demonstration pilots

- A rail corridor in Sweden: the Ore Iron Line (c/o LTU)





Impact	LOW	MED	HIGH
Reducing recurrent costs for maintenance and operational interventions.			
Extending the life span of the assets			
Overall increase in the availability of the infrastructure.			
Enhancing the reliability of the infrastructure			
Reducing drastically traffic disruptions			
Increasing the level of safety and comfort			
Enhancing the flexibility and quality of the interventions planning			



# Goals of this workshop

- To share with you the state of development of INFRA ALERT
- To be aware of your needs
- To discuss and generate ideas



1. Welcome, project overview and motivation → INFRA ALERT team
2. Examples and challenges in asset management and maintenance planning
  - Mr. Henk Samson (Strukton Rail)
  - Mr. Joao G. Morgado (Infraestruturas de Portugal)
3. Technical developments of the INFRA ALERT project → INFRA ALERT team
4. Open discussion on ICT tools for capacity improvement of existing transport infrastructures
  - Dr. Jesus Rodriguez (Spanish Construction Technology Platform)



What issues would you like to discuss? What are your worries?  
Some suggestions may be:

- How can we define complexity? **How complex** a system has to be to require these tools?
- How are **maintenance contracts** organised? Is it sensible? Does it encourage or prevent 'optimisation'?
- '**Big data**' analysis: Are we ready for this? Big data repositories for transport infrastructure maintenance interventions
- Transport systems are 'core business' in our countries. **Cloud based services and privacy/security issues**: are they compatible?
- What else???







[www.infralert.eu](http://www.infralert.eu)



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