PTFE
Plataforma Tecnológica Ferroviaria Española

Project Database
Spanish Railways Technological Platform

Monographic

RETOS COLABORACIÓN

Spanish National R&D and Innovation Programme

Rail Project Analysis
2013-2019 Calls

January 2021 edition

GOBIERNO DE ESPAÑA
MINISTERIO DE CIENCIA E INNOVACIÓN
AGENCIA ESTATAL DE INVESTIGACIÓN

Secretaría Técnica:
Technical Secretariat:
FUNDACIÓN DE LOS FERROCARRILES ESPAÑOLES

FOREWORD

The **Spanish Ministry of Science and Innovation** has the capacity, in the framework of the National Programme for Research and Innovation oriented to the Challenges of the Society, to finance and stimulate, through the launch of public competitive calls, scientific research, technological investigation and development, and innovation directed to answer these challenges.

RETOS-COLABORACIÓN is one of the tools used to achieve this objective. This instrument represents an opportunity for companies and R&D agents, for the execution of innovative projects in cooperation and with results close to the market that mobilize private investment, generate employment and improve the country's technological balance.

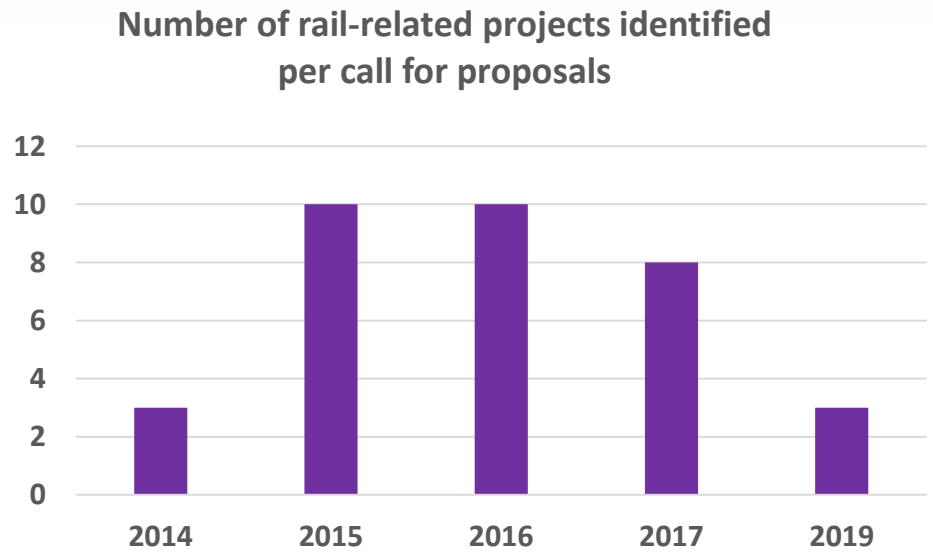
The Spanish Railways Technological Platform (PTFE) has gathered key information from the awarded RETOS-COLABORACIÓN projects, as provided on a voluntary basis by the project participants, with respect to rail results on the **2014, 2015, 2016, 2017 and 2019 calls**. It is a live document to be enlarged with each new call and with further project factsheets that may be submitted. For further information do not hesitate to contact PTFE Technical Secretariat.

RETOS-COLABORACIÓN Programme

- Driven by the Ministry of Science and Innovation
- Five competitive calls: 2014, 2015, 2016, 2017, 2019
- Open to a broad range of societal challenges and thematics
- Analysis of awarded **RAIL** projects, according to the information available at the website of the Ministry and the information provided by the participating entities
- A total of 34 rail-related projects have been identified, from which 28 factsheets have been collected, provided by the participating entities
- Participation of 105 different beneficiaries at the identified projects
- Continously updated document

Identified projects

The following graphic shows the distribution of the 34 rail-related projects identified according to the year of the call in which they were selected for financing.



RETOS COLABORACIÓN funding programme

RETOS-COLABORACIÓN - Participants

Company	# Projects as leader
TECSA EMPRESA CONSTRUCTORA	5
COMSA	4
VÍAS Y CONSTRUCCIONES	4
ARIÑO DUGLASS	3

Company	# Projects
FGC	7
VÍAS Y CONSTRUCCIONES	6
CEIT	6
TECSA EMPRESA CONSTRUCTORA	5
COMSA	4
UNIVERSIDAD CARLOS III DE MADRID	4

Proyects leadership

Projects participation

Companies with higher participation at the rail-related RETOS-COLABORACIÓN projects identified

Project classification per thematic area

PTFE Thematic Area	Projects		
Platform, superstructure, track and installations	AVATTRACK (2014) AVIF (2015) CIFIL (2016) DDP-VFE (2016) DESVÍOS (2017) FERRODRON (2015)	FERROMA (2017) HERMES (2016) HP-RAIL (2017) ICEBURNER (2015) PREDIVIA (2014) RAILFILLER (2019)	RAILSAND (2017) RECOVER (2015) ROBOTRACK (2015) SIMIT (2014) SINATU (2016) SOLBAN (2015)
Rolling Stock	AXIS (2016) BEA (2015) FOTOFREC (2017)	PYRCAST (2016) RENERSEG (2015) SENSEROD (2016)	VITECA (2019) WHEELCHECK (2015)
Policies, planning, economy, energy and sustainability	CONTER (2019) OPTICON (2015)		
Exploitation, operation and rail system security and safety	ALIS (2015) CARE (2016) DG-RAIL (2017)	GoalHUB (2017) SIGNAL (2016) TOOLTRAIN (2017)	

2019 CALL

3 rail-related projects identified:

- **CONTER**
- **RAILFILLER**
- **VITECA**

CONTER, Development of efficient multilayer coatings for energy control in rail architecture and transport

DESCRIPTION

The CONTER project aims to address the development of new multilayer coatings for solar or low-emission control from various points of view: improvement of current multilayer designs, improvement of the deposition process, improvement of their quality controls, development of coatings with new aesthetic aspects and new functionalities.

This type of multilayer coatings are widely used in architecture, rail transport and in maritime vehicles, a market in which Ariño Duglass has begun to enter, and they are a fundamental piece in the improvement of energy efficiency, since they allow a great control of the solar energy incident on the glazing, as well as in the case of the “low emissives” also allows the control of the re-emission of black body radiation from them.

RESULTS

The project began on October 1, 2019, so it is in the initial phase.

KEY FIGURES

Call: Retos Colaboración 2019

Duration: 39 months

Total budget: 563.784,22 €

CONSORTIUM

Ariño Duglass

Universidad Zaragoza

RAILFILLER. Additive manufacturing for maintenance of railway infraestructure assests

DESCRIPTION

This Projects aims to develop an in-situ repair systems for rails. The goal is a reduction of maintenance cost, extend the rail lifetime and reduce the environmental impact of the current methods.

RESULTS

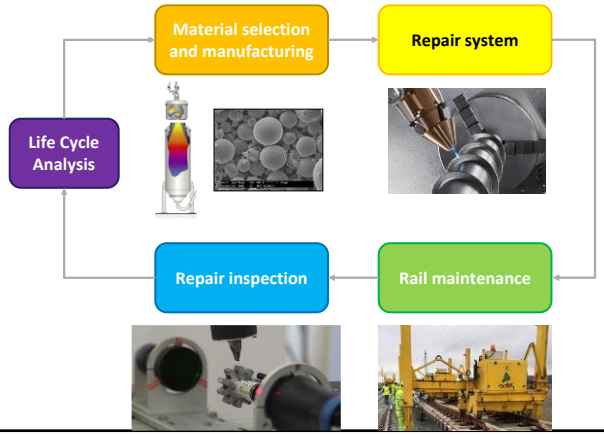
1. Rail repair process optimisation based on LMD technology.
2. Developmment and validation of the subsystems needed for a complete rail repair system.
3. Life cycle cost study of rails repaired by LMD technology.

KEY FIGURES

Call: Retos Colaboración 2019

Duration: 30 months

Total budget: 721.230 €



CONSORTIUM

TRIA Ingeniería

FGC

CEIT

VITECA, intelligent glass for railways manufactured using sputtering techniques

DESCRIPTION

Development of heated windscreens:Use of layers of conductive transparent oxides (TCOs) deposited by magnetron sputtering as an alternative to tungsten wires, since in this way the heating of the windshield can be more uniform, avoiding the formation of hot spots that can get to modify the optical properties of the windshield, creating areas with distortion, not acceptable for the driver.

Development of electrochromic side windows: It aims to develop windows based on electrochromic glass manufactured entirely by layer deposition using magnetron sputtering and easily industrializable at the Ariño facilities. Electrochromic glass has the peculiarity of changing its light transmission properties when a small electrical current is applied to it. This type of smart glass allows users to control the amount of light (and, consequently, heat) they transmit, representing considerable energy savings. Once activated, the glass changes from transparent to opaque, partially blocking light while maintaining a clear view, offering the passenger the possibility to modify the state of the window with the push of a button, and resulting in greater comfort.

RESULTS

We are in phase 2 of the project, out of a total of 5 phases, with very good results in the study of TCO's in the development of heated windshields and electrochromic side windows.

KEY FIGURES

Call: Retos Colaboración 2019

Duration: 36 meses

Total budget: 599.700€

CONSORTIUM

Ariño Duglass

Tekniker
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

2017 CALL

8 rail-related projects identified:

- **DESVÍOS**
- **DG-RAIL**
- **FERROMA***
- **FOTOFREC**
- **GoalHUB**
- **HP Rail**
- **RAILSAND**
- **TOOLTRAIN**

RETOS COLABORACIÓN funding programme

** Factsheet not available*

DESVÍOS. New solution for real-time automatic detection of defects in the drive system of a railway turnout, as well as its diagnosis

DESCRIPTION

Easy installation and low cost tool for monitoring the drive system of railway turnouts in order to detect anomalies with maximum precision and diagnose existing defects, all this on a real-time continuous basis towards a predictive maintenance of the railway turnouts.

RESULTS

The following results are expected:

-Precise and low-cost data acquisition subsystem to obtain the current curve in each operation of the turnout.

- Robust, low cost, autonomous and real time wireless communication subsystem.
- Specific software subsystem to study the existence of defects in the drive system and its diagnosis.

KEY FIGURES

Call: Retos Colaboración 2017

Duration: 36 months

Total budget: 816,608.00€

CONSORTIUM

COMSA

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

RETOS COLABORACIÓN funding programme

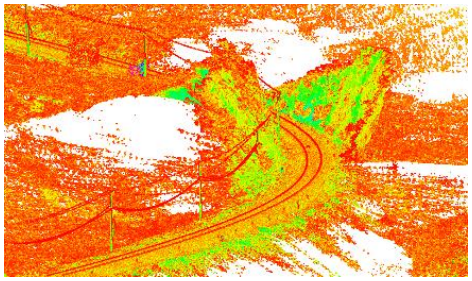
DG-RAIL

DESCRIPTION

Development of an autonomous air-ground system for collaborative inspection and digitization of the railway network.

RESULTS

Prototype of sensorized autonomous air-ground system and technology required for the treatment and interpretation of the information

KEY FIGURES		CONSORTIUM
Call: RETOS COLABORACIÓN 2017 Duration: 3 years Total budget: 681.658,30 €		*VIAS Y CONSTRUCCIONES S.A.* *TECSA EMPRESA CONSTRUCTORA S.A.* *UC3M*

FOTOFREC, Innovation and development of anti-pollution glasses with frequency-selective surfaces

DESCRIPTION

The FOTOFREC (PHOTOFREQ, loosely translated) project seeks to solve two very different challenges, namely the reduction of air pollution and the reduction of the obstruction of mobile phone frequency signals. It does this through research and development into innovative anti-pollution (PHOTOcatalytic) glazing with selective FREQueny surfaces.

Today the primary component used in glazing is soda-lime glass, which is very transparent and chemically stable. Solar control and low-emission coatings are applied to the glass as one technique to improve energy insulation. These layers are made of metals that reflect the sun's radiation. They do have the drawback, however, of obstructing the transmission of mobile phone frequencies. To overcome this issue and improve communication inside rail vehicles, we seek to develop frequency-selective surfaces that allow a given range of frequencies to pass through the coated glass.

Air pollution is a global environmental concern and causes serious damage to people's health and to ecosystems. To help reduce air pollution, we seek to design glass with photocatalytic properties that will help eliminate harmful gaseous pollutants, using solar energy and water.

RESULTS

In industrial scaling phase. Part of the research will be commercialized by mid-2021.

KEY FIGURES

Call: Retos Colaboración 2017

Duration: Until September 2022

Total budget: 1.607.643,5€

CONSORTIUM

Ariño Duglass

Universidad Zaragoza

RETOS COLABORACIÓN funding programme

GoalHUB. Automatic and optimized planning tool for highly-congested railway stations

DESCRIPTION

The forecast of demand in railway traffic suggests that, in many European and North American networks, situations close to collapse may occur in relevant stations and strategic junctions that may not be solved with additional investment in building new infrastructures. The goal of GoalHUB is to enable a more efficient use at these stations in order to maximize their offered capacity.

RESULTS

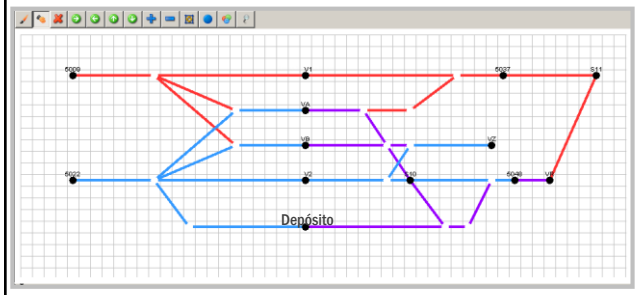
Development of an automatic and optimized railway traffic planning tool that guarantees the efficient exploitation of the train traffic capacity in highly-congested stations, so that the achieved operational usage of each station is closed to its full capacity.

KEY FIGURES

Call: MINECO RETOS 2017

Duration: 30 months

Total budget: 1.210.240 €



CONSORTIUM

Goal Systems, S.L.

Universidad Carlos III

HP-Rail. Smart technologies & high performance materials for the next railway generation

DESCRIPTION

The main objectives and innovations of the project are:

- Development of an innovative system for trains weighting while allowing for the monitoring of traffic loads and track response.
- Design of high performance binders for the manufacturing of more durable and resistant materials to support future traffic conditions.
- Development of components from the high performance binders for their application in the structure of track section.
- Design and tuning of new laboratory tests for the study of materials and section elements under real conditions expected in railway tracks.

RESULTS

- The new weighting system aims to reduce the time for trains weighting while monitoring the mechanical response of the track under traffic loads.
- The high performance binders will improve the durability and resistant of the asphalt materials, which will allow for reducing the thickness of foundation layers, and therefore, their costs.
- The improved asphalt components will reduce section degradation by increasing the bearing capacity of track, while obtaining higher homogeneity along the line which will reduce the need for maintenance.
- The development of more realistic laboratory tests, joined to the design of high performance bituminous solutions, will allow for optimizing the design of substructure, and therefore, of the global track section. In addition, the correlation of results from laboratory tests with real track response will collaborate to predict track failures.

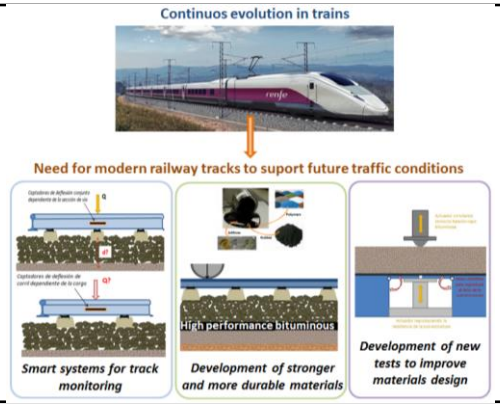
KEY FIGURES

Call: 2017

Duration: 42 months

Total budget: 641.604,15€

RETOS COLABORACIÓN funding programme



CONSORTIUM

CEPSA, University of Granada, Euroconsult, y Ciesm-intevia

RAILSAND. New rails for extraordinary abrasive conditions

DESCRIPTION

The main objective of RAILSAND is the design of the chemical composition of steel and the development of thermomechanical and thermal treatments to achieve a new type of rail capable of increasing the abrasion resistance of desert sand and preventing corrosion.
It is also intended to define an optimal process of chemical reduction of iron smelting slag for the elimination of CaO to the level that allows its use in desert climate infrastructures. Finally, a SW application will be developed to calculate the cost of the life cycle of the lane taking into account the characteristics of the infrastructure, the characteristics of the service (vehicle, speeds, accelerations, adhesion) and maintenance characteristics (for example, costs lane grinding, rail replacement costs, inspection costs).

RESULTS

- New rails that are more resilient under extreme climate conditions
- Development of a new type of ballast that is based on foundry slag
- Infrastructure assets degradation modeling based on physical laws and its application to predictive maintenance
- SW tool for the analysis of rails' life cycle
- Analysis of the life cycle cost (LCC) of rails in the Project's use case: Meca-Medina high-speed line

KEY FIGURES

Call: RETOS COLABORACIÓN 2017

Duration: 01/07/2018 – 31/12/2020

Total budget: 865,694.80 €

CONSORTIUM

ArcelorMittal, COPASA, IDONIAL, ceit

RETOS COLABORACIÓN funding programme

TOOLTRAIN. Advanced Tools for the Characterization and Dimensioning of high performance railway lines

DESCRIPTION

The general objective of the project is to develop innovative characterization and dimensioning tools for high capacity rail lines. These tools will allow performing minimum interval calculations for lines equipped with CBTC and ERTMS L2 signalling, as well as dimensioning fixed or virtual track circuits for a given minimum interval.

RESULTS

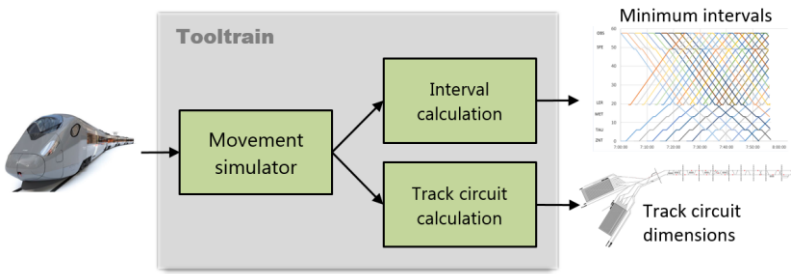
A complete and detailed model of the operation of trains equipped with the CBTC and ERTMS signaling systems will be obtained, which will allow the accurate calculation of the transport capacity, including models of the dynamics of the train, of the operation of the signaling and ATP protection systems (both trackside and onboard), and of the operation of the ATO (Automatic Train operation) systems (including the new "ATO over ERTMS" system, under development).

KEY FIGURES

Call: Retos-Colaboration 2017

Duration: 24 months.

Total budget: 647.646,80 €



CONSORTIUM

CAF Signalling.
Universidad Pontificia Comillas - Instituto de Investigación Tecnológica (IIT).

RETOS COLABORACIÓN funding programme

2017 Call
Projects without factsheet available

Title	Beneficiaries
Application of vibration analysis techniques to the detection and evaluation of damage in railway viaducts (FERROMA)	ALDESA CONSTRUCCIONES SA; FUNDACIÓN CAMINOS DE HIERRO PARA LA INVESTIGACIÓN Y LA INGENIERÍA FERROVIARIA; TECSA EMPRESA CONSTRUCTORA SA

2016 CALL

10 rail-related projects identified:

- **AXIS**
- **BEA**
- **CARE**
- **CIFIL**
- **DDP-VFE***
- **HERMES**
- **PYRKAST**
- **SENSEROD**
- **SIGNAL**
- **SINATU**

RETOS COLABORACIÓN funding programme

** Factsheet not available*

AXIS. High reliability advanced technologies to maximize the life, safety and availability of railway vehicles in service

DESCRIPTION

Development of damage tolerance methodologies and inspection technologies to monitor the structural integrity of railway axles in service that will improve the safety of these components and reduce vehicle LCC costs increasing their availability.

RESULTADOS

The development of technologies and methodologies for the design and monitoring of axles will favor the growth and internationalization of the Spanish railway industry by providing components and maintenance services of higher performance.

DATOS

Call: RETOS-COLABORACIÓN 2016

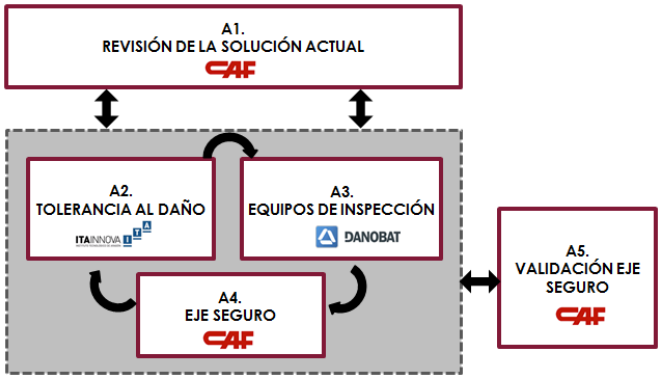
Ministerio de Economía y

Competitividad

(RTC-2016-4813-4)

Duration: 2016-2018

Total budget: 1.666.498,89 €



RETOS COLABORACIÓN funding programme

CONSORTIUM

CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES, S.A.

DANOBAT S. COOP.

IDEKO, S. COOP.

INSTITUTO TECNOLÓGICO DE ARAGÓN

BEA. Intelligent Monitoring System for Predictive Maintenance of Bogies based on Acoustic Emission

DESCRIPTION

The general objective of the project is to develop technologies that allow the detection, location and diagnosis, in incipient states of cracks of critical elements of the bogie, such as the axles, as well as the evolution of these cracks, being possible the prediction of the fracture of the component once the presence of a crack is detected.

RESULTS

The proposed technology can be installed in both existing and new bogies. It is estimated that in a first phase the product will receive a better reception to be installed in the bogies that are already in circulation since the probability of failures is greater than in the new bogies newly exited of the factory. At long term operators will require manufacturers to incorporate the new product in the bogies as standard.

KEY FIGURES

Call: Retos-Colaboración 2016. Ministerio de Economía Industria y Competitividad (RTC-2016-5410-4)

Duration: 2016 - 2019

Total Budget: 846.467€

CONSORTIUM

Ferrocarrils de la Generalitat de Catalunya
World Sensing
Draco systems
Fundació CTM Centre Tecnològic
Universitat Politècnica de Catalunya

RETOS COLABORACIÓN funding programme

CARE. Personal protective equipment (PPE) for the control of electric risk

DESCRIPTION

The main objective of the project is to develop new personal protective equipment (PPE) based on the detection of the electric field of catenaries, transformers or other electrical installations. This PPE will provide the operator with a higher level of protection against electrical hazards, as well as provide information on possible falls suffered by the user, due to an electrical accident or during the normal course of his/her activity, and information on the person's state of health at the time of the accident, allowing the necessary emergency action without the need of interaction with the user. To do this, the following phases are established: I. Definition of requirements for the development of PPE that minimize electrical risk. II. Design and development of PPE (I-CARE). III. Design and implementation of management software. IV. Implementation of the system and monitoring of results.

RESULTS

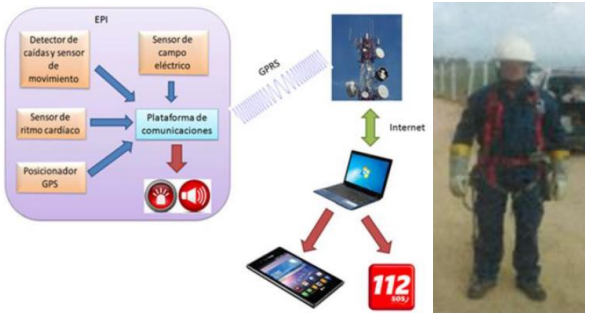
Develop a new personal protective equipment (PPE) based on the detection of the electric field, with a much higher level of protection against electric risks. Advanced individual protection equipment, allowing the action of the emergency services without interaction with the user.

KEY FIGURES

Call: 2016

Duration: 2016-2019

Total budget: 532.210,85 euros



CONSORTIUM

COMSA, S.A.U.

LEITAT

RETOS COLABORACIÓN funding programme

CIFIL. Development of a system for the Characterization of Railway Infrastructures using Lidar Image.

DESCRIPTION

New system for recognition and inspection of railway infrastructures based on Laser Imaging Detection and Ranging (LIDAR technology) by developing new equipment and systems, adapting data processing algorithms and software, leading to a system that improves significantly the State of the Art.

RESULTS

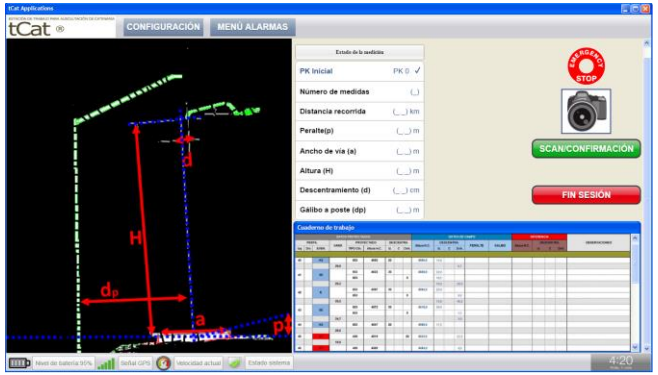
This solution is directly related to the quality assurance of the railway infrastructures, which proposes a new and improved way of carrying out the overhaul of overhead power lines, specifically through the development of a more precise, more agile and more efficient system of measurement and revision of the electrical infrastructures. It is also cheaper than current products in the market and therefore, it is a product with great future, and a high capacity of penetration in the market.

KEY FIGURES

Call: Retos-Colaboración 2016. Ministerio de Economía y Competitividad (RTC-2016-5166-4)

Duration: 2016-2019

Total budget:1.084.526 €



CONSORTIUM

TELÉFONOS LÍNEAS Y CENTRALES, S.A.

UNIVERSITAT POLITECNICA DE CATALUNYA

UNIVERSIDAD DE LEON

RETOS COLABORACIÓN funding programme

HERMES. Tool for management and decision making aid in rail system maintenance

DESCRIPTION

The HERMES project is proposed as a new information system and management of the railway maintenance that implies a leap forward in the following areas:

- Modularity and scalability: HERMES will have some modules that can be used separately or integrated in a single solution based on Cloud Computing.
- Risk management: In order to establish a vehicle and infrastructure maintenance policy, the decisions risk must be known.
- Economic optimization of the maintenance process through maintenance logistics modelling and the assessment of their costs.
- Control and monitoring of maintenance tasks through a ticketing system of maintenance and incidents.

RESULTS

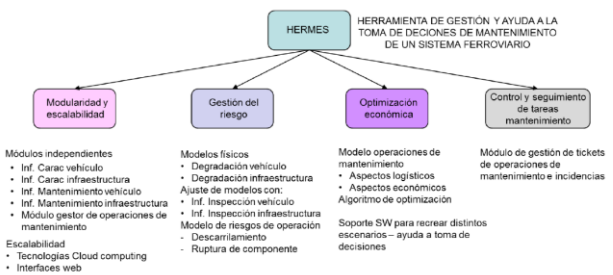
The developed platform will allow the implantation of a predictive maintenance strategy that will ensure the optimization of means and times, the reduction of the maintenance costs and a better control of the operation risks.

KEY FIGURES

Call: Retos-Colaboración 2016. Ministerio de Economía Industria y Competitividad (RTC-2016-5204-4)

Duration: 2016 - 2019

Total budget: 945.918,59€



CONSORTIUM

Ferrocarrils de la Generalitat de Catalunya

Vias y Construcciones

INYCOM

CEIT

RETOS COLABORACIÓN funding programme

PYRKAST. Premium brake discs for high-speed trains

DESCRIPTION

The objective of this project is to develop a new generation of premium brake discs for high speed trains. These brake discs are characterized by presenting greater braking capacity and longer service life, being safer and more reliable than conventional ones, looking for zero defect.

RESULTS

Thanks to this product development, the reliability of the high speed brake systems will be increased. This is a critical issue in this type of transport which is growing exponentially.

KEY FIGURES

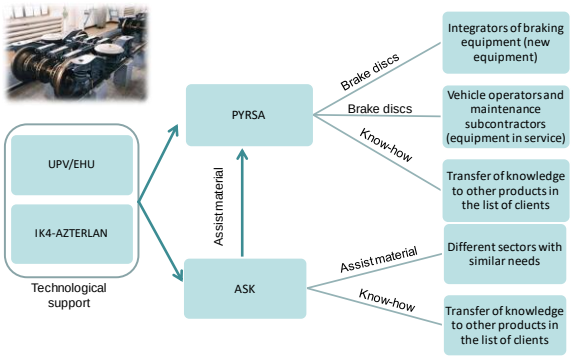
Call: Retos-Colaboración 2016.

Ministry of Economy and Competitiveness.

(RTC-2016-4880-4)

Duration: 2016-2018

Total budget: 1.176.508,00 €



CONSORTIUM

Piezas y Rodajes S.A.
ASK Chemicals
Casa Maristas Azterlan
Universidad del País Vasco

SENSEROD. Monitorization and diagnosis solutions for the advanced management of main rolling stock components

DESCRIPTION

Development of technologies for data adquisition, and monitorization and diagnosis solutions, that will enable an optimization of Rolling Stock management lowering vehicle's LCC and improving train availability.

RESULTS

The development of technologies and advanced diagnosis methodologies will enhance the competitiveness of Spanish railway industry in internacional tenders, through vehicles and services of higher performance.

KEY FIGURES

Call: RETOS-COLABORACIÓN 2016

Ministerio de Economía y Competitividad

(RTC-2016-4634-4)

Duration: 2016-2017

Total budget: 936.570,79€

CONSORTIUM

CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES, S.A.

CENTRO DE ENSAYOS y ANALISIS CETEST, S.L.

IKERLAN, S. COOP.

RETOS COLABORACIÓN funding programme

SIGNAL – Incident Intelligent Management System for Commuter Trains

DESCRIPTION: Incidents and emergency events in passenger rail transport are more frequent than expected. One of the top priorities is to minimize the consequences of this type of events by ensuring the safety of the passengers. This responsibility often falls on people who must make decisions quickly and efficiently. To achieve this goal there are predefined plans that establish an orderly sequence of actions where it has been proven to be ineffective and insufficient. The objective of SIGNAL is to develop and test an intelligent management system prototype capable of supporting decision makers and managers in front of incidents and emergencies in commuter trains.

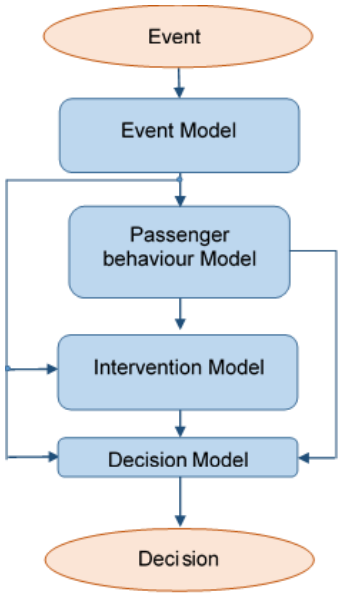
RESULTS: SIGNAL will be able to offer decisions and actions suggestions in real time, mainly oriented to guarantee the safety and support for passengers, based on the analysis of multiple alternatives with advanced computational modeling and simulation techniques and the use of artificial intelligence methods , expert systems and decision trees. This will allow the decision-maker to take scientific-based measures, reduce decision cycles, and thus increase effectiveness in resolving the event.

KEY FIGURES

Call: Retos-Colaboración 2016. Ministerio de Economía, Industria y Competitividad (RTC-2016-5474-4)

Duration: 2016 – 2019

Total budget: 399.384,27 €



CONSORTIUM

SETELSA, S.A. (Líder)

Universidad de Cantabria (GIDAI)

RETOS COLABORACIÓN funding programme

SINATU. Inertial auscultation system of concrete tunnel linings

DESCRIPTION

The general objective of the SINATU project is to design a new inertial auscultation system to install in a tunnel which will be capable of characterizing the structural state of the concrete that forms part of the coating while the vehicle passes through it.

RESULTS

Design of inertial sensors network to place on the concrete lining of the tunnel which will be able to record the vibratory behavior of the tunnel. Send this information automatically and instantaneously to the control center. And furthermore, to have a management software able to process and analyze the sensors data and to obtain as a result the structural state of the concrete lining of the tunnel detecting, classifying and locating the defects in it.

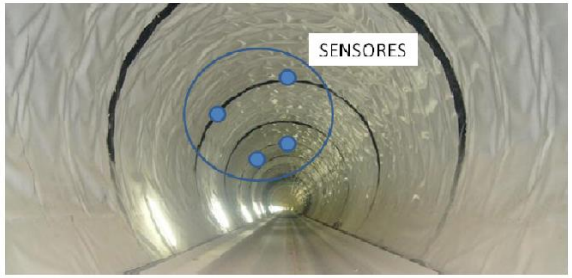
KEY FIGURES

Convocatoria: Retos-Colaboración 2016.

Ministerio de Economía Industria y Competitividad (RTC-2016-5038-4)

Duración: 2016 - 2019

Presupuesto Total: 1.078.988€



CONSORTIUM

Ferrocarrils de la Generalitat de Catalunya
Comsa corporación
Universitat Politécnica de València

2016 Call
Projects without factsheet available

Title	Beneficiaries
Development of a new system for detecting the wear of pantographs of electric railway vehicles for the optimization of the maintenance process (DDP-VFE)	ALDESA CONSTRUCCIONES SA, UNIVERSIDAD POLITÉCNICA DE MADRID

2015 CALL

10 rail-related projects identified:

- **ALIS**
- **AVIF***
- **FERRODRON***
- **ICEBURNER**
- **OPTICON**
- **RECOVER**
- **RENERSEG**
- **ROBOTRACK**
- **SOLBAN**
- **WHEELCHECK***

RETOS COLABORACIÓN funding programme

** Factsheet not available*

ALIS. *Modeling based on Intelligent Algorithms for the integration of electrification, safety and energy efficiency in railway systems*

DESCRIPTION

This Project has been proposed by Inabensa, Universidad Politécnica de Madrid and Universidad de Málaga. It focuses on the development of a simulation tool which includes characteristics, that are currently non-existent in the market. This development has emerged from the internal need that was detected by the Engineering Railway Department (Inabensa). This result has achieved for first time the integration of electrification systems design, installations and traveller safety and energy efficiency which focuses on design as well as the exploitation.

RESULTS

The end result of the project will be a simulation tool divided into modules. The concepts included are related to concepts of optimal location of substations, behavior of pantographs within the interaction with catenary, development of modules associated with safety in the vicinity of railway systems, both for workers, travelers and passers-by in general, and affections of the rail system. In addition, we will not lose sight of the analysis of the energy re-use of regenerative braking with its corresponding systems of storage, use of renewable energy and efficient driving.

KEY FIGURES

Call: Retos Colaboración - 2015

Duration: 2015 - 2017

Total budget: 777.981,62 €

alis
Inabensa
Universidad Politécnica de Madrid
Universidad de Málaga

CONSORTIUM

Inabensa Abengoa
Univerisdad Politécnica de Madrid
Universidad de Málaga

ICEBURNER. HIGH PERFORMANCE IN EFFICIENCY, AVAILABILITY AND VERSATILITY RAILPOINT HEATING SYSTEMS

DESCRIPTION: The objective of the ICEBURNER project is the design and development of a heating system for points by induced currents that exceeds the performance of the products currently available in the market.

RESULTS: ICEBURNER represents a great leap in the performance of point heaters, improving in the following areas:

Improved availability through the following points:

- Modular power electronics with two parallel solutions that allow fault tolerance
- Possibility of connection of external batteries that allow to maintain the functions at least 4h in a reduced working regime
- Configuration of hot spots on rail or slab with possibility of redundancy for fault tolerance

Improving efficiency

- Use of induction heaters with rail or plate heating by induced currents, which allows to go from an efficiency of 20% to more than 80%
- Power regulation that allows to adapt the power consumed to the external environmental conditions

Improved versatility

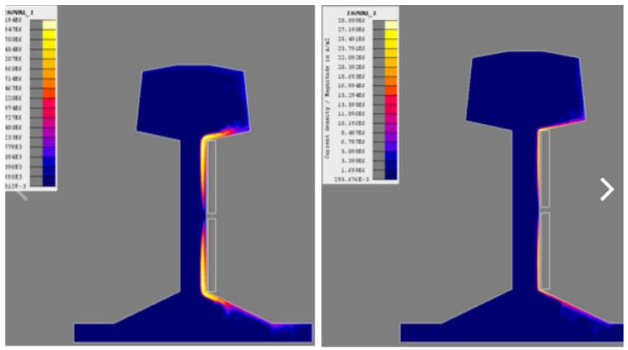
- Self-diagnosis function of the installation
- Communications with checkpoint for monitoring and remote control
- Design of inductors with multiple configurations for the same power electronics
- Single inductor installation-uninstall solution to facilitate substructure maintenance

KEY FIGURES

Call :Retos-Colaboración 2015. Ministerio de Economía y Competitividad (RTC-2015-3659-4)

Duration: 2015-2018

Total Budget: 770.257,04



CONSORTIUM

Vias y Construcciones

TELICE

CEIT

RETOS COLABORACIÓN funding programme

OPTICON. Tool to aid decision-making in the optimization of the electric consumption of railway systems based on the flow of vehicles and infrastructure characteristics

DESCRIPTION

The aim of this project is to develop a decision making support tool for railway and infrastructure operators to optimize the electric consumption of the system. To address the objective a software capable to simulate a complete rail network in terms of energy consumption will be developed. This software will be able to give response to the following questions: Which electricity supply contract suits better?, Which way of driving reduces the consumption while maintains the quality of service?, What time of return does it have to introduce an ATP or a converter change?

RESULTS

The developed platform will include:

- Model of the power supply network, including all components of the electrical infrastructure such as traction substations, catenary or converters.
- Model of consumption of the traction system, which will include the dynamics of the train as well as the auxiliary consumptions.

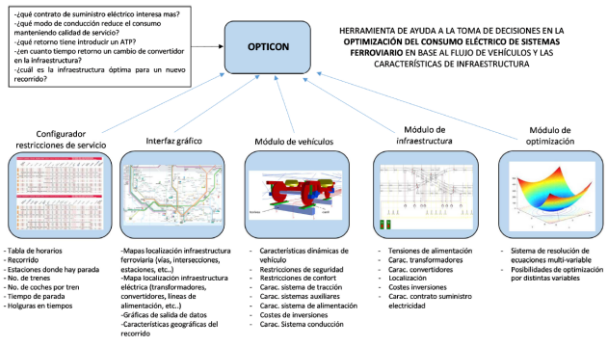
The result of this project will be a tool capable to simulate in a reasonable time the whole rail network in terms of energy consumption.

KEY FIGURES

Call: Retos-Colaboración 2015. Ministerio de Economía Industria y Competitividad (RTC-2015-4320-4)

Duration: 2015 - 2018

Total budget: 889.904,88€



CONSORTIUM

Ferrocarrils de la Generalitat de Catalunya

Vias y Construcciones

CEIT

RETOS COLABORACIÓN funding programme

RECOVER. Comprehensive sustainable anti-pollution treatment for the creation of green railway corridors

DESCRIPTION

The project seeks to create green railway corridors by means of systems for removing contaminants associated with the operation of the infrastructure, especially in relation to ballast, allowing an environmental improvement of the track itself and its surrounding area. To do this, it intends to design several systems for heavy metals and hydrocarbons pollutants capture and removal through different technologies:

- Sol-gel ballast coating composed of silicon oxide and complexing functional groups capable of absorbing heavy metals, and photocatalytic titanium oxide capable of degrading hydrocarbons
- Ballast modified by fixing ionically printed polymers based on polyurethanes
- Soil microbial population phytoremediation and bioaugmented processes

RESULTS

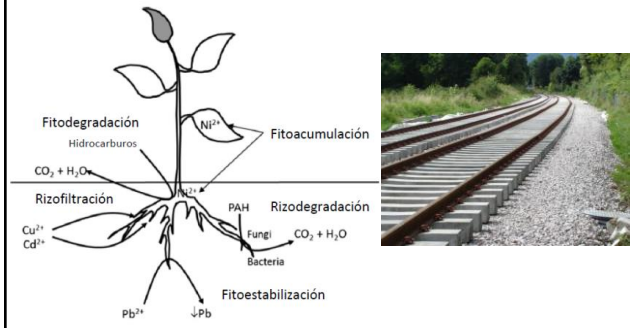
It aims to achieve: Design of systems to capture and eliminate heavy metals and hydrocarbons in the ballast and soil adjacent to railway tracks and generation of pollution-free zones associated with the circulation of trains.

KEY FIGURES

Call: 2015 (RTC-2015-4043-4)

Duration: 2015-2018

Total budget: 857.110,60 Euros



CONSORTIUM

COMSA, S.A.U., Fundación CETIM, LEITAT

RETOS COLABORACIÓN funding programme

RENERSEG. New running gear for improving energy efficiency and safety in passenger trains.

DESCRIPTION

This new running gear system involves the development, on the one hand, of a new suspension which will allow to increase the comfort and safety level when travelling under certain degraded conditions; and on the other hand, the development of a new energy storage system.

RESULTS

The development of this new running gear will make possible to meet the requirements of safety, dynamic behavior and comfort without reducing speed under certain degraded conditions, while improving the energy efficiency of the vehicle.

KEY FIGURES

Call: Retos-Colaboración 2015. Ministerio de Economía y Competitividad (RTC-2015-3977-4)

Duration: 2015-2017

Total budget: 708.974,05€

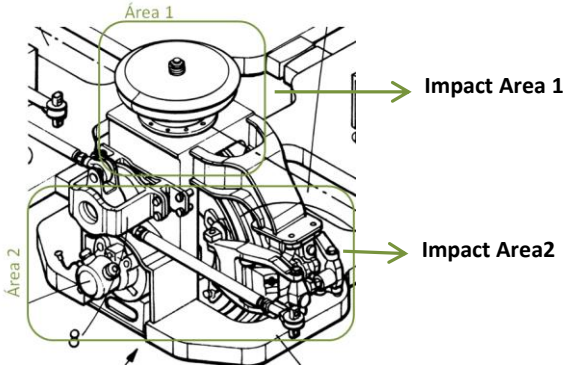


Diagram of the areas where the project will impact

CONSORTIUM

PATENTES TALGO, S.L.U. (Leader)

Universidad Politécnica de Madrid

RETOS COLABORACIÓN funding programme

http://www.robotrack.es

ROBOTRACK. Robotization of commissioning systems for a new concept of lightweight track

DESCRIPTION

The overall objective of the Robotrack project is the development of a new economic and sustainable ballastless track, specially designed to establish an innovative fully automated installation process using a new robotic system.

RESULTS

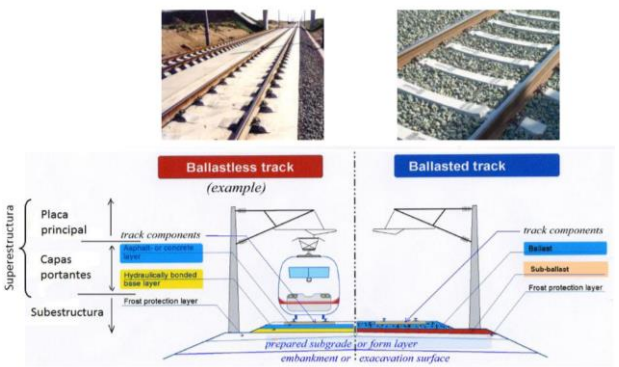
From a global perspective, the project proposes innovations in design, materials and processes which allows the product to be much more competitive with respect to the ballastless tracks that currently exist in the market.

KEY FIGURES

Call: Retos-Colaboración 2015. Ministerio de Economía Industria y Competitividad (RTC-2015-3692-4)

Duration: 2015 - 2018

Total budget: 1.061.907€



CONSORTIUM

Ferrocarrils de la Generalitat de Catalunya
Centro de Estudios de Materiales y control de Obra
Vias y Construcciones
Centro Tecnológico Acamm
Universitat Politécnica de València

RETOS COLABORACIÓN funding programme

SOLBAN. Development of an advanced welding procedure of new carbide free bainitic steels for rail

DESCRIPTION

The objective of SOLBAN is the design and development of a novel welding process, specially designed for high performance rail qualities and the instrumentation of the rail using state-of-the-art sensors for track monitoring and maintenance.

RESULTS

An experimental quality rail has been developed and the welding parameters for crackling and aluminothermic welding have been defined. A robotic welding head has been designed to automate the process and achieve a low level of defects.

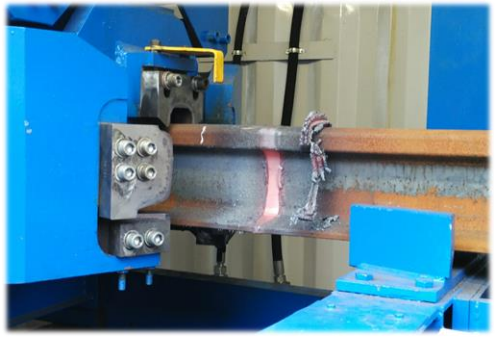
In addition, sensors with wireless communication systems for specific maintenance have been developed and installed on the ArcelorMittal rail network.

KEY FIGURES

Call: Retos-Colaboración 2014. Ministerio de Economía y Competitividad (RTC-2014-2313-4)

Duration: 3 years

Total budget: 886.905,05 €



CONSORTIUM

ARCELORMITTAL; ITMA; UNIOVI

RETOS COLABORACIÓN funding programme

2015 Call
Projects without factsheet available

Title	Beneficiaries
Vibration Attenuation in Railway Infrastructures (AVIF)	UNIVERSITAT POLITECNICA DE VALENCIA, CHM OBRAS E INFRAESTRUCTURAS AS, VIAS Y CONSTRUCCIONES SA, ASOC. EMPRESARIAL DE INVEST. CENTRO TECNOL. DE LA CONSTRUCCION REGION DE MURCIA
Ultralight unmanned vehicle movable on rails for automatic inspection, maintenance and surveillance of track and railway infrastructure with intelligent positioning and behavior using computers and sensors. FERRODRON	UNIVERSIDAD CARLOS III DE MADRID, TECSA EMPRESA CONSTRUCTORA SA
WheelCheck. Railway wheel inspection system from 3D reconstruction of the complete wheel.	VISIONA CONTROL INDUSTRIAL SL, UNIVERSIDAD PUBLICA DE NAVARRA

2014 CALL

3 rail-related projects identified:

- **AVATTRACK***
- **PREDIVIA**
- **SIMIT**

Retos Colaboración funding programme

** Factsheet not available*

PREDIVIA. Development of a detection and monitoring system of mechanical failures based on acoustic emission for the predictive maintenance of track diversions

DESCRIPTION

The overall objective of the project is to develop technologies able to detect, to predict the evolution and to make a diagnosis of incipient cracks in initial states situated in critical elements of the railway infrastructure such as switch tongue of track diversions. This will make possible to predict the component fracture once the crack is detected.

RESULTS

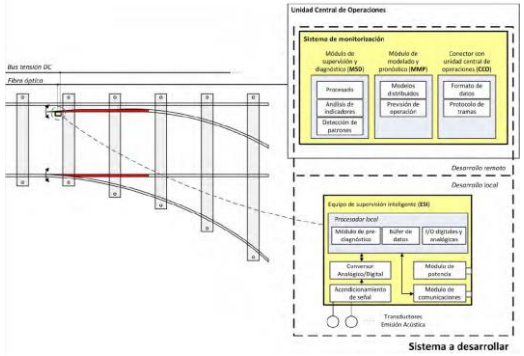
The continuous monitoring of such elements will result in a substantial increase in infrastructure security as well as a reduction in costs of operation and maintenance; maximizing the availability of the infrastructure, increasing its effective life and minimizing the impact of repair operations.

KEY FIGURES

Call: Retos-Colaboración 2014. Ministerio de Economía Industria y Competitividad (RTC-2014-2960-4)

Duration: 2014 - 2017

Total budget: 872.917€



CONSORTIUM

Ferrocarrils de la Generalitat de Catalunya
Fundació CTM Centre Tecnològic
INGIMEC

SIMIT. Intelligent monitoring system for slopes and obstacle detection on track. Pro-active slope maintenance

DESCRIPTION

The project began with the objective of designing a new product for slope movement control based on the development of an intelligent monitoring system that favored the implementation of pro-active maintenance. The technological solution was based on the real test of different types of technology: 1) System based on artificial vision cameras; 2) System based on fiber optic sensing (DAS); 3) Wireless sensor network.

RESULS

A demonstrator was achieved with each type of system (all of them were deployed at a specific point on the Madrid-Valencia HSL and the Madrid-Barcelona HSL). The results of this project allowed for further tests that have finally led to the practical implementation of all of them.

KEY FIGURES

Call: 2014

Duration: 2 years

Total budget: 0,9 M€

CONSORCIO

RETOS COLABORACIÓN funding programme

2014 Call
Projects without factsheet available

Title	Beneficiaries
Precision and high-performance intelligent robotic system for automatic tamping guidance and railway construction and maintenance optimization, based on artificial vision and sensor fusion. AVATTRACK	TECSA EMPRESA CONSTRUCTORA SA

Spanish Railways Technological Platform

Technical Secretariat

Spanish Railways Foundation

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