

Issue 28. October 2021

The role of the railway in sustainable recovery





SPECIAL REPORT

Analysis of railway transport in the Recovery, Transformation and Resilience Plan.



MAFEX INFORMS

Spain-Egypt industry meeting with the Minister of Transport, Kamel Elwazir.



INTERVIEW

María Luisa Domíguez, President of Adif and Adif Alta Velocidad

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MAFEX Sumary

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MAFEX INFORMS

INDUSTRY MEETING SPAIN - EGYPT

Mafex hosted a Spain-Egypt industry meeting at CEOE on the occasion of the presence of the Minister of Transport of Egypt, Kamel Elwazir in the country.

THE SPANISH RAILWAY PRESENT AT THE FAIR - MIDDLE EAST RAIL CONGRESS FROM 11 TO 12 OCTOBER

The Spanish railway industry is heading back to the Middle East, where it seeks to expand trade relations and participate in new infrastructure investments.

MAFEX COORDINATES THE SPANISH JOINED PARTICIPATION IN THE TRANSMEA CONGRESS-FAIR FROM 7 TO 11 NOVEMBEMBER IN EGYPT

This fair represents an opportunity for the railway industry, which already has a wide presence in the country, in a market where there are numerous railway projects planned for the coming years.

MAFEX PARTICIPATES IN A SESSION OF ACLIMA, BASQUE ENVIRONMENT CLUSTER ON THE SUSTAINABLE DEVELOPMENT GOALS (SDGS)

The session hosted entities and companies interested in the implementation of the SDGs, their contribution to the 2030 agenda and the possibilities they offer especially to SMEs.

SPANISH RAILWAY INDUSTRY, AN INDUSTRY WITH A KEY ROLE IN THE NATIONAL ECONOMY

For Mafex, 2021 as the European Year of Rail designated by the European Commission, is a key moment to highlight the dimension of railway and its great contribution to combat climate change and achieve sustainable mobility based on the mode of transport with greater environmental, safety, and territory structuring benefits.

COUNTDOWN TO RAIL LIVE! 2021

Madrid is preparing to host, from 30th November to 1st December, Rail Live! 2021. Everything is ready for the railway event of the year.

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INTERVIEW

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SPECIAL REPORT

THE RAILWAY, THE MAIN CHARACTER OF THE INVESTMENTS OF THE SPANISH RECOVERY PLAN

Spain is committed to an emission-free economic model. To fight climate change, it will allocate a large part of European funds to promote more sustainable modes of transport. This report analyzes all the details of the Recovery, Transformation and Resilience Plan (PRTR) and the historical investments planned in railway projects, both for passenger and freight transport.

69,

INNOVATION

MAFEX PARTNERS PRESENT THEIR LATEST DEVELOPMENTS

80,

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DSAF APPLICATIONS ARE IMPLEMENTED IN THREE SPECIFIC AREAS: EMERGENCY LIGHTING IN WIND TOWERS, SAFETY SIGNAGE WITH EMERGENCY LIGHTING IN ROAD TUNNELS AND SAFETY SIG-

NAGE AND EMERGENCY LIGHTING

IN RAILWAY TUNNELS.

LAS APLICACIONES DSAF SE IMPLEMENTAN EN TRES ÁREAS ESPECÍFICAS: ALUMBRADO DE EMERGENCIA
EN TORRES EÓLICAS, SEÑALÉTICA DE
SEGURIDAD Y ALUMBRADO CON KIT
DE EMERGENCIA EN TÚNELES CARRETEROS Y SEÑALÉTICA DE SEGURIDAD Y ALUMBRADO CON KIT DE
EMERGENCIA EN TÚNELES FERROVIARIOS.



The railway, the great commitment to sustainable and digital recovery



Europa is moving towards a decarbonized economic model to become the first climate-neutral continent by 2050.

Plans to transform its activity towards that goal have been accelerated by the effects of the pandemic through the approval, by the European Commission, of a historic investment for recovery. Within funds, aimed especially at promoting digitalization and sustainability, one of the sectors that will have the most resources is that of transport. Within this, sector, the aim is to achieve a modal change where the railway, due to its numerous environmental and structuring advantages, is the main character.

Iln line with the European strategy, in the Spanish Recovery, Transformation and Resilience Plan (PRTR), about 20% of the funds allocated as non-reimbursable, 13.20 billion euros are destined to implement a new mobility system, free of emissions and equipped with the latest technological developments. Of these, 6.30 billion

euros are allocated to the railway: improvement of commuter trains, large European corridors, actions in intermodal and logistics terminals, freight transport, etc. It is an unprecedented commitment, a unique opportunity that opens the door for companies in the sector to contribute their know-how and extensive experience in the numerous projects planned until 2026. The PRTR allocates two of its components to plans to expand this means of transport in urban environments, the improvement of the commuter network, the support for intermodality, and the completion of the Atlantic and Mediterranean corridors.

But despite this a priori favourable news for our industry, it is necessary more than ever the support and definition of reforms by the administration in areas that reduce national and international competitiveness, such as the skyrocketing cost of electricity, the increase in the transport of goods and logistics, especially for export, the difficulty of attracting and maintaining talent in our industry and the sector in general, the difficulty of acquiring certain key components due to their current scarce supply or the generalized rise in the cost of raw materials among others.

We enter the final stretch of 2021, a year, that of the railway, which highlights the great movement that exists in the sector and the expectations for the coming months. A journey, that of reactivation, which travels on the train of sustainability.

MANAGEMENT: MAFEX.

MAFEX COMMUNICATION COMMITTEE: Alstom Transporte, ArcelorMittal, Bombardier España, Caf, Icon Multimedia, Grupo Trigo, Idom, Indra Sistemas, Ingeteam, La Farga Yourcoopersolutions, Patentes Talgo, Siemens Rail Automation, Stadler Rail Valencia, Thales España, TPF Getinsa Euroestudios y Zitron. ADMINISTRATION: comunicacion@alencom.es ADVERTISING: mafex@mafex.es SUBSCRIPTIONS: mafex@mafex.es. Mafex magazine is not responsible for the opinions, images, texts and works of authors and readers that will be legally responsible for their content. It is understood that the signing authors have given their consent to be included, for which he or she will be responsible. Also, the magazine is not responsible for typographical errors contained in the original documents submitted by the authors.



Spain – Egypt industry meeting

esterday morning, 29th September, the president of Mafex, the Spanish Railway Association, Víctor Ruiz Piñeiro, presided over the opening of the railway corporate meeting organized at the Spanish Confederation of Business Organizations, (CEOE) on the occasion of the presence of the Minister of Transport of Egypt, Kamel Elwazir in the country. Ruiz Piñeiro thanked the minister and the Egyptian government "for their commitment to the Spanish railway technology and their confidence in our know-how." An industry that is "a global benchmark, with a high international presence in more than 90 countries and that in Spain generates 30,000 direct jobs with a turnover of more than 15,000 million euros (more than 8% of industrial GDP). It therefore constitutes a key and driving sector for both our economy and our country image."

The event has involved the Chief Executive Officer of Icex – España

THE SPANISH RAILWAY ASSOCIATION (MAFEX) HOSTED A SPAIN - EGYPT INDUSTRY MEETING ON 29TH SEPTEMBER ON THE OCCASION OF THE PRESENCE OF THE MINISTER OF TRANSPORT OF EGYPT, KAMEL ELWAZIR IN THE COUNTRY.

Exportación e Inversiones, María Peña, and the General Director of International Trade and Investments of the Secretariat of State for Trade, under the Ministry of Industry, Commerce and Tourism, María Paz Ramos. The institutional block has been finalized with the intervention of the Egyptian Minister, Kamel Elwazir. Subsequently, the representatives of the companies that have

been present have been able to deliver a brief presentation to the delegation attending the event.

This interest of the Spanish railway industry in the potential of the Egyptian market with the Ministry of Transport of Egypt has been reflected in the participation of more than 22 representatives of companies in the sector.



The Spanish railway present at the benchmark congressfair in the Middle East, **Middle East Rail**

n this context, the Spanish Railway Association (Mafex) is once again coordinating the grouped participation of 5 companies in the Middle East Rail congress-fair, which will take place in Dubai between 12th and 13th October 2021.

There will be companies present in this edition such as Idom, Consuloría, Ingeniería y Arquitectura, Danobat, Ineco, Typsa and Zitron.

Achieving positioning and looking for new opportunities are two of the main objectives of Spanish companies, which already appear as a technological benchmark in the countries of the area and where they have already contributed their solutions in the main projects of recent years. For this reason, attendance at Midd-

THE SPANISH RAILWAY INDUSTRY IS HEADING BACK TO THE MIDDLE EAST, WHERE IT SEEKS TO EXPAND TRADE RELATIONS AND PARTICIPATE IN NEW INFRASTRUCTURE INVESTMENTS.

le East Rail represents for Mafex an ideal platform to raise awareness of the new Spanish technologies and establish contacts with the main actors that shape the future of transport in this market. •





We have been reinventing ourselves FOR OVER 100 YEARS







Mafex coordinates the Spanish joined participation in the **TransMEA congress-fair** in Egypt

n this context, the Spanish Railway Association (Mafex) coordinates the grouped participation of 5 companies in the TransMEA congress-fair, which will take place in New Cairo between 7th and 10th November 2021.

There will be companies present in this edition such as Aquafrisch, Hispacold, Talleres Alegría, Typsa and Zitron, in addition to the manufacturers of rolling stock Caf and Patentes Talgo. TransMEA, organized in cooperation with the Egyptian Ministry of Transport, aims to bring together the main regional and international actors to show on the one hand, the main solution trends, products, and new technologies to achieve more efficient and even faster transport and logis-

THE SPANISH RAILWAY INDUSTRY WILL TRAVEL TO EGYPT TO PARTICIPATE IN THE TRANSMEA CONGRESS-FAIR.

tics services. And on the other hand, to offer a congress programme where topics such as digital technology, a vital element to promote innovation, will be addressed, and which covers data analysis, artificial intelligence, machine learning, cybersecurity, automation, digital transformation, or disruptive technologies, among others.

It should be remembered that the country wants to carry out in the coming years various megaprojects such as the start-up of the first high-speed line in the country, the signalling of

the lines from Alexandria to Cairo, and from Beni Suef to Nag Hammadi, the modernization of line 2 of the Cairo metro, the future Lines 5 and 6, the Abu-Qir metro project, the extension of the Alexandria tramway, as well as the various opportunities that will arise for the acquisition and rehabilitation of rolling stock.

An opportunity for the railway industry that already has a wide presence in the country due to the numerous systems designed by Spanish companies, as well as in rolling stock and infrastructures.

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Mafex participates in a session organized by Aclima, **Basque Environment Cluster** on "The SDGs an Essential Ingredient for the Future of Your Company"

he objective of the conference was to reveal the Sustainable Development Goals (SDGs) and to identify companies interested in integrating them into their organization. To this end, the session was structured based on an inspirational talk to then go on to find out about different examples of organizations such as Aquadat, Zabalgarbi and Aclima which have implemented the SDGs in their management structures, and to end with a workshop entitled "Cooking with the SDGs".

As for the institutional part, Iker Atxa, Director of Social Innovation of the Basque Government, opened the event and put it into context. Arantxa Atxa, Director of Unesco Etxea, explained the opportunities that the SDGs represent in the management of companies, especially in the SMEs.

ACLIMA, BASQUE ENVIRONMENT CLUSTER ORGANIZÓ EL PASADO 24 DE SEPTIEMBRE, LA JORNADA "LOS ODS UN INGREDIENTE ESENCIAL PARA EL FUTURO DE TU EMPRESA".



The fight against climate change has become a global priority. Aware of the need to act together, railway transport has much to contribute to help reduce global greenhouse gas emissions.

Its own interest responds to the objective of Mafex as an association

and through the value chain to reference the work and help companies in the sector to incorporate the different SDGs in their own business strategy and their daily activity in order to fully collaborate with the reduction of emissions and environmental care.

Spanish railway industry, an industry with a key role in the national economy

or Mafex, 2021 as the European Year of Rail designated by the European Commission, is a key moment to highlight the dimension of railway and its great contribution to combat climate change and achieve sustainable mobility based on the mode of transport with greater environmental, safety, and territory structuring benefits.

The role of this sector is also key in our country, where this industry has a very prominent weight in the economy. Proof of this are the figures of Mafex, which is made of 95 partners, which currently represent in aggregated form and in recent years, 83% of Spanish railway exports. Data recently obtained from the Secretariat of State for Trade, an agency under th7e Ministry of Industry, Trade and Tourism where Mafex is the officially

In addition, it has a railway turnover of more than € 5.5 billion and it provides more than 27,000 direct

up the analysis.

recognized association in the field of

internationalization and at the head

of exports of the sectors that make

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SPANISH RAILWAY ASSOCIATION

jobs. It should be noted that the business fabric of the sector is at the forefront of R&D and has a referenced portfolio of large-scale awarded projects around the world. Its companies stand out for their know-how and its ability to lead projects from start to finish, thanks to a solid business value chain that covers all areas of action.

Rail Live! 2021 finalizes its agenda and announces the celebration of a symposium featuring the collaborating entities of the event within the general programme

ail Live! will be held in person from 30th November to 1st December 2021. Under the heading "Technology, innovation and strategy for the entire railway supply chain", the event will host an agenda full of panels, presentations, and round tables. The agenda covers all current issues for the future development of the industry, such as: integrated mobility, ticketing, energy, and sustainability, IoT, BIM, digital and smart infrastructure, among others.

Among the main international speakers there are already confirmed, to date, executives of DB Netze (Germany), HS2 (United Kingdom), SCNF Reseau (France), Texas Central (United States) and Trafikverket (Sweden) among others.

In addition, it announces the celebration of a symposium within the general programme, featuring the main collaborating entities of the event where different topics of interest will be presented. Among them, Adif's vision of the stations as centres of the new sustainable urban mobility. Digital transformation and improvement of the traveller experience. Renfe for its part will reference Mobility-as-a-Service, goods, and internalization. Madrid City Council will explain its Madrid 360 vision. On the part of Metro Madrid, its strategic vision will be shown with a focus

THE ORGANIZATION TERRAPINN, THAT HAS THE SUPPORT AND COLLABORATION OF MAFEX – SPANISH RAILWAY ASSOCIATION, FINALIZES AN INTENSE AGENDA OF PRESENTATIONS AND SEMINARS WHERE THE NEW TRENDS IN RAILWAY TRANSPORT AND THE MAIN CHALLENGES OF THE FUTURE WILL BE ADDRESSED FOR TWO DAYS. DIGITALIZATION OR SUSTAINABLE MOBILITY ARE SOME OF THE TOPICS THAT WILL BE ADDRESSED BY THE MORE THAN 250 CONFIRMED SPEAKERS. ATTENDEES WILL ALSO BE ABLE TO LEARN MORE ABOUT THE LATEST TECHNOLOGICAL ADVANCES IN THE EXHIBITION AREA.

on citizen accessibility. Mafex and the Spanish Railways Foundation – Spanish Railways Technological Platform will offer a joint dialogue on what the railway and its industry need to be the true central axis of the mobility of the future. Finally, Icex Spain Trade and Investment will close the forum by presenting its railway strategy with a focus on key markets and how this financing will be executed.

The event also has the presence of the main national and international companies in the sector. The wide national participation stands out, as well as the participation as sponsors of companies such as Grupo CAF, Talgo, Ingeteam, Ineco, ArcelorMittal, Indra, NGRT, Stadler, Amurrio, Idom, Sener, Siemens, NRF, Zitron, Hispacold and Voestalpine Railway Systems Jez.

The participation of more than 150 companies is expected where

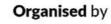
they will explain their latest innovation and technological developments.

Rail Live! 2021 has again the support of Mafex, the Spanish Railway Association, in the organization of the event. The Ministry of Transport, Mobility and Urban Agenda, through Renfe and Adif, as well as the Community of Madrid, Madrid City Council, Metro de Madrid, the Spanish Railways Foundation, the Spanish Railways Technological Platform, and ICEX collaborate in the development of the event. Other organizations such as UNIFE, EIM, Shift2Rail and Railgrup will participate in the event and have supported its dissemination.

More details about the congress and fair, the speakers and the participating companies on the following website: https://www.terrapinn.com/conference/rail-live/index.stm.













MEMBERS NEWS



Alstom factory in Trápaga installs solar panels for self-consumption

ALSTOM

Alstom's factory in Trápaga, Vizcaya, has successfully implemented a 91-panel self-consumption photovoltaic installation that will generate 46,000 kWh per year and avoid the emission of 16Tn of CO2 per year. With this new equipment, the center establishes a new milestone in the achievement of Alstom's objectives in terms of sustainability and reduction of the carbon footprint of its operations.

The facility is already generating the electricity needed for internal consumption in services such as lighting, offices, 24-hour equipment, and power outlets for production.

This initiative is part of the Alstom Group's efficiency strategy, which aims to ensure that all new projects and the entire energy consumption of the Group's activities and operations come from renewable energy.

Aquafrisch moves its headquarters increasing sustainability

AOUAFRISCH

Within the strategy of increasing productivity and implementing actions that allow the improvement of sustainability, Aquafrisch will move its headquarters throughout the last quarter of 2021.

The new facilities are located on Calle Margarita Salas 7 in Rivas-Vaciamadrid. With an area of 3,500 m2 and a modern and sustainable design, the building has insulating walls and roof, a translucent cover for better lighting, solar panels for the production of electrical energy and connection for the charging of electric vehicles for both workers and visitors. For those who decide to come by bicycle, there is also a specific parking area.

Located next to L9 of the Madrid Metro and the A3 highway, it promotes mobility by public transport and facilitates the access of goods, contributing to the reduction of the carbon footprint.

With this change, Aquafrisch triples its production capacity, in line with the growth it has experienced in recent years, focusing on quality and sustainability as core values.





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MEMBERS NEWS

Discretely in the second of th

New tramway contracts for CAF in Belgium and Australia

 $C\Delta F$

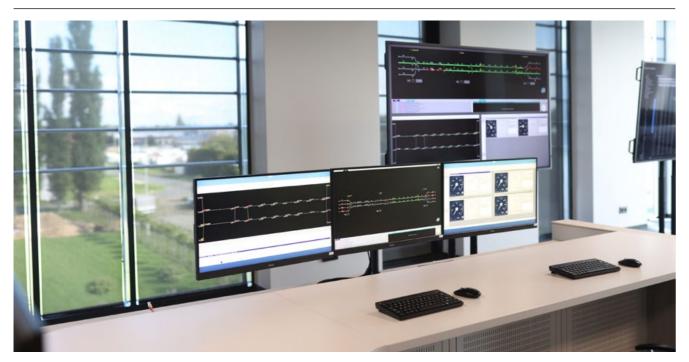
The CAF Group has signed two new contracts for the delivery of Urbos trams. First off, the Flanders Transport Company, De Lijn (Belgium), has approved the purchase of 18 more trams from CAF. These new trams are the fifth batch in the contract concluded with CAF in October 2017, which comprises of the manufacturing and supply of up to 146 trams which are distributed into batches to be activated by the customer in due course.

At the same time, Transport for New South Wales (TfNSW) has awarded CAF the supply of 4 Urbos 100 5-module trams for the city of Sydney, as well as all the relevant spare parts. These new units will be delivered in early 2023 and will be added to the current fleet comprising of 12 CAF Urbos units that have been run-



ning on the Inner West Light Rail Line since 2014. Both contracts, amounting to a combined value of close to €100 million,

corroborate once more the CAF Group's leading position in the international tram



CAF Signalling allies with Kombud (Poland) and strengthens its international presence

CAF SIGNALLING

CAF Signalling has partnered with Kombud, a leading company in the railway sector in Poland with 30 years of experience. Thanks to this strategic alliance, the Spanish technology company strengthens its international presence and adds a new milestone to its expansion

plan. Through this agreement, both companies complement their strengths and combine their knowledge to develop an interface between Kombud's MOR 3 electronic interlocking and CAF Signalling's AURIGA ETCS L2.

This union reinforces the leading position of both companies as a reference in the development of ETCS projects in Poland, thanks to this state-of-the-art technological solution.

With the synergy between the R&D departments of both companies, CAF Signalling has opened an important gap in the Polish market and will have the opportunity to implement its ETCS system in the railway network of the Central European country.

As a first joint public action, both entities were represented at the Trako fair (Poland), where they presented the interface between the MOR 3 electronic interlocking and CAF Signalling's AURIGA ETCS L2.

New homologation campaigns over HS vehicles

CFTFS

During the last months, CETEST as an accredited testing laboratory is participating in two important high-speed projects.

On the one hand, the high-speed project of the American operator Amtrak for the Northeast Corridor (NEC), led by Alstom. This is the busiest passenger rail line in the United States and can reach speeds of 165 mph.

CETEST is conducting tests for the Avelia Liberty homologation campaign, from the dynamic behavior validation (both stationary and on-track tests by means of instrumented wheelsets), to EMC, pantograph (dynamic interaction, arching and uplift), aerodynamic tests and modal analysis, among others. The first part of the tests took place in the TTCI ring in Colorado, then moved on to the NEC.

It is also worth highlighting the participation of CETEST in the Ilsa HS project in Spain. CETEST is helping Alstom to adapt their Zefiro V300 vehicle to the Spanish network by collaborating in the management and execution of tests prior to commercial operation.



Dsaf . eleds-tunnel

DSAF

Focused on the field of emergency signaling and lighting in railway tunnels, road tunnels and wind towers, the business activity of Dinámicas de Seguridad SL (Dsaf) prioritizes its commitment to new technologies in the execution of its projects and initiatives in pursuing compliance with the highest safety standards regarding the evacuation of people in risky situations.

Starting from innovation, research, development and application, Dsaf develops products that can be effectively adapted to the problems and conditions of the projects to be implemented, either from the point of view of the fields of application, or from the current regulations and the corresponding security guarantees.

The latest example in these products is ELEDS-TUNNEL dynamic signaling.

This signaling made up of LED modules and power supply guarantees

effective orientation, even in the most adverse conditions, for the evacuation of people in risky situations, facilitating access to the safety zones provided in the tunnels.



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MEMBERS NEWS

• Breaking News

Hispacold renews IRIS performance quality certificate and gains top level Silver

The bus, coach and vehicle air-conditioning systems manufacturer increased its rating from Bronze to Silver after a successful audit by IRIS during the renewal of its certification.

In achieving Silver, only introduced in 2020, Hispacold has demonstrated that it can meet the most stringent and respected rail industry standards.

In 2016, Hispacold gained its first certification from IRIS (International Railway Industry Standard), a quality assurance rating system for performance, initiated by UNIFE (The European Rail Industry) and backed by the major rail operators, manufacturers and system integrators. The rating system aimed to ensure compliance with international standards of



quality and was developed in response to a growing demand for reliablity and for quality capacity management in the rail sector.

IDOM - technical structuring of the studies and designs of the Valle del Cauca Cercanías Train

IDOM

IDOM will be responsible for the technical structuring of the studies and designs of the Valle del Cauca Cercanías Train, an important mobility infrastructure associated with the longest Green Corridor on the continent, which will improve transportation in the region.

This LRV electric train-trams will benefit the nearly three million inhabitants of the municipalities of Cali, Jamundí, Yumbo and Palmira. It will travel more than 70 kilometers, 38 kilometers from north to south, from Jamundí through Cali and Yumbo, and 30 kilometers from east to west, to Palmi-

ra. In this prioritized phase, IDOM will design the section between Jamundí and Cali, 23.6 km and 20 stations. With the aim of promoting the development of the region in terms of transport and improving efficiency in the interconnection between towns, it will be linked to the MIO (Western Mass Integrated) transport system, thus enhancing public transport with the addition of a sustainable system.



ALSTOM and GMV set up a new fleet management system in TRAM Barcelona

GM\

ALSTOM, a world reference in the manufacture of railway rolling stock and supplier of the current 41 tram units of Trambaix and Trambesòs (TRAM of Barcelona), includes within its scope a new Fleet Management System (CAD/AVL) contracting the multinational GMV as a supplier of this new tool.

GMV will implement its SAE-R product in these new units, which combines the expectations of passengers for integrated mobility and reliable information in real time, and those of TRAM de Barcelona as an operator that is committed to innovation with tools that improve the management of the service.

The system will include the installation of on-board systems and unified central systems, which allow the joint management of the two tram networks. Among its fea-



tures it can be mentioned the inclusion of MMI systems in each cabin, over-speed

control functions and several interfaces with on-board systems.



Indra is set to implement its technology on the AVE to Extremadura at a cost of 15 million euros

INDRA

Indra will equip the Plasencia-Badajoz section of the Extremadura AVE (High-Speed Train) line with its signaling and telecommunications technology for an amount of 15.4 million euros as part of a joint venture with the Alstom group, to which Adif has awarded an important contract in this area for the section of the line connecting Madrid with the Portuguese border.

More specifically, Indra will be responsible for implementing the ASFA Digital on-track system, a technological evolution that offers an increase in performance compared to the current ASFA Analog on-track sys-

tem. Indra will introduce the developed solution of the ASFA Digital, pursuant to the Technical Specification drawn up by Adif, which is part of its line of Mova Protect solutions and which entails evolution and improvement in driving aid systems. Indra will also implement the security and operation concentrators and fixed telecommunications.



Ingeteam equips Talgo's new High Speed vehicles

INGETEAM

Talgo has selected Ingeteam to supply the electric traction systems for 30 High Speed and multiple voltage trains that TALGO is manufacturing in the Basque Country, specifically at its plant in Rivabellosa (Álava).

These vehicles will be homologated for services in Spain and France, and will reach commercial speed of up to 330 km/h.

The first vehicle is currently undergoing on-track tests.

The contract includes the design of the system and the supply of 120 high-power traction converters (2.4 MW), located on board, as well as the additional equipment (motors and traction transformers) that compose the traction system of the 60 tractor units. In this project, which has been a significant technological challenge, the traction system supplied by Ingeteam will bring significant advantages

to the vehicle in terms of space, weight and efficiency.

The design has also been conceived with the ease of maintenance activities in mind. Each vehicle is equipped with two tractor heads and its propulsive power of 9.6 MW, equivalent to 13 formula one.

The converters will be manufactured at Ingeteam's plant in Ortuella (Bizkaia), which was inaugurated at the end of last year and is at full capacity.



SSICE awarded its first Rail project in the ANZ region

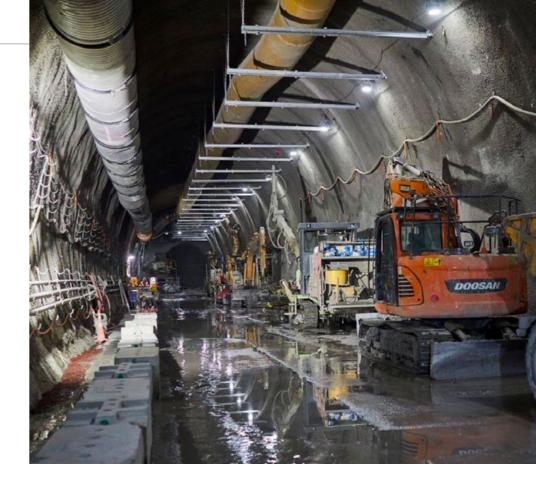
SICE

ANZ and the Link Alliance have agreed to a contract for the Tunnel Ventilation Control System of the City Rail Link project in Auckland.

SICE has been appointed to provide the design, testing and commissioning of the Tunnel Ventilation Control System, including all the hardware and software, as well as the design and construction of the cabinets, the programmable logic controllers and communication network.

With this project, SICE strengthens its presence in the ANZ region ans consolidates its position in the ANZ market as a key system integrator for New Zealand's major infrastructure projects.

The City Rail Link, with a 3.45km twintunnel underground rail link up to 42 metres below the Auckland city centre, is the largest transport infrastructure project

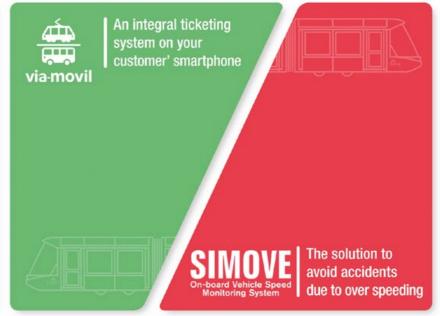


in NZ. Once completed, it will transform the downtown Britomart Transport Centre into a two-way through-station that better connects the Auckland rail network and will allow the rail network to at least double rail capacity.



The experience of an operator at the disposal of your mobility projects





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• Breaking News

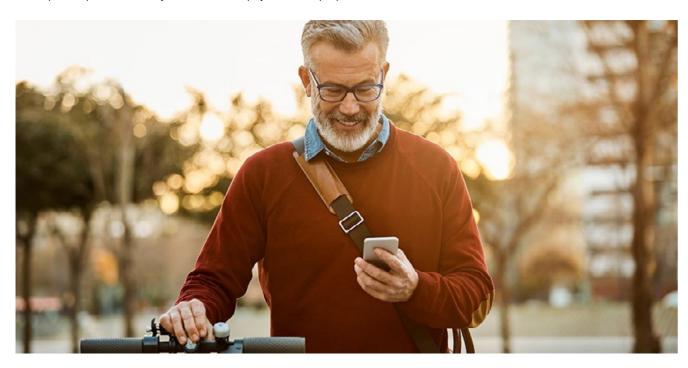
Siemens Mobility and everis to develop a Mobility as a Service (MaaS) platform for Renfe in Spain

SIEMENS

Siemens Mobility and everis have been awarded a 5-year contract by Renfe, the national railway company of Spain, to develop and operate a countrywide, intelligent Mobility as a Service (MaaS) platform

The comprehensive platform will integrate in a single application different mode of transport, such as train, metro, bus, bicycle, car sharing, and scooter services, so users can plan, book and pay for the trip option that best meets

their needs. Renfe estimates to attract a minimum of 650,000 new customers to train travel and expects additional revenues up to €156 million thanks to this intermodal platform, which will be available in 27 cities across Spain including metropolitan areas like Madrid, Barcelona, Valencia, Bilbao, and Sevilla.



Smart motors launch Blacknest SURFACE to monitor track condition

SMART MOTORS

Blacknest SURFACE was born with the objective of continuously monitoring the rail temperature, as well as the tilting and vibrations, with a simple installation. A solution adapted to the needs of train circulation and requiring very occasional maintenance that makes its installation technically and economically feasible.

It is installed directly on the rail by means of magnets. Particularly suitable for sensitive areas such as turnouts, problematic joints, or areas with significant temperature gradients. LTE-M1 communication ensures low data consumption and does not require track repeaters. The LTE-M1 card is included in the sensor and is activated remotely as soon as the sensor is installed.







Other two cities with Stadler's TRAMLINK

STADLER

In 2019, EVAG, Erfurt's local rail operator, ordered 14 TRAMLINK LRVs to improve the urban mobility in an economical and sustainable way.

Since last July, the citizens of Erfurt (Germany) have been able to enjoy these 42 m long, fully accessible trams with a capacity

of 242 persons. Seven doors allow a quick entrance/exit of passengers.

Since this summer, the inhabitants of Lugano (Switzerland) have also been using the new tram-trains to travel on the iconic metric gauge line of Ferrovie Luganesi (FLP) between Lugano and Ponte Tresa. The new TRAMLINK LRVs comply with reinforced crash standards, the EN 15227 C-IV and C-III Scenario 1 and 3. They reach speeds

of up to 80km/h, can carry 293 passengers and are 45.5 m long. The passenger compartment is 100% low-floor and barrier-free and features several areas reserved for wheelchair users, as well as for bicycles and prams.

During 2022, further TRAMLINK projects will be launched in several European cities, including Milan, Augsburg, Basel and others.

Teltronic upgrades the TETRA network of Metro Ligero Oeste

TELTRONIC

Teltronic has upgraded the TETRA radio communications network of Metro Ligero Oeste, which provides service to the ML2 and ML3 lines, which connect the municipalities of Boadilla del Monte, Alcorcón and Pozuelo de Alarcón with Madrid, its Metro, commuter trains and bus networks.

The network, based on the NEBULA TETRA infrastructure, is used for voice communications between control center and train drivers and security and maintenance personnel. It also supports train-to-ground data transmission, including those of the Intelligent Transport System (ITS), which is carried out through the Teltronic on-board terminals.

Upgrading tasks allows the system to incorporate the new features included in the latest versions of NEBULA, and extending its useful life under the best conditions of functionality and maintainability.

115
metro ligero
metro ligero
metro ligero

Thales ERTMS technology in tests on the Pedralba de la Pradería-Ourense section

THALES

Adif Alta Velocidad is conducting journeys with trains at maximum speed as part of the testing phase of the ERTMS security system for the Pedralba de la Pradería (Zamora) -Ourense section, corresponding to the Madrid-Galicia high-speed line.

During these tests the trains reache the maximum speeds allowed in the section, 300 km / h, and include pursuit routes, with two trains circulating on the same track and in the same direction, maintaining the safety distance that marks the railway operation, as well as circulations in parallel, in the same direction and in the opposite direction (crossings). The tests are carried out on both tracks and in both direc-



tions between Sanabria AV and Ourense, a section of about 128 kilometers, and are carried out at night in order

not to interfere with the commercial rail service in the Sanabria-Pedralba and Taboadela-Ourense sections.

ACCIONA, CAF and EIT InnoEnergy bet on Zeleros to accelerate hyperloop in Europe

ZELEROS

Zeleros, the European company based in Valencia that develops a scalable hyperloop system, has announced the support of three key players that will accelerate the development of its pioneering transport system to travel at 1000 km/h and 0 direct emissions: ACCIONA, Grupo CAF and EIT InnoEnergy. They thus join the more than 30 organizations and more than 180 people involved in development, including organizations such as Red Eléctrica de España, Airbus,

Tecnalia, CIEMAT, FHECOR or Renfe. Spain is a leader in high-speed transport systems and now also in hyperloop: the country has the presidency of the world's first hyperloop standardization committee, leads the Hypernex project promoted by Shift2Rail, has a national developer (Zeleros) and a powerful industrial sector.

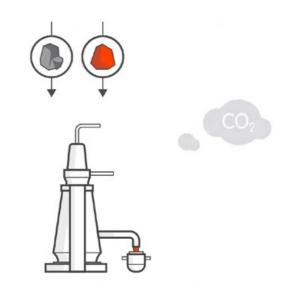


ArcelorMittal signs MoU with the Spanish Government supporting €1 billion investment in decarbonisation technologies

ARCELOR

ArcelorMittal has signed a memorandum of understanding (MoU) with the Spanish Government that will see a €1 billion investment in decarbonisation technologies at ArcelorMittal Asturias' plant in Gijón, in the construction of a green hydrogen direct reduced iron (DRI) plant, as well as a new hybrid electric arc furnace (EAF).

The investments will reduce CO2 emissions at ArcelorMittal's Spanish operations by up to 4.8 million tonnes (1), which represents approximately 50% of emissions, within the next five years. ArcelorMittal has also announced that its Sestao plant in Spain will become the world's



It is a carbon-intensive method of making steel which produces an average of two tonnes of CO₂ for every tonne of steel produced

first full-scale zero carbon-emissions steel plant. (2)

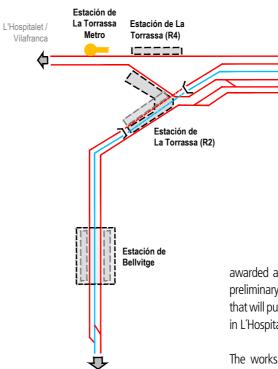
[1] Should green hydrogen not be available at affordable rates by the end of 2025, natural gas would be used to power the DRI furnace. This would still result in a very significant reduction in CO2 emissions, of 4 million tonnes, approximately 45%.

Túnel Plaza

de Cataluña

Trinel Paseo

[2] On a Scope 1 and 2 basis.



Lines R2 and R4 to be taken underground in L'Hospitalet de Llobregat (Barcelona)

Aeropuerto / Vilanova

GFTINS/

TRN TÁRYET, a company of the TPF Group, is a partner in the joint venture that has been

awarded a contract by ADIF to perform the preliminary and detailed design of the works that will put Line R2 and Line R4 underground in L'Hospitalet de Llobregat (Barcelona

The works to be designed are challenging in terms of urban planning, due to the constraints associated with sending the railway lines underground, and in terms of railway functionality in this major commuter hub for Barcelona.

The railway arrangement provides a flexible operating model for the lines running

across Barcelona, forming a railway "hinge" that allows for all possible routes, at different levels, with a third track for regional trains. In addition, the project includes a station in La Torrasa for intermodal exchange between both commuter lines and the Metro lines.

The geometric layout, tunnels and structures, as well as the provisional situations to be planned in order to select the final solution, are key elements of the project on account of their complexity and the shortage of space.

MEMBERS NEWS Interview

Ardanuy Ingeniería: Assisting in the implementation of **Railway Networks in over 60** countries

ARDANUY INGENIERÍA

Ardanuy Ingeniería has carried out over 700 jobs in more than 60 countries. The Consultancy has been an active participant in launching one of the most important railway projects currently being developed in Europe, Rail Baltica, which will connect Estonia, Latvia and Lithuania.

Moreover, Ardanuy is also involved in various R&D projects, amongst them the 4SE-CRail project, which forms part of the EU's Shift2Rail innovation program. The goal of this project is to create a collaborative cybersecurity platform to respond to possible cyber-attacks in the railway sector, apart from ensuring proper functioning of all European



METROTENERIFE

Metrotenerife has successfully refinanced all of its bank debt, contracted since the beginning of its activity for the construction and commissioning of the current Tramway Lines.

This Green Bond issuance is in line with the United Nations Sustainable Development Goals as Metrotenerife

COMSA Corporación completes the works for the extension of Line 4 of the São Paulo Metro

COMSA

COMSA Corporación, together with the Brazilian engineering firm Tiisa Infraestrutura e Investimentos, has completed the construction works on the second phase of Line 4 of the São Paulo Metro (Brazil), one of the most important infrastructure projects in the capital in recent years, which will substantially improve the mobility of the city's inhabitants.

The project consisted of the construction of two new kilometres of tunnel, the commissioning of four new stations, three emergency exit shafts and the construction of a city bus terminal.



signalling systems. Spanish consulting in different transportation networks has also been a key feature of developing metro networks in emerging markets such as in India. The Ardanuy team has taken part in over 25 urban networks with work successfully completed for different metros including in the cities of Bangalore, Mumbai, New Delhi, Ahmadabad and Kochi. In South America, the company has collaborated in the designs of railway and metro networks in countries such as Argentina, Bolivia, Chile, Colombia, Mexico, Nicaragua, Panama, Paraguay, Pero,

is dedicated to clean and non-pollu-

With this issuance, which represents

its debut in the capital markets, the

Project Finance modality is no longer

used and is replaced by a fixed-income

issuance, aimed at professional inves-

ting passenger transport.

the Dominican Republic, and Uruguay, to name a few. Aside from these works, the Development Bank of Latin America (CAF) has entrusted Ardanuy with a study to assess "Electromobility in public transport in Latin America".

To date, Ardanuy has branches and subsidiaries in Lithuania (Ardanuy Baltic), Colombia (Ardanuy Colombia SAS), India (Ardanuy India Pvt, the US (Ardanuy Consulting Inc.), Algeria (Ardanuy Algerie), Panama (Ardanuy Panama S.A.), and Peru (Ardanuy Peru).

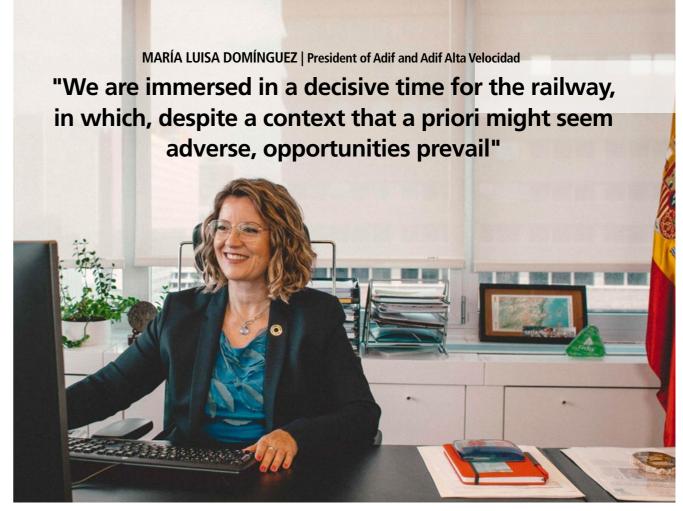
tors, both domestic and international. The amount issued totals 130 million EUR at 15 years and has been placed at par with a profitability of 1.229%.

This transaction will result in financial cost savings for the company compared to the previous bank debt structure. The bonds have been subscribed by around twenty investors, 40% of which are national and 60% interna-



COMSA has completed the civil works of the Higienópolis-Mackenzie. Oscar Freire. São Paulo-Morumbi and Vila Sônia stations, as well as building an urban bus

interchange-terminal annexed to the Vila Sônia station and completing the section linking Butanta and Vila Sônia.



Mafex Magazine: As the new president of Adif and Adif Alta Velocidad (AV) following your recent appointment by the Council of Ministers, how do you face this new chapter in your professional career at the head of one of the most important dynamic organizations in the railwav sector?

María Luisa Domínguez: For someone who, like me, has developed most of their professional career at Adif it is an honour and an exciting challenge, as well as a great responsibility. We are immersed in a decisive time for the railway, in which, despite a context that a priori might seem adverse, opportunities prevail over difficulties.

This becomes more evident if we take into account that Adif and Adif Alta Velocidad have been able to face significant challenges in recent months: the liberalization to put more trains on the tracks and extend high speed to more families; the agreements with the Central

Government, which finally guarantee the predictability necessary to undertake the investments we need; and the generational succession plan, which was an emergency measure and which will allow us to bring new talent to the house. And of course, the enormous work developed to put into service new highspeed sections: this year, Galicia and Elche-Orihuela, and later the connections to Extremadura, Asturias, Murcia and Almería, among others, with important advances in the Atlantic and Mediterranean cross-border corridors. We have also worked on our 2030 Strategic Plan, advanced on safety culture and promoted all the necessary actions to take advantage of European funds and the Recovery and Resilience Mechanism. That is why I believe that we have a promising future ahead of us, in which the railway is called upon to occupy a central place in the new mobility.

In the coming years, Adif and Adif Alta Velocidad have to spend 5,785

million euros (amount without VAT) from the Recovery, Transformation and Resilience Plan to improve urban and interurban mobility, enhancing the Commuter train networks; reduce inequalities between territories; transform the role of the stations; promote the Atlantic and Mediterranean Corridors; promote the intermodality and goods and ultimately, to provide assistance so that no Spaniard is left behind in their right to mobility. Adif and Adif Alta Velocidad, and the railway system as a whole, will have a key role in a recovery that gives competitiveness to our society. If the railway was already standing as the epicenter of sustainable mobility, the windows of opportunity opening grow exponentially.

Mafex Magazine: We are immersed in the "European Year of Rail." This commemoration coincides in time with the process of liberalization of passenger transport or the emerging model of new mobility. In this sense, Adif

MAFEX 25 24 MAFEX

INTERVIEW Interview

is working on a 2030 Strategic Plan to face the changes that are coming to the sector. What are the main lines of work and objectives of this programme ten years from now?

María Luisa Domínguez: The process of liberalization of railway passenger transport has been a milestone for Adif and for the transport sector in general. A process that has been conducted with the greatest transparency and that is already a reality, since May the operator Ouigo and the Avlo brand of Renfe are providing their services. It is expected that in 2022 Ilsa will start its services, the third company that has managed to have a reserve capacity for its trains. Our goal is to achieve an opening of the market with the maximum possible competition and for it to substantially increase the use of the railway network, which is a real challenge for our company. Thus, in this process of liberalization, the main beneficiary will undoubtedly be the user, who will enjoy an expanded and more competitive transport offer and the modernization of the sector.

Railway liberalization, which is being one of the main players in this European Year of Rail, is part of the paradigm shift currently facing the transport sector, in which mobility is incorporated into a broader concept than traditionally established. This means putting users at the heart of mobility policies, proposing effective solutions to their needs beyond the provision of infrastructure and the facilitation of travel between an origin and a destination.

In Adif we understand that the new concept of mobility is intimately related to the evolution of society, urban and territorial development, the generation and consumption of energy, the standard of living, the relationship of the human being with nature and its effect on the environment.

This change of course requires an integrative approach that facilitates

the multidisciplinary relationships of integral and multimodal mobility. For this reason, the strategic plan of Adif and Adif Alta Velocidad is committed to a mobility policy that focuses on society, which we serve as a public entity, and it places the user and their needs at the centre and engine of the plan.

The main objectives of our 2030 Strategic Plan are security; sustainable, competitive, and intermodal mobility; the stability of public investment; and maximizing the impact of infrastructure on economic growth in the medium term, improving the standard of living of citizens and social and territorial cohesion. And in this framework, both Adif and Adif Alta Velocidad establish the main initiatives to address 11 critical challenges for the institution in particular and the railway sector in general. Challenges that will guide the main lines of work of the company in the coming years.

One of these challenges is, of course, the liberalization of the railway sector and the full implementation of the fourth Railway Package, addressing all potential railway infrastructure operators and within the framework of the Network Declaration.

But other challenges such as the implementation of the Safety Culture are equally important; combating the effects of climate change; the extension of the railway network and the promotion of mobility and connectivity; maintaining economic sustainability, with a marked focus on results; and the implementation

of a plan in the face of pandemics and emergencies. To face these challenges, Adif must face others during the coming years such as the generational succession of the company's human resources structure, the adaptation and impact to disruptive technologies and the promotion of diversity, equality, and social action.

It should not be forgotten that the 2030 Strategic Plan aims to ensure that Adif contributes significantly to the Sustainable Development Goals defined in the 2030 Agenda of the United Nations, assumed by the Government of Spain in the Agenda for Change, and developed by the Ministry of Transport, Mobility and Urban Agenda in its Safe, Sustainable and Connected Mobility Strategy.

In short, this Plan aims to position Adif and Adif Alta Velocidad in a competitive and sustainable way in the sector of management and operation of railway infrastructures within the framework of a new vision of the infrastructure policy of Mitma.

Mafex Magazine: The pandemic has accelerated the implementation of a sustainable economic model where the railway is the central axis of the inversions in transport infrastructures. Precisely, two agreements have been signed with the Ministry of Transport, Mobility and Urban Agenda for which 12,764 million euros will be allocated between 2021 and 2025 to promote the national network. Can you give us more details of the actions that will be carried out?

The pandemic has accelerated the implementation of a sustainable economic model where the railway is the central axis of the inversions in transport infrastructures.

María Luisa Domínguez: The agreements signed by Adif and Adif Alta Velocidad with Mitma are a fundamental tool to guarantee the economic sustainability of both companies and the stability of investments in the medium term. Thus, we are no longer at the mercy of possible political ups and downs and a stable framework of relationship with the Central Government is established. which guarantees us the necessary economic contribution to be able to carry out our functions. All this in accordance with the priorities established in the Mobility Strategy of the Mitma and the future Indicative Strategy for the development, maintenance and renovation of the railway infrastructures that are part of the Railway Network of General Interest owned by Adif and Adif Alta Velocidad, as well as the common European railway transport policy.

The contribution of more than 12,700 million euros will be used mainly to cover the development and improvement of the railway network, both conventional and highspeed, as well as its management and administration. In this sense, two clear priorities are set: on the one hand, the Commuter train networks and the promotion of urban mobility, and, on the other hand, the development of the Trans-European Transport Network (TEN-T) and its corridors.

Nor can we forget the promotion of intermodal and logistic terminals, access to ports and other transversal actions. Finally, part of these contributions will be used to compensate for the reduction in license fee revenue for the maintenance of rates in both entities.

Of course, the agreements are not a blank cheque for Adif and Adif Alta Velocidad and they thoroughly detail the commitments and obligations during the period 2021-2025, among them the fulfillment of the investment obligations; the optimization of the management of the operation of the railway network; the conservation, maintenance and efficient renovation of the infrastructure, applying safety and efficiency criteria; the coherence between investment and financing plans for the construction and administration of the network; and the implementation of actions aimed at promoting European transport policy (railway interoperability and adaptation to European standards).

In addition, both companies must achieve the agreed values with respect to various indicators with the aim of favoring a socially responsible management, which promotes the development of a safe, sustainable, efficient, and quality infrastructure system. Specifically, the provision of the service (reliability of the facilities and punctuality records), the capacity of the network (availability of the facilities), the management of the assets (compliance with preventive maintenance plans), the quality of the road, the safety levels (accidentability) and the protection of the environment (reduction of emissions) will be evaluated.

It is, ultimately, a clear commitment to railway transport, to a sustainable mobility model, which acts as an engine of growth and social cohesion.

Mafex Magazine: In terms of freight transport, will this large investment be used to promote intermodality, connections with the main ports of the State and strategic corridors such as the Mediterranean and the Atlantic? María Luisa Domínguez: Of course. In addition to promoting the Commuter trains and urban mobility, among the main objectives of

these investments is the promotion of rail freight transport, through the development of the corridors of the Trans-European Transport Network, which will be great backbones of the continent, and the promotion of the Strategic Nodes and the railway port-connections, among other wide-reaching actions.

It cannot be otherwise, because we work in line with the Freight Plan 30 that Mitma is developing, which proposes to reach a share of 10%, and with the objectives of the Strategy for Sustainable Mobility of the European Commission, which proposes the challenge of increasing freight traffic by railway at 50% by 2030 and doubling by 2050, as one of its main bets to reduce emissions. The goal is for intermodal railway transport to be able to compete on an equal footing with road transport and, to meet these challenges, a strong boost to freight transport is needed.

In relation to the TEN-T corridors. Adif is immersed in different actions that require significant investments, to make them interoperable for all types of operators who are interested in channeling part of the loads through the railway. We are working on the implementation of community interoperability criteria. such as the electrification of the lines; ERTMS, the European standard System; the axle load of 22.5 tons, the sidings for trains of 740 meters and a minimum speed of 100 km/h for freight lines. These technical requirements are necessary to materialize a solidly structured and homogeneous multimodal network that will support mobility in Europe and favour the cohesion of the territories of Spain and the competi-

Among the main objectives of the investments is the promotion of rail freight transport.

INTERVIEW Interview



tiveness of our industrial export and logistics sectors, among others.

The funds of the EU Recovery and Resilience Mechanism will be added to the aforementioned investments, which will be an important boost to continue their development and accelerate the modal shift from road to train. These funds will be the ultimate push for sustainable, safe, and connected mobility.

On the other hand, Adif is working, in cooperation with Mitma and the autonomous communities, on the development of a strategic network of intermodal and logistics terminals in Valencia, Madrid, Barcelona, Vitoria, Valladolid, Seville and Zaragoza. These nodes, which fully integrate the railway into the transport chain of companies in the Spanish logistics sector, are part of the Atlantic and Mediterranean Corridors, and have also been designed to comply with European interoperability standards and in particular, the one related to

the treatment of trains with a minimum of 22.5 tons of load per axle and a length of 750 meters.

Another of the pillars for the promotion of freight transport are the connections with the port network. Intermodal traffic in Spain is strongly linked to ports and in recent years the maritime-rail chain has grown significantly. It is essential that the administrations go hand in hand so that there are no load ruptures, and the logistics are efficient and correct.

Fortunately, the close collaboration that Adif has with the State Ports and the different Port Authorities is allowing the development of projects linked to the promotion of railway transport so that synergies are achieved in the large logistics nodes. To this end, it should be noted that the Financial Fund for Port Land Accessibility is consolidating itself as an effective and necessary reference and a clear example of inter-administrative cooperation.

Mafex Magazine: Today's railway rolling stock has evolved a lot over the years. However, the way ADIF calculates maximum loads continues to be done as it did decades ago, which affects the competitiveness of freight trains by preventing them from taking on more load than they could. Are reviews and/or updates of these operating requirements planned to enable the operation of longer, heavier trains without the need for large infrastructure investments?

María Luisa Domínguez: It is true that the technique has evolved considerably. Parameters such as increased power, traction control or the development of high-strength hooks improve adhesion at start-up and can improve the load dragged.

Although the calculation formulas have several decades of use, the truth is that the experience in the network managed by Adif shows that its application is very much in line with reality. Experience has also shown that any change in the calculation of maximum loads can affect the operation if not analysed in depth. Aspects such as adhesion not only depend on the characteristics of the rolling stock, but on the location of the line, the time of year or the time of day. Humidity, accumulation of organic matter in the autumn, among others, cause situations that do not allow generalizing the maximum values of traction, since they can endanger the normal development of traffic.

That said and taking into account Adif's interest in promoting the traffic of goods in our network, as part of the SDGs and the European strategy and the Government of Spain for adaptation to sustainable development framed in the Green Deal, we study all the possible improvements that can favor such traffic. Adif is governed by processes that pursue continuous improvement, so the revision of the regulations can be un-

dertaken, for which the participation of the industrial sector is valued as very positive, but also of specialists in rolling stock associated with the operators or of the State Railway Safety Agency itself.

Mafex Magazine: R&D and sustainability also has much weight in Adif, which has already become an international benchmark in this field. Example of this is the pioneering technological platform Simple, the ferrolineras, etc. What plans are there to give continuity to this successful innovation strategy and environmental protection?

María Luisa Domínguez: Indeed, both innovation and sustainability have been essential in Adif's strategy since its inception. Since our beginnings we have a department specialized in innovation, focused on the achievement of results. Innovation is configured as a key element in the corporate strategy, which constitutes a lever of transformation for the entity itself and for the sector. In the period 2005-2020, we have completed more than 100 R&D&I projects, in which more than 265 million euros have been invested. Although Adif's contribution has been important, with more than 41 million euros, even more relevant has been the mobilization of funds from the sector, 224 million euros.

That is one of the keys to the success of our innovation activity, collaboration with the sector. At Adif we are convinced that no one innovates alone, let alone on the railway. But we have gone a step beyond collaboration. Always looking for new ways to innovate more effective and efficient, we have moved from collaborative innovation to open innovation in search of possible solutions to our needs. Open innovation is based on needs detection and intrapreneurship, technology surveillance and innovation ecosystem collaboration. Thanks to a strategic approach, Adif promotes the competitiveness

of companies linked to the railway sector, fosters an environment where diverse technologies coexist and makes available to the market the results of innovation in the form of technological products.

Many of the advances achieved thanks to innovation undoubtedly contribute to the sustainability of Adif's activity and, therefore, of the railway system. And we will continue walking in that line, now within the framework of our Strategic Plan 2030. Sustainability is one of the four pillars on which the Plan is based, along with safety, service, and results orientation. While innovation, together with communication and digital transformation, are configured as the levers to achieve corporate objectives and face the challenges of a future in which the railway must be the protagonist. All this let us not forget, with people as the engine of change.

At this crucial moment, innovation

defines challenges and proposes so-

lutions supported by concepts such as mobility as a service, intelligent infrastructures, intelligent mobility or digitalization, and its role is essential to reinforce all the pillars. The safety pillar brings together advanced solutions to raise standards throughout the General Interest Railway Network. The service pillar is a focus of attraction for technologies linked to the development of the station of the future and the increase in freight transport by railway. with solutions as innovative and versatile as the Variable Gauge Axle for Goods. Sustainability is the axis around which projects linked to energy efficiency and alternative energies applied to the railway are developed, with projects in the areas of electromobility, reversible

substations and the use of hydrogen as traction energy.

In a situation in which everyone, administrations, companies, civil society, must row together to face the climate emergency, the railway is called to be one of the great protagonists in this fight where we have so much at stake. The train is already per se the most sustainable and environmentally friendly means of transport, but we must influence this quality to increase its contribution to the decarbonization of the economy and energy savings and, at the same time, encourage modal transfer to increase its share. Innovation can and should be the instrument that facilitates the changes needed to achieve those goals.

Mafex Magazine: Another area of great interest is the external projection. A year ago, Adif and Mafex signed an agreement to strengthen their cooperation, boost the Spanish railway industry and strengthen confidence in this transport. How do you assess the result of this joint work? Are these types of alliances important to reinforce the current leading position in the world?

María Luisa Domínguez: The collaboration of Adif in activities that



Adif and Mafex, both entities have worked regularly in the search and development of new business opportunities for companies.

promote and catalyze the internationalization of the Spanish railway industry and experience is one of the objectives of our strategy abroad.

Adif has been supporting the internationalization of the Spanish railway sector and its know-how for years through initiatives such as collaboration and contribution of its experience to third countries, many of which send delegations to Spain to learn first-hand about the sector, its companies, and the development of the railway network.

To all of them, Adif offers the experience of its professionals who, together with the Spanish companies in the sector, are responsible for the process of modernization of the Spanish railway network in the last thirty years. We respond to the needs of infrastructure managers, institutions and companies in other countries interested in developing or modernizing their national network or specific aspects of it.

In this sense, public-private collaboration, that is, joining forces between the different actors in the sector, has always proven to be a sure key to success, especially when it comes to valuing abroad the work that together, administration and public and private companies, have been doing in Spain for many years.

In the case of the collaboration between Adif and Mafex, both entities have worked regularly in the search and development of new business opportunities for companies and the signing of the agreement last year has only further strengthened the foundations of an even closer coo-

30 MAFEX

peration. All this with the common objective of promoting the competitive improvement of the Spanish business railway sector and its projection abroad.

Mafex Magazine: In this stage of great changes where the focus is on the fight against the climate emergency, how do you see the future of the railway? Are you optimistic about the increase in its share and its prominence compared to other modes of transport in the medium term? What role are actors as relevant as Adif called to play in this development?

María Luisa Domínguez: Railway is emerging as the mode of transport of the future within the framework of the new safe, sustainable, and connected mobility. And it is, precisely, thanks to the fact that is the most environmentally sustainable mode of transport and because its modernization through new infrastructures and technologies makes it competitive in travel times and comfort.

Added to this is the process of liberalization of railway passenger transport, that is, the entry into the network of new operators, which is already resulting in an increase in the supply of services and frequencies under more competitive conditions for passengers.

The good results that are deriving from this opening process, such as the recovery of the volume of prepandemic travellers of the relationship between Madrid and Barcelona, lead us to continue advancing in this liberalization process and to extend it to other corridors and relationships of the network.

In this way, the railway is clearly called to attract travellers from other modes of transport, such as the private vehicle and the plane, in this case on national routes, before which high speed is positioned as a clear alternative both in sustainability and in travel times.

In addition, we consider that the contribution of the railway to society extends beyond covering a need for mobility or transport. For example, it contributes to promoting other modes of sustainable transport, such as the electric vehicle, in addition to the economic and employment recovery, thanks to the investments made annually in the construction and improvement of infrastructure.

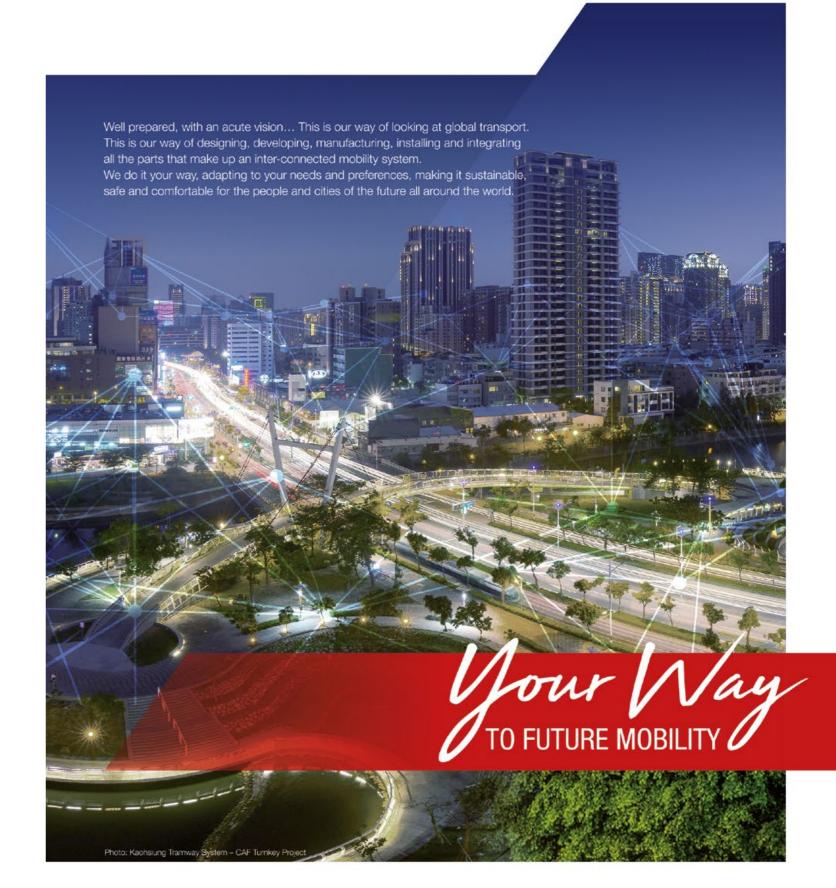
In all this context, Adif has a double role that the entity faces with optimism and with the conviction that it is prepared to face it. On the one hand, there is the role of Adif in the construction and maintenance of infrastructures, in which it is currently facing the milestone of taking advantage of the funds from the Recovery Plan, to conclude the major corridors underway, modernize infrastructures and adapt and expand the stations to respond to the needs of travellers and turn the railway into the most competitive mode.

On the other hand, we have the increasingly important role of Adif as administrator and manager of all that railway network and infrastructure, where the challenge is a big one. It is about valuing all these assets and enhancing and maximizing their use to give a greater and better service to society, get a return in the investment made in their construction, and guarantee the sustainability of the railway system.

In this respect, the liberalization process to which I have already referred is an exciting challenge and opportunity. I dare to say that all of us who integrate Adif are not only prepared, but also excited.



TRAINS
BUSES
SIGNALLING
COMPONENTS
SERVICES
TRANSPORT SYSTEMS



an even closer coo- of the network. but also excited.

Sustainable and digital mobility: the

centrepiece of the European economic

recovery plan

EUROPE IS WORKING ON THE DESIGN OF A NEW DECARBONISED AND ENVIRONMENTALLY FRIENDLY ECONOMIC MODEL. THE EFFECTS OF THE PANDEMIC HAVE ACCELERATED THIS PROCESS WITH THE APPROVAL OF A HISTORIC INVESTMENT FOR RECOVERY AND JOB CREATION.

MUCH OF THIS FUNDING WILL GO TO TRANSPORT, WITH RAIL AS A PRIORITY TO REACH THE GOAL OF CLIMATE NEUTRALITY BY 2050. EACH MEMBER STATE WILL SUBMIT A PLAN TO BENEFIT FROM THESE FUNDS AND TO BUILD AN EMISSION-FREE, DIGITAL, CONNECTED, AND RESILIENT FUTURE.

accelerated existing plans to achieve an ecological and digital transition that outlines "a new model of fairer, more resilient and more sustainable economy for future generations".

To implement a joint and coordinated programme, in June 2020 the European Council gave the green light to the NextGenerationEU pro-

gramme, with an investment of 750 billion euros. Within the framework of this plan, two financial instruments are launched. On the one hand, the European Recovery and Resilience Facility (RRF) that will support the 27 member states in their public investments and reforms through direct transfers and loans for economic recovery and employment. Spain will receive 140,000 million between 2021 and 2026, of which 70,000 million will be in the form of transfers. On the other hand, the "Recovery Aid for Cohesion and the Territories of Europe" (REACT-EU) has also been approved. In addition, there are additional items for other programmes and funds, including Horizon 2020 or InvestEU.

Historic investments in transport

This strategy requires a great economic effort that the European Union will assume through tools such as the Connecting Europe Facility. In July 2021, the European Parliament approved the update of the funds allocated to this programme for the period 2021-2027. Of the total budget, 25,800 million euros will be used to subsidize "projects proposed by states that work to achieve a much more efficient and less aggressive transport network with the environment". In addition, special emphasis may be placed on their



he European Union is moving

towards a revival with unpre-

cedented financial stimulus.

The impact of the pandemic has

SUSTAINABLE AND SMART MOBILITY: PRIORITY OBJECTIVE

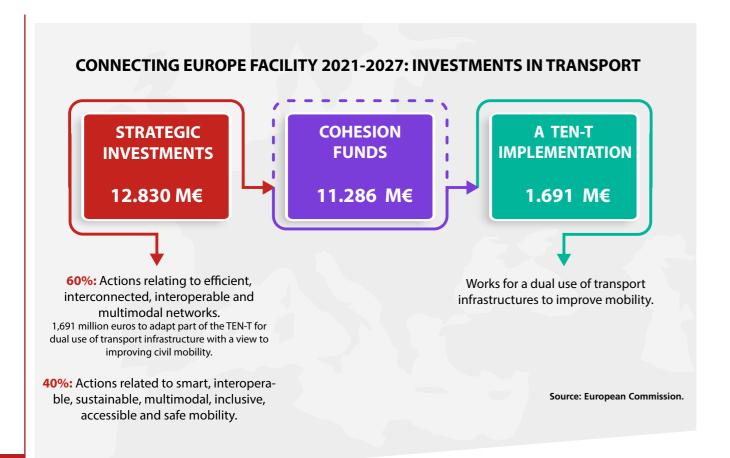
In this context, one of the main pillars of these investments focuses on investments in transport. The goal is to be the first climate-neutral continent by 2050 and to have a multi-modal zero emissions system.

The emphasis on this sector is due to its relevance. Not only does it represent 5% of the European Union's GDP, but it employs 10 million workers and is also responsible for 20% of total CO2 emissions.

The changes that are to be introduced are included in the "European strategy of sustainable and smart mobility". It is a planning instrument that lays the foundations for designing a new digital, connected and environmentally friendly model. This transformation will be carried out through 82 initiatives identified as "priority work pillars" to be implemented in the coming years.

Among its main milestones, in line with the commitments of the European Green Deal, is the reduction by 90% of greenhouse gases by 2050 to achieve climate neutrality. To this end - among other measures - it is intended to double the high-speed rail traffic by 2030 and triple it by 2050. In this year we also want to double rail freight

In smart mobility, the goal is that within nine years there will be an integrated electronic multimodal ticketing system for passenger networks and that there will be a large-scale development of automation. Regarding the resilience section, the idea is that the multimodal Trans-European Transport Network (TEN-T) will be fully operational also in 2050.



modernization, in order to make them safer.

On the one hand, 12,830 million euros of this mechanism are reserved to support "strategic investments". 60% of this item will go to "Actions relating to efficient, interconnected, interoperable and multimodal networks". In this section there is a specific allocation of 1,560 million euros that will be allocated to the completion of the main outstanding cross-border rail links between the member states that are eligible for funding from the Cohesion Fund.

The other 40% will be allocated to implement "smart, interoperable, sustainable, multimodal, inclusive, accessible and safe mobility from the operational and physical points of view".

On the other hand, there are another 11,286, transferred from the Co-

Europe is moving towards a new model of economic activity that will be based on three main pillars: sustainability, digitalization, and connectivity. Transport will be one of the sectors where more will be invested to achieve this green transformation.

hesion Fund, which will be used exclusively for The Member States eligible for funding from the Cohesion Fund. They are joined by a third item of 1,691 million euros aimed at adapting part of the Trans-European Transport Network (TEN-T) for a dual use of transport infrastructure with a view to improving civil and military mobility.

One of the improvements of this multiannual mechanism in force until 2027 is that it expands the European corridors in Spain. In this way, it is now incorporated into Galicia,

León, Asturias, Huelva, Teruel, Navarra, La Rioja, the Balearic Islands, and the Canary Islands.

In the Atlantic Corridor four new axes are added: Gijón -León -Valladolid, La Coruña-Vigo-Ourense-León, Zaragoza-Pamplona/Logroño-Bilbao, Tenerife/Gran Canaria - Huelva/Sanlúcar de Barrameda - Seville - Córdoba. Also, in the Mediterranean, the axis Madrid - Valencia - Sagunto - Teruel - Zaragoza are added. The coastal branch is also joined by Palma de Mallorca - Barcelona.



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ArcelorMittal Rails & Special Sections has rail production facilities in Poland, Luxembourg and Spain that offer a wide portfolio of products, covering rails for subways, trams, trains, light rails, crane rails, crossings and rail accessories. The company is a specialist in rails for high-speed rail networks, with over one million tonnes produced and is present in infrastructure projects in over 30 countries. Its high technologic quality allows ArcelorMittal to participate in the more demanding tenders all over the world.

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- R&D: ArcelorMittal operates a dedicated rail research and development unit which includes pilot plants and prototyping facilities. Its Rail Excellence Centre also includes a dedicated welding unit which can provide advice and support for current and future grades for its customers.
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The railway, the main character of the investments of the Spanish recovery plan

SPAIN HAS DESIGNED A MODEL OF ECONOMIC REACTIVATION WITH SUSTAINABLE MOBILITY AS ONE OF THE GREAT BOOSTERS OF EMPLOYMENT UNTIL 2023. THE RAILWAY WILL TAKE 85% OF THE INVESTMENTS DESTINED TO THE NEW DECARBONIZED, DIGITAL, AND CONNECTED TRANSPORT MODEL.

n Spain, the Recovery, Transformation and Resilience Plan (PRTR) represents the strategy to channel European funds aimed at mitigating the impact of the pandemic. The agenda of planned investments and structural reforms seeks to move towards a greener, more digital, more cohesive, and egalitarian Spain.

This plan allocates an investment of 20 billion euros in mobility and urban agenda. The commitment to railway corridors and intermodality will create 130,300 jobs and contribute 9,4 billion to GDP, according to the Ministry of Transport, Mobility and Urban Agenda (MITMA).

Sustainable mobility

On the one hand

"Mobility

One of the fields with the highest budgetary dating is mobility, to which 13 billion euros will be allocated. This amount will increase the investment of the Ministry and its companies by approximately 30% in the coming years: In addition, aid to municipalities and autonomous communities will be increased.

and the Demographic Challenge.

In order to advance in the decarbo-

nization of

action plan in urban and metropoli-

tan environments" has been alloca-

ted more than 4.5 billion euros. To

this must be added another 2 billion

for electromobility and hydrogen,

an allocation coordinated by the

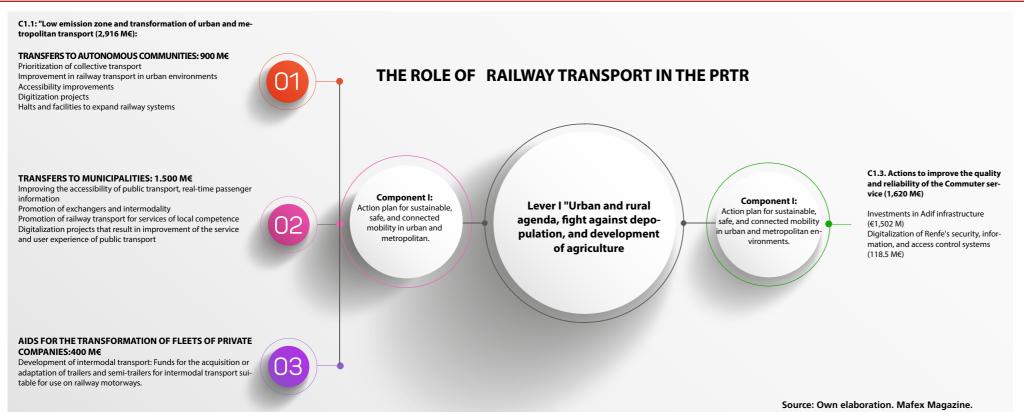
Ministry for the Ecological Transition

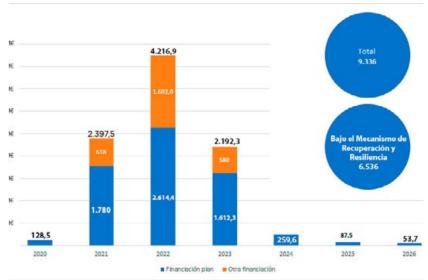
mobility and enhance public transport, more than 1,6 billion euros will be invested in the commuter railway networks.

For long-distance mobility, an investment of 6.7 billion euros is foreseen. The objective is "to advance in more sustainable and digital infrastructures, modal rebalancing", in addition to completing in 2030 the Atlantic and Mediterranean railway corridors and their extensions.

Of the overall funds allocated to mobility, MITMA will directly implement some €7.6 billion, of which €6.2 billion are earmarked for the railway. Likewise, another €3.6 billion will be allocated to other administrations and companies.







Source: Component 1 of the Recovery, Transformation and Resilience Plan (PRTR).

"Transport is one of the pillars for economic reactivation in Spain. The railway will be the mode having the most momentum."

Pillars of the plan

The four transversal pillars through which the European funds are distributed in Spain: ecological transition, digital transformation, social and territorial cohesion and gender equality, are projected in 10 policy levers, with a great capacity to drag on the activity and employment already in the first phase of the Plan, with the horizon 2023, to boost economic recovery in the short term and support a transformation process that increases the productivity and potential growth of the Spanish economy in the future.

These ten levers include the 30 components that articulate coherent investment and reform projects to modernize the country. Although most of them are horizontal, for the economy as a whole, some are specifically aimed at promoting the modernization of driving sectors, such as commerce, tourism, food industry, health, automotive or the public administrations themselves.

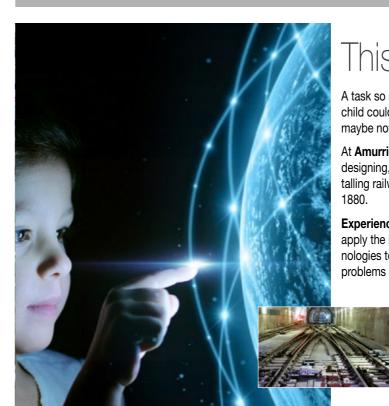
4 transversal pillars

10 policy levers

components

RECOVERY, TRANSFORMATION AND RESILIENCE PLAN (PRTR)

It's like conecting points with lines and paths



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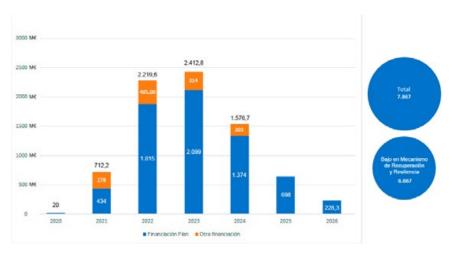


Lever I focus on the "Urban and rural agenda, fight against depopulation, and development of agriculture". Within it, the first of its three components (C1), named "Action Plan for sustainable, safe and connected mobility in urban and metropolitan environments" includes a battery of measures to promote sustainable public transport and the railway. More specifically, it focuses on the actions planned to boost the commuter network.

Lever II "Resilient infrastructures and ecosystems" includes a specific component, C6, to "sustainable, safe and connected mobility". This section focuses on detailing the Spanish strategy that has been designed to achieve this change of decarbonized model, the planned development of railway corridors, the support programme developed for emission-free and digital transport, as well as the activities for improving the efficiency of the

freight transport and distribution system.

The extraordinary investment foreseen in the Recovery, Transformation and Resilience Plan represents an opportunity to build a new transport model. In this sustainable future, the railway sector faces a historic moment to make a modal change a reality where it becomes the main character of sustainable, safe, connected, and digital mobility. "Component 1 of the Recovery, Transformation and Resilience Plan (PRTR) will have a budget of € 9,336 M."



Source: Componente 6 del Plan de Recuperación, Transformación y Resiliencia (PRTR).

The investments proposed in component 6 are directly related to the Safe, Sustainable and Connected Mobility Strategy and its 9 pillars.

C6. RI. Indicative railway strategy

The Ministry of Transport, Mobility and Urban Agenda draws up a strategy for the development, maintenance, and renewal of railway infrastructure.

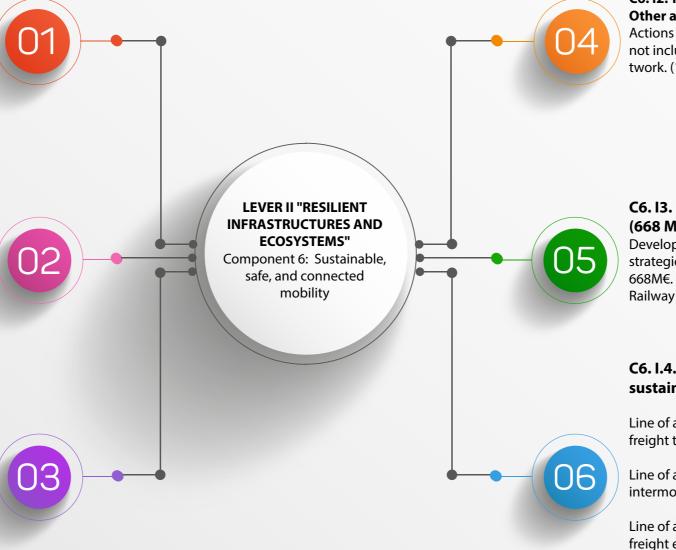
It will be the main sectorial instrument for railway infrastructure planning in the coming years.

It will have eight main objectives: planning, network maintenance, economic sustainability, interoperability, promotion of freight railway traffic, safety, digitalization and innovation, and energy efficiency.

C6. I1. National transport network: Atlantic and Mediterranean European corridors (2,988 M€)

Main types of investments:

Platform, replacement of services, track, electrification, signaling and traffic control, telecommunications, and stations.



Source: Own elaboration. Mafex Magazine

C6. I2. Trans-European Transport Network. Other actions

Actions in the TEN-T railway infrastructures, not included in the corridors of the core network. (1,010 M€).

C6. I3. Intermodality and logistics (668 M€)

Development of intermodal terminals and strategic logistics (TILOS) and access to ports: 668M€

Railway accessibility inside ports (177 M€)

C6. I.4. Support programme for sustainable and digital transport

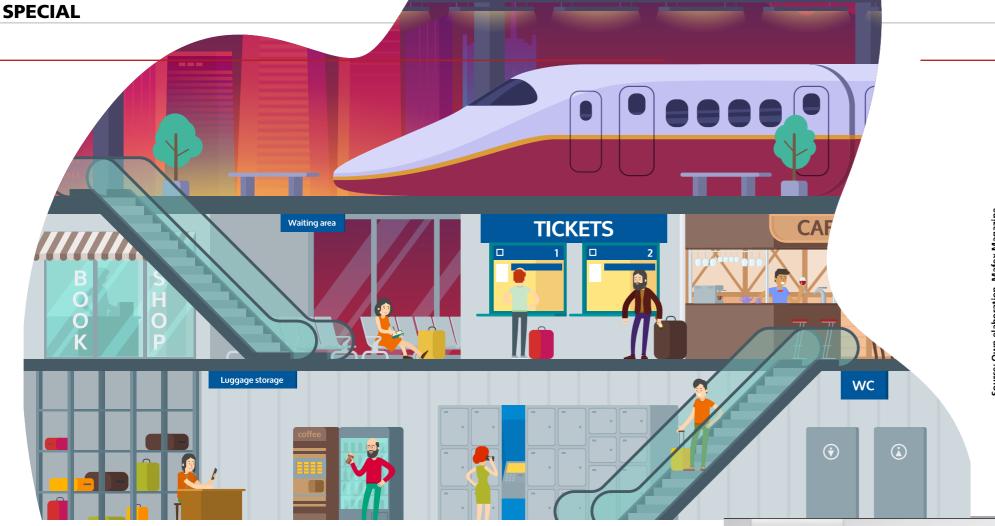
Line of action 1. Interoperability in railway freight transport (45 M€)

Line of action 2. Promotion of transport intermodality (195 M€).

Line of action 3. Modernization of railway freight equipment (125 M€)

Line of action 6. Digitalization of transport (47.5 M€)

"Component
6, dedicated to
sustainable, safe
and connected
mobility, has a
budget of
€ 7,867 M to
achieve the
decarbonization of
transport and its
digitalization."



A strategy to accelerate modal shift in transport

he Recovery, Transformation and Resilience Plan exclusively devotes a section - the component 6 - to the actions foreseen in the area of "Sustainable, safe and connected mobility". These initiatives are based on the "Safe, Sustainable and Connected Mobility Strategy 2030", a document that will be the guide of the actions that will be carried out in the next 10 years.

The objective is to decarbonize the economy and "respond to climate change, the irruption of new technologies and the challenges produ-

THE SPANISH ECONOMIC RECOVERY, IN LINE WITH EUROPEAN OBJECTIVES, FOCUSES ITS MAIN ACTIONS ON ACHIEVING A NEW CONCEPT OF TRANSPORT - WITH ZERO EMISSIONS - WHICH TAKES ADVANTAGE OF ALL TECHNOLOGICAL ADVANCES. THE ACTIONS FORESEEN IN THE RECOVERY PLAN ARE BASED ON THE "SAFE, SUSTAINABLE AND CONNECTED MOBILITY STRATEGY 2030".

ced by the increasing concentration of population in large cities". To this end, solutions that take advantage of the opportunities offered by digitalization and intermodality will be promoted, with special attention to the enhancement of the railway.

One of the main challenges of the Spanish mobility strategy is to achieve a modal distribution where the railway prevails.

Key challenges include a new modal split where the balance is tipped towards more sustainable ways to reduce transport-associated emissions. In addition, to improve connections with ports, logistic centers and with the neighbouring countries of France and Portugal. Another challenge pursued by this strategy is to complete the European corridors in Spain and implement in the sector all the digital and technological advances available.

A SPECIFIC STRATEGY FOR THE RAILWAY

The main axis on which the new model of sustainable mobility is based is the railway. Due to the prominence, it has in the investments of the Recovery Plan, a specific roadmap for the planned actions is being worked on. This is the "Indicative Railway

Infrastructure Strategy", an instrument to plan its development, maintenance, and renovation in the coming years. In this way, efficiency in the decision-making process is improved and investment priorities are specified.

STRATEGY: PRIORITY OBJECTIVES

I. Establish a railway planning aimed at meeting the mobility needs of users, especially those of daily mobility.

II. Improve the maintenance of the network to avoid its decapitalization and increase the reliability, comfort, and safety of railway transport.

III. Economic sustainability of the railway network, giving priority to efficiency in the application of

IV. Interoperability of the network: trans-European network corridors. Enhancement of intermodality.

V. Boosting railway freight traffic.

VI. Improvement of operational safety in railway transport.

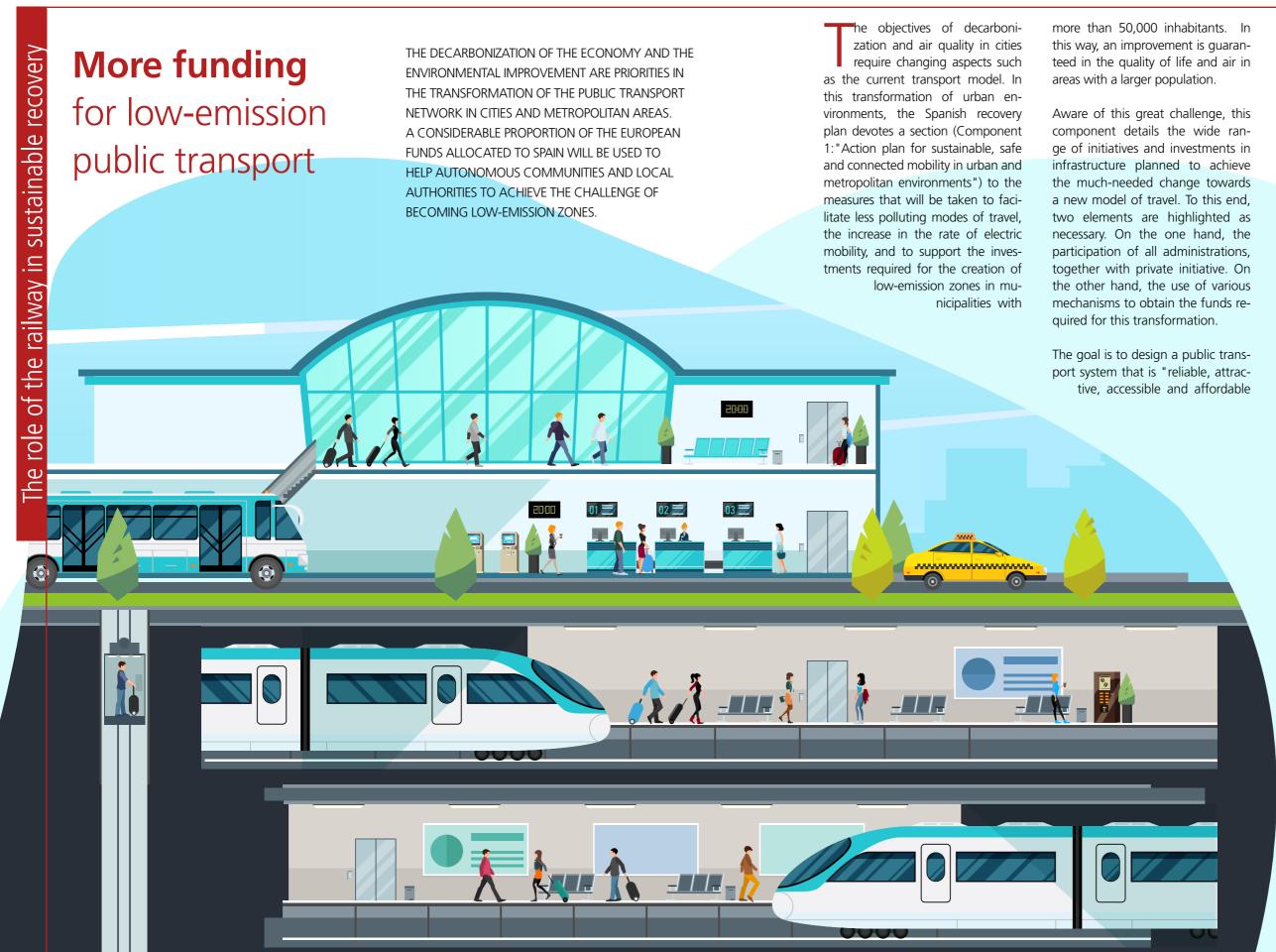
VII. Promote digitalization and innovation for connected mobility.

VIII. Increase the energy efficiency of the railway system.

With this planning instrument, a roadmap for investments in railway infrastructure is established. The ultimate goal is to achieve a more sustainable, efficient, and digital transport model



▶ The role of the railway in sustainable recovery



to all citizens" which incorporates new concepts such as smart mobility and the electrification of transport, promotes the use of the railway with the necessary investments, and takes full advantage of digitalization.

This component contributes 72.5% to the ecological transition and 2% to the digitalization of transport. The total estimated investment is 9,336 million euros. Of these, 6,523 million correspond to the Recovery and Resilience mechanism. The financing of the Plan will be carried out until the year 2026.

Along with the implementation of Low Emission Zones (LEZ) before 2013 in urban areas of more than 50,000 inhabitants - which represent more than 50% of the Spanish population - work is being done on those areas for the recharging infrastructure and the promotion of electric vehicles, as well as on the expansion of more sustainable modes such as the railway, which will be the beneficiary of large amounts of aid so that it gains greater prominence both in the networks of the city (metros, trams, etc.), and in the commuter train services.

The investments included in this component will have a strong impact on the economic activity and employment at national level during the years of the Plan. €11.1 billion of GDP and 154,000 jobs.

The Spanish plans seek the decarbonization of transport.

44 MAFEX

MAFEX 45

Mafex Magazine.

€2.916 MILLION TO TRANSFORM TRANSPORT AND ACHIEVE LOW-EMISSION URBAN AREAS

Component one includes an specific support line for the autonomous communities, municipalities, and companies, both public and private, borrowers of the different mobility systems. The objective of this investment, which amounts to 2.916 billion euros, is the implementation of sustainable and digital transformation projects of public transport networks. The expected result is that by the end of 2025, there will be at least 100 urban areas that will have been able to benefit from this aid aimed at reducing CO2 emissions.

On the one hand, the transfers planned for the Spanish autonomous communities cost 0.90 billion euros. This includes low emissions financing, among which are those relating to collective travel. One of the main actions will be aimed at improving railway networks (extension, modernisation of lines, digitalization, etc.).

As for the funds allocated to municipalities, there is an allocation of 1.5 billion euros. This amount will also boost Sustainable Urban Mobility Plans (SUMP) and low emission zones (LEZ), especially in city centres. This line of aid gives great flexibility to local authorities to choose the specific actions that they consider to be priorities. Once again, the railway mode will be key,

due to its many environmental advantages, to reduce emissions and as an alternative to the use of initiatives: global projects aimed at reducing emissions, measures for the sustainable transformation of collective transport, improvement of fleets and rolling stock, plans for the digitalization of public transport.

Initially they are aimed at municipalities of more than 50,000 inhabitants and provincial capitals, but, under certain conditions, they can also be used for towns with a population of between 20,000 and 50,000 inhabitants. In this case they can opt for digital and sustainable transformation projects.

Among the digitalization projects, the ultimate goal is for the initiatives of the municipalities to contribute to the reduction of emissions in urban transport. To this end, two types of subsidised projects have been envisaged. The first ones are those aimed at improving the service and the usage of public transport, as well as those associated with accessibility. This wide range of options includes technology for journey planning, traveller information systems, ticketing, and online ticket sale, etc. All this to make public transport more attractive to all types of users, to help it become the best alternative to private transport and thus reduce pollu-

Additional facilities to expand the metropolitan railway

transport system (halts, etc.).

ting emissions. In addition, the second block of measures that can benefit from these aids are those that have an impact on a better management of the Administrations. For example, implementation of smart systems for the coordination of traffic and mobility, supply of information on the transport offer to the National Access Point to the Multimodal Information, demand management, etc.

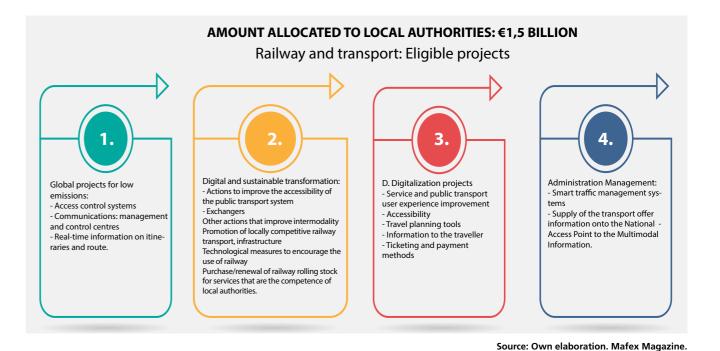
Transformation of passenger and goods fleets

Finally, there is a third line of subsidies whose goal is the transformation of fleets of passenger and goods. These funds are for private companies that provide transport services and have an endowment of 400 million euros. They will be convened by each autonomous community in its field of

Most of these incentives aim to renew the fleet of heavy commercial vehicles for less

> communities. transport service companies will from the aids to to improve the quality of life in urban areas.

Autonomous municipalities and be able to benefit mobility planned



400 MILLION EUROS Railway: eligible project

AMOUNT ALLOCATED TO FLEET TRANSFORMATION:

Acquisition and long-haul freight rail

polluting ones that incorporate new technologies in terms of propulsion. This is how alternative fuels (electric, LNG, CNG, biomethane) and the implementation of the necessary refuelling infrastructure are chosen. Although this action will allocate most of the funds, there are also plans to develop an intermodal transport with the railway mode as an alternative and complementary means to the road.

In this sense, there is specific aid so that companies can acquire or adapt trailers and semi-trailers so that they are suitable for use on long-haul freight rail

The major changes projected in mobility

and the large volume of planned inves-

tments have led the Spanish Executive to

draw up specific regulations in this regard.

The "Law on Sustainable Mobility and

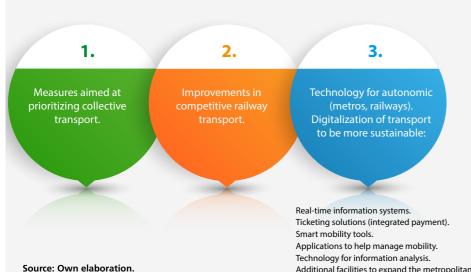
Transport Financing" seeks to create the

the "Instrument of State Strategic Planning

in Mobility" (IPEEM) that will serve to set

AMOUNT ALLOCATED TO THE AUTONOMOUS COMMUNITIES: €0.90 BILLION

RAILWAY AND TRANSPORT: ELIGIBLE PROJECTS



legal framework that defines the main lines of policy on this issue and that allows regulating transport-related activities. It is a regulatory tool with several purposes. On the one hand, it will introduce mechanisms to advance within a more sustainable urban mobility, through tools such as obligations, incentives, and guidelines. In addition, there will be more discipline around the planned actions in the field of infrastructures and services through mechanisms such as priorities, as well as informative studies of new infrastructures, prior and subsequent analysis of the profitability of investments. Likewise, measures to promote Innovation and digitalization will be articulated and a more coordinated and robust transport governance system will be created among all administrations (National Mobility System) that puts the citizen at the centre of decisions. At this point there are also plans to launch the Higher Council of Transport and Mobility, as an advisory body, debate, and participation, as well as a Comprehensive Information Platform to ensure the effectiveness of public policies in this area.

A LAW TO PLAN FOR SUSTAINABLE MOBILITY AND ITS FINANCING

The Law envisages others such as a homogeneous system of contributions to local authorities for the financing of urban public transport from state funds or a possible payment system for the use of roads.

At this point, as recently pointed out by the Minister of Transport, Mobility and Urban Agenda, Raquel Sánchez, the details of its drafting are being finalized and it is expected to be approved before the end of 2021.

One of the pillars that underpin this new law is sustainability and the need to commit to a decarbonized system where the least polluting collective transport, such as the railway, is prioritized. This regulatory framework, therefore, represents an opportunity to plan a modal shift in which investments in infrastructure for both goods and passengers are prioritized.

MAFEX 47 46 MAFEX

The commuter rail network, a priority funding

ne of the priorities of component I of the Plan are the "Actions to improve the quality and reliability in the commuter rail service". The objective is to maximize the use of this collective transport through projects that result in the improvement of aspects such as its capacity and the quality and reliability of the service.

This network is called to play a significant role in metropolitan mobility, since this is a fully electrified zero-emission mode of transport which has an average of more than 400 million passengers each year in Spain. Given its great relevance, it accounts for 89% of al railway users. Historical investments are de-

COMPONENT I PRIORITIZES INVESTMENTS IN THE COMMUTER RAIL NETWORK OF 2,916 MILLION EUROS TO ACHIEVE SUSTAINABLE MOBILITY IN URBAN ENVIRONMENTS OF MORE THAN 50,000 INHABITANTS IN ORDER TO TURN THEM INTO LOW-EMISSION ZONES.

tailed in the component which exceed those made during the last 20 years.

The actions will focus on five priority lines. Firstly, work will be done to improve punctuality, reliability, and real-time information systems, so that users have an optimal perception of the quality of the service and choose commuter trains on their travels as opposed to their private

vehicles. In addition, the available resources will be invested in expanding the use of this network to more people in all territories, making their infrastructures accessible to all types of users and implementing the latest technologies available. Likewise, a prioritization of resources will be carried out in order to start on the lines with the highest traffic and on those other actions that have a greater social return.

FUNDS FOR INFRASTRUCTURE (ADIF)

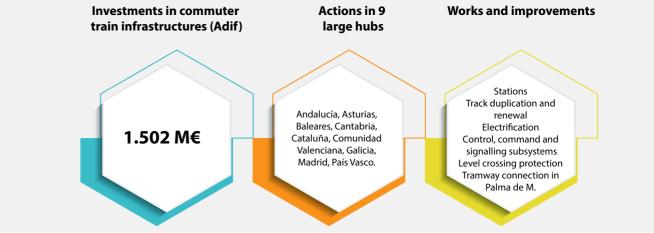
The investments planned for the national commuter network in order to promote its greater use compared to other modes of transport are divided into several lines of action. On the one hand, 1,502 million euros have been reserved for the Railway Infrastructure Manager (Adif). These funds will be used to improve the various subsystems, including stations. The planned works will be undertaken in nine hubs: Andalusia, Asturias, Balearic Islands, Can-

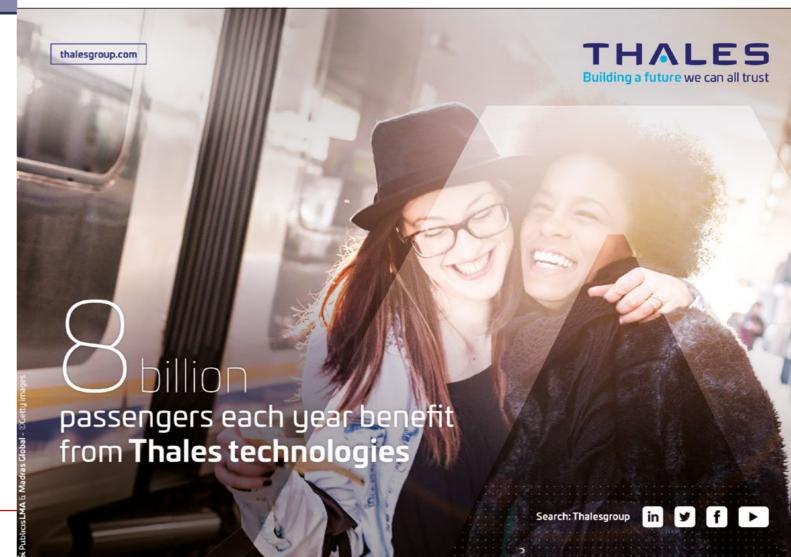
tabria, Catalonia, Valencian Community, Galicia, Madrid, and the Basque Country.

Once all the projects financed by these grants have been implemented, actions will have been carried out on 60 stations and 700 kilometres of railway lines.95% of the projects foresee an improvement of the electrified lines, while the other 5% - about 55 million euros - will be allocated to the electrification of the section of Valencia

commuter train (Buñol-Utiel) with the renewal of the track necessary for this purpose. In addition, it is planned to carry out a tramway connection in Palma de Mallorca.

The funding granted to Adif will also be used for work on rehabilitation, expansion, and new construction of commuter stations. With these actions, more accessible and modern facilities will be enabled and intermodality will be enhanced.





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RENFE: 118,5 MILLION EUROS FOR DIGITALIZATION AND IMPROVEMENTS

Along with the commuter train infrastructures, another priority objective is to improve services to increase the number of passengers who opt for one of the most sustainable transport systems. To this end, Renfe will be allocated 118,5 million euros of investment for the digitalization of security, information, and access controls systems of railway stations. Such actions will be 100% financed with these funds.

The projects of systems modernization and implementation of new technologies seek to improve the management of public railway transport services and increase customer satisfaction. In total, more than 850 stations of the commuter railway network managed by Renfe are expected to benefit from these funds.

The planned investments are divided into five major areas. On the one hand, 33 million euros will be used in the digitalization of the security systems of the commuter train stations. Through the application of "intelligent video analytics" the aim is to optimize the control of capacity, increase security and control possible fraud. The installation of cameras will allow to obtain strategic data for the detection of any alarm in real time. This way, not only will the positive perception of the traveller be improved, but the overall operation of the system will be enhanced. Secondly, another 33 million euros from the global budget will be aimed at modernizing trave-



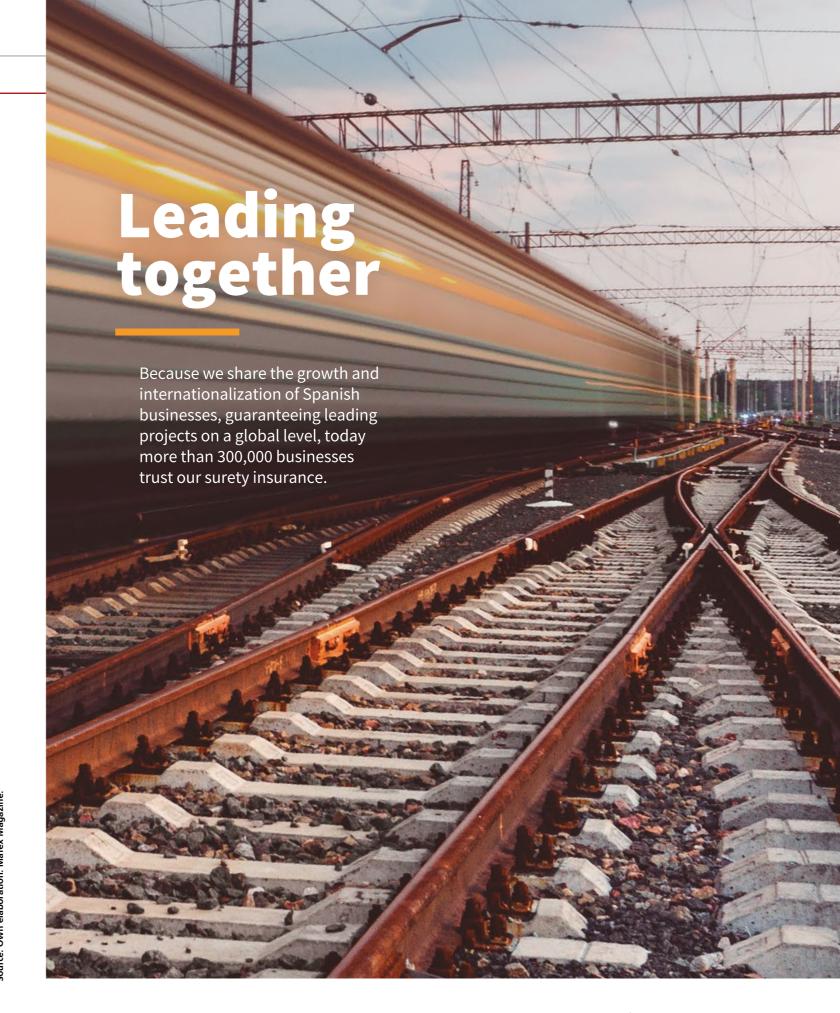
ller information systems (intercom, digital signage, chronometry, etc.). This technology is especially important in a mode of transport where frequency and punctuality are some of the aspects that the user values the most. Another area in which action will be taken - with an investment of 23 million euros - is in the improvement of access controls. The commitment here is to contactless technology (intelligent contactless systems) as well as to fare integration with other modes of transport managed by the consortia.

These works are complemented by the modernization of the self-service machines, which have a budget of 16 million euros and are part of the "intelligent access controls" project.

Finally, Renfe has financing of 13 million euros for the general adequacy of the facilities. This amount will be used for various equipment and power stations for the network of commuter stations.

▶ INVESTMENTS IN THE IMPROVEMENT AND DIGITALIZATION OF THE SERVICE (RENFE): 118.5 M€

1) Digitalization of security systems in stations	Intelligent video analytics for crowd and capacity control. Increase of cybersecurity and fraud control.
2) Information systems for travellers	Information systems and intercom in stations. Supply and installation of digital signage. Evolutionary information systems, chronometry.
3) Improved access controls	Access and Ticketing Controls, Contactless smart validators, cancellers Tariff integration in transport consortia Barcode readers.
4) Adaptation of self-service machines to new technologies	Remote-control blinds facilities for the closing of lobbies equipped with machines. Purchase of new self-service machines.
5) Adequacy of the facilities	Equipment for the conditioning of facilities and the network. Uninterrupted power systems.



New opportunities are coming and we are ready to lead them together.



Investments are committed to intermodality for sustainable freight traffic

THE INVESTMENT PLANS FOR ECONOMIC RECOVERY FOCUS A LARGE PART OF THE EUROPEAN AID ALLOCATED TO SPAIN ON THE OPTIMIZATION OF INFRASTRUCTURES, MODERNIZATION OF ROLLING STOCK AND DIGITALIZATION TO INCREASE THE SHARES OF FREIGHT RAILWAY TRAFFIC.

ALL THE MEASURES ENVISAGED TO ACHIEVE THIS OBJECTIVE ARE SET OUT IN A SPECIFIC SECTION OF CHAPTER 6 DEVOTED TO "INTERMODALITY AND LOGISTICS".

he decarbonization of freight transport is one of the great challenges in the fight against the climate emergency. The European institutions and the Member States are working to make a modal change a reality where the railway has the greatest role to reduce the emissions associated with this sector.

In this sense, Spain is committed to improving the distribution system by promoting intermodality, and to the modernization and improvement of logistics nodes. This is reflected in pillar 6 of the Safe, Sustainable and Connected Mobility Strategy, in its "Intelligent In-

termodal Logistics Chains" section. At this point, the predominant role that the railway should have in the coming years is prioritized.

In line with this strategy, the investment plans for economic recovery focus a large part of the European aid allocated to Spain on the optimization of railway infrastructures. All the measures envisaged to achieve this objective are set out in a specific section of Chapter 6 devoted to "Intermodality and logis-

The planned actions are divided into three main areas. On the one hand, the development of Spanish intermodal and logistics terminals (TILOS) that are considered strategic. On the other hand, the impro-

vement of external railway access to ports. And, thirdly, projects to advance the concept of "Green Ports," which will also be financed by other European funds. The implementation schedule, which began in February 2020, will end in August 2026.

The purpose of the "greening" of freight transport is for the 75% of inland transport, which is currently carried out by road, to move to railway and inland waterways

technologies focuses another of the lines of action in supporting sustainable and digital transport. This measure has a budget of 47.5 million euros. The following are susceptible to financing automation projects, modal integration, and digitalization

transport of goods, others are also contemplated for passengers to advance in aspects such as Mobility as a Service (MaaS).



MAFEX 53 52 MAFEX

INTERMODAL TERMINALS AND STRATEGIC LOGISTICS

One of the three budget items of this chapter of 217 million euros will be used to carry out infrastructure improvements in four of the network's strategy terminals that must be operational with sufficient capacity standards in the comingyears: Vicálvaro (Madrid), Fuente de San Luis (Valencia), La Llagosta in (Barcelona) and Júndiz (Álava). In all of them, the current functionalities will be extended so that the intermodal zone converges with the logistics area.

All four are the backbone of the country's network of intermodal and logistics terminals, due to both their cargo volume, and their territorial location and international dimension. These projects are also

included in other planning projects such as the Trans-European Transport Network (TEN-T), the Infrastructure, Transport and Housing Plan (PITVI) 2012-2024 and the Logistics Strategy of Spain.

Additionally, part of this item will be used to make improvements in the intermodal and logistics terminals of Can Tunis (Barcelona), Orduña (Bizkaia), Lezo (Gipuzkoa), Muriedas (Santander) and Escombreras (Murcia).

The objective is to boost the presence of the railway in the logistics chain to achieve a more efficient and sustainable economic activity.

Priority terminals:

Vicálvaro (Madrid) Fuente de San Luis (Valencia) La Llagosta (Barcelona) Júndiz (Álava)

Works in other terminals:

Adaptation and remodeling of the logistics facility in Can Tunis (Barcelona).

Improvement of the Orduña terminal (Bizkaia).

Adaptation of the logistics facility in Lezo (Gipuzkoa).

Improvement of the Muriedas terminal (Santander).

Renewal of the Terminal of Escombreras (Murcia).

Railway access to the Port of La Coruña and Castellón. Building of sidings of 750 metres.

External railway access to ports and other railway actions to promote intermodality:
407 M€

Development of intermodal terminals and strategic logistics (TILOS) and access to ports: 668M€

INVESTMENTS IN THE PROMOTION OF INTERMODALITY

SUPPORTING SUSTAINABLE AND DIGITAL TRANSPORT

The objective of changing the current mode of transport towards a more sustainable model is to improve its energy efficiency and implement the most advanced technological developments.

Both sustainability and digitalization are priority aspects of the Spanish recovery system, which seeks a reactivation based on a green and decarbonized economy. In this sense, the "support program for sus-

tainable and digital transport" has been designed, which is included in component 6 of the Recovery, Transformation and Resilience Plan" and in which the freight sector has a great weight in order to increase the percentage of the railway in the supply chain.

It is a program with six lines of action, including 15 measures. Three different modalities have been established for its

financing. On the one hand, grants will be awarded in competitive competition to ensure transparency and equality. On the other hand, aid is established in simple competition through the support for sustainable freight transport (railway and sea) through eco-incentives. Thirdly, transfers will be made to the autonomous communities for the digitalization of both passenger and freight services at the regional and local level.

ACTIONS TO IMPROVE ACCESSIBILITY IN THE INTERIOR

Railway accessibility in the interior, to which 177 million euros will be allocated, is another of the priority actions in the field of transport. This amount will be used in 19 projects ranging from remodeling and im-

provement works, to works of new access and internal transit in the ports.

To expand the circulation in these facilities, the infrastructure that gives continuity to their external land accesses will be adapted. It should be noted that of the 43 ports that make up the Spanish system, 39 belong to the Ten-T Network, which is why these remodeling projects have been considered so relevant.

D SUPPORT PROGRAMME FOR SUSTAINABLE AND DIGITAL TRANSPORT

Line of action 1. Interoperability in freight railway transport: 45 M€	On board European Railway Traffic Management System (ERTMS).	
	Elimination of barriers to interoperability.	
	Noise reduction systems in rolling stock.	
	Adaptation of locomotives to various voltages.	
	Installation of variable gauge axles in freight transport wagons.	
	R&D on variable gauge axles in locomotives.	
Line of action 2. Promotion of intermodality: 195 M€	Building or improvement of loaders and intermodal rail-road terminals.	
	Eco incentives: Support for sustainable transport.	
Línea of action 3. Modernization of freight railway equipment: 125 M€	Wagons for the railway transport of goods,	
	Railway tractor material to adapt it to others that use alternative fuels such as	
	hydrogen or electricity.	

BOOSTING NETWORK INTEROPERABILITY AND INTERMODALITY

In these 15 lines of action, the promotion of less polluting means has a main character: the railway.

The first block of measures, which has an allocation of 45 million euros, focuses on increasing the interoperability of the network. Among the projects that will be carried out, those focused on expanding the implementation of the European Railway Traffic Management System (ERTMS) on board stand out. They are joined by the actions planned to remove barriers to interoperability in accordance with the Technical Specifications for Interoperability

(ETIs) adopted by Directive 2016/797 on the interoperability of the railway system. In addition, work will be done on the introduction of new systems for the noise reduction in the rolling stock and in the adaptation of the locomotive fleet to various operating voltages. It also contemplates the ilnstallation of variable-width axles in freight wagons as well as support for R&D initiatives relating to axles of variable gauge in locomotives.

The second line of action, endowed with another 195 million euros, aims to promote the modal shift of freight transport from

the road to the railway. Measures to achieve this objective include the construction and improvement of loading platform and intermodal "rail-road" terminals as well as their land connections. In addition, support will be established for the sustainable transport of goods, including maritime, which will be based on "eco-incentives" on supply and demand. This measure aims to reward the services that have the greatest impact on environmental costs. In the railway sector, these direct aids will be allocated on the supply, that is, they will go to the companies that provide transport services on the market.

MODERNIZATION OF RAILWAY FREIGHT EQUIPMENT

Along with the aids for the improvement of infrastructure and terminals, there is a third line of action aimed at modernizing the current fleet of vehicles.

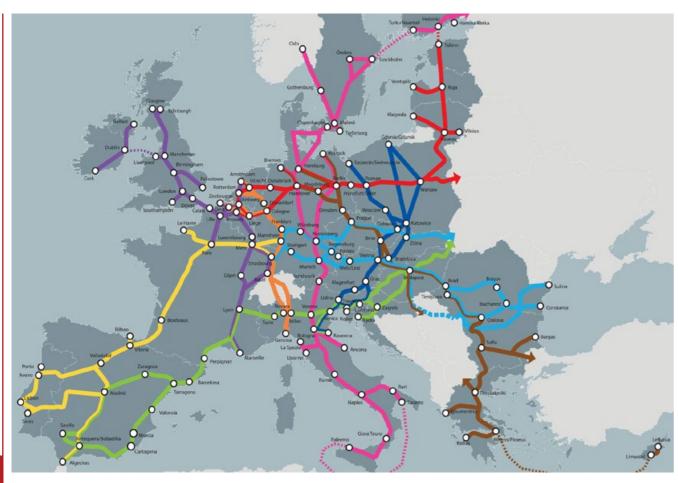
125 million will be allocated to private companies to subsidize both the acquisition and renovation of rolling stock for freight railway transport. This amount will

be used to enable them to adapt wagons for the transport of goods and to include the changes necessary for the operation of railway motorways.

In addition, investments in the compatibility of railway tractor equipment with alternative fuels such as hydrogen or electricity will be supported.

EXTERNAL RAILWAY ACCESS TO PORTS

One of the key measures of the strategy to boost freight railway transport is the improvement of external access to ports. This will enable its connection with the rest of the network and also with the European corridors. These works include ports such as La Coruña or Castellón. In addition, this line of financing includes the installation of sidings of 750 meters in several points of the network.



More funding for the Atlantic and **Mediterranean corridors**

he development in Spain of the corridors of the core network of the Trans-European Transport Network (TEN-T) are part of the national recovery plan. The "safe, sustainable, and connected mobility" within Component 6 details the investments planned to advance in its implementation and to have a railway connection without borders.

The completion of this network in Spain is necessary to meet the milestones set out in the new European mobility strategy. It wants to double high-speed traffic by 2030 and triple it by 2050 compared to 2015 figures. In addition, goods transported by train are expected to increase by 50% by 2030 and double that by 2050.

Both the Atlantic and the Mediterranean Corridors are key to the construction of the Single European Transport Area. For this reason, they are considered key in the planned investments in transport (Pillar 7 of the Safe, Sustainable and Connected Mobility Strategy). Although they have been in full development for some time, having the economic support of the European funds allocated to Spain will make it possible for them to be finalized in those provided for by European regulations. In addition, it has extensive experience and high levels of Spanish competitiveness in the construction of railway lines, an aspect that is a guarantee that the investments made will be carried out very efficiently.

The funds foreseen for both corridors in the Recovery Plan amount to 2,988 million euros, an amount that will be allocated both to the construction of new railway infrastructures and to the modernization and improvement of existing ones throughout the whole country. To date, these lines had national funding and also European aid from the European Regional Development Fund (ERDF) and the Connecting Europe Facility (CEF).

The actions will be carried out in several sections throughout the whole country and include work of very diverse nature from new infrastructures (platform, viaducts, tunnels, etc.), to new sections, assembly and renovation of track, electrifica-

tion, signaling and control, as well as fixed and mobile telecommunications and works in stations. The planned implementation schedule began in February 2020 and will run until August 2026. Once the works are completed, it is estimated that infrastructure expansions and improvements will have been made to around 1,700 kilometers of network of both corridors

Atlantic Corridor

One of the most significant railway projects is the Atlantic Corridor. It is included in the Trans-European Transport Network. Its construction is carried out for its full interoperability with the rest of Europe. Once completed on schedule - in 2030 - the complete route will be double-track with international gauge (1,435 mm), electrification at 25 kVac and will have the ERTMS control system. It is a strategic line that will connect the northern coastal area with the interior of the country and the rest of Europe.

One of the objectives of this project is to increase railway freight traffic and make it more competitive compared to other modes such as road or aircraft. The commitment to this corridor, like that of the Mediterranean, will make it possible to make progress in achieving sustainable

Two of the most significant railway projects that will be advanced in the coming years are the Atlantic and Mediterranean corridors.

mobility and reducing emissions associated with transport.

Its importance from the economic point of view is also very relevant. As stated in the 4th Atlantic Corridor Work Plan published in 2020, "the implementation of the Basic Network of the Trans-European Transport Network in the Member States belonging to the corridor will lead during the period 2017-2030 to an increase in cumulative GDP of 0.9%, corresponding to an investment of € 795,000 M, and the generation of a total of 2,7m jobs million jobs." In addition, it is estimated that the cargo volumes on this route will be 29% up to 115 billion tons-kilometre in 2030. Railway transport will experience the largest increase, accounting for 71%. The planned route has just been recently extended to reach Asturias and Ga-

Mediterranean Corridor

Another priority in the Spanish reactivation agenda is the promotion of the

Mediterranean Corridor, which is also part of the Trans-European Transport Network. It is an international gauge railway route that runs from Algeciras along the eastern coast of the country to the French border, where it connects with the rest of Europe. In its route, of 1,300 kilometers, you will join the most important cities of this area among which are Barcelona, Valencia, Alicante, Murcia and Málaga and connecting them in turn with the rest of Europe. In addition to having a connection with the main ports in the area, this pillar would cover 47% of the Spanish population and half of exports.

Both corridors are infrastructures that will allow to expand travel times, frequencies and boost economic activity and employment. As stated in the "4th Mediterranean Corridor Work Plan", the final implementation in 2030 of the Trans-European Transport Network Core Network will lead to a sharp increase (+29%) in the number of tonnekm transported by railway.

▶ ACTIONS IN THE ATLANTIC AND MEDITERRANEAN CORRIDOR: €2.988 M

Atlantic Corridor	And Basque: Vitoria-Bilbao- San Sebastián/Astigarraga-Irún	
Atlantic Corridor	Valladolid/Palencia-León	
Atlantic Corridor	León-La Robla-Pola de Lena	
Atlantic Corridor	Zaragoza-Castejón-Pamplona	
Atlantic Corridor	Ourense-Monforte	
Atlantic Corridor	Talayuela-Plasencia-Cáceres-Mérida-Badajoz	
Atlantic/Mediterranean Corridor	Connection LAV Barcelona-LAV Levante	
Atlantic/Mediterranean Corridor	Alcazar de San Juan-Manzanares	
Atlantic/Mediterranean Corridor	Madrid-Seville	
Mediterranean Corridor	French-Barcelona-Tarragona-Vandellós border	
Mediterranean Corridor	Sagunto-Teruel-Zaragoza	

ACTIONS IN THE TEN-T RAILWAY INFRASTRUCTURES, NOT INCLUDED IN THE CORRIDORS OF THE BASIC NETWORK: €1,010 M

General actions of modernization and adaptation of the network (Security, digitalization and environmental protection):

- Technology infrastructure for railway traffic management
- Security (cybersecurity, obstacle drop detectors, etc.)
- Acoustic protections / Noise maps
- Development of satellite technology applied to ERTMS railway signalling

Actions in lines (900 km of network): Improvement in the different sub systems

- Electrification of sections (e.g., Monforte-Lugo)
- Track renovation (e.g., Soria-Torralba, Xáitva-Ontinyent and Monforte-Lugo)
- Improvement of the control command and signalling
- subsystem (e.g., Soria-Torralba and Ávila-Salamanca)
 Creation of new sections or variants (e.g., Palencia-Santander, variant of Rincón de Soto and Variant of Ourense)

DIGITAL TRANSFORMATION OF THE MINISTRY OF TRANSPORT, MOBILITY AND URBAN AGENDA. PLANNED INVESTMENT: €50 M

Driving Mobility as a Service (MaaS)

Offering open data and using new technologies for the analysis and optimization of mobility.

New systems

Implementation of a system of analysis, monitoring, surveillance, control of needs, execution of service and implementation and application of new technologies in Road Transport.

BIM

Building Information Modeling (BIM): Enhancing coordination and communication through the BIM Commission's website.
Collaborative platform for information management and digital models, etc

OTHER ACTIONS IN THE TRANS-EUROPEAN NETWORK

In component 6 of the Recovery, Transformation and Resilience Plan, other actions have also been approved to improve the interoperability of the railway network, especially in relation to the Trans-European Transport Network (TEN-T). These measures also seek to introduce and deploy digitalization, traffic management systems such as SESAR, ITS or ERTMS and new technologies available on the market as a means to increase safety, efficiency, control in their management.

On the one hand, 1,010 million euros are set aside for TEN-T infrastructure works that are not included in the core network corridors. These are security projects, digitalization, implementation of technologies and environmental protection.

Likewise, actions will be carried out in 900 kilometers of railway lines for the improvement of the different subsystems including electrification, track renewal, command control and signaling. In addition, there

will be a specific item for the digital transformation of the Ministry of Transport, Mobility and Urban Agenda (MITMA) with the aim of increasing the efficiency and quality of public services.

Among other actions, the use of the collaborative work methodology BIM (Building Information Modeling), the Mobility as a Service (MaaS), through open data and using new technologies for the analysis and optimization of mobility will be promoted.

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Supporting the Hydrogen: An innovative opportunity for the growth of the sector

he green and digital transformation of the growth model that it has been designed in Europe is committed to the promotion of renewable energies.

The ecological transition in which we are working is especially important in sectors with high rates of CO2 emissions, such as transport. The need to act to achieve this change is also included in the Spanish Recovery, Transformation and Resilience Plan, where clean sources have a great weight. Among them, the deployment of green hydrogen - as an energy vector - is considered key to achieving climate neutrality.

The Component 1 focuses on the demand and the aid is intended to boost the electric vehicle and the deployment of the charging infrastructure, while component number 9 "Roadmap of renewable hydrogen and its sectoral integration" is dedicated to supply. In other words, to how to expand its generation and make it available to the different consumer sectors, including mobility. In addition, the objective pursued is to position Spain as a technological benchmark in its production and use considering that it is a sector with great prospects for the future. More specifically, there is a wish to define a strategic framework for action for its take-off, as well as to develop pioneering projects in initiatives associated with the transport sector and in isolated energy systems.

One of the "country objectives" for 2030 that this component includes is the continuous use of hydrogen-powered trains on at least two commercial medium and long-distance

ONE OF THE "COUNTRY OBJECTIVES" FOR 2030 IS THE CONTINUOUS USE OF HYDROGEN-POWERED TRAINS ON AT LEAST TWO COMMERCIAL MEDIUM AND LONG DISTANCE LINES ON TRACKS THAT ARE NOT CURRENTLY ELECTRIFIED.

lines on tracks that are not currently electrified. Likewise, it wants to create a cluster for sectoral integration that spatially concentrates largescale production, transformation, and consumption displacing fossil materials. Among its commitments would be to promote innovative solutions of transport, hydrogen storage and final supply that minimize the environmental impact, as well as the development of unique and pioneering projects that allow the introduction of renewable hydrogen, among others, in other industrial poles other than those included in the cluster and in transport.

Both components will contribute to achieving the transport objecti-

ves set out in the "Hydrogen Roadmap", a guide document proposed by the Ministry for the Ecological Transition and the Demographic Challenge (MITECO).

This document is the key pillar on which investment plans and measures to boost their deployment are based, as it is considered an essential element to achieve climate neutrality, with a 100% renewable electricity system by 2050. In addition, it is considered that its development will encourage the creation of innovative industrial value chains, a great technological knowledge of high added value and the generation of employment associated with a sustainable economy.



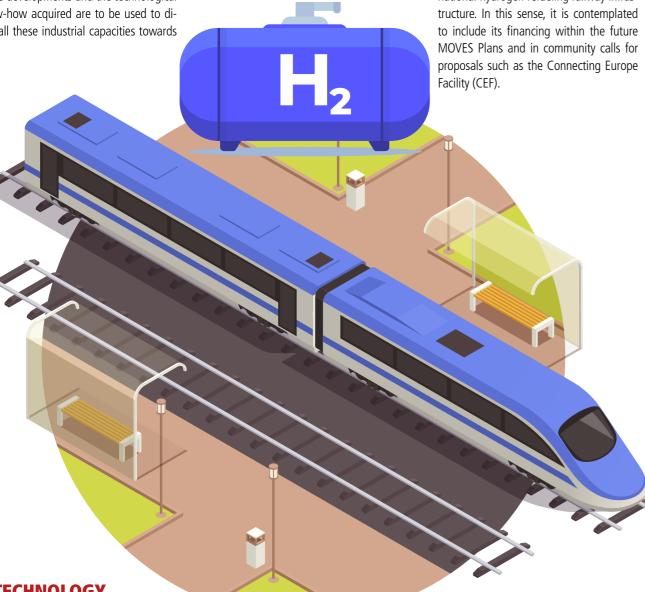
Green hydrogen has its own "Roadmap" in Spain, and it opens the doors to innovation in the railway transport sector.

OPPORTUNITY FOR THE RAILWAY SECTOR

Although much of the funding is focused on the electric vehicle, there are also great development options in the railway sector. Support for the automotive industry to promote the production of this type of vehicles - both in the roadmap and with European. d - will have a driving effect on the sector. These developments and the technological know-how acquired are to be used to direct all these industrial capacities towards

various modes of public transport such as the bus, the tram systems, and the general renewable hydrogen rail network.

Likewise, as stated in the roadmap, it is committed to promoting studies and feasibility tests of the replacement of diesel trains by fuel cell trains for their circulation on partially or non-electrified lines. They contemplate both the transformation of existing rolling stock and the acquisition of new units. In addition, other measures may be put in place for the development of a national hydrogen refueling railway infrastructure. In this sense, it is contemplated to include its financing within the future MOVES Plans and in community calls for proposals such as the Connecting Europe Facility (CEF).



A TECHNOLOGY THAT TAKES OFF

This path of integrating hydrogen into the railway is already underway. There are already some very significant samples. For example, the National Center for Experimentation of Hydrogen and Fuel Cell Technologies (CNH2), in Puertollano, is working on the prototype of a Talgo hybrid train that will use hydrogen batteries and fuel cells and is expected to be operational before the end of 2021. In Huesca, another industrial-scale project for the production of renewable hydrogen is being developed for its subsequent application in road mobility, both by road and by rail.

On the other hand, *Renfe Operadora* wants to renew its fleet of regional trains under

the criteria of sustainability and decarbonization so necessary in railway transport. In this tender for the acquisition of 72 new units, it will be especially valued that they can circulate in electrified sections and in those without catenary. Green hydrogen technology is presented as an ideal alternative for this or other projects related to emission-free rolling stock.



Leading the way to greener and smarter mobility, worldwide

GROWTH by offering greater value to customers

INNOVATION

by pioneering smarter and greener mobility solutions for all

EFFICIENCY

at scale, powered by digital

ALSTOM

Last July, Alstom's Executive Board approved the Alstom in Motion 2025 strategic plan, as well as the Group's mediumterm financial targets.

The new strategy will focus on capturing market growth opportunities, strengthen Alstom's innovation leadership, drive effi-

ciency throughout the new organization and ensure the successful integration of Bombardier Transportation.

The strategy also envisages major advances in sustainability, such as a 25% reduction in energy consumption in all rail solutions, 100% of new solutions having eco-design criteria, and 100% of energy supply coming from renewable energy sources. In terms of intelligent mobility, the Group aims to have fully autonomous train prototypes for freight and passengers by 2023.

Alstom faces these new challenges with a solid foundation and, following the acquisition of Bombardier Transportation, with a reinforced dimension.

ARDANUY INGENIARÍA

The development of the main railway networks in the world, including the Spanish rail network, relies on the solutions and services of highly specialized consulting firms in the sector. Among them is Ardanuy Ingeniería, which contributes its know-how and research developments to the implementation of high-speed systems, conventional railway lines, subways, trams, light rails and cable cars throughout the world.

Along with the more than 1,500 technical assistance and project management contracts in more than 60 countries, the consulting company has a very prominent role in the innovation of rail technology and software. The firm has developed its own state-of-the-art programs that have been used to improve all types of transport networks. These software programs include Railpower, Rail Traffic, AutoElec, SimOLE as well as Railgetaway. In addition, Ardanuy is part of international R&D initiatives such as Shif2Rail in which the goal is to increase the levels of cybersecurity, energy storage, signalling, automization and communications through its participation in various projects such as: Etalon, Astrail, Mistral and



ARCELOR

As part of the company commitment to reduce CO2 emissions by 35% by 2030 in Europe, with a further ambition to achieve net zero by 2050. XCarb® will bring together all low and zero-carbon products and steelmaking activities, as well as wider initiatives and green innovation projects.

When it comes to the railway sector, ArcelorMittal Rails & Special Sections is also at the forefront of bringing innovative solutions with the future in mind. Increasing the length of our rails provide further savings in track safety, welding, track laying and maintenance cost.

Our solutions are also adapted to the different applications in order to increase their service life and reduce maintenance, such as: our low carbon grades for tramway, new hardness grades for heavy

haul and our new range of corrosion-resistant rails, RailCor, that offers protection in severe environments. In addition, we contribute to extend the 4.0 transformation of the rail sector with the launch of several digital tools such as the new Rail Tool app, Life Cycle Cost models and predictive maintenance.



CAF

Over the next few years, a significant volume of European funds is expected to arrive in Spain, a recovery plan in which the part dedicated to the ecological transition of our economy will play a significant role. Mobility is the most prominent sector in this area, as demonstrated by the fact that the

Sustainable, Safe and Connected Mobility Strategy includes an endowment of more than 13.2 billion euros until 2023.

The CAF Group, from its position as one of the leaders in the sustainable mobility sector, trusts in being part of the group of companies that help to achieve the objectives of the aforementioned plan. For this, the following main lines of action have been marked:

- The decarbonisation of rail transport, through the development of propulsion systems with H2 and batteries for trains, betting on the transformation and renewal of the current fleet of diesel trains.
- Promote the renewal of the urban and metropolitan bus fleet with zero-emission models, both electric and H2, and its associated charging infrastructure, thanks to its complete range of sustainable bus models.
- The development of autonomous, efficient and resilient transport systems, through the implementation of advanced autonomous driving systems in key transport segments, as well as the optimization of operation and maintenance, improving the availability and safety of fleets thanks to to Big Data and advanced analytics.



MAFEX 63 62 MAFEX

SIEMENS

Siemens Mobility Spain plays a prominent role as a company at the forefront of mobility in Spain and actively contributes to the development of the industry in our country, helping to promote the railway as well as Mobility as a Service in order to achieve more efficient and sustainable transport. Each year it invests 33 million euros in R&D, with the aim of applying the latest technologies to its services. Siemens Mobility, in its commitment to innovation and digitization, has developed a new

Control Center, R9Kloud, that will offer a model of digital signage microservices on demand and from the cloud, which will eliminate hardware and maintenance of facilities current railways.

Also, in collaboration with Siemens Mobility Germany and after a demanding approval process, the company has carried out the first release of the new vital DS3 platform. It is the first commercial hardware- and operating-system-based interlock ever put into service by the

company. To boost the use of the railroad in times of pandemic, the company has developed AIRO, an Artificial Intelligence Engine designed to regulate the frequency of trains in real time and adjust them to passenger demand. In addition, it reduces waiting times at stations and prevents service disruption. In Barcelona, it has the Cornellá factory, where traction motors and converters for the railway sector have been produced and exported for more than 20 years.

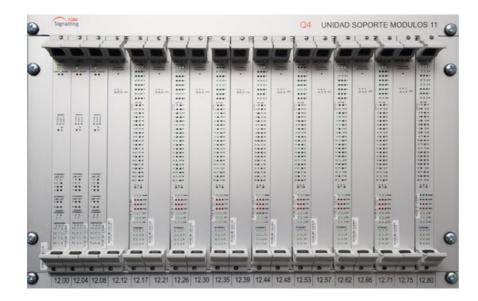


CAF SIGNALLING

CAF Signalling is participating in the project to modernise the Madrid-Vicálvaro freight terminal with the new generation Quasar Q4 interlocking system, developed entirely by CAF Singalling.

This new model, on which CAF Signalling has been working for ten years, is an evolution of the Quasar S3e and provides considerable improvements over its predecessor. Among others, it has greater capacity (up to 40 high density modules per node for field element control); a more flexible architecture, as it ranges from compact interlocking to distributed interlocking with multiple nodes; it has new generation microprocessors with higher processing speed; native IP/Ethernet communications, prepared for the new secure digital infrastructures and new communi-

cation standards; it is more resistant to adverse weather conditions, can be installed in outdoor cabinets, etc. In addition, the Quasar Q4 interlocking is easily expandable with more nodes to control the entire terminal in the near future.



COMSA

COMSA has participated, together with twenty-five companies and entities of the railway sector, in the process of creating the unique BIM classification, a key initiative framed in the LE BIM strategic line, promoted by Railway Innovation Hub.

This classification will allow the promotion of the Building Information Modelling (BIM) methodology in civil works, especially in the railway sector, as well as the use of the digital twin. Focused on the digitisation of infrastructures, the classification develops for the first time specific concepts of railway technology, which will facilitate its use and application in this sector.

The completion of the single BIM classification has been the result of the work carried out by Spanish companies with a high level of national and international expertise and their knowledge of railway infrastructure throughout its life cycle, as well as its commissioning and safety

Grupo de trabajo de la incea furrategica del sus.

analysis in accordance with the applicable national and European regulations.

Other companies in the sector, as well as technology centres, associations, infrastructure managers and operators have

also participated alongside COMSA.

The result of this collaboration is available for download on the Railway Innovation Hub website, https://www.railwayinnovationhub.com/bim/.

IDOM

IDOM is working with the Santiago Metro on the development of mitigation measures at the rolling stock workshop and depot facilities. By measuring data

using state-of-the-art technology, IDOM develops predictive noise models, including induced noise and vibrations, incorporating mitigation elements, available in the marketplace, that reduce the levels to

those required by Chilean environmental regulations.

The ultimate goal of these simulations is to improve the quality of life of the residents who live next to the facilities. The three-dimensional modeling and theoretical analysis simulate the noise and vibrations that would occur during railway operation, as well as the reduction with correctly dimensioned acoustic barriers, floating slabs and rail dampers, before they are installed. Upon completion of the IDOM design, mitigation measures will be operational by 2023.

IDOM has been working on vibroacoustic mitigation for years, and developed its own VARNA software, implemented in some of our metro, high-speed and conventional rail projects. This is a digital design and modeling tool, based on noise and vibration mitigation to contribute to the sustainability of infrastructures.



SMART MOTORS

The transportation industry is changing; vehicles, assets and even the most insignificant elements have the capacity to generate data. It is the processing of this data that is essential to create the ecosystem that will make it possible to generate new transportation models, au-

tomate processes and contribute to the efficient development of the cities of the future.

DAVANA is the answer to the inevitable need to channel all this information into a single place and put it at the service of operators, maintainers and, finally, the users. DAVANA integrates all the information of the transport network, from the vehicles to the infrastructure itself, becoming the information and process automation ecosystem that contributes to improving efficiency, increasing network availability, rationalizing resources, and increasing user information.



THALES

Thales has proposed the automation of intermodal nodes for 24 ports around the

whole of Spain and 2 European ones, a project that will bring greater logistical competitiveness and a carbon footprint reduction



to all supply chains. It is also committed to a disruptive technological leap forward through the fusion of railway security technologies and the space industry with the implementation of the satellite-based Level 3 ERTMS for regional lines where telephone signalling is still being operationally used, thus avoiding having to depend on the human factor and reducing investment in the network's installed infrastructure.

From the point of view of efficiency in running the network, the implementation was proposed of systems for remote steering within 23 railway logistics and maintenance bases in Spain.

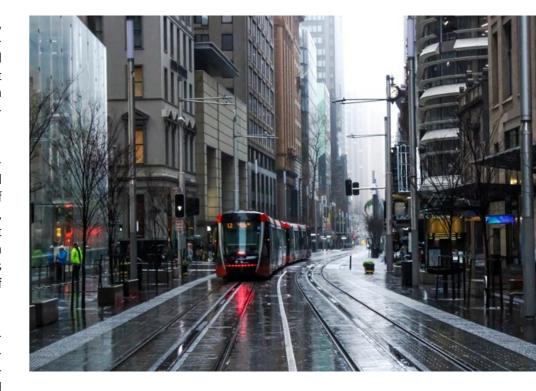
The GreenRail initiative has been put forward which, based on implementing Thales's own technology, will optimize and assist railway driving on the conventional and commuter network around the whole of Spain.

TELTRONIC

The potential offered by driverless trains, IoT and smart maintenance will inevitably lead to increasingly sustainable and efficient transport, but it also means that railway systems require the transmission and management of ever greater volumes of data.

To meet these needs, broadband communication systems are required, and Teltronic is currently in the process of developing a portfolio of solutions that, in line with the FRMCS development guidelines, will meet the communication requirements of railway systems in terms of availability, reliability and quality of service.

Teltronic has already made real deployments of its 4G LTE technology, demonstrating the suitability of its communications infrastructure and on-board equipment to, for example, support CBTC signaling systems. Meanwhile, it continues to participate in various R&D



projects in collaboration with entities such as the CDTI, or the University of Zaragoza, with whom it is working jointly for the characterization and optimization of 4G technology for the railway environment.



VOLTASPINE JEZ

Digitisation is an essential building block for ensuring and increasing the availability and efficiency of railway infrastructure. The turnout as an interface between track and signalling technology has long been a focal element of data acquisition and monitoring. It is therefore predestined to be further developed into a smart device with the corresponding components. This not only increases availability, but also reduces life cycle costs (LCC) in the long term.

Our intelligent switch machine is a perfect add-on, to make our turnouts even smarter. The sensors required for this are mounted directly on the switch machine. In the event of irregularities, the data is immediately transmitted to the platform, for further display of the performance and a precise analysis system for management.

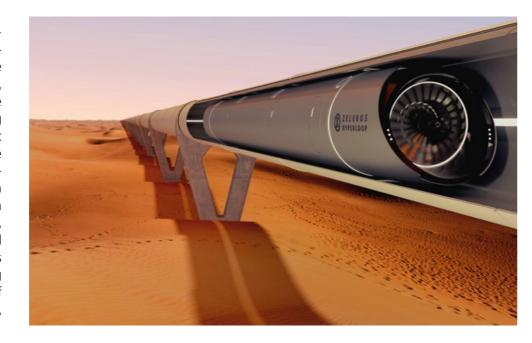
The use intelligent switch condition monitoring systems such as ROADMAS-TER® SCM enables detecting failures at an early stage and prioritizing maintenance based on the asset condition.

From voestalpine Railway Systems JEZ's side, foresee that the smart turnout will drive forward the digitisation of the railway infrastructure. With our system RO-ADMASTER®, the combination of hardware for recording the condition of the turnout and its environment, with software and artificial intelligence will be an essential piece for this process.



ZELEROS

Zeleros, the Valencia-based Spanish company that develops the scalable hyperloop, exhibits its novel hyperloop capsule in the Spain Pavilion at Expo 2020 Dubai, which will host millions of visitors. The Zeleros vehicle exhibited is 6 meters long and showcases the main technologies that make the Zeleros system drastically reduce infrastructure costs and simplify certification, shortening its path-to-market. Spain thus once again becomes a pioneer in high speed mobility, leading the hyperloop race, the hybrid between a high-speed train and an airplane, which allows reaching speeds of up to 1000km / h at ground level using levitation and a low-pressure network of tubes. From October 1, 2021 to March 31, 2022 in Dubai



Workplace Innovation (WI) will be the driving force behind the improvement of innovative services and the technological development of companies

n the occasion of the European Year of Rail, we have recently contributed an article on Innovation published in the Journal of Public Works (www. revistadeobraspublicas.com)", no. 3627.

The article, developed by Mafex's Head of Innovation and Competitiveness, Garazi Carranza, aims at analyzing the paradigm shift towards open innovation in the railway sector.

Workplace Innovation (WI) will be the driving force behind the improvement of innovative services and the technological development of companies. Its effects are directly related to improved levels of employee engagement, innovation, improvement and customer service that improve long-term competitiveness. These strategies aim at promoting innovative work behaviours to create, introduce and apply new ideas, processes and products. This article looks at WI in the railway sector and how CO-VID-19 affects the industry.

The article has been developed based on different empirical studies using a mixed perspective that consists of combining qualitative and quantitative research components. The data used was collected through two online surveys. The first survey aimed at analyzing the effects of COVID-19 on the industry and the second one aimed at measuring innovation in the workplace, using European WI indicators.

New technologies have the ability to significantly change the kind of skills the railway industry requires. It is evident that COVID has forced the industry to make certain adjustments to ensure the viability of its businesses. One of the main consequences that the current pandemic has left us in the supply chains has been the general fall in demand, which has gradually been recovering.

The new reality will force to readapt the strategy and management in the company. In this section, two areas of action should be highlighted: the relaxation of chains and the need to incorporate new products/services into their portfolios in order to respond to the needs of customers. In this sense, new technologies will influence railway maintenance activities, since these systems will facilitate the demand for these operations. Innovative technologies will allow better monitoring, diagnosis and communications that will lead to an increase in preventive and predictive measures, instead of re-



68 MAFEX MAFEX

active ones as has been done so far. Above all, these technologies will drive the digitalization of the sector and learning techniques.

Industry challenges and conclusions

The emergence of COVID-19 is coupled with important changes that affect consumer behaviour, supply chains and, therefore, the proper functioning of companies. In this context, the sector faces the challenge of aligning its supply chains with the markets in which they operate in an agile and immediate way and preparing for the new and future normal, in which they must proactively incorporate elements such as advanced planning and digitalization, in order to have chains that drive value.

Therefore, the short-term challenge for railway entities is to match demand with supply, which will require better planning capacity, thus it will be necessary to streamline management through digitalization. The biggest challenge at the process level is to promote planning as the main management element to deal with the uncertainty and complexity generated by the CO-VID-19 crisis. This means providing

the sector with a roadmap and the ability to make the right decisions to respond to crises that may arise in the future.

Companies are clearly committed to a paradigm shift in supply chains in which flexibility, resilience and, above all, digitalization will play a key role.

Given this situation, the role of WI as an engine to improve innovative services and technological development will be even more important than before, especially for SMEs: learning from forced experimentation and investment in risk mitigation technologies can help companies become smarter and more flexible. For example, forced experimentation has led to a better understanding of teleworking.

Europe has a highly competitive, professional and strongly integrated industrial railway sector despite the increasing mobility demands achieved by other modes of transport.

Nowadays the railway industry has sufficient capacity to implement innovative technologies developed in other industrial sectors, representing an opportunity to lead the sector through innovation.

In recent years, new business models and commercial strategies are being developed, offering railway companies new technological possibilities and thus accelerating innovation (European Commission, 2019).

That is why railway must be one of the central axes of EU policies and, hence of national policies. It is an inclusive, cohesive sector and, as it has been demonstrated in the toughest moments, key for the transport not only of people, but also of freight, food and goods and equipment of first necessity. It is time to look to the future by strengthening our capabilities, our supply chains; committing to training, innovation, digitalization, connectivity and, of course, security and reliability; being fully aware of our role as the backbone of society and engine of development and well-being.

This text is a version extracted from the published article. You can find the full version on the following link: https://www.revistadeobraspublicas.com/articulos/la-innovacion-abierta/

RTP-800 in the FRMCS Plugtests



TELTRONIC HAS PARTICIPATED IN THE FRMCS PLUGTESTS, INTEROPERABILITY TESTS ORGANISED BY THE EUROPEAN TELECOMMUNICATIONS STANDARDS INSTITUTE (ETSI). THE EVENT WAS BASED ON 3GPP, ETSI AND IETF (INTERNET ENGINEERING TASK FORCE) STANDARDS

eltronic has participated in the FRMCS Plugtests, interoperability tests organised by the European Telecommunications Standards Institute (ETSI), within the framework of the Mission Critical Services defined by the 3GPP for the railway sector.

The event tested some of the FR-MCS functionalities defined in the 3GPP MCS standard included in releases 15 and 16. Teltronic participated as a User Equipment supplier with its RTP-800 on-board

radio, demonstrating that it is prepared for these interoperability and harmonisation processes that are being promoted for the future deployment and operation of Mission Critical Services (MCS) in the field of rail transport.

The event was based on 3GPP, ETSI and IETF (Internet Engineering Task Force) standards, and tested railways-oriented capabilities like Functional Aliases or authentication and registration

By means of participating in these plugtests, Teltonic has been able to assess the level of interoperability of its implementations, validating its understanding of the standards and demonstrating that RTP-800 was designed and developed in order to be part of the future railway communications. The company will again take part in the next session of the plugtests, which will take place in November and will test new functionalities.

FRMCS is the future global telecommunications system designed by the International Union of Railways (UIC) in collaboration with different entities of the railway sector, and which, over broadband technology, will support the communications of the trains of the future based on mission critical services such as Mission Critical Push To Talk" (MCPTT), "Mission Critical Data" (MCData) and "Mission Critical Video" (MCVideo).

technology

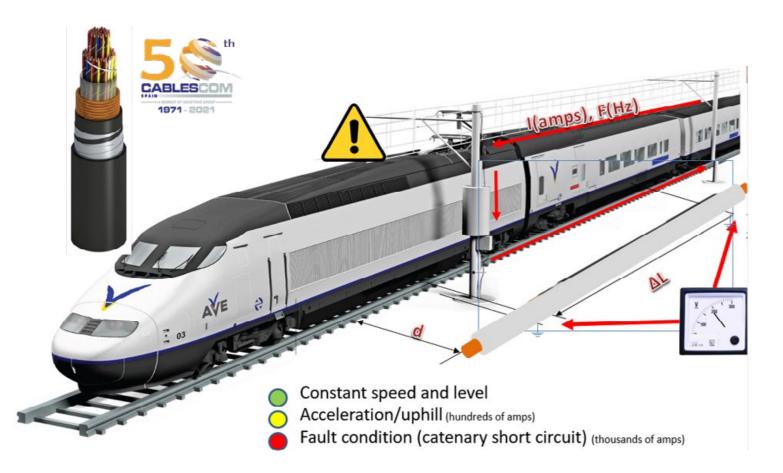
Find out more about all the activities and services we have prepared for 2020 to promote Internationalization, Competitiveness and Innovation.

mafex@mafex.es | 00 34 944 706 504



INNOVATION

• Breaking News



Reduction factor in trackside signalling

cables

The reduction factor is one of the most important design parameters in current trackside signalling cables, as it indicates the degree of protection the cable has against the electromagnetic interference caused by catenary cables in high-speed train lines.

With the development of high-speed lines and their alternating-current power-supply system through the catenary, ADIF in Spain found that the current that circulated through the 25kV catenary at 50Hz caused interference in the signals carried by the trackside signalling cables. This gave rise to the need to protect these cables using screening designed to reduce this interference.

The screening developed is a combination of copper and high magnetic permeability steel shields. ADIF currently defines two levels of reduction factor: 0.3 and 0.1. This means that the cable screens block most of the interference produced by the catenary, allowing only 30% (0.3) or 10% (0.1) of the interfering signal to pass through. Other countries also face this problem, although different voltages and frequencies may cause the interference currents, and therefore other reduction-factor levels are required.

CABLESCOM, TOGETHER WITH THE ICMA (INSTITUTE OF MATERIALS

STEELS, AND TO OPTIMIZE THE REDUCTION-FACTOR CABLE DESIGNS.

DEVELOPED AN INSTRUMENT TO MEASURE THE PERMEABILITY OF

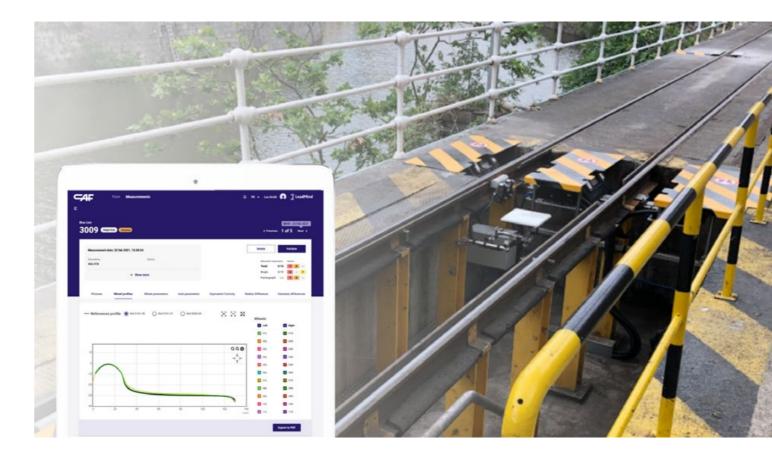
SCIENCE OF ARAGON) AND THE UNIVERSITY OF ZARAGOZA,

Both screen materials used (copper and high-permeability steel) are ex-

pensive elements that have a significant impact on the final cost of the cable. For this reason, at Cablescom, together with the ICMA (Institute of Materials Science of Aragon) and the University of Zaragoza, developed an instrument to measure the permeability of steels, and to optimize the reduction-factor cable designs.

Optimizing the design of reduction factor cables has become increasingly important of late, as raw-material prices are reaching record values.

Automatic Inspection station for the critical train assets



CAF'S LEADMIND WAYSIDE ALLOWS WEAR MONITORING, ANTICIPATING FAILURES AND PERFORMING INTERVENTIONS ONLY WHEN NECESSARY.

AF takes a step further in service growth and expands its digital portfolio within LeadMind to offer a wider solution with the implementation of a modular data acquisition system station.

The wayside systems make it possible to automate visual inspection and measurement activities and in this way, the status of the assets is known instantly and more frequently than manually. The

benefits of the use of automatic systems range from facilitating condition-based maintenance to improving diagnosis and avoiding repetitive failures. These benefits are captured through the integration of the automatic systems and the advanced analytics of CAF's digital platform.

LeadMind Wayside allows wear monitoring, anticipating failures and performing interventions only when necessary. This solution reduces the number of hours required for repetitive works and allows better adjustment of the frequency of changes of certain materials.

CAF offers the opportunity to design a modular and personalized Inspection Station. The sum and type of equipment are chosen by the operator or maintainer based on the needs of the fleet. Wheels, discs, linings, bogie, pantograph, roof, under floor and / or body side can be monitored according to customer requirements. This information can be integrated directly with other features of LeadMind Advanced Analytics or access to it independently.

CAF has 50 wayside systems installed in 15 countries with access to LeadMind Wayside.

Tooltrain', the solution that adapts the calculation of transport capacity to each operational scenario

CAF SIGNALLING AND COMILLAS PONTIFICAL UNIVERSITY HAVE DEVELOPED THE TOOLTRAIN PROJECT, AN INITIATIVE THAT PROVIDES ADVANCED TOOLS FOR THE CHARACTERISATION AND DIMENSIONING OF HIGH CAPACITY RAILWAY LINES.

he current protection (ERTMS Level 2) and communications (CBTC) systems allow for a significant improvement in the transport capacity of the lines through an operation with shorter headways between trains, always respecting their safety. This, together with the introduction of automatic driving systems (ATO), has facilitated the possibilities of centralised traffic control and optimisation. Considerable energy savings

are also achieved, as it enables the implementation of globally coordinated strategies.

In this scenario, Tooltrain responds to the need for new models for calculating transport capacity and line design that allow results to be adapted to each possible new situation in the operation.

The capacity analysis by infrastructure element present on the line (track section, terminal head-end, intermediate head-end, yard bed or bifurcation) makes it possible to identify the limiting sections or nodes on each line in order to analyse them in detail and look for alternative designs, while the dimensioning analysis makes it possible to obtain a cantonment design optimised to the real operating needs of the manager.

Tooltrain, therefore, is a particularly useful solution for both railway managers and suppliers, as it allows obtaining capacity and dimensioning results in an agile and simple way for very diverse operating environments, considering factors such as signalling system, driving mode, rolling stock characteristics and operating patterns.



Testing of the **BIRBALAS project** begins in the Basque Country

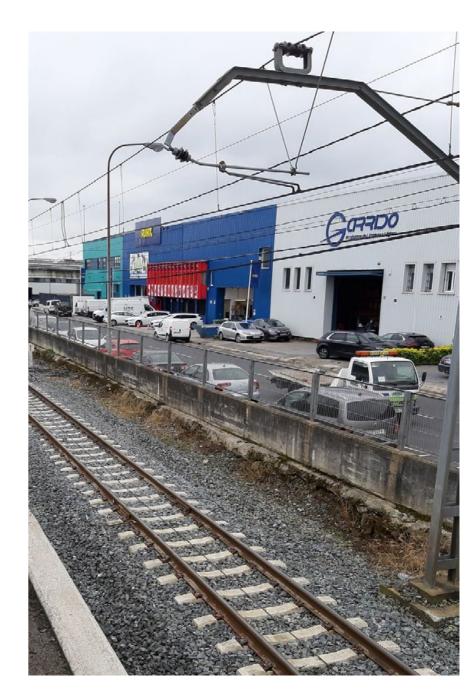
he initiative consists of the development and validation of railway ballast and sub-ballast products from recovered steel aggregate from electric arc furnace steelworks and will allow a second life to be given to the waste from this industry, which accounts for 400,000 Tm in the Basque Country every year.

The aim of BIRBALAS is to analyse the technical and market feasibility of using this product in the railway sector, taking into account its sustainable and environmental specifications that will promote intelligent management of preventive maintenance of the ballast, as well as the generation of new materials to replace traditional ballast.

Steel aggregate is a waste product obtained as a by-product of the steel manufacturing process in electric arc furnace steelworks. This process consists of two stages: the first is the melting of the raw materials in the electric arc furnace, and the second is the refining of the molten bath, which ends in the ladle furnace.

The start of the tests in Derio is a further step in the BIRBALAS project, subsidised by the Hazitek programme of the Basque Government, which will open up a new way of managing the surplus of this waste in the region, in accordance with the strategic guidelines for the circular economy promoted by the Department of the Environment and Territorial Policy.

COMSA, IN CONSORTIUM WITH SIDENOR, ELINFE, SAITEC AND IN COLLABORATION WITH TECNALIA, HAS STARTED THE TESTS OF THE BIRBALAS PROJECT IN A SECTION OF THE RAILWAY NETWORK MANAGED BY THE BASQUE PUBLIC ENTITY EUSKAL TRENBIDE SAREA IN THE MUNICIPALITY OF DERIO (VIZCAYA).



INNOVATION

• Breaking News

IoT Train: **new maintenance service** models and IoT monitoring platforms for predictive rail maintenance



his Ikusi-led project aims to maximise train operating times and availability by reducing the number and duration of unplanned stops. To do so, it will leverage on new technology tools that will provide real-time performance information about all the systems installed on the trains of the whole operational fleet, even in the case of trains that run at speeds of hundreds of kilometres per hour.

These technologies will capture tens of thousands of data items in real time to check how the train systems' are performing, then conduct a descriptive analysis of the data, generate alarms for immediate action and, at a later stage, create models to facilitate pre-

IKUSI, LKS NEXT AND SQS ARE GOING TO WORK ON THE IOT TRAIN PROJECT WITHIN THE FRAMEWORK OF THE HAZITEK2021 R&D AID PROGRAMME PROMOTED BY SPRI.

dictive train maintenance tasks. This will allow train manufacturers or railway operators to ascertain the operational status of their trains and anticipate possible failures, thereby boosting the availability of their units while minimising their maintenance costs.

This process involves having a control centre that is permanently connected to the train fleet in order to receive all the operational

information. A centre capable of applying IoT platform-based data analytics to obtain valuable information on the performance of each of the units and the fleet as a whole.

Each of the IoT project companies will be work in tandem with a research establishment: Tekniker in the case of Ikusi, Ikerlan in the case of LKS Next and the Innovalia Association in the case of SQS.

First two autonomous trains for **Cairo monorail** arrive in Egypt

Istom has delivered the first two INNOVIA 300 trains for the Cairo monorail project, which arrived in Egypt after being completed at the company's factory in Derby, UK. The shipment of these first vehicles marks an important milestone for the company and for the Group's centers in Spain, from where key propulsion components, control, and signaling systems are supplied.

In August 2019, a consortium led by Alstom signed a €2.700 million contract for the construction, operation, and maintenance of the monorail lines that will link Giza to Sixth of October City and the New Administrative Capital to East Cairo; as well as the supply of 70 trains with a total of 280 cars.

Alstom Spain's center in Trapaga, Vizcaya, is leading the design of the ALSTOM SPAIN'S CENTER IN TRAPAGA, VIZCAYA, IS LEADING THE DESIGN OF THE PROPULSION SYSTEM APPLICATION AND IS PARTICIPATING IN THE SUPPLY OF THE EQUIPMENT THAT IS PART OF THE CONTRACT.

propulsion system application and is participating in the supply of the equipment that is part of the contract, as a result of its extensive experience in the design, manufacture, and supply of MITRAC traction equipment for international railway projects.

The INNOVIA 300 trains will use a CITIFLO 650 telecommunications-based control system (CBTC), which, with the highest degree of automation (GOA4), makes it possible to

operate the trains without a driver, offering the highest levels of reliability, safety, availability, and flexibility. Its implementation will be carried out from the center of excellence in signaling systems located in San Sebastián de los Reyes, Madrid, which has already developed this technology for other major international projects, such as the subways of Turkey and São Paulo, or national projects, such as lines 1 and 6 of Metro de Madrid.



INNOVATION

• Breaking News

Automation, the keystone in the new Afragola-Naples (LAN) metro line)



he new Afragola–Naples Metro line (LAN) will connect the Afragola High Speed Station with the Plaza Cavour node, located in the center of the city where lines 1 and 2 of the current transport system converge.

One of the keystones of this project of the Campania Agency ACAMIR led by IDOM in a joint venture with local partners, TecnoSistem and Rocksoil, is automation, unattended train operation using GoA 4 automation to move the trains on the line, as well as for most of their maneuvers towards outdoor enclosures, such as Depots or SideTracks.

PROJECT OF THE CAMPANIA AGENCY ACAMIR LED BY IDOM IN A JOINT VENTURE WITH LOCAL PARTNERS, TECNOSISTEM AND ROCKSOIL.

Together with automation, the project will have the best standards of security and comfort for users, making the LAN line one of the most modern in southern Italy.

At IDOM we strive to develop designs and projects that contribute to the achievement of the United Nations sustainable development

goals, considering the entire life cycle, producing resilient and safe solutions

This type of technology has been implemented in other projects around the world, such as Line 3 of the Riyadh Metro (Saudi Arabia) or Lines 3 and 6 of the Santiago Metro (Chile).



New IoT device for point machine monitoring

SMART MOTORS DEVELOPS AND ADDS A NEW IOT DEVICE TO ITS RANGE OF POINT MACHINE MONITORING SOLUTIONS: THE DAEN IOT DEVICE.

he solution is modular and compact, collects electrical data continuously and communicates wirelessly and securely directly with the DAVANA platform, which makes installation much easier as it does not require access to the operator's network.

The collected data such as current, voltage, waveform, RMS current, operating times and power among others are displayed in graphs, generating alarms and warnings to prevent and predict possible failures. DAVANA offers maintenance tools that with FFT analysis, RMS comparison and other statistical analy-

sis tools provide extra resources to identify pathologies.

The monitoring device is adaptable to different point machine models and also offers remote programming and configuration. Installation is simple and hot-swappable, without the need for service stoppage. DAEN IoT complies with safety standards and CE regulations and respects, in its application, electrical, electromagnetic, vibration and environmental safety standards.

Switches are very sensitive elements when it comes to the correct operation of the network. As they are

complex elements combining electrical and mechanical systems, it is practically impossible to ensure their good performance without continuous supervision.

Performing corrective maintenance in service requires shutting down the line, with the enormous consequences that this entails.

For this reason, smart motors® has designed different equipment with different levels of investment to collect data at a different level and to meet different performance or budget requirements. Specifically, the DAEN IoT is capable of predicting 45% of failures and guiding 55% of corrective tasks.

This solution ease the point machine's maintenance and consequently increases network availability by improving service.

ENGINEERING, CONSULTANCY AND CERTIFICATION

Projects and infrastructure technical assistances, superstructure, signalling, communications and ticketing

- Aimen Centro Tecnológico
- Ardanuv Ingeniería, S.A.
- Caf Signalling, S.L.
- Caf Turnkey & Engineering, S.L.
- Calmell, S.A.
- **CEIT**
- Citef (Fundación para el fomento de la innovación industrial)
- Dsaf-Dinamicas De Seguridad, S.L.
- Mieres Rail, S.A.
- ▶ Enclavamientos y Señalización Ferroviaria ENYSE S.A.U.
- FEX, Fastening Excellence Center
- lbérica Tecnología en Sistemas de Seguridad Ferroviarios S.L. (ITSS)
- ▶ Idom-Engineering, Consulting, Artchitecture
- Ikusi S.L.U.
- Indra Sistemas, S.A.
- Ineco-Ingeniería y Economía del Transporte, S.A.
- Inse Rail, S.L.
- Luznor Desarrollos Electrónicos. S.L.
- ▶ Segula Technologies España, S.A.U.
- Sener Ingeniería y Sistemas, S.A.
- SGS Group Spain
- Tecnivial S.A.
- **▶** Tectronic
- Tekniker
- Thales España Grp. S.A.U.
- ▶ TPF Getinsa Euroestudios, S.L.

- Typsa Técnica Y Proyectos, S.A.
- Vicomtech
- WSP Spain-Apia S.A.

Systems, environmental, financial management and IT consulting

- Aimen Centro Tecnológico
- Aquafrisch, S.L.
- Ardanuy Ingeniería, S.A.
- Citef (Fundación para el fomento de la innovación industrial)
- Fundación Gaiker
- ▶ Idom-Engineering, Consulting, Artchitecture
- Ineco-Ingeniería y Economía del Transporte, S.A.
- Mainrail ST
- ▶ Segula Technologies España, S.A.U.
- Sener Ingeniería y Sistemas, S.A.
- SGS Group Spain
- ▶ TPF Getinsa Euroestudios, S.L
- ▶ Vicomtech
- WSP Spain-Apia S.A.

Technical Specifications Drafting and supervision of rolling stock manufacturing

- Aimen Centro Tecnológico
- Ardanuy Ingeniería, S.A.
- Caf Turnkey & Engineering, S.L.

- Hispacold S.A.
- Idom-Engineering, Consulting, Artchitecture
- Ineco-Ingeniería y Economía del Transporte, S.A.
- Segula Technologies España, S.A.U.
- Sener Ingeniería y Sistemas, S.A.
- SGS Group Spain
- Trigo Group
- WSP Spain-Apia S.A.

Work supervision

- Aimen Centro Tecnológico
- Ardanuy Ingeniería, S.A.
- ▶ Caf Turnkey & Engineering, S.L. ▶ Idom-Engineering, Consulting, Artchitecture
- Indra Sistemas, S.A.
- Ineco-Ingeniería y Economía del Transporte, S.A.
- Inse Rail, S.L.
- ▶ Segula Technologies España, S.A.U.
- ▶ Sener Ingeniería y Sistemas, S.A.
- SGS Group Spain
- ▶ Sice Tecnología y Sistemas
- ▶ Tpf Getinsa Euroestudios, S.L.
- ▶ Typsa Técnica y Proyectos, S.A.
- WSP Spain-Apia S.A.

Product and process certifications

- ▶ Aimen Centro Tecnológico
- Ardanuy Ingeniería, S.A.
- ▶ Belgorail, S.A.
- Cetest, S.L.
- Ditef (Fundación para el fomento de la innovación industrial)
- Dsaf-Dinamicas De Seguridad, S.L.
- FEX, Fastening Excellence Center
- Fundación Gaiker
- ▶ Idom-Engineering, Consulting, Artchitecture
- Ineco-Ingeniería y Economía del Transporte, S.A.
- Sener Ingeniería y Sistemas, S.A.
- SGS Group Spain
- Trigo Group
- WSP Spain-Apia S.A.

Drafting of operation and maintenance (O&M) plans and transport and demand studies

- ▶ Aimen Centro Tecnológico
- Ardanuy Ingeniería, S.A.
- Caf Turnkey & Engineering, S.L.
- ▶ Citef (Fundación para el fomento de la innovación industrial)
- Mieres Rail, S.A.
- Gantrex Spain
- ▶ Idom-Engineering, Consulting, Artchitecture
- Ineco-Ingeniería y Economía del Transporte, S.A.
- ▶ Segula Technologies España, S.A.U.
- SGS Group Spain
- **Tekniker**
- ▶ Tpf Getinsa Euroestudios, S.L.
- ▶ Typsa Técnica y Proyectos, S.A.

Training and simulations tools

- ▶ Aimen Centro Tecnológico
- ▶ FEX, Fastening Excellence Center
- Tekniker
- Segula Technologies España, S.A.U.
- Lander
- WSP Spain-Apia S.A.

INFRASTRUCTURE AND SUPERSTRUCTURE

Civil works (platforms, stations, depots)

- Aimen Centro Tecnológico
- Caf Turnkey & Engineering, S.L.
- Comsa Corporacion Funor, S.A.
- Inserail, S.L.
- Lantania
- Luznor Desarrollos Electrónicos, S.L.
- Parrós Obras, S.L.
- Sener Ingeniería y Sistemas, S.A.
- Uretek Soluciones Innovadoras, S.L.U.

Electrification

- Alstom Transporte, S.A.
- Azvi S.A.
- Caf Turnkey & Engineering, S.L.
- Comsa Corporación
- Cunext
- Ingeteam Power Technology, S.A.
- Inse Rail, S.L.
- La Farga Yourcoppersolutions, S.A.
- Lantania Semi - Sociedad Española de Montajes Industriales, S.A.
- Telice, S.A. Valdepinto, S.L.

Infrastructure and superstructure equipment and components

- Aimen Centro Tecnológico Alstom Transporte, S.A.
- Amurrio Ferrocarril y Equipos, S.A.
- Arcelormittal España, S.A.

Arteche (Electrotécnica Arteche Smart Grid, S.L.)

- Azvi S.A.
- Cables de Comunicaciones Zaragoza, S.L.
- Caf Turnkey & Engineering, S.L.
- Comsa Corporación

) CFIT

- Cunext
- Dsaf-Dinamicas De Seguridad, S.L.
- Mieres Rail, S.A. Flexix, S.A.
- Funor, S.A.
- Hicasa-Hierros y Carbones, S.A.
- lkusi S.L.U.
- Inse Rail, S.L
- Ladicim Lantania
- Precon Prefabricaciones y Contratas, S.A.U.
- Pretensados del Norte, S.L.

- Semi -Sociedad Española de Montajes Industriales, S.A.
- Talleres Alegría, S.A.
- ▶ Talleres Zitrón
- Tecnivial S.A.
- ▶ Telice, S.A.

Track assembly

- Alstom Transporte, S.A.
- Amurrio Ferrocarril y Equipos, S.A.
- Azvi S.A.
- Caf Turnkey & Engineering, S.L.
- Comsa Corporacion
- Gantrex Spain, S.A. Inse Rail, S.L.
- Lantania
- Pretensados del Norte. S.L.
- Talleres Alegría, S.A.
- voestalpine Railway Systems JEZ SL

TRAFFIC CONTROL AND SIGNALLING SYSTEMS, COMMUNICATION,

PASSENGER INFORMATION AND TICKETING

- Traffic control and signalling (safety) Alstom Transporte, S.A.
- Cables de Comunicaciones Zaragoza, S.L.
- Caf Signalling, S.L.
- ▶ Caf Turnkey & Engineering, S.L.) CFIT
- Duagon Iberia, S.L.
- ▶ Endavamientos y Señalización Ferroviaria ENYSE S.A.U.
- ▶ Electrosistemas Bach, S.A. lkusi S.L.U.
- Indra Sistemas, S.A.
- Inse Rail, S.L.
- Luznor Desarrollos Electrónicos, S.L.
- Revenga Ingenieros S.A:
- ▶ Segula Technologies España, S.A.U. Semi - Sociedad Española de Montajes
- Industriales, S.A.
- Sice Tecnología y Sistemas
- ▶ Siemens Rail Automation, S.A.U. Tecnivial S.A.
- Tectronic, S.A.
- Telice, S.A.
- Thales España Grp, S.A.U. voestalpine Railway Systems JEZ S.L.

Protection (security) and infrastructure

- monitoring Alstom Transporte, S.A.
- Azvi S.A.
- Caf Turnkey & Engineering, S.L.
- Comsa Corporación Dsaf-Dinamicas De Seguridad, S.L.
- Inse Rail, S.L. Mainrail S.L.

Indra Sistemas, S.A.

- ▶ Segula Technologies España, S.A.U.
- Semi-Sociedad Española de Montajes Industriales, S.A.

- Siemens Rail Automation, S.A.U.
- Telice, S.A.
- Thales España Grp. S.A.U.
- ▶ Vicomtech

Systems and equipment for collection, ticketing and access control

- Caf Turnkey & Engineering, S.L.
- Calmell, S.A.
- Comsa Corporación
- Gmv Sistemas, S.A.U. Ikusi S.L.U.
- Indra Sistemas, S.A. Inse Rail, S.L.
- Revenga Ingenieros S.A. ▶ Semi- Sociedad Española de Montajes
- Industriales, S.A.

▶ Siemens Rail Automation, S.A.U.

- Sener Ingeniería y Sistemas, S.A. ▶ Sice Tecnología y Sistemas
- Telice, S.A. ▶ Vicomtech

Communications

- Azvi S.A. ▶ Cables de Comunicaciones Zaragoza, S.L.
- ▶ Caf Turnkey & Engineering, S.L. **CEIT**
- Comsa Corporación Duagon Iberia, S.L.. ▶ Enclavamientos y Señalización Ferroviaria
- ENYSE S.A.U.
- Gmv Sistemas, S.A.U. lkusi S.L.U.
- Indra Sistemas, S.A.
- Inse Rail, S.L.
- Revenga Ingenieros S.A:
- ▶ Semi Sociedad Española de Montajes Industriales, S.A. ▶ Sener Ingeniería y Sistemas, S.A.
- ▶ Sice Tecnología y Sistemas ▶ Siemens Rail Automation, S.A.U.
- Tectronic, S.A.U. Telice, S.A.

Thales España Grp, S.A.U.

▶ Vicomtech Passenger information and on-board

- entertainment systems Alstom Transporte, S.A.
- ▶ Caf Turnkey & Engineering, S.L. Duagon Iberia, S.L..
- Gmv Sistemas, S.A.U. Icon Multimedia, S.L.
- Indra Sistemas, S.A. Inserail, S.L. Ikusi S.L.U.
- Revenga Ingenieros S.A.
- ▶ Sice Tecnología y Sistemas, S.A. ▶ Siemens Rail Automation, S.A.U.
- Tecnivial S.A.

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- ▶ Vicomtech

FROLLING STOCK MANUFACTURERS

High Speed trains (over than 250km/H) M.R para tráfico de pasajeros alta velocidad (más de 250km/H)

- Alstom Transporte, S.A.
- Ariño Duglass, S.A.
- ▶ Caf-Construcciones y Auxiliar de Ferrocarriles, S.A.
- Patentes Talgo, S.L.
- ▶ Siemens Rail Automation, S.A.U.
- ▶ 7eleros

Long distance and regional passengers trains (up to 250km/H)

Alstom Transporte, S.A. Ariño Duglass, S.A.

Patentes Talgo, S.L.

- Caf-Construcciones y Auxiliar de Ferrocarriles, S.A.
- ▶ Siemens Rail Automation, S.A.U.
- ▶ Stadler Rail Valencia, S.A.U. Urban and suburban trains Alstom Transporte, S.A.
- Ariño Duglass, S.A. ▶ Caf-Construcciones y Auxiliar de Ferrocarriles, S.A.
- ▶ Siemens Rail Automation, S.A.U. ▶ Stadler Rail Valencia S.A.U.

Freight wagons and Locomotives

Alstom Transporte, S.A. Ariño Duglass, S.A.

Patentes Talgo, S.L.

- ▶ Caf-Construcciones y Auxiliar de Ferrocarriles, S.A.
- Patentes Talgo, S.L. ▶ Siemens Rail Automation, S.A.U. ▶ Stadler Rail Valencia, S.A.U.
- ▶ Talleres Alegría, S.A. Zeleros

Caf-Construcciones y Auxiliar de Ferrocarriles, S.A.

Vehicles for infrastructure maintenance Alstom Transporte, S.A.

▶ Talleres Alegría, S.A.

Patentes Talgo, S.L. ▶ Siemens Rail Automation, S.A.U.

MANUFACTURERS OF VEHICLE **COMPONENTS, AUXILIARY**

Traction and propulsion components

▶ Arteche (Electrotécnica Arteche Smart Grid, S.L.

EQUIPMENT AND SYSTEMS

▶ Aimen Centro Tecnológico Alstom Transporte, S.A.

▶ Caf Power & Automation, S.L.U.

- Flexix, S.A.
- Ingeniería Viesca S.L.
- Ingeteam Power Technology, S.A. Mgn Transformaciones del Caucho, S.A.

PER SECTOR

DIRECTORY

MEMBERS

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offers a complete range of solutions (from high-

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passenger solutions, customized services (main-

tenance, modernization), infrastructure, signa-

lling and digital mobility solutions. The company

recorded sales of €8,2 billion in the 2017/18 fis-

cal year. Alstom is present in over 60 countries

and employs 38,900 people. In Spain Alstom

employs around 2,000 people on 18 sites, in-

cluding a rolling stock manufacturing site and 4

innovation centres where it runs R&D program-

mes for rolling stock and railway signalling, sa-

fety, security, digital mobility and services.

ALSTOM SPAIN

- Siemens Rail Automation, S.A.U.
- Zeleros

Control, auxiliary and diagnostic systems

- Aimen Centro Tecnológico
- Alstom Transporte, S.A.
- ▶ Arteche (Electrotécnica Arteche Smart Grid, S.L.)
- Caf Power & Automation, S.L.U.
- **CEIT**
- Duagon Iberia, S.L..
- ▶ Enclavamientos y Señalización Ferroviaria ENYSE S.A.U.
- Gmv Sistemas, S.A.U.
- Hispacold S.A.
- ▶ Ibérica Tecnología en Sistemas de Seguridad Ferroviarios S.L. (ITSS)
- Indra Sistemas, S.A.
- Ingeniería Viesca S.L.
- Ingeteam Power Technology, S.A.
- ▶ Kimua Group
- NGRT S.L.
- NRF España, S.A.
- ▶ Stadler Rail Valencia, S.A.U.
- Zeleros

Assembly equipment

- Agui S.A.
- Aimen Centro Tecnológico
- Arteche (Electrotécnica Arteche Smart Grid, S.L.)
- Danobat, S. COOP.
- Fundiciones del Estanda, S.A.
- Funor, S.A.

Mechanical components

- Agui S.A.
- Alstom Transporte, S.A.
- Caf-Construcciones y Auxiliar de Ferrocarriles, S.A.
- FEX, Fastening Excellence Center
- Flexix, S.A.
- Funor, S.A.
- Fundiciones del Estanda, S.A.
- Hispacold S.A. Mecanizaciones aeronáuticas, S.A.
- Metalocaucho, S.L.
- Mgn Transformaciones del Caucho, S.A.
- Stadler Rail Valencia. S.A.U.
- Talleres Alegría, S.A.
- Zeleros

Interiors

- Agui S.A.
- Ariño Duglass, S.A.
- Colway Ferroviaria, S.L. (Nexus Management)
- Flexix , S.A.
- FEX, Fastening Excellence Center
- ▶ Flanker Tech Solutions
- ▶ Fundación Gaiker
- Satys Interiors Railway Spain, S.A.

Safety

Agui S.A.

- Alstom Transporte, S.A.
- Arteche (Electrotécnica Arteche Smart Grid, S.L.)
- Dsaf Dinamicas de Seguridad, S.L.
- ▶ Enclavamientos y Señalización Ferroviaria ENYSE S.A.U.
- ▶ FEX, Fastening Excellence Center
- ▶ Fundación Gaiker
- Indra Sistemas, S.A.
- Luznor Desarrollos Electrónicos. S.L.

MAINTENANCE: EQUIPMENT, MAINTENANCE SERVICES AND REFURBISHMENT

Infrastructure and superstructure maintenance

- Aimen Centro Tecnológico
- Alstom Transporte, S.A.
- Amurrio Ferrocarril y Equipos, S.A.
- Azvi S.A
- Caf Turnkey & Engineering, S.L.
- **CEIT**
- Comsa Corporación
- Mainrail S.L.
- Mieres Rail, S.A.
- Gantrex Spain Inserail, S.L.
- Ladicim
- Semi Sociedad Española de Montajes Industriales, S.A.
- Smart Motors
- DUretek Soluciones Innovadoras, S.L.U.

Rolling Stock maintenance

- Aimen Centro Tecnológico
- Alstom Transporte, S.A.
- Arteche (Electrotécnica Arteche Smart Grid, S.L.)
- Azvi S.A.
- Caf Construcciones y Auxiliar de Ferrocarriles, S.A.
- Caf Turnkey & Engineering, S.L.
- Comsa Corporación
- Grupo Trigo
- Hispacold S.A.
- Patentes Talgo, S.L.
- Siemens Rail Automation, S.A.U.
- Stadler Rail Valencia. S.A.U.
- Talleres Alegría, S.A.
- ▶ Talleres Zitrón

Maintenance of traffic control and signalling, communications, passenger

information and ticketing systems

- Aimen Centro Tecnológico
- Alstom Transporte, S.A.
- Arteche (Electrotécnica Arteche Smart Grid, S.L.)
- Azvi S.A.
- Caf Signalling, S.L.
- Caf Turnkey & Engineering, S.L.
- Dsaf-Dinamicas de Seguridad, S.L.
- ▶ Electrosistemas Bach, S.A.

- Gmv Sistemas, S.A.U.
- lbérica Tecnología en Sistemas de Seguridad Ferroviarios S.L. (ITSS)
- Ikusi SLU
- Indra Sistemas, S.A
- Inserail, S.L.
- Luznor Desarrollos Electrónicos, S.L.
- Patentes Talgo, S.L.
- ▶ Semi Sociedad Española de Montajes Industriales, S.A.
- Sice Tecnología y Sistemas, S.A.
- Siemens Rail Automation, S.A.U.
- Smart Motors
- Telice S.A.
- voestalpine Railway Systems JEZ S.L.

Maintenance of traffic control and signalling, communications, passenger information and ticketing systems

- Aimen Centro Tecnológico
- Alstom Transporte, S.A.
- Arteche (Electrotécnica Arteche Smart Grid, S.L.)
- Caf-Construcciones y Auxiliar de Ferrocarriles, S.A.
- Caf Power & Automation, S.L.U.
- Caf Turnkey & Engineering, S.L.
- ▶ Enclavamientos y Señalización Ferroviaria ENYSE S.A.U.
- Gmy Sistemas, S.A.U.
- ▶ Géminis Lathes
- ▶ Grupo Trigo
- ▶ Hispacold S.A.
- Indra Sistemas, S.A. Ingeteam Power Technology, S.A.
- ▶ Kimua Group
- Mgn Transformaciones del Caucho, S.A.
- NGRT S.L.
- NRF España, S.A.
- Patentes Talgo, S.L. ▶ Satys Interiors Railway Spain SA
- Sice Tecnología y Sistemas
- ▶ Smart Motors
- Stadler Rail Valencia. S.A.U.

Maintenance of systems, equipment and vehicles components

- Aimen Centro Tecnológico
- Alstom Transporte, S.A.
- Aguafrisch, S.L.
- Danobat, S. COOP.
- ▶ Electrosistemas Bach, S.A. ▶ Kimua Group
- Ingeniería Viesca S.L.
- Newtek Solidos S.L.
- Patentes Talgo, S.L. Tecnivial S.A.



AGUI S.A.

AGUI is a B2B subcontractor and manufacturer of complex integrated assemblies for OEMs. In recent years we have evolved from being a reactive subcontracting firm, adaptable to clients' needs, to become a subcontracting services partner, anticipating to market needs; innovation and continuous adaptation.

AGUI currently provides services in more than 10 different sectors including lifts and railway, exporting production to more than 25 countries.

Within the Railway sector, AGUI is certified in ISO-3438 and EN-15085, which positions us as a reference supplier for complex welded assemblies.

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EOUIPOS, S.A.



AIMEN TECHNOLOGY CENTRE

We are an innovation & technology Centre specialized in materials and in advanced manufacturing technologies, especially joining technologies and laser technologies applied to materials processing and robotics. We develop R&D&I in collaboration with companies in the field of the technologies for industry 4.0, and we offer technological services to industry in the field of welding and corrosion engineering, manufacturing engineering, design and simulation and mechatronics; developing customized and integral technological solutions which respond to the needs of our dients and associated companies. Our accredited laboratories provide analysis and testing services, especially failure analysis and in-service behavior of industrial components.

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Martinez Villergas, 49 - Edificio V -

- www.alstom.com



AQUAFRISCH, S.L.

More than 20 years of experience in the railway sector guarantee Aguafrisch as a manufacturer of train washing tunnels, bogies, WC extraction systems and other equipment for the maintenance of rolling stock in railway workshops. Our equipment is installed in more than 30 countries on 5 continents. Aquafrisch is also a reference in industrial water treatment, potabilization and purification. In Aquafrisch we take care of the design, manufacture, installation, commissio-

Ignacio Zuloaga, 10 28522 Rivas Vaciamadrid (MADRID)

ning, training and maintenance of the machines

according to the customer's needs. Aquafrisch is

certified in ISO9001:2015, ISO14001:2015 and

OHSAS2007.

- www.aquafrisch.com

**** +34 91 380 03 33



ArcelorMittal, as the steel industry leader in product and process innovation, is fully geared to meet the future requirements of the rail industry. With rail production facilities in Spain, Poland, Luxembourg and USA offers a wide portfolio of rails for subways, trains, trams, light rails, crane rails, crossings and rail accessories. We area specialist in rail for high-speed net, with over 1 million tons produced, and presence in infrastructure of over 30 countries, the high technologic quality allows participating in the more demanding tenders all over the world. ArcelorMittal has its own R&D Rail Excellence Centre for developing new products and processes

ArcelorMittal Asturias. Edif. de Energías, 2 pl. 33691 Gijón (ASTURIAS) **** +34 985 187 750

- □ rails.specialsections@arcelormittal.com https://rails.arcelormittal.com/

Ardanuy

ARDANUY INGENIERÍA, S.A.

Ardanuy Ingeniería, S.A. es una empresa consultora de ingeniería especializada en estudios, proyectos, direcciones de obras, ingeniería de seguridad (ISA), estudios de operación/mantenimiento; y asesoramiento técnico para ferrocarriles (alta velocidad, convencional, mercancías), transporte urbano (metro, tranvías, BRT, teleféricos), ingeniería eléctrica (subestaciones y líneas de alta tensión), carreteras (autovías, autopistas, calles, etc.), edificación (arquitectura e instalaciones) y telecomunicaciones. Constituida en 1992, está formada por un equipo permanente de más de 200 profesionales. Desarrolla su actividad en todo el mundo: más de 60 países en los 5 continentes.

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- madrid@ardanuy.com
- www.ardanuy.com



ARIÑO DUGLASS, S.A.

50 años de experiencia en el sector nos avalan como empresa especializada en vidrio para Arquitectura y Ferrocarril. Una dilatada presencia en el mercado español, europeo y mundial nos ha permitido obtener el conocimiento y el saber hacer para ofrecer los productos tecnológicamente más avanzados y de mayor calidad. En nuestro ADN está la continua investigación y el desarrollo tecnológico, que permiten incorporar día a día los últimos métodos de fabricación que nos llevan a la excelencia empresarial y a la mejora continua. Junto con diferentes entidades e instituciones, colaboramos, cooperamos y dirigimos proyectos de investigación.

- Polígono Industrial Royales Bajos, S/N, La Puebla de Alfindén 50171, Zaragoza
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- **+34 976 455 085**
- www.duglass.com



ARTECHE

La actividad del Grupo Arteche se centra en ofrecer soluciones y equipamientos para el sector ferroviario y eléctrico a nivel mundial. Los más de 70 años de experiencia en fabricación de transformadores de medida y relés electromecánicos aportan al cliente la confianza de un líder tecnológico. Con presencia en más de 40 países, nuestra gama de relés dedicada de ferrocarriles está diseñada para cumplir los más altos estándares de exigencia de este sector y su fiabilidad y durabilidad permiten su utilización no sólo como relés de propósito general, sino también en todo tipo de funciones de seguridad hasta SIL-4, tanto en aplicaciones embarcadas como de señalización.

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- www.arteche.com

+34 946 155 628

C4F

CAF - CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES, S.A.

CAF es uno de los líderes internacionales en el diseño e implantación de sistemas integrales de transporte. CAF ofrece una gestión integral del proyecto y de la ingeniería en todas las fases del proyecto que incluyen análisis y estudios de viabilidad, diseño del sistema, obra civil, señalización, electrificación y otros sistemas electromecánicos, suministro del material rodante y operación y mantenimiento

En cuanto a material rodante, CAF fabrica y mantiene trenes de alta velocidad, trenes regionales y de cercanías, locomotoras, unidades de metro, tranvías y autobuses.

- J.M. Iturrioz, 26 20200 Beasain (GUIPÚZCOA)
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- +34 943 881 420
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- www.caf.net

Power & Automation

CAF POWER & AUTOMATION

CAF Power & Automation diseña y desarrolla sistemas de tracción eléctrica, de Almacenamiento de energía y de control y comunicación, que garantizan soluciones adaptables, fiables y comprometidas con el transporte. Nuestros sistemas son modulares y flexibles y pueden integrarse tanto en vehículos nuevos como en servicio o en proceso de rehabilitación. PRO-DUCTOS: Sistemas de tracción; de almacenamiento de energía (GREENTECH) y de control y comunicación (COSMOS). SERVICIOS: Modernización de los sistemas ferroviarios: Equipos y componentes, integración de sistemas, instalación, mantenimiento y garantía y mantenimiento de los sistemas ferroviarios.

- Mikeletegi, 58 2, Parque Tecnológico de San Sebastián (GUIPÚZCOA)
- +34 943 309 251
- info@cafpower.com
- www.cafpower.com

Signalling

CAF SIGNALLING, S.L

CAF Signalling, filial tecnológica del Grupo CAF, diseña y proporciona soluciones integrales de señalización y control ferroviario tanto en España como a nivel internacional. La compañía dispone de productos avanzados de tecnología propia, tanto en el ámbito embarcado como en el de infraestructuras que constituyen el núcleo de sus soluciones integrales. Gracias a un importante y creciente esfuerzo en I+D+i, en particular en el ámbito de los sistemas de seguridad críticos, CAF Signalling impulsa una continua innovación y orientación hacia los clientes. CAF Signalling cuenta con capacidad y tecnología para acometer proyectos "llave en mano" de señalización ferroviaria.

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- www.cafsignalling.com

Azvi /\'/

AZVI

Azvi es la empresa que desarrolla la actividad de construcción dentro del Grupo Azvi. A lo largo de sus más de 100 años de historia, Azvi ha ejecutado todo tipo de grandes proyectos de infraestructuras civiles y edificación. Azvi, sin perder sus orígenes y especialización en ferrocarril, ha extendido su actividad a todas las áreas de construcción en Europa, América y Oriente Medio, aplicando principios de responsabilidad en todos los ámbitos de la vida empresarial. buscando la creación de valor, manteniendo un firme compromiso con sus grupos de interés e invirtiendo en I+D+i para seguir construyendo una compañía capaz de afrontar los desafíos de un mercado cada vez más globalizado.

- Almendralejo, 5. 41019 (SEVILLA) / Maudes, 51, 2°. 28003 (MADRID)
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- www.azvi.es



BELGORAIL S.A.

Belgorail SA es una entidad de certificación, inspección y evaluación de seguridad del sector del transporte guiado, tanto ferrocarril convencional como metros y tranvías.

Somos un organismo acreditado para la certificación de la interoperabilidad (NoBo), la normativa nacional (DeBo), las evaluaciones de seguridad bajo normativa CENELEC (ISA) y bajo la Reglamentación CE (AsBo).

Formamos parte del Grupo Certifer, con presencia, además de en España, en Bélgica, Francia, Países Bajos, Alemania, Austria, Italia, Suecía, Turquía, Argelia, Brasil, Australia, Vietnam, Emiratos Árabes Unidos y China.

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- www.belgorail.es



CABLES DE COMUNICACIONES ZARAGOZA, S.L.

Es una de las principales compañías europeas dedicadas al diseño, fabricación y comercialización de cables de telecomunicaciones, señalización y fibra óptica. Desde su fundación en 1971, está contribuyendo al desarrollo y extensión de las infraestructuras de telecomunicaciones. Compañías operadoras de ferrocarril de los principales países europeos nos confían la fabricación de sus cables. Entre ellos, cabe destacar: Adif, SNCF, NetworkRail, Infrabel etc. Cablescom desarrolla toda su actividad en Zaragoza, en el Polígono Industrial de Malpica, sobre una superficie de 77.000 m², que albergan la planta de producción, oficinas y almacenes.

- Polígono de Malpica, C/D, 83 50016 (ZARAGOZA)
- **+34 976 729 900**

- www.cablescom.com

Turnkey & Engineering

CAF TURNEY & ENGINEERING

CAF Turnkey & Engineering nace en 2007 y tiene su sede central en el Parque Tecnológico y Científico de Bizkaia (Zamudio). Inició su actividad como Ingeniería Integral de Sistemas de Transporte y en 2015 tras la integración de la sociedad CMFS (México) ha ampliado su cartera de servicios hacia el desarrollo de proyectos EPC tanto de obra civil como de subsistemas.

Con un crecimiento sólido v constante, actualmente cuenta con 200 empleados y oficinas en Zamudio, Madrid y México, dando servicio tanto a empresas del Grupo CAF como a clientes públicos y privados nacionales e internacionales.

- Parque Científico y Tecnológico de Bizkaia, Laida Bidea, Ed. 205, 48170 Zamudio (VIZCAYA)
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- www.cafte.com

Carmett 🔊 Group

CALMELL, S.A.

Calmell Group es líder en control de accesos e identificación, a través de las empresas del grupo, Calmell S.A., Affix S.L, e Idoneum S.A., dedicadas respectivamente a la fabricación de los soportes (billetes, tarjetas,...), desarrollo de software y hardware específico, personalización y seguridad.

En el sector del transporte público trabaja para integradores y/o operadores suministrando cualquier tipo de soporte para los sistemas de ticketing y lectores/grabadores para los equipos. Con una fuerte presencia internacional a través red de representantes y distribuidores, Calmell Group puede satisfacer sus necesidades en todo el mundo.

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ceir

CEIT

Somos un Centro Tecnológico vasco fundado por la Universidad de Navarra cuyo principal objetivo es desarrollar proyectos de I+D+i aplicada con empresas para mejorar su competitividad. Formamos parte del BRTA (Basque Research & Technology Alliance), que engloba a 16 agentes pertenecientes a la Red Vasca de Ciencia, Tecnología e Innovación (RVCTI). También participamos en la alianza Shift2Rail como miembros asociados. Enfocamos nuestra actividad de I+D+i en el sector ferroviario en las siguientes líneas: eficiencia energética, mantenimiento, dinámica ferroviaria, diseño y caracterización de componentes, sistemas embebidos (SIL4), posicionamiento, inteligencia de datos.

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CETEST, S.L. Centro de Ensayos y Análisis

Fully accredited ISO17025, CETEST is an experienced laboratory in railway vehicles and components testing. Its offering covers a wide variety of component test benches at their facilities as well as portable ones. CETEST provides a global on-track measurement deployment capacity. From validation and verification test in the development phase to product homologation and failure detection / root cause analysis in the after-sales operation, CETEST can assist you during the full lifecycle of your product. Their customers include passenger, freight and special track maintenance vehicle manufacturers, component suppliers, as well as Notified Bodies, engineering firms and authorities.

- Lazkaibar, s/n Edif. CETEST 20200 Beasain (GUIPÚZCOA)
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- www.cetestgroup.com



CITEF

CITEF (Railway Technology Research Centre) was created in 1997 as part of F2I2 (the Foundation for the Development of Industrial Innovation) for research, innovation, experimentation, study and teaching purposes within the railway knowledge area.

It is a non-profit organisation pursuing aims of general interest within any rail transport technology sector.

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- www.citef.es



COLWAY FERROVIARIA, S.L.

COLWAY FERROVIARIA S.L., a company belonging to the COLWAY Group, is specialized in the design, engineering, manufacture, installation and commissioning of turnkey railway interiors and toilet modules projects. Revamping of seats and floors for a significant improvement of the coaches, with a controlled investment, is included among its capabilities. Through the integrated management of modular supplies & systems, based on experience, research and innovation, satisfaction and expectations of railway constructors and Public Administrations are achieved. Its work is based on the application of strong values: commitment, professionalism, ethics and agility.

- Botánica, 149-151, 08908, Hospitalet de LLobregat (BARCELONA)
- +34 93 414 65 12
- +34 93 639 86 10
- jlperalta@colway-08.com http://colway-08.com/site/es



DINÁMICAS DE SEGURIDAD, S.L.

DSAF is a entrepreneurial society focused on the safety of the movement of people at risk. Committed to the new technologies applied to the design of signaling systems, prevention and emergency in safety, DSAF promotes the development of products that guarantee the highest grade of security according to the standards of type approval current in generalized risk societies such as global ones.

The activity of DSAF focuses on these two major sectors: road / rail tunnels and wind towers.

San Blas,13 Pol. Ind. Goiain 01170 Legutiano (ÁLAVA)

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- www.dsaf.es

duagon

DUAGO

Duagon Iberia, a subsidiary of the Swiss group Duagon. We have been providing railway signalling engineering services for railway signalling companies such as railway signalling equipment and solutions for 12 years. We are 160 engineers with consolidated experience in the following areas: design and programming of electronic interlockings and track systems, control centers, systems engineering (CBTC, ERTMS) with an important software component, test & commssioning and commissioning on track and on-board equipment engineering. From Spain we collaborate in the R&D of duagon's products especially network & control, embeded software and computing on-board.

- San AVA)
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- **+349**
- ins wws



ENCLAVAMIENTOS Y SEÑALIZACIÓN FERROVIARIA ENYSE S.A.U.

Enyse is a Signalling company belonging to the Industrial Services division of the ACS group.

For Enyse, the success of their projects is based on a high level of adaptation to functional and operational needs of the various railways - flexibility is the key word. In an industry increasingly integrating technology standards, the required Reliability, Availability, Maintainability and Safety standards not only apply to system design level, but are the actual premises to properly implementing and commissioning turn-key Signalling projects.

Valportillo Segunda, 8 bis; 28108 Alcobendas (MADRID)

FLANKER

FLANKER TECH SOLUTIONS

Flanker produces components in the field of wood

and its derivatives (tablex, HPL, OSB, plywood),

as well as in fibreglass, plastic or composites. We

integrate CNC technology, stamping, assembly

and painting, for roof, floor, boot, carpeting or side

We are present in the Railway, Automotive, Packa-

cladding applications, among others.

ging and Laboratory Furniture sectors.

- **434 91 490 13 83**
- **+34 916 619 296**
- www.enyse.com



COMSA

COMSA is the company of COMSA Corporación specialised in railway infrastructures. Founded in 1891, the company provides a comprehensive service in the field of construction, maintenance, electrification and control and communication systems for high-speed and conventional lines, metros and tramways. In this business activity, it is leader in Spain, where has been involved in the carrying out of all high-speed lines, and has permanent operations in Argentina, Brazil, Croatia, Denmark, Mexico, Poland, Portugal and Uruguay. It has also taken part in a large number of projects in other markets such as Italy, the Philip-

- Julián Camarillo, 6A 2ª planta 28037 (MADRID)
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pines, Taiwan, Malaysia, India, etc.

www.comsa.com



CUNEXT COPPER INDUSTRIES

Cunext in the way to continuous development has created the entire cable product range for overhead line electrification adapting at any speed from local transport to high speed line. Our modern technology together with a wide experience at cable and alloy manufacturing makes us the best partner for railway companies offering best product quality and service. Cunext Group locate production plants at strategic places such us Cordoba for copper products, Vitoria and Brescia for aluminium products.

- Av. de la Fábrica, s/n 14005 (CÓRDOBA)
- **434 957 499 300**
- iosep_anfruns@cunext.com

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- www.cunext.com



DANOBAT S.COOP.

Specialised Machine Tools and production systems for railway industry offering technologically advanced solutions and services, including among others engineering, consultancy, which are fully adapted to clients' needs.

DANOBAT focuses its activity in the supply of turnkey solutions for the manufacturing and maintenance of railways rolling stock, incorporating own leading technology products, together with those manufactured by specialised companies.

- Arriaga Kalea, 21 20870 Elgoibar (GUIPÚZCOA)
- **L** +34 943 748 044
- +34 943 743 138
- www.railways.danobatgroup.com



ELECTROSISTEMAS BACH. S.A.

Electrans, established in Barcelona in 1977, has had a successful career path that turn it in an international relevant supplier in signalling, particularly in the field of level crossing protection solutions, railway and tramway signalling, detection systems and LED lighting, obtaining its products and solutions worldwide recognition.

Electrans' constant progress is motivated by the commitment to innovation, at the service of the adaptability of systems and products for the current needs of railway projects.

- Calle de la Mar Mediterrània, 9 Pol. Ind. La Torre del Rector 08130 Santa Perpètua de Mogoda (BARCELONA)

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www.electrans.es



FEX, FASTENING EXCELLENCE CENTER

The creation of the Fastening Excellence Center association responds to the concern of several companies to promote the transformation and competitiveness of the bolted joint sector, going from being companies more focused on the day-to-day and manufacturing process, to companies that also direct their attention to the finished product and the market. Currently, we have 17 companies in the association, which intends to develop two lines of activity, one focused on internal activities for members, and the other open to the market offering services on demand. Many of the partner companies work the railway market and we have a table to deal with this sector specifically.

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- +34 688 628 080; +34 664 161 833
- jbayerbe@fex.eus; jurzelai@fex.eusw. fasteningexcellencecenter.com
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- croma@flankertech.com
- www.flankertech.com

FX FLEXIX

FLEXIX, S.A.

FLEXIX, develops, manufactures worldwide since 1950 INJECTION and EXTRUSION RUBBER PARTS, rubber-metal, rubber-plastic, special elastomers and assemblies. We are part of the KÄCHELE-FLEXIX Group, with 2 plants in Germany, 1 in Spain and a warehouse in USA. For the RAILWAY SECTOR we produce mainly for infrastructures, absorption of vibrations under track, tie pads for sleepers, different range of stiffness (14-152 kN/mm). We provide development in geometries (FEM), materials, (conductivity, non-harmful gases...)

TYPE OF PARTS: Pads, Ducts, bellows, tubes, silent-blocks, joints, bumpers, axles, links, valves, bearings. MIXTURES: NR, SBR, EPDM, CR, H/NBR, ECO, AEM, ACM, Silicone, FPM.

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- **** +34 944 977 180
- **+34 944 977 190**
- flexix@flexix.com
- www.flexix.com



FORGING STEEL PRODUCTS, S.L.

Manufacturing of machined and if needed painted forged components ready for assembly destined to the railway rolling stock manufacturers for chassis, brakes, clutches, hooks etc.

- Barrio Arregui s/n 48340 Amorebieta-Etxano (VIZCAYA)
- **** +34 946 300 211
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 ightherefore

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- www.forgingsteelproducts.com

ESTANDA

FUNDICIONES DEL ESTANDA, S.A.

Since 1957 Estanda has been providing various sectors with steel castings. The half of all its activity is focused on the high-speed train brake discs manufacturing, being one of the first worldwide manufacturers, the other half is focused on a wide range of sectors such as the cement and mining industry, defence, off-shore, automotive industry, and bogie components for the railway equipment. Mostly low alloy steels , wear resistant steels, refractory steels, stainless steels and white irons are casted. With its 14.000 tonnes per year production capacity, Estanda manufactures from 10 to 2000 kgr. parts in all kinds of batch sizes, with 2.400 mm as its maximum part dimension.

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- **L** +34 943 880 500
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- www.estanda.com



GANTREX SPAIN, S.A.

Gantrex is the global market leader in production, distribution installation and maintenance of high quality crane rail solutions.

Gantrex products are used in may different applications and end-markets including ports, shipyards, steel mills aluminion smelters railway depots and heavy industries..

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- +34 944 535 084
- info.bilbao@gantrex.com
- www.gantrex.com

GEMINIS

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Leaders in the development of horizontal and multiprocess lathes, and specialized in railway sector, where we are proud to support the manufacturers of trains and maintenance lines, among other agents in the value chain. We offer customized solutions with highly reliable machines for the maintenance of rolling stock. Our lathes are specialized in the machining of axles, axle-wheel set and wheels.

- Lerun, 1 20870 Elgoibar -(GUIPÚZCOA)
- **434 943 748 060**
- **+34 943 744 182**
- geminislathes.com



GLOBAL QUALITY ENGINEERING SER. UNA COMPAÑÍA DE TRIGO GROUP

TRIGO Spain is a supplier of quality services and support in the supply chain in industrial sectors. Founded in 2001, it offers quality assurance services in products, maintenance, industrial means management and metrology with more than 600 quality professionals in Spain. TRIGO GROUP is present in 25 countries with a team of more than 10,000 professionals.

TRIGO Spain exports to the railway sector good practices of high added value developed in sectors such as aerospace and automotive.

- Papiro, 8-9 Parq. Ind. La Negrilla 41016 (SEVILLA)
- + 34 954 526 195
- antonio.peco@trigo-group.com
- www.trigo-group.com



FUNORSA

Funorsa is a Steel casting foundry with more than 20 years in the railway sector. We are specialized in pieces of high responsibility as couplers, Pivots, connection rods and different parts of the bogies. We are able to cast low alloy, alloy and inox castings up to 1.300 kg with a capacity of 2.000 Tons per year.

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 Villalonquejar, 09001 (BURGOS)
 +34 650 665 302
- ...
- www.funorsa.es

Gaiker

MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

GAIKER CENTRO TECNOLÓGICOS

GAIKER Technology Centre, located in the Technological Park of Bizkaia, is devoted to the development of new technologies to be transferred to the industry. Since 1985, the Centre has carried more than 2,000 R&D Projects in the areas of Plastics and Composites, Environment and Recycling and Biotechnology. Besides, GAIKER offers to its customers Advanced Technological Services, Analysis and Tests and Technological Dissemination Services. GAIKER counts on 87 employees and was awarded in 2008 by the European Foundation for Quality Management (EFQM) with the "Prize Winner" for the best European organisation in "Management for Process and Facts".

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GMV SISTEMAS S.A.U.

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- jagg@gmv.com
- www.gmv.com



HIERROS Y CARBONES, S.A.

Since 1997 Hicasa is specialised in transformation, tailored cut, storage and distribution of railway tracks materials, all kinds of rails and railways accessories with a permanent stock of more than 3.500 MT.

In 2006 we have incorporated to our Group of companies a factory specialised in manufacturing light rails from 7 kg/m to 48 kg/m, manufacture according European and American Standard, Australian or South African together with other types of Standard (AREMA).

Our own experience allows us the optimal management of the supply chain, exporting to more than 30 countries all over the world.

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- www.hicasa.com



ICON MULTIMEDIA, S.L.

With over 25 years of experience, we have a extensive experience in the Digital Signage

Our DENEVA Digital Signage platform is specially designed for high availability environments such as Smart Cities or as a powerful and comprehensive marketing tool for 'Smart Stations', guaranteeing a reliable and safe travelers and users experience.

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- **434 979 702 906**
- **+34 979 702 021**
- www.iconmm.com

MEMBERS DIRECTORY MEMBERS DIRECTORY



INGENIERÍA Y CONTROL FERROVIARIO, SAU

ICF offers technical and sustainable solutions for railway signalling. In this area, our vocation is betting heavily on the development and innovation, constantly releasing new products that can be used to improve and optimize existing technology solutions. All the level crossings since June 2001 have been protected by ICF with its level crossing protection system SPN-900. We are working worldwide with more than 1000 international references. For us it's very important to be sustainable so we have worked hard to design systems that reduces dramatically its power consumption which allows it to work taking its energy only from sun, getting a zero CO2 emissions and zero external power supply.

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- **L** +34 91 490 15 19
- +34 91 661 58 31
- www.icf.com.es

IDOM

IDOM CONSULTING, ENGINEERING AND ARCHITECTURE S.A.U

IDOM is one of the leading companies in the field of professional services in Engineering, Architecture and Consultancy. An independent company established in 1957 and it has participated in over 30.000 projects in five continents. In 25 countries with 42 offices. More than 3.500 staff posseses the expertise and experience to cover all the phases of a railway project(high speed, conventional, freight, metro, light rail, tramway, depot and workshops). From conception to commissioning and beyond and facing the challenges of an innovative, efficient and resilience Transport System.IDOM accompany the client by providing the correct technical assistance required for the decission making process.

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- **+34 944 761 804**
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IKUSI

IKUSI, S.L.

Soluciones integrales a bordo y en tierra. En Ikusi desarrollamos soluciones integrales de movilidad inteligente que hacen posible la gestión y operación centralizada del material rodante desde tierra, al mismo tiempo que se aporta seguridad y confort a los pasajeros. Todo ello permite que planificadores, operadores y autoridades de transporte puedan visualizar la información de forma ordenada y sencilla y tomar las mejores decisiones para reducir los costes operativos en los servicios,

coordinar de forma óptima los recursos y an-

ticiparse a los problemas y tendencias futuras.

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- **** +34 943 448 800
- +34 943 448 816
- www.ikusi.com

Ingeteam

INGETEAM POWER TECHNOLOGY, S.A.

Ingeteam es un grupo especializado en electrónica de potencia y de control, (inversores, convertidores de frecuencia, controladores y protecciones).

Operamos en todo el mundo, empleando a 3.900 personas. Nuestra actividad está estructurada sobre la base del I+D.

En el sector ferroviario, los convertidores de tracción INGETRAC se basan en la integracion de módulos de potencia (BPM) ampliamente probados, e incluyen todos los elementos necesarios para cada aplicación.

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- **** +34 944 039 600
- +34 944 039 837
- ▼ traction@ingeteam.com
- www.ingeteam.com

inse rail

INSE RAIL S.L.

Inse Rail es una ingeniería altamente especializada en el sector ferroviario y en particular en sus instalaciones y sistemas.

Fundada en 1994, está plenamente dedicada a la ingeniería, consultoría y project management en los sectores ferroviario, industrial, de energía y edificación, desarrollando su actividad en las diferentes etapas de planificación, diseño, construcción y explotación de las inversiones. Inse Rail participa en el desarrollo internacional de Alta Velocidad ferroviaria y trasportes metropolitanos, con una profunda especialización en los sistemas de electrificación, señalización y seguridad, comunicaciones y demás instalaciones del transporte ferroviario.

- Avda. de Burgos, 12 7º DCHA. 28036 Madrid (MADRID)
- +34 91 302 95 40

- www.inserail.es

hispacold

INTERNACIONAL HISPACOLD, S. A.

Hispacold, una empresa con más de 40 años de experiencia, líder a nivel mundial en sistemas de climatización y especializada en el confort de las personas.

Hispacold diseña y fabrica soluciones HVAC para todo tipo de vehículos ferroviarios: tranvías, metros, EMUs, DMUs, LRV (trenes ligeros)... con soluciones tecnológicas probadas y fiables.

Hispacold cuenta con los más reconocidos certificados internacionales de calidad, medio ambiente y seguridad: ISO 9001, ISO 14001, OSHAS 18001, EN 15805-2 y el prestigioso certificado IRIS ISO / TS 22163.

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- www.hispacold.es

ındra

INDRA

Indra es una de las principales compañías globales de tecnología y consultoría y el socio tecnológico para las operaciones clave de los negocios de sus clientes en todo el mundo. Es un proveedor líder mundial de soluciones propias en segmentos específicos de los mercados de Transporte y Defensa, y una empresa líder en consultoría de transformación digital y Tecnologías de la Información en España y Latinoamérica a través de su filial Minsait. Su modelo de negocio está basado en una oferta integral de productos propios, con un enfoque end-to-end, de alto valor y con un elevado componente de innovación. En el ejercicio 2018, Indra tuvo unos ingresos de 3.104 millones de euros, 43.000 empleados, presencia local en 46 países y operaciones comerciales en más de 140 países.

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- www.indracompany.com

lineco

INECO

Ingeniería y consultoría global referente en transporte que contribuye, desde hace más de 50 años, al desarrollo de infraestructuras de transporte en más de 50 países.

Su alto grado de especialización técnica le ha permitido diversificar su actividad hacia nuevos mercados y afianzar aquellos en los que está presente.

Su participación en toda la red ferroviaria española le ha servido para desarrollar importantes proyectos internacionales como la Alta Velocidad Meca-Medina, en Arabia Saudí, el proyecto HS2, en Reino Unido o el despliegue de ERTMS en Europa.

- Paseo de la Habana, 138 28036 (MADRID)
- **434 91 452 12 00**

- www.ineco.com

Viesca s.L.

INGENIERÍA VIESCA S.L.

En Ingeniería Viesca somos especialistas en diseño y fabricación de equipos electrónicos de potencia. Nuestros equipos operan satisfactoriamente en todos los continentes con alta fiabilidad y disponibilidad haciendo un uso eficiente de la energía disponible.

Adaptamos nuestros productos a las necesidades y requisitos de cliente aplicando los estándares de calidad y normativas específicas que correspondan. Disponemos de medios de pruebas que permitan efectuar los protocolos que garanticen la funcionalidad esperada. Nuestra innovación está presente en nuestras soluciones: convertidores auxiliares de potencia, cargadores de baterías, arrancadores, ...

- Rumanía 5, Nave B2 P.E. Inbisa Alcalá I. 28802 Alcalá de Henares (MADRID)
- **\ +34 91 883 08 65**
- **+34 91 882 07 17**
- www.ingenieriaviesca.com

ITSS

IBÉRICA TECNOLOGIA EN SISTEMAS DE SEGURIDAD FERROVIARIOS SL (ITSS)

IBERICA TECNOLOGIA EN SISTEMAS DE SE-GURIDAD FERROVIARIOS SL (ITSS), fundada en 2005, es una empresa con sedes en Sagunto (Valencia) y en Madrid. Se centra principalmente en detectores de cajas calientes / frenos agarrotados y detectores de impacto vertical. Los sistemas de ITSS utilizan tecnología de infrarrojos y fibra óptica de última generación. El sistema PEGASUS DCC/DFA monitorea las temperaturas de las caias de grasa y de los frenos de los vagones. El sistema AGUILA DIV utiliza sensores de fibra óptica para detectar ruedas descentradas y planos, y puede informar el peso del tren. Los productos ITSS son un modelo de combinación perfecta de experiencia e innovación.

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- mail@itss.tech
- www.itss.tech

KIMUA

KIMUA ENGINEERING, S.L.

Kimua designs and produces different types of auxiliary tools for lifting, transporting, assembling and doing maintenance of rolling stock and its components during any stage of the Railway value chain. Additionally, Kimua has added 2 new business units to its portfolio; one for providing renting services of standard solutions and a second one for providing its clients with specific training courses in areas like handling and lashing of big and large

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- www.kimuagroup.com



LA FARGA YOUR-**COPPERSOLUTIONS, S.A.**

La Farga is able to produce all the range of railway products in an integrated process. Our railway range includes all alloys used, the different measures of grooved contact wire and all supporting and electricity supply elements, feeders, hangers and cables. Furthermore, we offer technical visits and assessment to our clients and we constantly develop new railway products with the aim of introducing the best copper solutions into the market.

La Farga is a family-run metallurgical company, with more than 210 years of history. We produce semifinished copper products and their alloys for several technological sectors.

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- www.lafarga.es

MEMBERS DIRECTORY **MEMBERS DIRECTORY**



LADICIM - UNIVERSIDAD DE CANTABRIA

LADICIM participates in R&D projects focused on the innovation of the railway superstructure, carrying out studies on the development of its elements, acc to national (Adif), European (EN) and American (AREMA) reference standards. The results are reflected in more than 500 reports, 25 research papers with a high impact index and 7 Doctoral Theses. The projects include collaborations in countries such as the USA, Canada, Saudi Arabia, Turkey, Germany, Senegal, Tanzania, Morocco or Ethiopia. LADICIM has implemented a quality system according to the UNE-EN ISO/ IEC 17025 standard, being accredited by ENAC (Spanish Accreditation Board) for the testing of fastenings, sleepers and rail welds.

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- **™** jose.casado@unican.es
- https://ladicim.es/

LANDER

LANDER SIMULATION & TRAINING SOLUTIONS

Lander Simulation & Training Solutions, S.A. specialises in designing, developing and implementing cutting-edge commercial simulation devices for training purposes.

On the basic premise of preventing accidents and loss of human life, Lander works with each customer to build training simulators which meet the specific needs of each operation.

Lander was incorporated in 2002, and now operates in more than 20 countries across all 5 continents. Its solutions cover the entire range of railway operations - suburban trains, long-distance units, high-speed trains, freight, monorail systems, metros or light rail..

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- +34 943 217 491
- lander@landersimulation.com
- www.landersimulation.com

lantania,

LANTANIA

Lantania specializes in the construction of heavy civil works (roads, highways, dams, water treatment plants, maritime works, railways and airports), building construction and energy projects. The company began its activity in 2018 with the acquisition of the construction, energy and services business units of the Isolux Corsán Group and the subsequent purchase of the Velasco Group in 2019. One of the differential characteristics of Lantania is its ability to execute any kind of rail project in an integral way. The company has built more than 150 km of infrastructure, tunnels and railway viaducts, as well as more than 50 traction power substations and more than 1,500 km of overhead line..

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- ioaquin.navarro@lantania.com
- www.lantania.com

MTC

METALOCAUCHO, S.L. (MTC)

MTC, being part of Wabtec Corporation, designs and manufacture rubber-metal components for suspension and vibration control systems used on railway, automotive and industrial applications. With headquarters in Spain, MTC has 4 production facilities in 1) Spain, 2) China, 3) India and 4) USA, which offers to customers the possibility to localize production in any of these countries. Thanks to a wide commercial presence in any country of the world, MTC gives local support to develop projects for both OE and Aftermarket

Our main products are related to Primary Suspensions, Secondary Air Springs, Bushings, Buffers, Layer Springs, Subassemblies, Elastic Wheels, etc.

- Poligono Erratzu 253, 20130 Urnieta (GUIPÚZCOA)
- +34 943 333 755
- +34 943 333 751
- minfo@mtc.com
- www.wabtec.com/business-units/ metalocaucho-mtc

$M(\cdot)$

MGN TRANSFORMACIONES DEL CAUCHO, S.A.

MGN was established in 1957 and since then it has been developing its activity both designing and manufacturing rubber-metal components, mainly for the railway industry. MGN invests in research and innovation as a basis for the development of elements to be adapted in the new understanding of passenger and freight trains, taking the latest technological advances of the rubber world, vibration control and damping systems. - Primary and secondary suspensions. - Conical springs - Bushes and spherical bearings - Rods, Bogie subsystems - Pivot Bushes - Elastic Supports - Compression buffer and Draw Gear springs - Bellows, Gangway protections - Profiles, o-rings and seals.

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- www.mgncaucho.com

MieresRail

MIERES RAIL S.A.

Design, manufacturing and supply of turnout suystems, and their components, for Metro, classic or conventional lines, industrial and heavy haul or High Speed up to 350 km/h.

Design, manufacturing and supply of casted manganese steel crossings. Trimetallic flash butt wel-

Insulated glued joints, transition rails, fastening systems, locking systems, wear measuring devices.

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- www.mieresrail.com



LUZNOR DESARROLLOS ELECTRONICOS, S.L.

LUZNOR is a company specialized in the design and manufacture of professional torches, emergency lighting and other electronic security devices. LUZNOR puts at your disposal highly qualified technicians, a high quality standard, efficient development, manufacturing and control systems and, above all, a philosophy of commitment to clients that allows LUZNOR to offer innovative products with advanced technology and recognised prestige.

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MAINRAIL S.L.

MainRail is a high-tech startup devoted to providing IT-based solutions to help you digitizing and optimizing the railway infrastructure maintenance operations.

We combine our expertise in a wide range of technologies (e.g. big data analysis and visualization, digital twins, IoT, machine learning, etc.) with a solid knowledge in railway maintenance and operations. Our solutions are based in a customizable IT platform (MainRailMT) for the management of all maintenance-related operations and a family of IoT devices (MainRailID) for a continuous and costeffective inspection of your infrastructure.

- ►Paseo Manuel Lardizabal, 15, Donostia/ san Sebastian, 20018, (GUIPÚZCOA)) +34 662 574 768
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AERONÁUTICAS, S.A. MASA is specialised in manufacturing medium and large structural parts in aluminum and hard

MECANIZACIONES

We are able to provide a complete finished part to our customers (from the raw material purchasing to the treated and equiped part).

- Avenida del Ebro.33 Pol. Ind. El Seguero - 26150 Agoncillo (LA RIOJA) **\ +34 669 540 962**
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NEXT GENERATION RAIL TECHNOLOGIES, S.L. (NGRT)

NGRT S.L. is a company focusing on railway safety, working with railway regulators and helping infrastructure managers and train operators secure their infrastructure and operations. NGRT's products are designed to detect any anomalies that occur in the railway infrastructure.

The NGRT applications will detect rolling stock, independent of speed, direction and track conditions at any location, in all weather conditions, as well as anomalies impacting on the railway infrastructure.

- C/ Severo Ochoa, 9 29590 Campanillas (MÁLAGA)
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NEWTEK SOLIDOS, S.L.

NEWTEK is mainly active in the manufacture of systems for filling sand in trams, trains and locomotives. NEWTEK supplies installations composed of storage silos, fixed sand feeders, sand feeding mobile units, aspiration systems and dust collection devices. The company also designs, manufactures and maintains custom installations according to the needs of each

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NRF

Since 1927 NRF is a leading manufacturer and supplier of cooling products for the automotive market, industrial, railway and marine sector. NRF is known for the production of high quality radiators, but also produces and supplies a large range of other engine cooling and air conditioning products. NRF has global engineering, testing and development facilities. Railway and ship manufacturers, large retailers of vehicle parts, radiator shops and specialists in more than 80 countries worldwide daily rely on NRF's high quality products.

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MAFEX 93 92 MAFEX

GUÍA DE SOCIOS MEMBERS DIRECTORY



PARRÓS OBRAS, S.L.

Family business with over 25 years experience in civil construction and iron and steel industry for the railway sector. Parros Group which is specialized in pile driving and catenary foundations, has implemented the 80% of the foundations of the entire Spanish High Speed Network. Whether conventional railway network or Highspeed Railway (AVE), PARROS GROUP is distinguished by the versatility of our machines adapted "Ad hoc" for auxiliary civil works from the railway, with automatic switching to the three Spanish gauges. Also innovative is our implementing system of noise barriers from the railway track and its foundations. Generic activities of building and general construction.

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PATENTES TALGO, S.L.U.

Talgo is a Spanish company with more than 70 years of experience, specialized in designing and manufacturing trains, maintenance equipment as well as providing maintenance services to railway operators worldwide. Today, Talgo is the leading global reference for Spanish High Speed Technology and the number one player in Spain's railway market. Due to Talgo's successful expansion strategy and its globally acclaimed products, the company has become truly international. Its key success factors are innovation, unique technology, sustainability, safety, competitiveness and tailor-made projects with clear focus on customer. Talgo trains are internationally recognized as the best in their category.

- P° del trenTalgo, 2 28209 Las Matas (MADRID)
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- marketing@talgo.com
- talgo.com



PREFABRICACIONES Y CONTRATAS, S.A.U. (PRECON)

PRECON is the Spanish leader in design and supply of precast concrete products for railway tracks, either ballast and ballastless tracks. It has supplied monoblock, twinblock, block slabs and sleeper for switches and crossings, Either for high speed, conventional lines, haul, subways and tramways.

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- www.preconsa.es



SEGULA TECHNOLOGIES

SEGULA Technologies is an engineering group with a global presence, helping boost competitiveness within all of the major industrial sectors: automotive, aerospace, energy, rail, naval and defense, pharmaceutical and oil & gas. Present in 30 countries and with 140 offices worldwide, the Group fosters a close relationship with its customers thanks to the expertise of its 12,000 employees. A leading engineering specialist placing innovation at the heart of its strategy, Segula Technologies conducts large-scale projects, ranging from studies to industrialisation and production.

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- www.segula.es

SEMI

SOCIEDAD ESPAÑOLA DE MONTAJES INDUSTRIALES, S.A.

Activities in 2018/2019: *Execution of Works and maintenance SS/EE traction and autotransformer centers associated with, for the section: Plasencia-Badajoz in the High Speed railway Madrid-Extremadura. *Electrification, safety installations and telecommunications of Medina del Campo — Salamanca — Fuentes de Oñoro Line, in section Salamanca — Fuentes de Oñoro.

*New SS/EE traction in Parets del Vallés at the p.k.

20/285 of Barcelona-French border line. Innovations in 2018: Design and development of a new overhead contact line C-200, powered to 25 kV and versatile in their different sections.

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SENER INGENIERÍA Y SISTEMAS, S.A.

SENER is one of the leading engineering and technology groups in Europe with over one billion euros of annual turnover, more than 2,000 professionals and a continuously growing international presence with offices in over 15 countries. In the field of railway engineering, Sener counts on an extensive experience in metros, light rail trains systems and tramways, conventional railway line, freight transport and High Speed Lines. SENER's activities range from preliminary, conceptual and feasibility studies, basic and detailed engineering to project management services, supervision of works, value engineering and ICE services.

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PRETENSADOS DEL NORTE, S.L.

PRETENSADOS DEL NORTE, is one of the most important producers of pre-stresses steel in the word. Our products are recognised for having the best quality on the market. Our high standards of quality mean that we are talking about the best pre-stresses steel you can find. Our company has more than 30years' experience in manufacturing and investment tha have led to what we are today: PRETENORTE. Technologically, we have equipped our company in Vitoria-Gasteiz with the best state-of-the-art machinery. We continue to incoporate the lastest novelties for your complete satisfaction. Pretenorte is highly specialised in pre-stressed sttel and its many applications.

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- **+34 945 261 400**
- □ pretenorte@pretenorte.com
- www.pretenorte.com



REVENGA SMART SOLUTIONS

Revenga Smart Solutions offers comprehensive solutions for the transport sector: railways and metros, roads, ports & airports. In railways & metros we focus on passenger experience solutions, ranging form intercomms, public address and information panels, to systems related with revenue/cost issues, like ticketing, tolling and access control, and also with operator oriented solutions like railway telephony, signalling (level crossings, point heaters and inspection systems) and station control. More than 45 years of experience. Projects deployed in 24 countris.

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- marketing@revenga.com
- www.revenga.com



SATYS INTERIORS RAILWAY SPAIN

Satys is a Spanish company specializing in the design and manufacture of galley systems for railway rolling stock.

A galley system is broken down into 3 main families of equipment:

- Refrigerated cabinets
- Functional systems. Cooling, electricity, water, lighting, etc.
- Interiors. Countertops, lining, etc.

Satys offers a wide range of products specifically for each one. Thanks to the unique and highly efficient Satys technology, our products are internationally recognized as the best in their class in terms of quality, safety, availability, reliability, accessibility and environmental friendliness.

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- **+34 91 358 05 64**
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SGS GROUP SPAIN

SGS is the world's leading inspection, verification, testing and certification company. We are recognized as the global benchmark for quality and integrity. With more than 97,000 employees, we operate a network of more than 2,600 offices and laboratories around the world.

Our core services can be divided into four categories: Certification , Inspection, Testing and Verification.

We are constantly looking beyond customers' and society's expectations in order to deliver market leading services wherever they are needed. Our independent services add significant value to our customers' operations and ensure business sustainability

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SICE TECNOLOGÍA Y SISTEMAS, S.A. (SICE TYS)

SICE Tecnología y Sistemas, (SICE TYS) is a group of companies that provides solutions and systems for Transport and Traffic, Environment and Energy efficiency, Smartcities and Telecommunications.

SICE TyS, as systems integrator, offers technological solutions adapted to the railways sector, conceiving a centralized management with functionalities oriented to the operation of public and private transport, integrating: - Security Systems - Telecommunications Systems - Signaling (Interlockings, Level Crossings, CTC) (ENYSE) - Automatic Fare Collection - Traffic Prioritization of Public Transport - Engineering (OFITECO): railway lines; Tunnel monitoring; Load test (railways bridges).

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SIEMENS

Ingenio para la vida

SIEMENS MOBILITY, SLU

Siemens Mobility is a separately managed company of Siemens AG. As a leader in transport solutions for more than 160 years, Siemens Mobility is constantly innovating its portfolio in its core areas of rolling stock, rail automation and electrification, turnkey systems, intelligent traffic systems as well as related services. With digitalization, Siemens Mobility is enabling mobility operators worldwide to make infrastructure intelligent, increase value sustainably over the entire lifecycle, enhance passenger experience and guarantee availability.

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- **434 91 514 88 87**
- www.siemens.es/siemens-mobility

94 MAFEX MAFEX

MEMBERS DIRECTORY MEMBERS DIRECTORY



SMART MOTORS

Smart Motors(R) applies new technologies to generate added value from the monitoring of critical railway assets that believe that Digitalization and the uses of advanced analytics are the way to service excellence. The priority is to generate new knowledge about the operation of railway assets that satisfies the requirements of the most demanding environments and with a real day to day contribution.

smart motors(r) has its own Digitalization Platform to help maintenance and operation that brings together signaling monitoring systems, infrastructure and rolling stock, as well as IoT sensors adapted to the railway sector.

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- smartmotors.org

STADLER

STADLER RAIL VALENCIA, S.A.U.

International rail vehicle construction company, Stadler, is headquartered in Bussnang in Eastern Switzerland. Founded in 1942, it has a workforce of over 8,500 based in various production and over 40 service locations. Stadler provides a comprehensive range of products in the heavy and urban transport segments: High-speed trains, intercity trains, regional and commuter heavy rail trains, underground trains, tram trains and trams. Stadler also manufactures main-line locomotives, shunting locomotives and passenger carriages, including the most powerful diesel-electric locomotive in Europe. It is the world's leading manufacturer in the rack-and-pinion rail vehicle industry.

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Talleres Alegría, s.a.

TALLERES ALEGRÍA, S.A.

Talleres Alegría, s.a. is a family owned company devoted since 1900 to design, manufacturing and after sales assistance of all kind of fixed track material, its accessories and spare parts. Developing of Designing and Commissioning Integral projects of turnouts to be installed at Depots and Industrial Ports and Factories. Design, manufacturing, repair and maintenance of self propelled vehicles to carry out works at the infrastructure. Design, manufacturing, retrofitting, repair and maintenance of freight

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TELTRONIC

Backed by over 40 years of experience in the design, manufacturing, and deployment of Professional mobile radio projects on a turnkey basis, Teltronic presents a broad portfolio of critical communication solutions for transport sector, providing complete solutions: network infrastructure, control centre, and end-user equipment, including specialized onboard systems specifically designed for train, metro, tram and LTR. Besides voice and data transmission solutions, the company offers integration services with other subsystems: PA and intercom, applications to manage and control fleets and for operating aid, real time CCTV or communications support for signalling systems ETCS, CBTC, PTC...

- Pol. Malpica, C/F Oeste 50016 (ZARAGOZA)
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- www.teltronic.es

THALES

THALES ESPAÑA GRP S.A.U.

Thales is a World leader in Mission Critical Solutions for Land Transportation. Thales Spain, with more tha 60 years of experience, has been pioneer and leader in the thecnological development of the Spanish railways, beein one of the main suppliers of safety and telecommunication systems for the Spanish Railways Administrations and present in countries as Turkey, Mexico, Algeria, Malaysia and Morocco.

Its activity goes from the development, manufacturing installation, commissioning to the maintenance of equipments and systems for railway signalling, train control, Telecommunication, Supervision ticketing and critical infrastructures security.

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getin/a-euroe/tudio/



TPF GETINSA EUROESTUDIOS, S.L.

Passion for excellence

Our priority: developing solutions that meet our client needs. This approach is based on three pillars: expertise, efficiency and continuous innovation.

Today, TPF is ranked among the most important multidisciplinary companies active in the following sectors: building, transport infrastructure, water and energy.

Over the years, the group successively expanded in Europe, Asia, Africa and America through a series of acquisitions and became a key player, internationally recognized in its field.

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TECNIVIAL.S.A.

In TECNIVIAL we specialize in all types of fixed signalling for track (Marker Boards), conventional lines and High Speed lines. We are one of the companies approved by the Spanish Railway Infrastructure Administrator (Adif) and the others. The last product boosted to the market have been the NANOTEC SIGNS (R+D). The incorporation of cutting-edge materials (carbon nanoparticles) to the signs manufacturing , allows the improvement of its behavior and mechanical features: light, corrosion-free, low residual value and maintenance, eco-friendly, resistant to loads (snow/ wind). Besides, we develop Corporative Image projects according to the needs of the customer; design & installation.

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TEKNIKER

R&D center oriented to technology transfer through research projects. Specialization areas:

- Advanced manufacturing: laser processes, LMD coating and repair, cutting processes
- Surface engineering: friction and wear studies, physical-chemical coatings seeking to improve anti-corrosion, wear, easy cleaning, anti-adherence, optical and aesthetic characteristics
- ICTs: solutions for inspection and measurement based on vision and AI techniques, O&M, condition monitoring, data management, Smart components, sensor development
- Product engineering: new product development, tribological testing, fault diagnosis.
- lñaki Goenaga, 5, 20600 Eibar (GIPUZKOA)
- +34 943 206 744
- www.tekniker.es



TELICE. S.A

Telice is an international company, with more than 45 years of experience in different markets related to cutting-edge technology and standing out in the railway market. Its activity covers the design, installation and maintenance of railway electrification systems, safety and railway signalling, electrical substations, civil engineering projects, industrial electricity, fibre optic installation, industrial automation and safety systems in tunnels, underground and mining projects. Due to its wide expertise, Telice has become preference collaborator for the main railway administrations. Telice has international presence in Norway, United Kingdom, Portugal, Peru, Chile and Brazil.

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TYPSA

Founded in 1966, TYPSA is a leading consulting engineering group in the fields of transport, buildings, water, environment, energy and rural development. We have a long-standing relationship with public, private and institutional clients in the Americas, Europe, Africa, Asia and the Middle East, assisting them in the development of infrastructure, energy and city projects from concept to completion. In addition to providing world-class engineering services, TYPSA has extensive experience in building the capacity of local firms and in strengthening institutions to guarantee the sustainability of the infrastructure.

TYPSA

CONSULTORES

Y ARCHITECTOS

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URETEK SOLUCIONES INNOVADORAS, S.L.U

We are the inventors of consolidation with Expansive Resins. Our patented technologies are the most used in the world, with more than 100.000 interventions carried out. Our high technology, the quality of the interventions and more than 30 years of experience, we have become the reference for the consolidation of land with injections of expansive resin to be able to provide multiple solutions to your problems. We are committed to repairing structures without interfering with life and activities, in particular we use unique and patented innovative technologies that are fast and conservative.

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- www.uretek.es



VALDEPINTO, S.L.

Valdepinto, S.L. was established in 1986 and focuses its activities in the Railway sector. We have four main product lines:

- All types of machining (specialists in electrical insulation).
- Screen printing, Signs and Engraving low-
- Metal transformation and welding.
- Design and fabrication of transformers and coils of high/low voltage. Our philosophy is to always offer all our clients an unbeatable value for Money, combined with an excellent

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MEMBERS DIRECTORY



VICOMTECH

Vicomtech is an applied research centre specialising in Artificial Intelligence, working on technological solutions based on Computer Vision, Data Analytics, Computer Graphics, Advanced Media Technologies and Language Technologies. It aims at meeting the innovation requirements of the local companies and institutions to face new economic and social challenges, and improving their competitiveness in a global market. The transfer mechanism for this research is the creation of R+D+i projects geared to companies' needs. Furthermore, the centre works intensively on cooperation projects, through cooperative technology development promotion schemes at local, national and international level.

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- www.vicomtech.org

virtualmech ?

VIRTUALMECH

Virtualmech comprises a highly specialized technical team that has extensive knowledge on the different sectors of the industry, such as railway and solar thermal energy industries. The unique Selling Proposition is offering our clients real results to difficult problems, always adapted to their specific issues. We achieve these results thanks to data gathering through simulation or experimental measurements that we offer to our clients so they can make effective decision based on objective criteria.

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voestalpine

voestalpine Railway Systems

We are committed to the designing, manufacturing, supplying and maintenance of all types of manganese steel switches and railway track systems for railways and tramways, in addition to moulded cast steel parts for the general industry. Our Technical Department (Department R&D) ensures we have the capability of designing and producing points and crossings (turnouts, crossovers, scissor crossovers and diamond crossings) or parts for them, such as hard steel manganese crossings, spare tongues... as well as the generation of patents.

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WSP SPAIN

As one of the world's leading professional services firms, WSP provides engineering and design services to clients in the Transportation & Infrastructure, Property & Buildings, Environment, Power & Energy, Resources and Industry sectors, as well as offering strategic advisory services. Our experts include engineers, advisors, technicians, scientists, architects, planners, surveyors and environmental specialists, as well as other design, program and construction management professionals. With approximately 49,000 talented people globally, we are uniquely positioned to deliver successful and sustainable projects, wherever our clients need us.

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ZELEROS

Zeleros is the Spanish company developing a hyperloop transport sytem, already considered as "the fifth means of transport". Its focus on the vehicle optimization allows to reduce infrastructure costs and to operate at safer pressures for the passengers. Zeleros has already raised substantial private and public support, and collaborates with companies such as Renfe (Trenlab) and Altran, research centers (Universitat Politècnica de València. CIEMAT, UPM) and is supported by investors such as Plug and Play, Angels or ClimateKIC. Currently Zeleros is preparing the construction of its own 2-kilometer test-track in Sagunto to demonstrate the system at high speed.

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- www.zitron.com



ZITRON, S.A.

ZITRON is a world-wide leading company in designing, manufacturing, commissioning and maintenance complete ventilation systems for metro and tunnels. ZITRON has the world's biggest aerodynamic test bench, certified by AMCA, for testing fans at full load and 100 % speed. ZITRON's extensive reference list includes more than 500 metro and tunnel projects. The latest and more significant ones are Crossrail in London and Doha Metro. Experience and knowhow, providing innovative and tailor-made solutions, are our most appreciated values. The global growing market of ZITRON's fans, along with the high level of satisfaction of the Clients is the best mark of its equipment and services quality.

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SIEMENS MOBILITY

Moving beyond -Soluciones de transporte impulsadas por la pasión por la movilidad.

El futuro de la movilidad en nuestro mundo globalmente interconectado exige soluciones de transporte fluidas, sostenibles, fiables y seguras. Aprovechamos las ventajas de la digitalización, la excelencia en ingeniería y nuestro espíritu emprendedor para superar este reto. Con la confianza de nuestros socios somos pioneros en el transporte, trasladando a las personas de manera sostenible y fluida desde la primera hasta la última milla. Y siempre vamos más allá para ayudar a los operadores de transporte de todo el mundo a superar sus expectativas.

siemens.es/mobility

SIEMENS



Sustainable infrastructures in ever changing environments

We design large-scale transport infrastructures on 5 continents, offering innovative, resilient and safe solutions.

Multidisciplinary teams, who consider the life cycle of the project as a whole, with expert knowledge in all disciplines and railway technologies.

IDOM.com

