

Collaborative Innovation Days

1st Workshop on Infrastructure Cloud - Construction and Maintenance

workshop 28/03

2017



INFRAALERT

Linear infrastructure efficiency improvement by automated learning and optimized predictive maintenance techniques

Project description, Targets & Partners

INFRAALERT is a research project supported by the EU within the Horizon 2020 Programme, started on 1 May 2015 for a 3-years duration.

The project aims to develop an **expert-based information system to support and automate infrastructure management** from measurements to maintenance.

The system developments is based in a **modular architecture**, consisting of several plug-in modules within a common framework: the eIMS.

The specific technologies developments are:

The Data Farm

A tool for the collection and organisation of condition monitoring data stored in external databases.

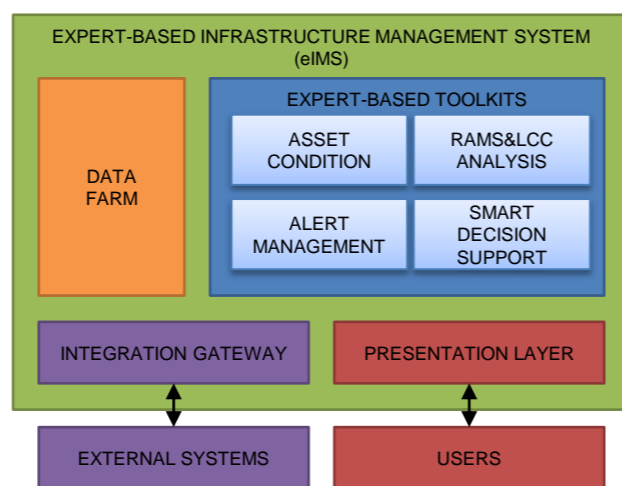
Expert-based toolkits

- An automated Health Assessment and Prediction tool to perform accurate nowcasting and forecasting → **The Asset Condition toolkit.**
- 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.**
- Methods and tools to evaluate and forecast RAMS parameters and LCC dynamically → **The RAMS&LCC Analysis toolkit.**
- 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.**

The eIMS

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

INFRAALERT's partners



Cases, expected impacts and interim major results

Demonstration sites

The INFRAALERT developments will be demonstrated in two real-world.



Road network, Coimbra region in the centre of Portugal, managed by Infraestruturas de Portugal.



Railway corridor, Iron Ore Line in Malmbannan in northern Sweden, managed by Trafikverket.

The major challenges of INFRAALERT are:

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

The major outcomes of INFRAALERT are:

- Ensuring service reliability and safety by minimising incidences and failures of decaying assets.
- Keeping and increasing the infrastructure availability by optimising operational maintenance interventions and strategic long-term planning decisions on new construction.
- Ensuring the operability under traffic disruptions due to interventions.

Collaboration opportunities

Interest to collaborate with other running projects

R&D done in INFRAALERT is also in line with other on-going European funded projects and initiatives:

- REFINET <http://www.refinet.eu/> This Coordination Support Action funded by the H2020-EU aims to create a sustainable network that integrates relevant stakeholder representatives of all transport modes and infrastructure sectors in order to create a shared European vision of how the multi-modal European transport infrastructure network of the future should be specified, designed, built or renovated, and maintained. CEMOSA has attended the two expert's workshops organized by REFINET in 2015 and 2016.
- IN2RAIL <http://www.in2rail.eu/> This large project, co-funded by the EU under the H2020 program, aims to set the foundations for a resilient, consistent, cost-efficient, high capacity European network by delivering important building blocks that unlock the innovation potential that exists in Shift2Rail. Fraunhofer and Luleå University of Technology participate in this project.
- IN2SMART <http://goo.gl/UR2YZ9>. This is the 1st H2020 project of the Shift2Rail JU members. It deploys an overall concept for Intelligent Asset management. It covers developments related to measuring and monitoring systems for railway assets, data management and analytic procedures and degradation models and decision making tools to support maintenance strategies and execution. Fraunhofer, CEMOSA and Luleå University of Technology participate in this project.
- USE-iT and FOX <http://www.useitandfoxprojects.eu/> These two H2020 projects have a common aim: to contribute to development of the Forever Open Road, Rail, Runway and River or FORx4 initiative. Together they will establish a crossmodal Working Group to develop a roadmap for the whole transport sector and set the agenda for the further improvement of cross-modal research development innovation.

External organizations engaged with the project

INFRAALERT is supported by external experts consisting of potential users and specialist groups in the transport linear infrastructure field and in particular in the area of road and rail transport. They constitute the External Advisory Board (EAB) that provide regular and meaningful inputs to the project, giving recommendations on scientific and business aspects.