SYSTEM FOR VEHICLE-INFRASTRUCTURE INTERACTION ASSETS HEALTH STATUS MONITORING

SIA

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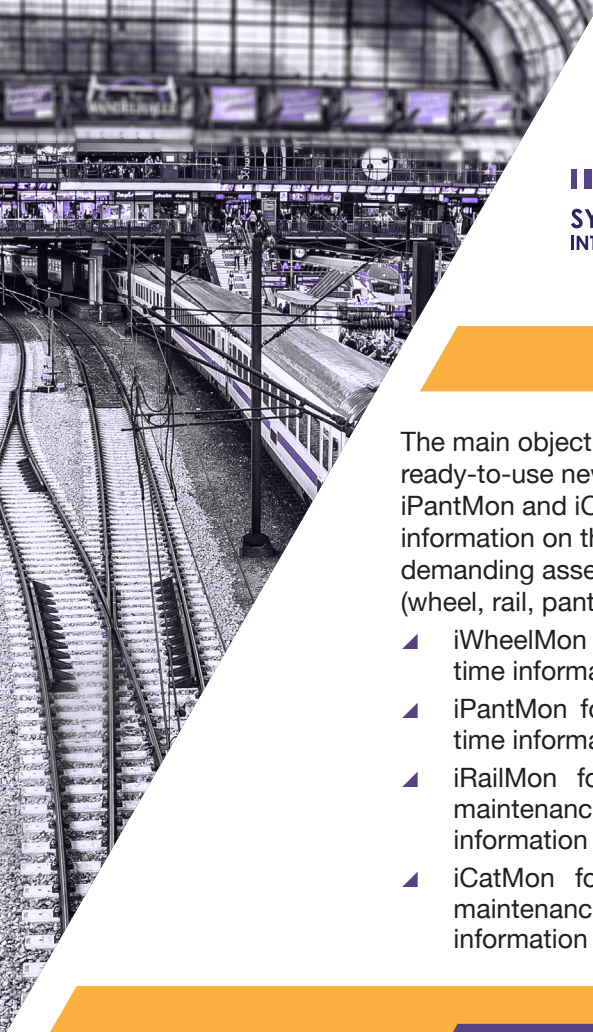**SYSTEM FOR VEHICLE-INFRASTRUCTURE**
INTERACTION ASSETS HEALTH STATUS MONITORING

SIA MAIN GOAL

The main objective of SIA is the development of four ready-to-use new services (iWheelMon, iRailMon, iPantMon and iCatMon) providing prognostic information on the health status of the railway's most demanding assets in terms of maintenance costs (wheel, rail, pantograph and catenary):

▲ iWheelMon for railway operators will provide real time information about wheel status

▲ iPantMon for railway operators will provide real time information about the pantograph status

▲ iRailMon for rail infrastructure managers and maintenance subcontractors will provide real time information about the rail status

▲ iCatMon for rail infrastructure managers and maintenance subcontractors will provide real time information about the catenary status

SIA OBJECTIVES

▲ Development of **low-cost sensor nodes (SIA_NoS)** for wheel to rail and pantograph to catenary interaction characterisation

▲ Development of a **data hub (SIA_DH)** that collects on-board information, provides accurate position and time stamping with high availability, and transmits the information to a trackside visualization platform

▲ Development of **predictive component degradation models (SIA_CDM)** that will enable to connect the monitoring information from wheelset, rail, catenary and pantograph with the asset management information system of end-users

▲ Development of a **visualisation platform (SIA_VP) with two plug-in software modules specific for the railway** infrastructure (track and catenary) and vehicle maintenance (wheelset and pantograph)

SIA AMBITION

Prognostic health monitoring of key railway assets

- Development of a low-cost real time monitoring system
- Increase of energy harvesting capabilities

EGNSS localisation techniques

- Development of a low-cost positioning solution that will provide high accuracy and high availability in the railway environment
- Finger printing using vehicle dynamics gathered data
- Development of a positioning algorithm testing tool

Component degradation models

- Degradation models: combination of physical modelling & sensors' data
- Predictive algorithms

SIA INNOVATION

- Development of new end-to-end EGNSS based services to address end-user needs
- Combination of cutting-edge technologies to provide added value to end users
- Innovation in business model

SIA IMPACT

- Make a more modern, efficient and user-friendly rail transport system:
  - 25% reduction of unscheduled maintenance activities
  - 15% reduction of maintenance costs
  - 15% reduction of derailment risks
- Maximise the potential of the EGNSS and its adoption in transport
- Demonstrate the benefits of the use of Galileo and EGNOS in rail transport
- Encourage market take-up of the developments

PROJECT ORGANISATION

WP NUMBER	WP TITLE	LEAD BENEFICIARY
WP1	Project Management	CEIT
WP2	End-user functionality and SIA architecture definition	NSL
WP3	EGNOS and Galileo based on-board low-cost receiver and algorithms for railway specific domain	NSL
WP4	Integration of sensors, communications and energy supply for on-board sensing nodes	CEIT
WP5	Component degradation predictive algorithms	DLR
WP6	Visualisation environment for railway specific maintenance applications	INGECONTROL
WP7	Integration with end-user specific application layer	INGECONTROL
WP8	Test setup development and validation	FGC
WP9	Dissemination, communication and result exploitation	UIC
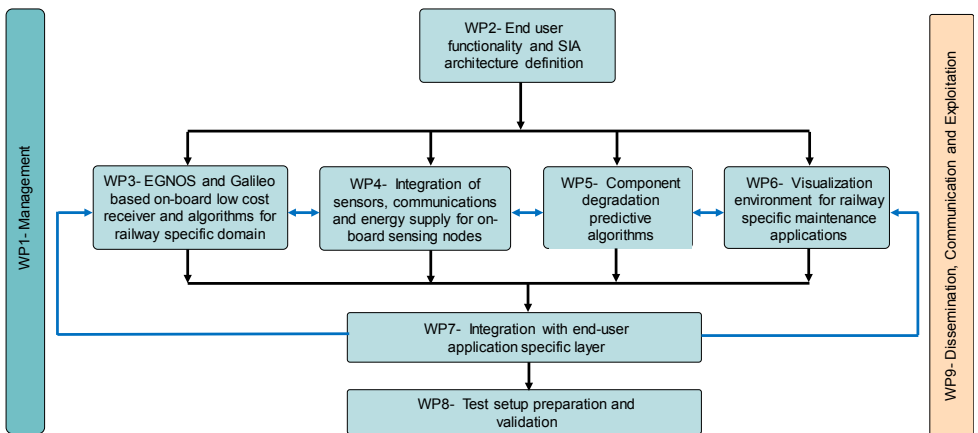
FACTS AND FIGURES

Horizon 2020
European Union Funding
for Research & Innovation

European
Global Navigation
Satellite Systems
Agency

N°	NAME	SHORT NAME	COUNTRY
1	Asociacion Centro Tecnológico CEIT-IK4	CEIT	Spain
2	Union Internationale des Chemins de fer	UIC	France
3	Deutsches Zentrum für Luft- und Raumfahrt e.V.	DLR	Germany
4	Ingeniería y Control Electrónico SA	Ingecontrol	Spain
5	Teléfonos Líneas y Centrales SA	TEL	Spain
6	Vías y Construcciones SA	VIAS	Spain
7	ÖBB-Infrastruktur AG	ÖBB	Austria
8	Ferrocarrils de la Generalitat de Catalunya	FGC	Spain
9	Nottingham Scientific Ltd	NSL	United Kingdom

CONSORTIUM

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