

ARTIFICIAL INTELLIGENCE

Innovation for a safer and more *efficient railway*



MAFEX INFORMS

Mafex is preparing an intense agenda of activities for 2024.



RAIL LIVE 2023

The leading experts in the international railway sector met at IFEMA.



MAFEX REPORTS

Mafex members present their latest developments and solutions.

At the forefront of rails solutions



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MAFEX

Summary

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NEW MAFEX MEMBERS

The Association continues to grow and adds 112 members.

HOLDING OF THE TCRINI 2 PROJECT TRANSFER COMMITTEE

The main objective of the committee is to facilitate the effective transfer of knowledge and results obtained during the project in the field of infrastructure maintenance.

FIRST MAFEX STEERING COMMITTEE MEETING OF THE YEAR

The sector is preparing to face the challenges in the short and medium term.

MAFEX LAUNCHES "LEARNING WORKSHOPS" FOR ITS MEMBERS

Three workshops will be organised on three different topics: Employee Experience, Advanced Technologies and Sustainability.

SMART MAINTENANCE DOCUMENT

The Smart Maintenance Working Group has completed its activity plan with the finalisation of the document on "Capacities of the Spanish Railway Industry in Smart Maintenance".

MAFEX PREPARES AN INTENSE AGENDA OF ACTIVITIES FOR 2024

In addition to international promotion activities, the Association continues to focus on innovation as a path to excellence.

TMB CHALLENGES DAY ON INNOVATIVE PURCHASING

The main aim of the conference was to raise awareness of TMB's activities in the areas of internationalisation and innovation, specifically in the area of accessibility.

FINAL PRESENTATION OF THE RIN - RAIL INNOVATION NETWORK

This document provides information on the contributions of technology centres, universities and R&D units to railway innovation.

MAFEX ORGANISES A TRADE DELEGATION TO PORTUGAL

The delegation, formed by 23 companies of the Association, held meetings with five key entities of the country: Infraestruturas de Portugal, Metro de Porto, Metropolitano de Lisboa, Fergu-

po and PFP - Plataforma Ferroviaria Portuguesa.

MAFEX ORGANISES A NEW SESSION OF "INTERNATIONAL MARKETS FORUM" DEDICATED TO THE UNITED STATES

The United States is a key market for the Spanish railway sector due to its large volume, its stability and the investments planned for the coming years.

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RAIL LIVE! 2023

The main experts of the international railway sector met at IFEMA, Madrid from November 29th to December 1st. This professional platform served to analyse the present and future of the railway as well as its challenges and opportunities. It was attended by more than 5,600 people, 300 speakers and more than 250 companies presented the latest innovations and cutting-edge solutions in the industry..



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Infraestructuras sostenibles en un entorno cambiante

Equipos multidisciplinares conscientes de la importancia de la seguridad, integración y evolución tecnológica en los sistemas ferroviarios.

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Spanish railway industry: strategic for a sustainable future



In this context, we started the year with the incorporation of four new members, bringing the total to 112 entities that, under the umbrella of our Association, represent all the sectors and subsectors of the industry value chain.

We also review the latest activities carried out by the Association in recent months and present our agenda for 2024. In terms of activities, it is worth highlighting the celebration, this year, of the InnoTrans fair from 24th to 27th September, where Mafex will once again coordinate the Spanish participation with the support of Icx, being the largest to date with more than 65 companies. In addition, we will celebrate a new edition of Rail Live! at the Palacio de Congresos (Convention Centre) in Zaragoza on 26th and 27th November. We hope to bring together more than 1,500 professionals in an important international event focused on networking and an intense congress programme.

Technologies based on Artificial Intelligence (AI) are beginning to make their way into the railway sector. It comes at a time when the European Union is working both on technological transformation, with specific targets for 2030, and on achieving a cleaner, greener, and smarter mobility, in line with the objectives of the European Green Deal.

A field where they have great potential for their development and where they will play an increasingly prominent role.

Therefore, its integration into the railway field not only represents an opportunity to increase operational efficiency, but it also promotes significant progress in terms of safety and efficiency. At the same time, speeding up the development and implementation of these innovative technologies requires responding to numerous challenges and analysing the evolution of the ongoing innovation projects based on this technology.

Therefore, we will continue our journey to defend an industry that is a global benchmark with a strong international presence in more than 95 countries, and which generates 30,000 direct jobs in Spain with a railway turnover of more than 6,5 billion euros (more than 8% of industrial GDP). Undoubtedly, a key sector and a driving force, both for our economy and our country image.

The industry as a whole must now respond to the new challenges it faces, both present and future, with the capacity for innovation and commitment that characterises it. And working, as always, together to make the railway the backbone of sustainable mobility.

MANAGEMENT: MAFEX. MAFEX COMMUNICATION COMMITTEE: Alstom Transporte, ArcelorMittal, Caf, Trigo ADR Iberia, HaslerRail, Icon Multimedia, Idom, Indra Sistemas, Ingeteam, Patentes Talgo, Sice, Siemens Rail Automation, Sener Mobility, Stadler Rail Valencia, Teltronic, Thales España, TPF Getinsa Euroestudios y Zitron. **ADMINISTRATION:** mafex@mafex.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.

Mafex new members

The number of businesses joining Mafex continues to rise. These are the new members:

MAFEX CONTINUES TO GROW WITH THE RECENT INCORPORATION OF FOUR NEW MEMBERS. MAFEX ADDS WITH THESE MEMBERSHIPS A TOTAL OF 112 COMPANIES THAT REPRESENT ALL THE SUB-SECTORS OF A SOLID INDUSTRY AND THAT FORGES ITS PATH AROUND THE WORLD.



KRUCH SIDOS

Development of software for electric network of transport, including consultancy, technical support and marketing. EFS (Energy Flow Simulation), digital twin of the complete railway network, both infrastructure and rolling stock, parameterizing the network and responding intelligently to different cases, problems, needs that may arise, allowing to have and maintain the knowledge in the Customer's own organization.

All this oriented to energy efficiency, anticipation of problems solving, cost reduction. Dynamic tool that takes into account Traction (Infrastructure and Rolling Stock) and Medium Voltage.



INSPECTRAIL

InspectRail, a technology-based startup born as a spin-off company from Ceit-BRTA Technology Center, stands as a new path to the future in the transformation of railway maintenance. Our value proposition focuses on integrating proprietary technology into any railway vehicle for infrastructure inspection and monitoring. Track, catenary, communications, signals, environment...

We provide a 360-degree view of the infrastructure's health condition, generating quality data that enables more efficient, cost-effective, and safer operations.



SCALIAN SPAIN

Scalian Spain, part of a leading French-origin multinational technology company, stands out in the Spanish market with over two decades of experience and a consolidated team of more than 550 professionals. We are positioned as references in the field of Data & Insights and Digital Solutions services, leading in artificial intelligence, data solutions, Big Data, software, microservices, embedded systems, edge computing and services related to Operations Performance and Strategy & Transformation.

We are experts in strategy and innovation, recognized for our methodological and digital skills, as well as for our operational support.



JUMO SPAIN

JUMO is a leading system and solution provider in industrial sensor and automation technology. Components for the measuring ranges temperature, liquid analysis, pressure, level, flow, and humidity, as well as products for registration, monitoring, control, and automation, are used to create complete systems for a wide range of industries.

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- Railway Technology
- Thermoprocess Technology
- Hydrogen
- Water and Wastewater
- Heating and air-conditioning technology
- Food and beverage
- Shipbuilding industry

Celebration of the Transfer Committee of the TCRINI 2 project

The first meeting of the TCRINI 2 project Transfer Committee took place last Friday, 26th January. The main objective of the committee is to facilitate the effective transfer of the knowledge and results obtained during the project in the field of infrastructure maintenance.

This Committee is intended to ensure that the lessons learnt, the best identified practices and developed innovations are effectively integrated into our day-to-day operations.

The key functions of this committee include:

1. To evaluate the results, that is, to critically analyse the results obtained in the project, highlighting successes and areas for improvement.
2. To identify and to plan effective strategies for the implementation of innovation.
3. To facilitate communication and collaboration with all stakeholders to ensure a smooth transition.

THE MAIN OBJECTIVE OF THE COMMITTEE IS TO FACILITATE THE EFFECTIVE TRANSFER OF KNOWLEDGE AND RESULTS OBTAINED DURING THE PROJECT IN THE FIELD OF INFRASTRUCTURE MAINTENANCE.



One of the key pillars to achieve this goal is the close collaboration between industry and the scientific field.

To conclude, this Transfer Committee is the bridge between the laboratory and reality, between research and implementation.

This project is not only about technical developments, but also about the consolidation of a technological and industrial leadership that will position Basque businesses in international markets in the long term.

The representatives of the 22 member companies highlighted the more than 220 actions organised and/or coordinated by the Association in the previous year and laid the foundations for the industry's roadmap to maintain the leading position of Spanish companies in the world.

First Mafex Steering Committee meeting of the year

Mafex held the first Steering Committee of the year on 31 January at Ineco's headquarters. During the session, the future of a key sector for the country's competitiveness was discussed.

THE SECTOR IS PREPARING TO FACE THE CHALLENGES IN THE SHORT AND MEDIUM TERM, AMONG WHICH TECHNOLOGICAL EVOLUTION AND THE ATTRACTION AND RETENTION OF TALENT STAND OUT.



Mafex launches "learning workshops" for its members

Within the framework of the Talent activities, MAFEX is organising a series of "learning workshops" that aim to train professionals with the help of experts, focusing on training with a very practical vision so that all participants can use that knowledge in their organisations. Three workshops are being organised on three different topics: Employee Experience, Advanced Technologies, and Sustainability.

The Employee Experience (EX) learning workshop aims to train team leaders or human resource managers. EX is known as the working life process of a person in an organisation. Through the care of the EX, the aim is to obtain a competitive advantage by seeking to create an exceptional

THREE WORKSHOPS WILL BE ORGANISED ON THREE DIFFERENT THEMES: EMPLOYEE EXPERIENCE, ADVANCED TECHNOLOGIES AND SUSTAINABILITY.

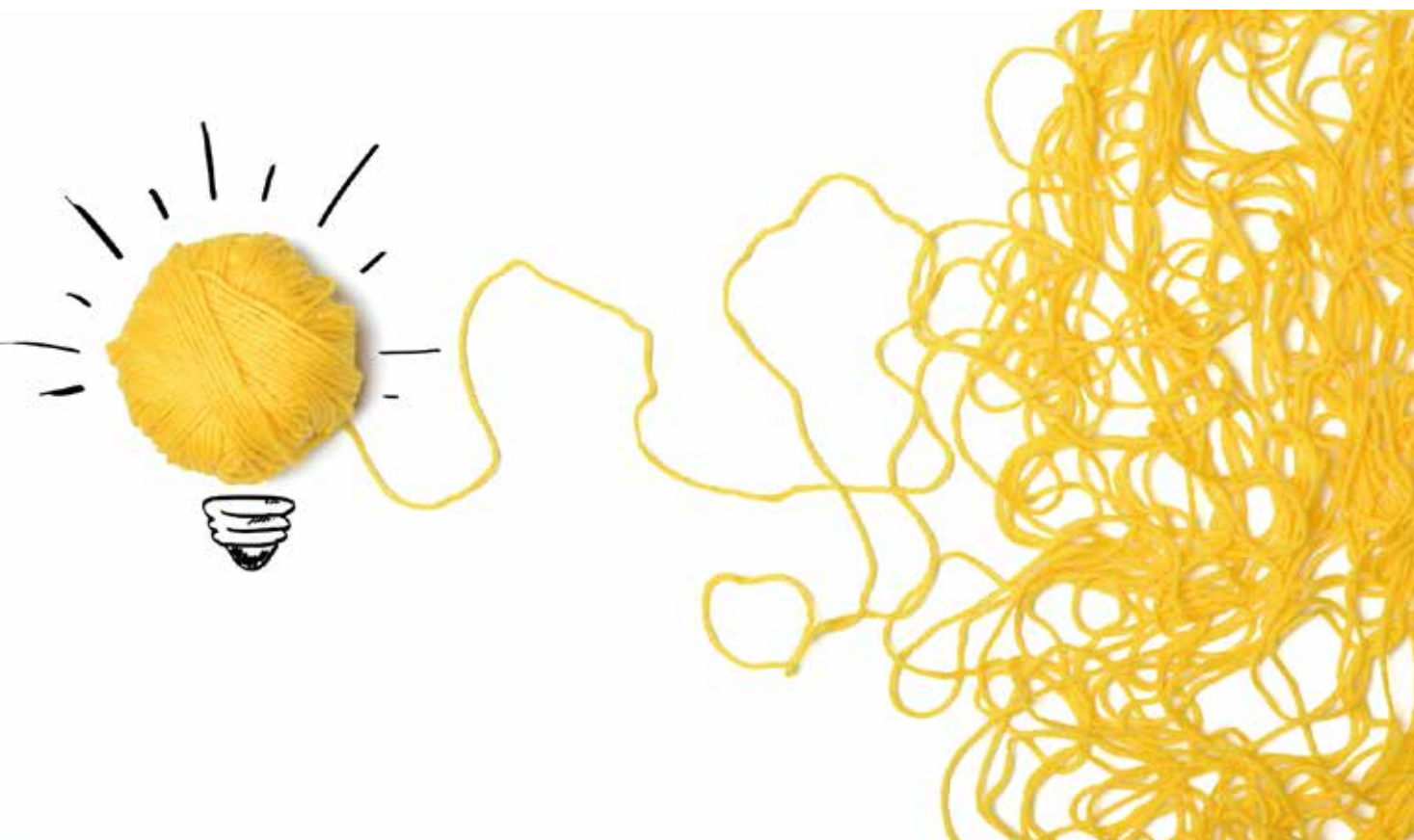
employee's experience in the organisation.

The Advanced Technologies learning workshop will consist of three modules: the Generative AI module applied to productivity, the module on professional uses of the metaverse, and the module on technological evolution. This workshop aims to enhance the understanding and application of these technologies in the day-to-day life of companies with a practical and didactic ap-

proach that allows them to get the most out of these tools.

In the sustainability learning workshop, three workshops are proposed with a focus on the circular transformation of the sector, through the introduction of the circular economy and reporting, including essential tools such as the eco-design and the life cycle analysis.

Any interested business can request information from the Association.



Smart Maintenance Document

THE SMART MAINTENANCE WORKING GROUP HAS FULFILLED ITS ACTIVITY PLAN WITH THE COMPLETION OF THE DOCUMENT ON "SPANISH RAILWAY INDUSTRY'S CAPABILITIES IN SMART MAINTENANCE".

The document, on which the 17 member companies of the group have worked, and which has the contributions of more than 30 partner companies, shows the challenges faced by the sector in this area according to the enabling technologies of Smart Maintenance, and the capabilities of the industry to face these challenges.

Specifically, the document structures the industry's capabilities in 9 key technologies such as the Internet

of Things (IoT), Big Data or Cloud Computing for the Rolling Stock, Signalling and Infrastructure segments.

The document was presented on 16th November at a specific Smart Maintenance forum held in Madrid, with more than 60 attendees, including institutions such as Los Tranvías de Zaragoza, Metrotenerife, Metro de Barcelona, Renfe and Adif.

In addition to being able to learn first-hand about the challenges of

these entities in smart maintenance and the initiatives they are carrying out, the forum made it possible to highlight the industry's capabilities in this area.



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Mafex prepares an intense agenda of activities for 2024

At international level, Mafex is once again committed to continue promoting Spanish railway services and technologies abroad.

International promotion: Delegations, exhibitions and conventions

As in previous editions, Mafex will participate in leading trade fairs such as Middle East Rail in Abu Dhabi and InnoTrans in Berlin.

It is worth mentioning the Innotrans fair that will be held between 24th and 27th September. Mafex will once again bring together and coordinate the joint participation of more than 65 companies from the sector. This pavilion represents the tenth time that the association has been in charge of promoting the Spanish railway sector at the main global event in the sector, with the strongest turnout.

It is also worth mentioning the celebration on 26th and 27th November and for the seventh consecutive year of Rail Live! which has become the main national benchmark forum for the railway sector with a distinctive international character and where Mafex is a co-organiser. This new edition will be held at the Palacio de Congresos (Convention Centre) of Zaragoza in a congress format.

Trade policy

The Association will pay special attention to issues regarding trade policy and impact on the industry, in addition to a special focus on industry and the different recovery plans of the member states given the importance of promoting investment in sustainable transport infrastructure. Negotiations on EU Trade Agree-

IN ADDITION TO INTERNATIONAL PROMOTION ACTIVITIES, THE ASSOCIATION CONTINUES TO BE COMMITTED TO INNOVATION AS A PATH TO EXCELLENCE.



ements with third countries will be closely monitored, given that to create new business opportunities

and overcome barriers to trade, it is necessary to take a close look at trade defence instruments, while

also ensuring effective protection of the sector's interests and preventing malpractice.

Strategic Monitoring

The preparation of "FocusOn" reports on strategic and identified markets will continue, as well as the renewal and improvement of the current intelligence platform with the most relevant news and business opportunities in the national and international railway sector.

Networking

Over the next year, industry forums on Digitalisation, Mobility, Sustainability, Hyperloop, and International Markets will be launched. Likewise, new working groups will be launched adapting them to the new dynamics defined in the Association Strategic Plan 2021-2024.

Competitiveness and Innovation

In addition to the strategic intelligence and international activities, innovation is key in the services offered by Mafex given its distinctive nature in the competitive improvement of businesses. That is why Mafex acts as a facilitating agent of supply and demand of innovation, supporting R+D with the aim of continuing to maintain the technological pace with other means of transport and seeking to make member companies more competitive, innovative, and technologically advanced.

In addition, the association considers that collaboration and the implementation of joint initiatives are necessary to support the sector in different areas such as: project management office and R+D, talent attraction, technological training and

the organisation of training sessions and technological missions. Likewise, and as has been normal practice, Mafex will continue with the continuous approach to universities and technological centres, as well as start-ups with technology to promote collaboration between academia and the industrial sector.

Throughout the year, work will continue on the identification of calls at national and European level, attracting and managing consortia for the presentation of projects and promoting the collaborative participation of member companies in R+D projects.

Committees' renewal

Mafex will also renew the Internationalisation, Innovation, and Communication committees during 2024. 🚂



A complete range of switches and crossings for urban layouts

TMB Innovative Procurement Challenge Day

TMB is the main public transport operator in the Barcelona metropolitan area, where it manages a metro network made up of eight lines and 158 stations, 28% of which are automated. In 2018, 407.5 million people tra-

ON 15TH NOVEMBER, MAFEX ORGANISED A CHALLENGE DAY TOGETHER WITH TMB, THE MAIN PUBLIC TRANSPORT OPERATOR IN THE METROPOLITAN AREA OF BARCELONA.

velled through it. Barcelona is currently an international benchmark

in terms of innovation and digitalisation applied to urban transport. The use of smart technologies and systems enables high efficiency, the best service, and maximum social and environmental benefit.

The main objective of the Day was to raise awareness about the activity that TMB carries out in the fields of internationalisation and innovation and, specifically, in the area of accessibility. The "Innovation Public Procurement Programme" of the TMBInnova project was presented during the challenge day, highlighting the potential of public-private collaboration to promote innovative solutions in the field of transport. The challenge day was attended by 16 companies. 🚀



Final presentation of the Rail Innovation Network (RIN)

RAIL INNOVATION NETWORK

APORTACIONES DE LOS CENTROS TECNOLÓGICOS, UNIVERSIDADES Y UNIDADES DE I+D A LA INNOVACIÓN FERROVIARIA



THIS DOCUMENT PROVIDES INFORMATION ON THE CONTRIBUTIONS OF TECHNOLOGY CENTRES, UNIVERSITIES AND R&D UNITS TO RAILWAY INNOVATION.

The closure of the RIN Project took place on 19th December. During the session, the latest results of the project were presented, with special emphasis on the process of compiling the capabilities of the entities adhering to the initiative and especially the capabilities document prepared during 2023.

This document provides information on the contributions of technology centres, universities, and R&D units to railway innovation. 🚀

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Mafex organises a business delegation to Portugal

THE DELEGATION, MADE UP OF 23 COMPANIES FROM THE ASSOCIATION, HELD MEETINGS WITH FIVE KEY ENTITIES IN THE COUNTRY: INFRAESTRUTURAS DE PORTUGAL, METRO DO PORTO, METROPOLITANO DE LISBOA, FERGRUPO, AND PFP - PLATAFORMA FERROVIARIA PORTUGUESA (PORTUGUESE RAILWAY PLATFORM).

From 13th to 15th November 2023, Mafex organised a business delegation to Portugal, a priority market for the Spanish railway industry due to the investments planned in the short and medium term, as well as our proximity and historical relationship.

In fact, the important modernisation process that the country is carrying out is reflected in the significant volume of investment foreseen in the

in the country: Infraestruturas de Portugal, Metro do Porto, Metropolitano de Lisboa, Fergrupo and PFP - Plataforma Ferroviaria Portuguesa (Portuguese Railway Platform).

The meetings with these entities included a brief presentation of their upcoming projects and investments, as well as a dialogue with Spanish companies, with meetings in small groups in which Spanish companies were able to address the heads of the areas of greatest interest to each company.



Mafex organises a new "Markets Forum" session dedicated to the United States

THE UNITED STATES IS A KEY MARKET FOR THE SPANISH RAILWAY SECTOR DUE TO ITS LARGE VOLUME, STABILITY AND THE INVESTMENTS PLANNED FOR THE COMING YEARS.

The first session of 2024 of the "Markets Forum" was held on 25th January with a day that focused on the West Coast of the United States, with more than 65 participants.

Aitor Ballester, Head of Business Development and Intelligence, highlighted at the opening of the meeting that "the United States is a key market for our sector due to its large volume, its stability and the investments planned for the coming years. In fact, the Infrastructure Investment Act has approved federal funds totalling \$102 billion for the

development of the railway sector, which is the largest investment in the sector since the creation of Amtrak 50 years ago."

Next, Joan Gasol presented the "Focus On USA" report and the opportunities that the aforementioned

market holds for Mafex members. Then, Bruce Armistead, Director of Operations and Maintenance for the California High-Speed Rail Authority, gave a presentation on the landmark project, with a detailed update on its status. Finally, Ane Fernández, Foreign Trade Technician/International Trade Advisor, moderated the round table with Jaime García from Indra and Mercedes Sierra from Sener, where both companies shared their experience in the country.



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TPF INGENIERÍA develops the detailed design of control, command and signalling subsystems within the framework of railways systems maintenance

TPF GETINSA
TPF INGENIERIA has carried out the detailed design for the upgrade of the power supply and transformer stations managed by the Linares maintenance department.

The project involves the analysis and development of solutions to improve the safety of sixteen (16) power supply and transformer stations for supply lines of the distribution network with voltages between 2,200 and 3,000 volts. The main purpose of the project is to detect deficiencies and upgrade the



systems to guarantee the safety of both personnel and equipment, as well as to bring these stations into line with ADIF's current regulations.

Icon Multimedia is working on the incorporation of SVM for predictive traveler information management

ICON MULTIMEDIA
In an effort to provide smarter and more efficient travel experiences, ICON Multimedia is already working on integrating AI technologies into its Passenger Information System. These advancements will enable operators using their DENEVA solution to have a more sophisticated real-time information management, significantly improving service quality and passenger experience.

The company is immersed in the development and implementation of machine learning algorithms that allow anticipating the needs of travelers and optimizing operational plan-



ning. This initiative, still in progress, includes facial recognition, predictive analysis, and real-time content personalization. These new opportunities can be integrated by railway operators into their communication

networks, allowing for better traffic management, anticipating issues, and providing more precise and personalized information to passengers. A competitive advantage in creating exceptional travel experiences.



COMSA progresses in the works for the replacement of a crossing at El Berrón station

COMSA
COMSA is carrying out works to replace a crossing at El Berrón station (Oviedo), the main railway junction in the suburban system of the Metric Gauge Network, where the L770

Oviedo - Santander and L752 Gijón - Laviana lines cross. This unique crossing, where two double-track lines cross orthogonally, is the only one of its kind in Europe.

The project includes the replacement of the straight crossing by a new one formed by a set of 4 Non-Union Crossings (TSU) larger than

the current one. It also includes the replacement of the prefabricated transition slabs with ballastless and ballasted track zones, each 12 metres long, to improve the current transition between the slab and ballasted track zones. This will increase train safety and speed and improve service efficiency and accessibility.



Revenge Smart Solutions introduces its state-of-the-art fare collection system in Metro de Quito

REVENGA
Revenge Smart Solutions (RSS), in collaboration with Acciona, has launched a pioneering integrated fare collection solution on line 1 of Metro de Quito that provides increa-

sed efficiency in the management of this important infrastructure and a greatly improved user experience.

The system is differential for the unprecedented variety of means of access that it provides, which includes the identity card - linked to the ABT account. The latter represents a groundbreaking solution

specific to the project, marking a significant advance in the way access to the transport system is approached.

Based on RSS's RT2P Backoffice and hosted in the cloud, the system will provide the complete infrastructure for managing up to 775,000 transactions per day.



**IMATHIA CONSTRUCTION
Marks a Turning Point in
Uganda with its Concrete
Sleeper Factory**

IMATHIA CONSTRUCCIÓN
IMATHIA CONSTRUCCIÓN S.L., a Spanish company specializing in Civil Works, inaugurated last September 2023, the first Concrete Sleeper Factory in Uganda located in the Kawolo area, Buikwe district, marking a milestone in railway modernization in the country.

Imathia's focus on local training is a key component in ensuring the long-term sustainability of railway upgrading in the African country. By equipping workers with the skills necessary to manufacture, operate, and maintain concrete sleeper technology, the company is not only building infrastructure but also local capabilities with a team of 35 people for plant operations.



This project not only transforms the railway landscape but also leaves a positive mark on the community

and the future economic development of the country.

Lantania is awarded the construction of the second phase of Valladolid's railway junction

LANTANIA
The Ministry of Transport and Sustainable Mobility, through Adif, has awarded Lantania and Copcisa the second phase of the construction works for the Valladolid Railway Complex. The project, which, to-

gether with the Eastern Bypass, will turn the city into a freight transport hub and a centre for railway technology and innovation, has an investment of 60.9 million euros. The project includes the construction of the new freight terminal, a track technology centre, the Redalsa centre and a maintenance base. The 230,000 m2 of the Railway Complex will house a technical

facility comprising nine tracks of more than 750 m for the reception and dispatch of trains; a container loading, unloading and storage area; a management building; vehicle parking and a logistics expansion area. It will also house the Track Technology Centre, the Redalsa centre, an Adif maintenance base, workshops, warehouses and offices.

The Talgo Award for Technological Innovation is back!

TALGO
After 25 years of history, the Talgo Award for Technological Innovation continues to seek to promote and develop innovative projects that provide additional value to the railway sector through its two categories:

- Railway Technology: which recognises projects that represent significant advances and improvements to railway operations.
- Mobility: which welcomes all types of projects related to industry 4.0, Big Data, accessibility, sustainability, digital transformation, passenger experience or cybersecurity, among others.

Both categories are endowed with €15,000 and the opportunity to publish an article about the project in a prestigious industry magazine. If you have an idea that improves mobility, take part in the 21th edition

of the Talgo Technology Innovation Award! The deadline for the reception of projects is June 1st.

More information at www.premio-talgoinnovacion.com



Create HR: Driving Talent in the Railway Sector

CREATEHR
Create HR stands out as an essential partner in the selection and training of highly skilled professionals in the railway sector. In response to the growing demand for talent, this leading consultancy in its segment ensures efficiency and drives innovation.

With a robust job pool, they connect talent with growing railway companies, ensuring the selection of the best candidates. Additionally, their training programs, ranging from sector-specific courses to exam preparation for positions such as train operators, ensure outstanding professionals in all areas of work.



Create HR not only acts as an intermediary but also as a facilitator of excellence in the railway sector, committed to promoting talent that drives national transportation for a strong and efficient railway future.



Training Center at Stadler Valencia

STADLER VALENCIA
In 2023, the company has successfully established the operation of its new professional training center, located next to its Albui-xech plant. This center, representing a 2 million euro investment, is a demonstration of Stadler's commitment to dual vocational training. With this initiative, the

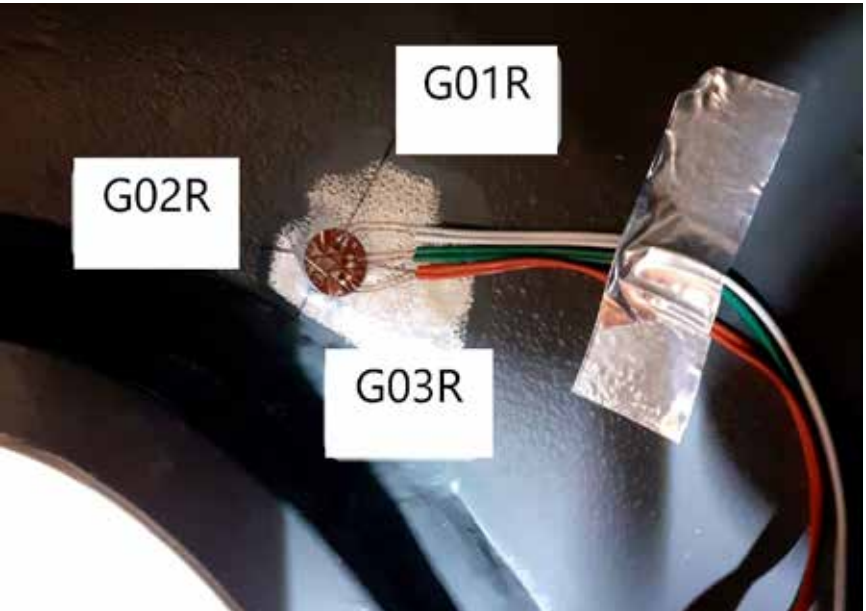
company aims to address one of the main challenges of the current Spanish industry: the training of qualified technicians.

Stadler's new training center has a dual purpose: on the one hand, ensuring the availability of new employees with the necessary qualifications, and on the other hand, promoting the continuous learning of its staff. The center offers training programs in cycles such as electricity, electronics, welding, and mechanics, as well as maintenance of railway vehicles.

In this regard, 9 professionals, who will become the first promotion of aluminium welders trained at the centre, began in January a rigorous training programme where they will acquire skills to work with this metal.

Fatigue on-track test

CETEST
CETEST is an ISO 17025 accredited specialist in track strain gauge testing. In these tests, stress levels are measured in different components (bogies, carbody frames or specific elements) under real load conditions to determine, by extrapolation, the stresses that the component will withstand during its lifetime.



This test combines CETEST's capabilities in strain gauge tests on benches (bogie and carbody), with on-track measurement experience in dynamics, brake, pantograph, etc... tests. CETEST has a large number of channels which enables to perform highly complex projects (more than 300 channels).

This type of test is required either for the cause's investigation of crack appearance during service, or for the approval of the tested component (bogies or carbodies) or for the determination of its remaining life.

Examples of the latest projects are: Västtrafik FLEXX, Renfe GC, Baltimore Metro, Vancouver Metro, M7 regional, Essen LRV, Shonbüchbahn EMU, Cairo Metro, Freiburg Tram, Docklands LRV, Toronto Metro...

Alstom and Fundación ONCE strengthen their commitment to continue building more accessible and inclusive mobility

ALSTOM ESPAÑA
Alstom and Fundación ONCE have renewed the framework collaboration agreement they initiated in 2019, reinforcing their commitment to promote the social inclusion of people with disabilities in rail mobility.

Both entities have collaborated to develop more accessible and inclusive projects, including the new Barcelona Metro and the future High-Capacity commuter trains for Renfe. In addition, Fundación ONCE has become a strategic advisor to Alstom worldwide for developing urban mobility solutions.

Through this extension, the mobility projects already underway will be



continued, with a special emphasis on those aimed at improving the usability and comfort of people with disabilities and elders, as well as those focused on the development of smart mobility solutions.

Carlos Mezquita, new General Manager of Thales' Transport business in Spain

THALES

Carlos Mezquita has been appointed as the new General Manager of GTS Transportation Spain, a company belonging to the Thales Group and dedicated to safety activities for rail transport.

As head of the company, he will lead the railway signalling and telecommunications business for high-speed, conventional, commuter and metro lines in Spain and other relevant international markets for the company such as Turkey, Egypt, Greece and Mexico.

He has more than 30 years of professional experience. Since 2007 he has been working for Thales, where he has held various positions of responsibility until reaching the position of Director of Bids & Projects, where he has led the implementa-



tion of projects on both conventional and high-speed lines, culmina-

ting in his recent appointment as head of the activity.



Opening of Stage 1A of Lima Metro's Line 2

SICE

December 21st marked the commencement of operations for Line 2 of the Lima Metro, representing the inauguration of the first underground rail system in the Peruvian capital. This initiative aims to enhance citizens' commuting efficiency, substantially reducing travel durations.

The newly opened stations-Evitamiento, Óvalo Santa Anita, Colectora Industrial, Hermilio Valdizán, and Mercado Santa Anita-are equipped with cutting-edge technology from SICE for ticket sales and validation.

Users have expressed satisfaction with the innovative system, which significantly enhances their travel experience.

The implemented ticketing solution covers a range of elements, including ticketing systems -both automatic and manual- and access control with retractable door aisles, extending to portable inspection equipment. All operations are overseen by redundant ticketing control centers utilizing the SIDERA AFC (Portare) software solution developed by SICE.

Beyond elevating user experience, this array of advanced technologies ensures the efficient and secure functioning of Lima's underground transport system.

In its inaugural week, Metro garnered notable approval from the population, as reported by the Urban Transport Authority for Lima and Callao (ATU), a technical entity affiliated with the Ministry of Transport and Communications (MTC). A total of 92,565 users benefited from complementary travel on Stage 1A of Line 2 of the Lima and Callao Metro during this period.



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STADLER

FGC awards a UPS tender in all its interlockings

SALICRU

Salicru has been selected to install devices in all interlockings of Ferrocarrils de la Generalitat de Catalunya (FGC) not yet equipped with modular Uninterruptible Power Supply Systems (UPS). Each interlocking will have a single power module, adaptable to three-phase, single-phase or three-phase 220v systems to provide the flexibility to interchange modules or devices arbitrarily and without additional concerns. Salicru's equipment is designed to auto-detect and configure itself automatically according to the input voltage and, therefore, meets this requirement.

For reasons of space and efficiency, the contract specifies that devices of



up to 20 kVA in the interlockings can only have one front-access power cabinet that holds both the batteries and the electronics. Each device must have 60 minutes of autonomy

at the power rating of the interlocking. This project further strengthens Salicru's position as a leader in energy solutions and reinforces its standing in the railway market.

Conferencia Qa&Test Safety And Cybersecurity Madrid 18 - 19 April - Círculo De Bellas Artes

SQS

All stakeholders involved in the value chain of railway projects (operators, train manufacturers, manufacturers of signaling technologies, ticketing, passenger information, certification entities, etc.) are immersed in a process of total digitalization applying

new technologies such as artificial intelligence or the internet of things, among others.

These technologies undoubtedly present great benefits: greater efficiency in operation, greater sustainability, better user experience, greater safety in tunnels or level crossings or in driving itself, etc. but we must not forget that the connectivity involved (to the cloud, to other infrastruc-

ture, to IoT devices...) generates new risks and threats that we cannot ignore. Vulnerabilities in information systems can cause a huge impact on the operation and safety of railway services, and even more so, if we talk about key systems such as electrical or signaling systems.

Therefore, work and innovation in the field of safety in the railway sector is essential and the increasing dependence on technology and information systems means that operational safety, focused on infrastructure and operation, and cybersecurity, must be addressed in an integral way.

Aware of all the above, the company SQS celebrates, for the fourth edition, its conference QA&TEST Safety and Cybersecurity (Madrid, April 18-19), where we will try to identify the challenges that this necessary integration still presents and explore the different solutions and ways to address them that will allow us to guarantee safety and mitigate the risks associated with the technological innovation that the sector is experiencing.



Ineco enters high-speed rail in Poland

INECO

Ineco has finalised the revision of the technical standards for the development of high-speed rail. This work has been carried out together with CPK (Centralny Port Komunikacyjny

Sp. z o.o.), which has just released version 3.0. of the new Polish high-speed rail standards.

CPK is the public company created by the Polish Government in 2018 and aims to lead the design, management and implementation of the new Warsaw Airport and Poland's

national high-speed rail network (STH project, Solidarity Transport Hub).

Since August 2022, Ineco has carried out this high-level collaborative project together with the best experts from CPK and the Polish Railway Institute, focused on the revision of the technical standards that will guide the design, construction, maintenance and operation of more than 2,000 km of high-speed lines in Poland. This work ensures full integration through interoperability and compatibility with all the most modern and state-of-the-art EU rail traffic control standards.

Advancing Railway Safety and Efficiency: Scalian's Innovations in Monitoring and AI

SCALIAN SPAIN

Operational efficiency and safety are cornerstones of the railway sector. In this regard, Scalian leads the way, offering advanced monitoring, analysis, and observability systems that enable proactive maintenance man-

agement of infrastructure and rolling stock. Our solutions detect potential issues early, optimizing operations and reducing downtime, significantly enhancing reliability and safety. Our expertise in cloud solutions translates into more agile and efficient data

integration and management, essential in the sector. It facilitates a swift response to contingencies and more efficient, adaptive planning, crucial in operational times.

In Artificial Intelligence, Scalian has developed its own generative AI platform currently being implemented in various clients, as well as within its own organization.



Ongoing business in Finland

ICF

After expanding our business to Finland through contracting with a local firm, we are pleased to announce that our project has reached the final stage. We are about to commission nine level crossings whose installations were fully designed by ICF.

The project has been an innovative and technological challenge that has tested ICF's capacity to adapt to extreme weather conditions, carrying out installations at -30 degrees Celsius, whilst collaborating and complying with the Finnish railway administrator.

Despite the technical difficulties, and the strict requirements of the



Finnish administrations, ICF has successfully and efficiently developed a technology that met all of

our client's demands. This project has proven the tenacity and innovative character of ICF's team.

CITEF will be developing the Granada Metro Driving Simulator

CITEF
Andalucia Regional Government, through the Public Works Agency (AOPJA) of Andalucia Regional Government, has awarded CITEF the design, installation and commissioning of a driving simulator for the training, recycling and assessment

of driving staff in the Granada Metro system.

The Granada Metro Driving Simulator will have a student station and an instructor station, as well as an observation space for the remaining students during training activities. The software will be able to replicate train behaviour, simulating the effects of acting on the controls;

traction and braking curves; the configuration of instruments; headlight, windscreen wiper and communication controls; and the operation of passenger doors, among others.

This simulator will be installed inside workshops and depot building and will reinforce driver training by simulating real situations that will enable drivers-in-training to develop the necessary driving skills. Besides simulating normal operation, the device also simulates faults and incidents that occur during real operation so that these situations can then be addressed more effectively as a result.

The technology developed by CITEF will also allow instructors to create exercises that reproduce real driving situations with or without incidents. They will be able to directly observe the operator's performance; record, extract and work with data from any scenarios implemented; analyse the results achieved and assess and improve the students' performance.



SEGULA Technologies celebrates 20 years in Zaragoza

SEGULA TECHNOLOGIES
In 20 years, SEGULA has gone from having 8 people in Zaragoza, to having more than 200 dedicated exclusively to the development of rolling stock projects.

Currently located, one of SEGULA's bets for 2024. Furthermore, as a result of this constant growth, since 2012 it has held the distinction of "International Centre of Excellence in the railway sector" within the international engineering group.

Today, SEGULA Zaragoza is one of the largest railway engineering offices in Spain and, thanks to the diversification of its areas of knowledge and service, it has the capacity to develop integral rolling stock projects, offering a complete service to its clients.



SEGULA Technologies began its journey in the railway sector in Spain in 2004, with the acquisition of a local engineering company of Zaragoza called GRINSA. In these 20 years, SEGULA Zaragoza has grown year by year to the current figure of more than 200 people working in its offices in the city centre, as well as managing other workers in Catalonia, the Basque Country and Madrid, where the RAM-Safety and Signalling departments are currently located.



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[siemens.es/mobility](https://www.siemens.es/mobility)

SIEMENS



Rome opts for CAF's Urbos Trams

CAF
The operator ATAC S.p.A., the public transport concessionaire for the metropolitan area of Rome, has awarded CAF the framework agreement for the supply of the new fleet

of trams for the Italian capital. The contract covers the design and manufacture of 40 trams, their maintenance for a period of 5 years and the corresponding spare parts. The units belong to the Urbos tram platform, which has more than 1,000 vehicles in service in more than

20 countries and 50 cities worldwide. The tramway will consist of 5 modules and can be equipped with OESS (On Board Energy Storage Systems) for catenary-free operation, thus achieving less visual impact on the historic Italian city and greater energy efficiency.



CAF signs a record 2023 in on-board ERTMS equipment contracts

CAF SIGNALLING
The CAF Group's signalling division has closed 2023 with contracts to equip more than 450 vehicles with on-board ERTMS and ATO (Automatic Train Operation). In total, it sums more than 1,300 equipped vehicles, covering all types of vehi-

cles, both new and retrofit. In barely ten years, CAF has expanded its geographical presence - in terms of signalling- in four of the five continents. Specifically, it has projects in Spain, the Netherlands, the Czech Republic, Slovakia, Poland, Hungary, the United Kingdom, New Zealand, Australia, Mexico, Uruguay, the United Arab Emirates and Arabia.

In fact, CAF's signalling business is already a leader in markets such as the Czech Republic, where it has a total of more than 400 vehicles equipped with on-board ERTMS; or the Netherlands, with more than 275 references. It has also achieved one hundred percent market share in on-board ERTMS in New Zealand, where one of the fleets has also been equipped with ATO over ERTMS.



Remodeling of the tracks at Montcada – Bifurcación station

SIEMENS RAIL AUTOMATION
Siemens Rail Automation will remodel the tracks at Montcada – Bifurcación station, located in Barcelona.

The project, awarded by Adif with an execution period of 26 months, includes the tests, documentation, operations, materials and works necessary for the assembly, execution of the works and installations, establishing the provisions and construction stages required, including in coordination with the contracts of other subsystems, to guarantee rail traffic at all times on the sections of the line that are currently in service.

The planned works include Westrace MK2 IxL, ERTMS, blocking and CTC Barcelona (Controlguide Rail9000) modifications; as well as the implementation of new field elements such as track circuits, LED signals, etc



The experience of an operator for the benefit of your mobility projects



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The **ticketing system** that works via a smartphone without need of physical infrastructure

Advanced Driver Assistance System designed to monitor operations and to avoid accidents due to over speeding

SIMOVE
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In terms of institutional participation, the Minister of Transport and Sustainable Mobility, Óscar Puente, who opened the second day of the edition, focused on the railway as "the centrepiece" to achieve a sustainable, healthy, and safe transport and mobility and to decarbonise the economy. Therefore, the Government and the Ministry will continue to commit to its development and the improvement of its reliability and capability. "The railway is a priority for the Spanish Government," he stated after confirming his "commitment" to its innovative industry and public transport, during his visit to Rail Live!

After his speech, he toured the stands of the fair, where he explained that "the Spanish railway system is a benchmark for its contribution to socio-economic development and the structuring of the territory, its innovative, safe and sustainable nature and its decisive impact on connectivity and connection with the world". "A success that has been achieved thanks to the policies deployed by the Government and the joint work

Madrid hosted the largest edition of **Rail Live!** from 29th November to 1st December 2023

Under the title "Technology, innovation and strategy for the entire railway supply chain", the opening and welcoming of the event was made by Sean Willis, Terrapinn Managing Director, and Víctor Ruiz, President of Mafex.

The event was developed with the collaboration of Adif, Renfe, the Spanish Railways Foundation, the Spanish Railways Technological Platform, ICEX, the Autonomous Community of Madrid, Madrid City Council and Metro de Madrid.

A programme full of panels and presentations was presented where businesses, operators, and experts once

THE 2023 EDITION HAD MORE THAN 5,600 PARTICIPANTS FROM MORE THAN 85 COUNTRIES. THE CONGRESS PROGRAMME WAS MADE UP OF 300 SPEAKERS AND AN EXHIBITION AREA WHERE MORE THAN 250 COMPANIES PRESENTED THEIR SOLUTIONS AND PRODUCTS.

again shared experiences in a forum where aspects such as R+D, sustainability or safety had a special role. It should be noted that the agenda covered current affairs for the future development of the industry, such as: Liberalisation, Goods, Megaprojects, Metro, Light Rail, Digital Control of Trains and Telecommunications, Sus-

tainability and Energy, BIM, and Digital Transformation, among others.

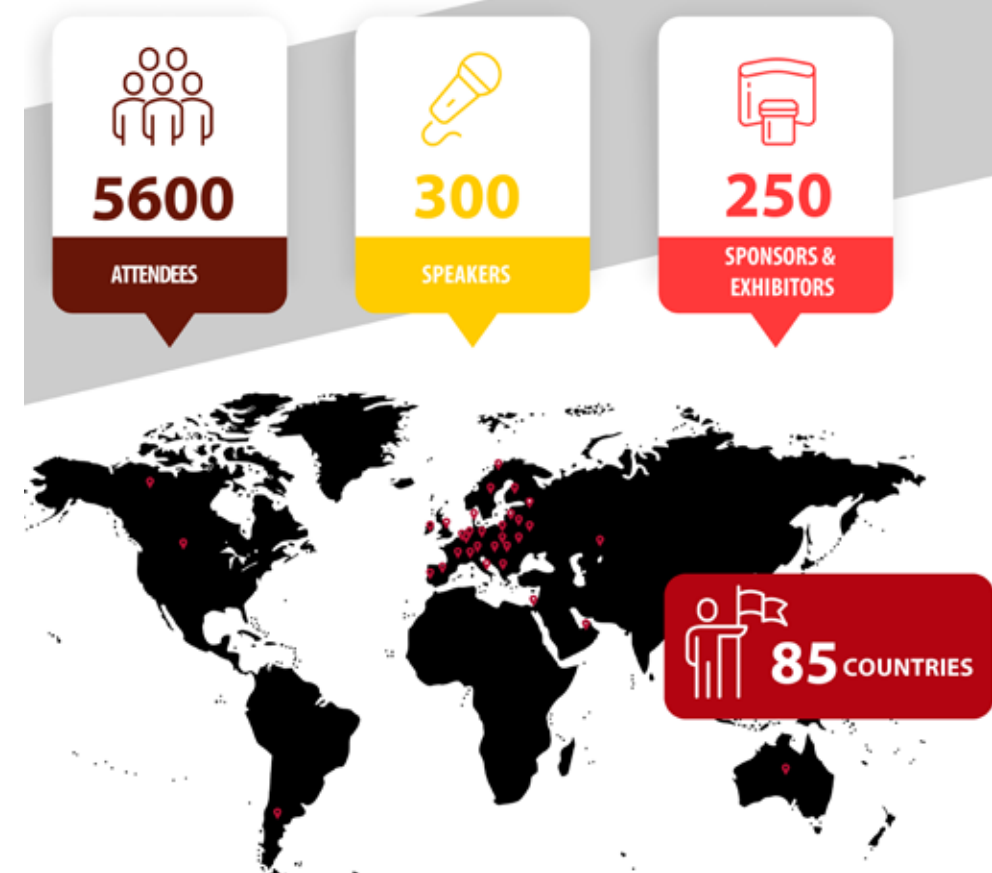
This edition will also refer to the railway sector as an attractive sector for employment and the initiatives that are being carried out to attract and retain talent, as well as the new profiles that need to be incorporated.

Zaragoza will host from 26th to 27th November 2024 the reference event of the railway sector in Spain

Among the main international speakers there were executives from Infraestruturas de Portugal (IP), DB Netze (Germany), EFE (Chile), DB Cargo (Scandinavia), Banedanmark (Denmark), Metro SNCF (France), Transport for London (United Kingdom), Mercitalia (Italy), RTA Chicago (USA), and LTG Cargo (Poland) among many others.

The event was also attended by the main national and international businesses in the sector. It is worth noting the sponsoring of companies such as Grupo CAF, NGRT, Talgo, Ineco, among others, as well as the broad national participation.

As for the exhibition area, more than 250 companies exhibited their latest innovations and presented their technological developments, as well as a dedicated area to host more than 80 start-ups.







of administrations and public and private companies, which have made it possible to place the railway industry at the forefront and turn it into an international benchmark for innovation".

Mafex presented an intense agenda during Rail Live!

As co-organiser of the event, MAFEX presented an intense agenda of activities.

On the first day, Víctor Ruiz, President of the Association, and Sean Willis, Terrapinn Managing Director, launched and welcomed the new edition. During the opening of the second day, Concepción Ortega, Vice-President of Mafex, gave way to the intervention of the Minister of Transport and Sustainable Mobility, Óscar Puente.

Mafex was also in charge of introducing each of the panels that made

up the programme of the "Symposium in Spanish" where the main collaborating entities of the event presented their new developments and discussed the latest trends in the sector. It is worth noting the one referring to: How can I work with the leading companies in the sector? Moderated by Ainara González, Head of Trade Policy and Institutional Relations at Mafex and with the participation of Ricardo Cifré, Purchasing Director of Alstom Spain and Portugal, Elena Moral, CEO of Talgo and Concepción Ortega, Global Market Lead of Idom, which discussed the needs that the leading businesses of the railway industry value chain are having, and how to be part of their network of collaborators.

As for the congress programme, it is worth highlighting on the one hand the panel moderated by the second Vice-President of Mafex,

Luis Fernández, on the digital future of the railway: what do operators, infrastructure managers, governments and technology providers need to make it a reality? UNIFE, TMB, Centralny Port Komunikacyjny, and Cross River Rail Delivery Authority participated in this panel.

On the other hand, the panel on "National roadmaps on the future deployment of ERTMS" moderated by Garazi Carranza Ruiz de Loizaga, Head of Innovation, included the participation of Finnish Transport, Infrastructure Agency, SBB, Rete Ferroviaria Italiana and NS.

As for the objective of giving visibility to the technological capabilities of the Spanish railway industry, Mafex organised two "Innovation tours" in the exhibition area. Two guided tours of the stands of exhibiting member companies that had the opportunity to showcase their product, prototype, technological

solution, or innovative service to the audience.

With regards to talent, we organised two student tours of our members' stands with the Asociación de Centros de Formación Profesional (FPEmpresa) (Vocational Training Centres Association), in addition to promoting, together with Terrapinn, an area dedicated to the human resources teams of the main companies in the industry, and the meeting with students and professionals interested in a career in the railway field.

In the field of internationalisation, Mafex organised together with the German Railway Industry Association on the one hand, a meeting with the delegation of more than 25 German exhibiting companies, and on the other, a working breakfast for the Spanish and Portuguese industry with the Portuguese Railway Platform and AICEP Portugal, which was attended by more than 60 repre-

Within the framework of the event, the collaboration agreement that Mafex has with Metrotenerife was once more renewed, and thus the internationalisation of the Spanish railway sector was strengthened.

The objective of this agreement is to establish a stable framework for collaboration between both organisations to support the competitive improvement and internationalisation of both entities as well as the companies associated with the latter. The aim of this alliance is to promote the joint and collaborative development of the Spanish railway industry inside and outside the national territory.

sentatives of the railway sector from both countries.

The welcome meeting was attended by Pedro Fortea, General Director of Mafex, Paulo Duarte, General Director of the Portuguese Railway Platform, and the Ambassador of Portugal in Spain, João Mira Gomes.

Fernando Nicolás, International Director of Adif, and Miguel Cruz, Portugal Infrastructure President, also delivered presentations. The

session concluded with the signing of a collaboration agreement between the two associations by President João Figueiredo and Second Vice-President of Mafex, Luis Fernández.

It should also be noted that the Royal Tapestry Factory welcomed the main sponsors, exhibitors, speakers, congress delegates and collaborating entities, which hosted more than 300 guests, and the traditional dinner of the railway industry, which brought together more than 100 representatives of the attending companies and delegates of sectoral and business entities.

New edition of Rail Live in 2024, Zaragoza

Zaragoza will host the next edition of the benchmark event for the railway sector in Spain on 26th and 27th November at the city's Palacio de Congresos (Convention Centre). This new edition is in a congress format.

Currently work is underway on the development of the programme, which will feature more than 250 speakers. The event will once again have the support of Adif, Renfe, the Spanish Railways Foundation, the Spanish Railway Technological Platform, and ICEX. Furthermore, this edition will be joined by the Government of Aragón, Zaragoza City Council and Zaragoza Tram.

More information: <https://www.terrapinn.com/conference/rail-live/index.stm>.



The event was developed with the collaboration of Adif, Renfe, the Spanish Railways Foundation, the Spanish Railways Technological Platform, ICEX, the Autonomous Community of Madrid, Madrid City Council and Metro de Madrid

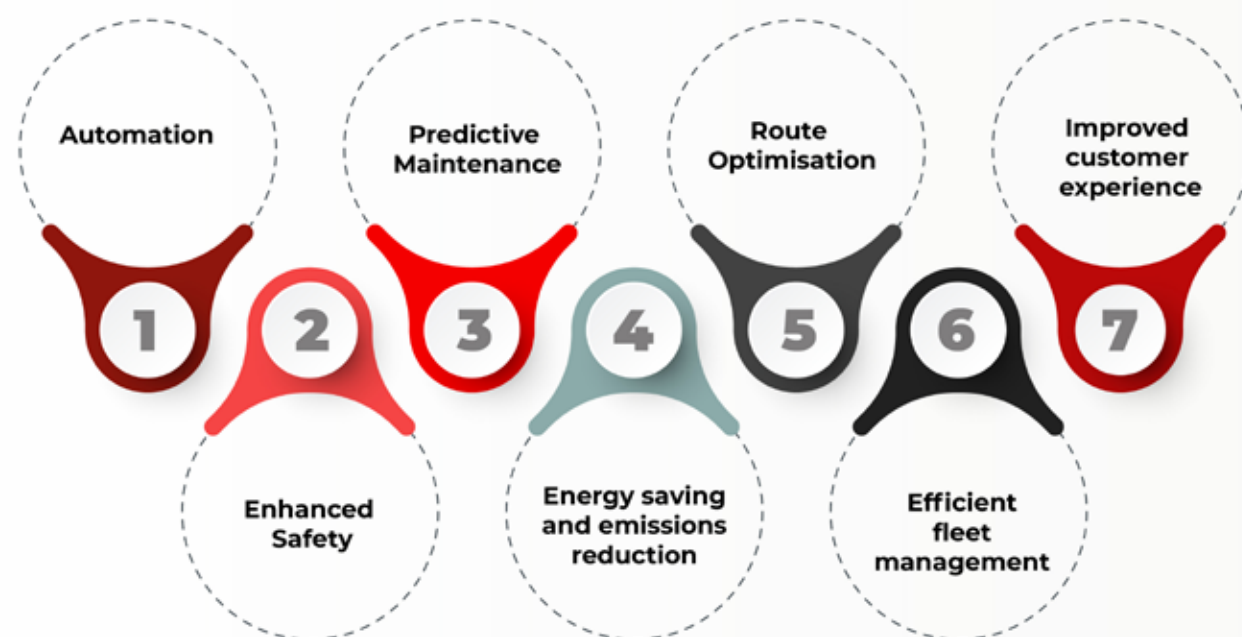
Artificial Intelligence: Innovation for a safer and more efficient railway

AI OPENS A NEW ERA THAT CAN REVOLUTIONISE TRANSPORT AND BRING NUMEROUS BENEFITS IN DIFFERENT FIELDS SUCH AS AUTOMATIC TRAIN OPERATION, OPERATIONS MONITORING IN REAL-TIME, PREDICTIVE MAINTENANCE, IMPROVED EFFICIENCY, OR INCREASED SAFETY, AMONG MANY OTHER ASPECTS. ACCESS TO DATA, SCALABILITY AND CYBERSECURITY ARE THE MAIN CHALLENGES THAT THE SECTOR WILL HAVE TO FACE.

Technologies based on Artificial Intelligence (AI) are beginning to make their way into the railway sector, a field where they have great potential for development and where they will play an increasingly prominent role. The use of these developments, which is currently in an emerging phase, opens up a wide range of possibilities to make the railway a safer, more efficient, sustainable, and attractive mode of transport.

The ability for machines to programme jobs with characteristics typical of human reasoning provides a new perspective on mobility on a global scale. The present and future developments in which these solutions are applied will have an impact on the transformation of the railway industry. The use of systems that replicate human intelligence and skills through data analysis and task automation will help improve the daily operation of both, passenger, and freight transport networks.

ADVANTAGES



Source: Own elaboration.

Artificial Intelligence has achieved a number of major improvements in the efficiency of the operation of all types of systems

It will also help strengthen the infrastructures' resilience, improve manufacturing processes and maintenance work, and comply with strict quality requirements at the same time.

In this initial phase of implementation, the application of AI has achieved a series of notable improvements in the operation efficiency of all types of systems, the security of networks, as well as contributing to reducing production costs throughout the supply chain, having real-

time information for fast tracking of shipments of goods, to know the status of infrastructures or to provide a more customised service for passengers.

One of the biggest driving forces behind these developments is the railway industry's commitment to open innovation and its collaboration with startups specialising in



this field. This forward-looking approach aims to join forces and moves towards a smart mobility system that has the latest developments in the market.

In terms of benefits for businesses, it offers extensive possibilities in terms of using data more efficiently, refining manufacturing processes and services, and developing new business models.

Challenges

Accelerating the development and implementation of these innovative technologies requires, in turn, responding to numerous challenges and analysing the development of the ongoing innovation projects supported by this technology. It is an emerging tool, which requires a large number of Graphics Processing Units (GPUs) to function and the computing power of a supercomputer. In addition, there are challenges to work on, such as its integration with existing infrastructure and

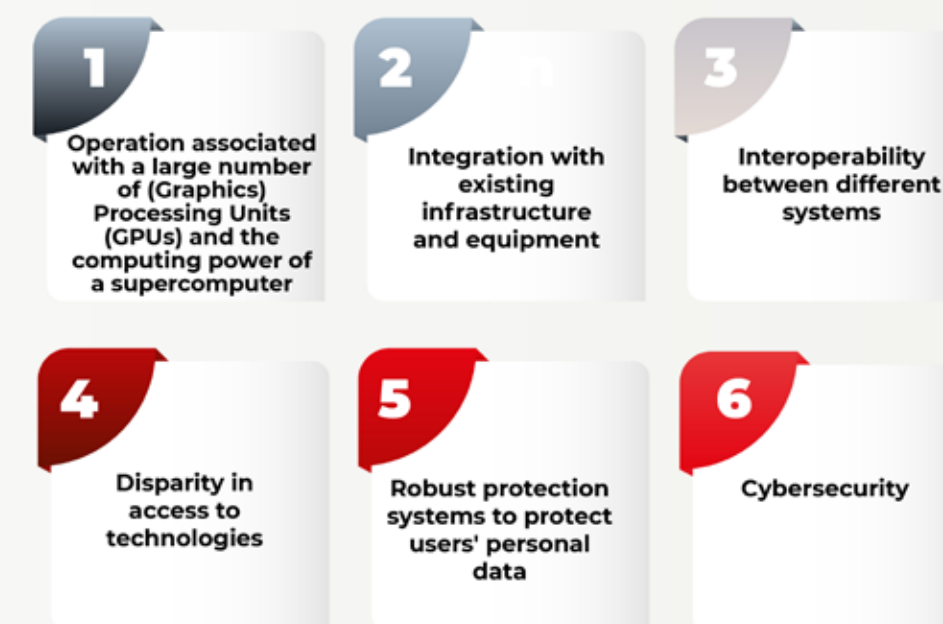
equipment. In this sense, interoperability between different Artificial Intelligence systems will represent another challenge, as different players in the sector can use different technologies and standards. Likewise, its implementation requires large investments in technology and staff training.

Among these topics stands out the monitoring of the proper use of the information. In this case, appropriate regulation is required to ensure data security and privacy, as well as

its regulatory compliance, and to address potential ethical and legal implications. Another major challenge it presents is the high cost of its implementation or the training of skilled professionals to manage and interpret Artificial Intelligence systems.

AI has opened up a disruptive scenario, unprecedented in railway systems, with a future of great prospects, but its evolution entails, in turn, a series of questions that are associated with the future applications that will be incorporated.

CHALLENGES



Source: Own elaboration.

One of the main challenges of Artificial Intelligence is the high cost of its implementation or the training of skilled professionals to manage and interpret the systems



Europe promotes smart mobility

The gradual deployment of Artificial Intelligence in the railway sector comes at a time when the European Union is working both on technological transformation, with specific goals for 2030, and on achieving cleaner, greener and smarter mobility, in line with the objectives of the European Green Deal.

On the one hand, the policy programme "Path to the Digital Decade" sets out the framework that guides actions towards innovation. With this programme, Europe aims to empower businesses and individuals for a sustainable, more prosperous, and human-centred digital

EUROPE HAS PUT IN PLACE SEVERAL MECHANISMS TO ADVANCE IN TERMS OF TECHNOLOGY, WITH THE PROMOTION AND REGULATION OF NEW TOOLS SUCH AS AI, AND IN A SMART, SUSTAINABLE, AND DIGITAL TRANSPORT MODEL.

future. The initiatives focus on four areas, three of which have an impact on the railway industry. Firstly, on the skills front, the target is to have 20 million ICT specialists within six years. As for "Safe and Sustainable Digital Infrastructures", the goal is to increase connectivity and data.

With regards to the area of "Digital transformation of businesses", the aim is to ensure that 75% of

businesses in the European Union obtain a high level of assimilation of technology through the use of the cloud, Artificial Intelligence, or big data. Work will also be undertaken to increase the number of growing start-ups, among others. To this end, an initial list of multinational projects has been established. This list includes areas of investment, such as data infrastructure, 5G communication, high-performance

computing, quantum secure communication, blockchain, digital innovation centres, cyber capabilities, and cybersecurity.

In January 2024, the European Commission went a step further with the launch of a package of measures to support start-ups and SMEs in developing "a trustworthy artificial intelligence that respects EU values and standards". This decision follows the political agreement reached in December 2023 on the EU Artificial Intelligence Act, the first global regulation on the matter, which sets clear rules on its use and supports the development, implementation, and uptake of a safe artificial intelligence at EU level.

Europe, a pioneer in regulating AI

Regarding this regulation, the European States and Parliament gave the green light at the end of 2023 to the final text of the world's first comprehensive law that fully regulates the different uses of artificial intelligence (AI) and establishes clear rules in this regard. This text sets out the rules that should govern the implementation of this technology. The aim is to ensure that the systems used are secure and respect the fundamental rights and values of the European Union, which is why it is considered that they should be monitored by people, rather than by automation, to avoid detrimental outcomes.

As for the obligations for both, providers and users, they are classified according to the level of risk. First, those that pose a threat to people are considered unacceptable and are prohibited. This includes cognitive manipulation of individual behaviour or specific vulnerable groups such as voice-activated toys; real-time and remote biometric identification systems, such as facial recognition; or the social score, which is the classification with AI based on the socioeconomic status or personal characteristics of citizens. The law includes some exceptions such as ex post remote biometric identification systems, in which identification occurs after a signi-

ficant delay and will be allowed to prosecute serious crimes and only when there is prior court approval.

Second, it specifies the applications that are defined as high risk, which are those that adversely affect safety or the fundamental rights and that will be evaluated before they are placed on the market and throughout their life cycle. In this case there are two categories. The first of these refers to AI systems used in products subject to EU product safety legislation; whereas the second details the applications to be made in eight specific areas and which will need to be registered in an EU database. These include the management and operation of critical infrastructures.

As for generative AI, such as ChatGPT, it is indicated that it will have to comply with transparency requirements such as disclosing that the content has been generated by this tool, designing the model to prevent it from generating illegal content, and publishing summaries of the copyrighted data used for training.

Finally, this law also deals with limited risk cases, which "must meet minimum transparency requirements that allow users to make informed decisions. After interacting with the applications, customers can decide if they want to continue using them." This includes systems that generate or manipulate image, audio, or video content.

Europe is working on technological transformation and a cleaner, greener, and smarter transport system

"Efficient & Green Mobility"

Along with this digital roadmap, Artificial Intelligence also finds a scope of application to achieve the objectives of the "Efficient & Green Mobility" programme. The European Commission approved this package of measures at the end of 2021 to support a transition towards a cleaner, greener and smarter mobility, in line with the objectives of the European Green Deal. This is the most ambitious set of initiatives since the publication of the "Sustainable and Smart Mobility Strategy" in December 2020.

The plan focuses on four areas. The first of these is to create a smart and sustainable Trans-European Transport Network (TEN-T); the second is to update the Intelligent Transport Systems (ITS) Directive to adapt it to the emergence of multimodal travel applications and to the connected and automated mobility. The third block focuses on an Action Plan on cross-border and long-distance railway, while the fourth sets out a new Urban Mobility Framework. On this last point, among the many objectives planned, it is to increase the attractiveness of public transport through digitalisation and multimodality, and to promote technologies, innovation, and new mobility services.

Spain

In Spain, the Ministry of Transport and Sustainable Mobility manages

the Recovery, Transformation and Resilience Plan (PRTR) to decarbonise and digitalise mobility and to promote the sustainable transformation of transport. On the other hand, the operator Renfe has launched actions that will improve the passenger experience by improving the information provided in real-time and is working on the digitalisation of security systems in 850 stations.

To guide all of MITMA's actions in the coming years, the "Safe, Sustainable and Connected Mobility Strategy 2030" was created and approved in December 2021. This standard is based on three pillars: safety, sustainability, and connectivity.

In addition, it is structured in nine axes, which are developed through lines of action. Axis number 5, called "smart mobility", includes actions to improve the user experience and the efficiency of the transport system as a whole and the intelligent management of infrastructures: optimising their use, reducing maintenance costs, etc. It also promotes R+D and innovation, automation, and the need to look after job security, new technologies and data protection.

In all these lines, the application of Artificial Intelligence can provide solutions that help achieve safer, more efficient and connected railway systems.



► EUROPEAN UNION INITIATIVES IN THE DIGITALISATION OF TRANSPORT

EU Artificial Intelligence Act

To ensure that Artificial Intelligence systems used in the European Union and introduced into the European market are safe and respect citizens' rights.

- To stimulate investment and innovation in the field of AI in Europe.
- The Artificial Intelligence Regulation should be applied two years after coming into force.

"Path to the Digital Decade"

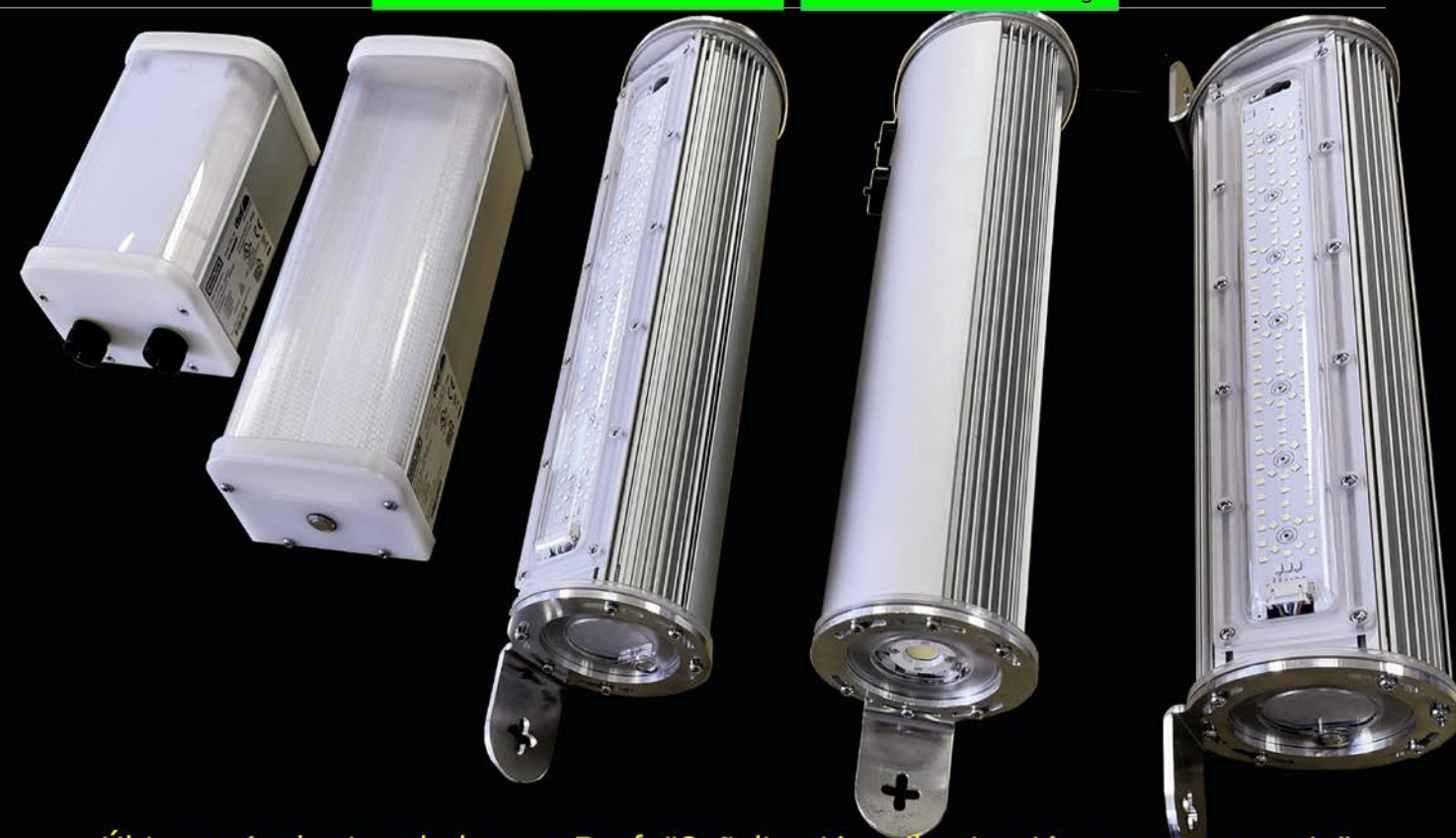
- To increase the number of ICT specialists.
- To increase connectivity and data.

"Efficient & Green Mobility" Programme

- To create a smart and sustainable Trans-European Transport Network (TEN-T).
- To promote digitalisation, innovation, and new mobility services.

*Source: European Commission

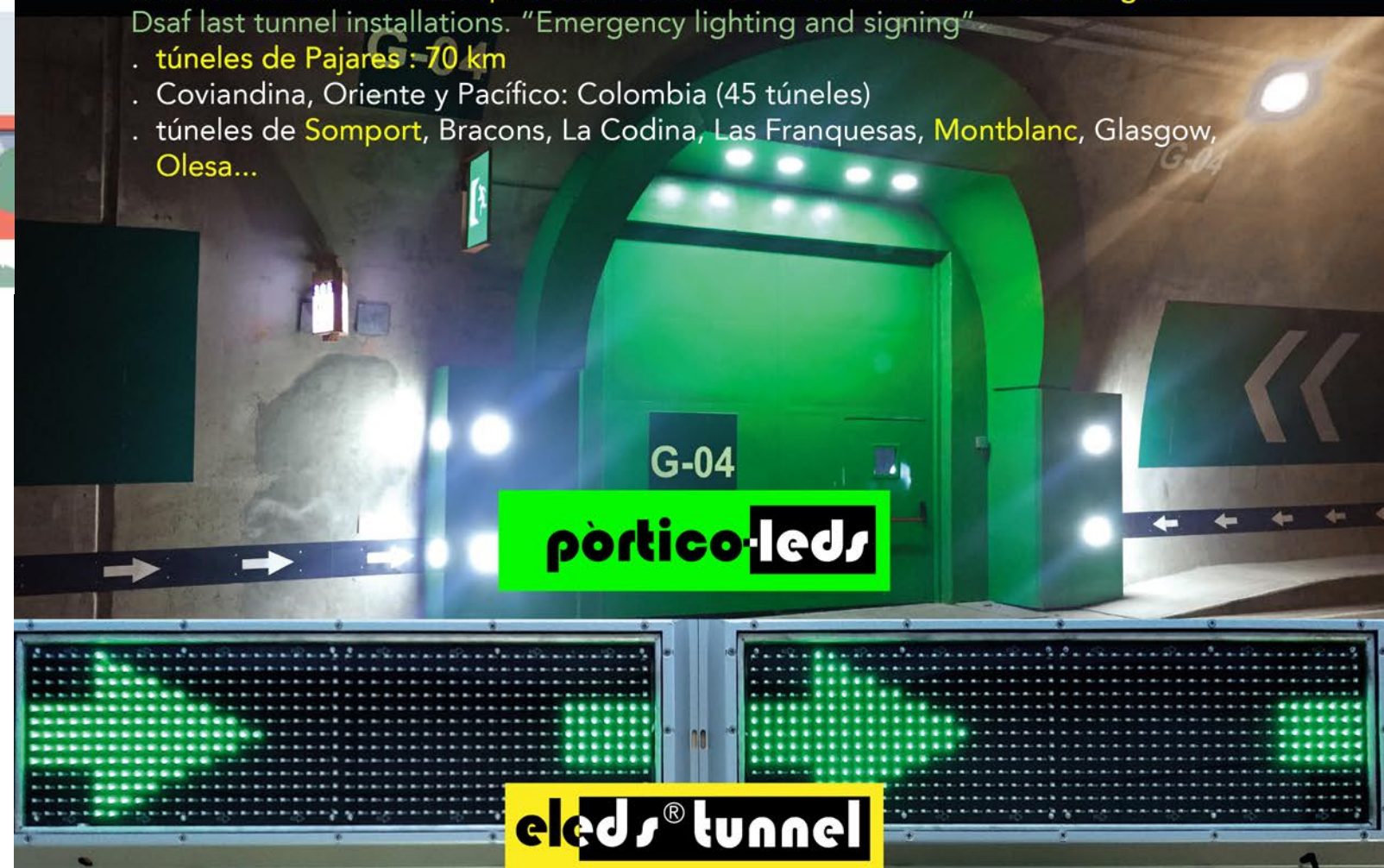
INHELIUM **TUNNEL**® Artificial Intelligence



Últimos túneles instalados por Dsaf. "Señalización e iluminación con emergencia"

Dsaf last tunnel installations. "Emergency lighting and signing"

- túneles de Pajares: 70 km
- Coviandina, Oriente y Pacífico: Colombia (45 túneles)
- túneles de Somport, Bracons, La Codina, Las Franquesas, Montblanc, Glasgow, Olesa...



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DINÁMICAS DE SEGURIDAD. S.L.

AI Applications: New Solutions for the Railway of the Future

THE TRANSPORT SECTOR IS IMMERSING IN A PROFOUND TECHNOLOGICAL CHANGE. THE EMERGENCE OF AI AND ITS APPLICATION IN NUMEROUS AREAS OF THE INDUSTRY MARKS THE BEGINNING OF A NEW ERA IN AREAS SUCH AS EFFICIENCY, SAFETY, AND RELIABILITY.

With the advent of the digital age, the railway sector has also undergone a very significant transformation, which in recent years could practically be called a revolution, driven by the developments in Artificial Intelligence (AI).

Nowadays there is a wide range of applications from different aspects of AI that have changed the way railway systems are planned, operated, and maintained, which has improved efficiency, safety, and customer experience in all aspects of the railway industry.



EDGE COMPUTING

Edge Computing is a technological strategy that consists of processing data as close as possible to where it is generated, rather than sending it over a network to a remote data centre for processing. This option reduces latency, optimises bandwidth, and enables a faster and more efficient decision-making. In the railway industry, it covers a range of applications, including predictive maintenance, energy management, and security and surveillance.

Predictive maintenance is achieved thanks to the sensors incorporated in modern trains that constantly monitor

the condition of critical components, such as engines, brakes, tracks, etc. This data is processed in real-time using Edge Computing to predict potential failures or maintenance needs, allowing repairs to be made before serious and costly problems occur. This computing framework is also very useful for monitoring and optimising energy consumption in real time, adjusting speed and other operating parameters to maximise energy efficiency and reduce costs.

Another application of Edge Computing is in the field of security, through cameras and various surveillance de-

vices distributed throughout the network.

The large volumes of video data they generate are processed locally to detect security events in real time, such as trespassing on the tracks or dangerous behaviour near stations.

Regarding traffic management and logistics, it is also essential in complex railway environments, such as stations and junctions. Train location and status data is processed locally to coordinate traffic flow, avoid congestion, and minimise waiting times.

The mobility OF THE FUTURE travels by train



MACHINE LEARNING

Another relevant technique is Machine Learning, which allows computers to learn automatically and improve with the experience without being explicitly programmed. In the railway field, it is widely used in operation optimisation. Through historical data analysis and in real time, Machine Learning models can identify traffic patterns, weather factors, and other events that can affect ongoing traffic, enabling a more informed and adaptive decision-making.

For example, Machine Learning algorithms are used to optimise train planning and routing, maximising operational efficiency and minimising delays. In addition, Machine Learning is used to predict the demand for railway services, allowing companies to adjust their timetables and allocate resources based on user needs, thus improving customer satisfaction and profitability.

ROBOTICS

Robotics also plays an increasingly important role in the railway field, especially in areas such as track maintenance and the inspection and repair of infrastructure and equipment.

Robots equipped with sensors and cameras can perform detailed and autonomous inspection tasks of vehicles, tracks, bridges, and tunnels, accurately identifying defects and damage. This not only increases the efficiency and accuracy of maintenance operations, but also reduces the risk of accidents by minimising workers' exposure to hazardous environments. In addition, robotics is used in the automation of railway operations, such as loading and unloading of goods, improving efficiency, and reducing operating costs.

BIG DATA

In this digital context, the railway sector generates a large amount of real-time data, including operational, geospatial, meteorological and maintenance information, among others. Unlike Edge Computing, which analyses data objectively in its own environment, Big Data performs the analysis of this data on a large scale.

This tool enables to obtain valuable conclusions and insights that can be used to improve operational efficien-

cy, safety, and customer experience. For example, by analysing passenger flow patterns, businesses can optimise resource allocation, improve timetable planning, and devise more effective marketing strategies. In addition, Big Data is used for other functions such as predictive risk analysis, allowing possible incidents to be anticipated and mitigated before they occur, which contributes to improving the safety and reliability of the service.

DEEP LEARNING

Deep Learning is an AI technique based on artificial neural networks with multiple layers that mimics how the human brain works to process complex data. In the railway sector, it has primarily revolutionised the detection of anomalies and the predictive maintenance of infrastructures.

By analysing large volumes of data such as the vibration, temperature, and sound, collected from sensors installed on trains and tracks, Deep Learning sys-

tems can identify subtle patterns that indicate potential problems in equipment and infrastructure.

In addition, these models can learn independently, allowing businesses to continuously improve their ability to predict and prevent failures. This, on the one hand, increases safety and prevents accidents, which is the main objective, and on the other, it helps to reduce the costs arising from the fault repairs and unplanned maintenance.

INTERNET OF THINGS (IOT)

The Internet of Things (IoT) refers to the interconnection of physical devices that are integrated with sensors, software, and other technology elements to collect and exchange data. Within the railway sector, the IoT plays a crucial role in the real-time monitoring of assets, such as networks, trains, tracks, and the different infrastructure equipment.

The IoT sensors installed on the rolling stock, tracks, and infrastructure equipment collect a wealth of real-time data that provide information on location, speed, temperature, and other relevant variables, enabling accurate tracking

and an efficient fleet management, while serving at the same time to monitor performance, detect anomalies, and prevent failures.

This is due to the fact that the data is transmitted to centralised management systems (Edge Computing and Big Data), where it is analysed and processed to generate alerts and notifications in case of problems. In addition, the IoT is used for inventory management and supply chain optimisation, improving the availability of spare parts, and reducing unplanned downtime.

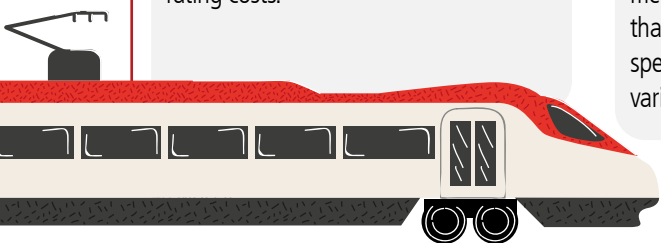


MAFEX

Spanish Rail Industry

2024

FIND OUT MORE ABOUT ALL ACTIVITIES AND SERVICES WE HAVE PREPARED FOR 2024 REGARDING INTERNATIONALISATION AND COMPETITIVENESS AND INNOVATION



Artificial Intelligence has changed the way railway systems are planned, operated and maintained

The technological union

All technologies are used individually or in connection with each other, and in turn they make use of others such as computer vision and natural language processing (NLP). Computer vision applications help railways to improve safety, measure the flow of people, enable smart parking at stations, and provide automated access control. Railway operators can use optical detec-

tion, thermal detection, and alarm systems to protect the operating perimeter. Track monitoring identifies arriving and departing trains with optical detection, thermal detection, long-range display, and panorama mode.

As for its use on board the train, passengers can be provided with information in near real-time, including 3D orientation, event details,

points of interest or multimodal transit data and connections to other modes of transport. Passengers also have the option to connect directly with station inspectors and speak to a manager from their screen.

On the other hand, thanks to NLP (natural language processing), computers have the ability to understand texts and spoken words in the same way as human beings, which greatly facilitates the use of machines by employees at all levels, without the need for them to adapt to the technical language, not accessible to all.

As the science and engineering applied across all these lines con-

AI: EXAMPLES OF APPLICATIONS OF AI ALGORITHMS IN VARIOUS RAILWAY FIELDS

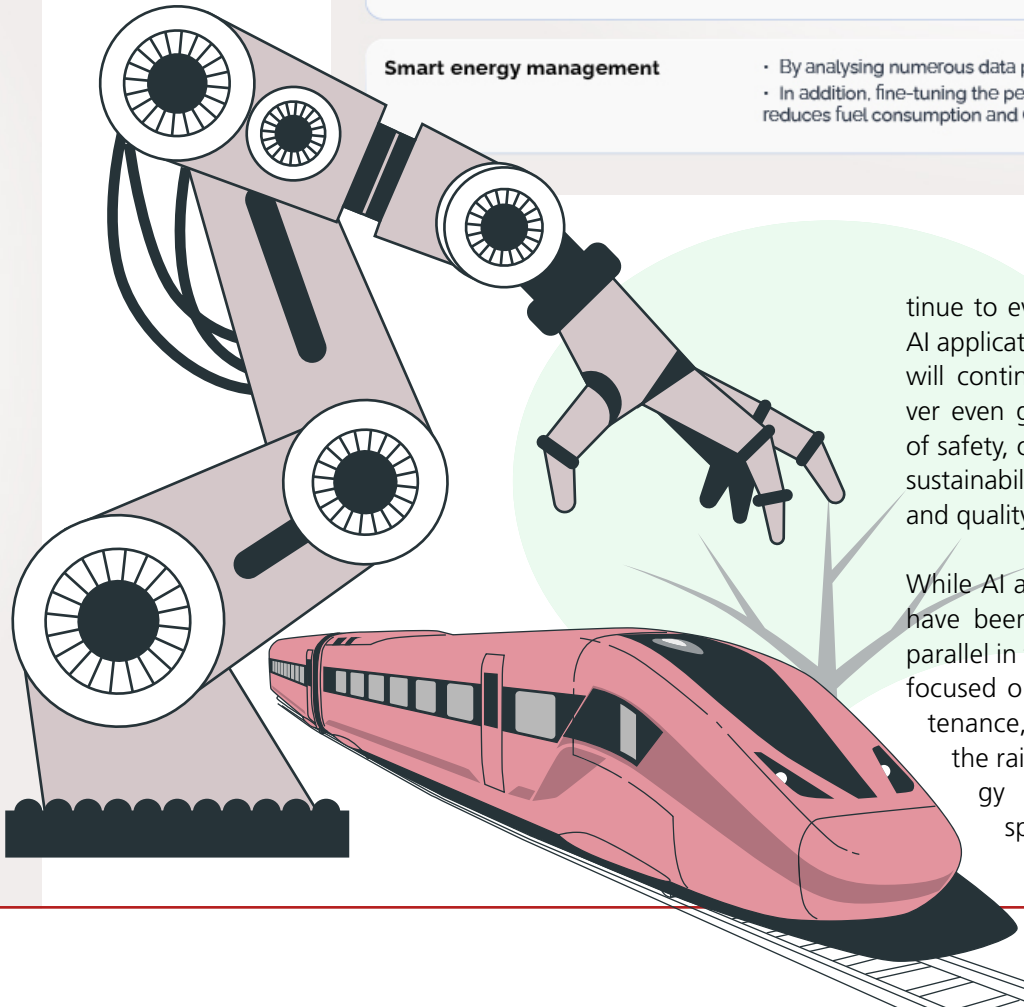
Preventive Maintenance	<ul style="list-style-type: none">• Possible equipment failures are predicted by analysing sensors data.• Experts can perform proactive replacements, prevent breakdowns, and reduce downtime.
Driverless Trains	<ul style="list-style-type: none">• With automatic train control systems, timetables are optimised, traffic is managed, and safe distances are guaranteed.• By automating some functions, operators can focus on more strategic tasks.
Infrastructure safety	<ul style="list-style-type: none">• Sensors and video analysis technologies monitor and detect potential hazards in infrastructure.• AI helps to prevent accidents and ensure safety.
Efficiency in traffic management	<ul style="list-style-type: none">• Digital signalling systems improve the efficiency of traffic management.• Based on AI, train timetables are dynamically adjusted based on real-time conditions, delays are minimised, and traffic flow is improved.
Driverless Trains	<ul style="list-style-type: none">• Driverless trains, which operate in an open environment, are equipped with systems that detect changes or obstacles in real time.• They circulate based on the conditions of their environment.• Train automation brings more capacity, better flow, and regularity and less energy consumption.
Passenger Experience	<ul style="list-style-type: none">• Improving passenger services with the application of AI allows passengers to be provided with real-time information and facilitates smart mobility at stations and during their journey.• Chatbots and personalised travel recommendations also enhance customer experience.
Optimised operations and programming	<ul style="list-style-type: none">• The organisation of team schedules ensures efficiency in the allocation of human resources.• This ensures that the right staff are available when needed.
Smart energy management	<ul style="list-style-type: none">• By analysing numerous data points in real time, energy consumption can be optimised.• In addition, fine-tuning the performance of components such as traction, braking, and general operations reduces fuel consumption and CO2 emissions.

Source: Own elaboration.

AI AND ASSOCIATED TOOLS IN THE RAILWAY SECTOR

Deep Learning	<p>Analysis of large volumes of data.</p> <p>To improve the ability to predict and prevent failures.</p> <p>It contributes to increased safety, and it prevents accidents.</p> <p>It helps to reduce the costs of fault repairs and unplanned maintenance.</p>
Machine Learning	<p>Machine Learning Algorithms to optimise train planning and routing.</p> <p>It helps to maximise operational efficiency while minimising delays.</p> <p>It is used in the prediction of demand for services</p>
Internet of Things (IoT)	<p>It monitors different assets in real time.</p> <p>It collects large amounts of data for further analysis with Edge Computing and Big Data.</p> <p>It manages the inventory and optimises the supply chain.</p>
Edge Computing	<p>It processes data as close as possible to where it is generated.</p> <p>It is used in predictive maintenance, energy management, security, and surveillance.</p>
Big Data	<p>It analyses data on a large scale.</p> <p>It improves operational efficiency, safety, and customer experience.</p> <p>It carries out a predictive risk assessment: greater safety and reliability of the service.</p>
Robotics	<p>It performs inspection tasks with robots equipped with sensors and cameras.</p> <p>It is intended for the automation of freight railway operations.</p>

Source: Own elaboration.



tinue to evolve, it is expected that AI applications in the railway sector will continue to expand and deliver even greater benefits in terms of safety, operational performance, sustainability, cost - effectiveness, and quality of service.

While AI applications in the sector have been being incorporated in parallel in the various areas, mainly focused on predictive asset maintenance, obstacle detection in the railway network, and energy consumption, in 2020 special emphasis was

placed on passenger control. The COVID-19 pandemic raised the urgent need to monitor and control the flow of people to avoid crowds and ensure social distancing and the safety of travellers and employees on trains, platforms, and shared spaces.

In addition to these purely technical applications, examples can also be found at the customer's disposal, such as the means of payment, identification and access to platforms or information systems in stations.

AI research projects, a way to implement the most advanced solutions



In Europe, within the 'Europe's Rail' R&D programme, Artificial Intelligence is the centre of some of the ongoing research. Likewise, in Spain pioneering initiatives have been launched such as the continent's first proof of concept of intelligent navigation,

EUROPEAN BUSINESSES, INSTITUTIONS AND ORGANISATIONS IN THE SECTOR HAVE PIONEERING PROJECTS UNDERWAY TO EXPAND THE APPLICATIONS OF ARTIFICIAL INTELLIGENCE. THE AIM IS TO TEST NEW CONCEPTS AND IMPLEMENT THE MOST ADVANCED SOLUTIONS FOR A SMARTER RAILWAY SYSTEM.

digital security processes, fleet optimisation or accessible stations for

people with hearing impairment, among others.

EUROPE'S FIRST 5G+ AND AI SOLUTION THAT FACILITATES SMART MOBILITY

The Spanish Infrastructure Manager, Adif, leads Europe's first proof of concept for intelligent navigation. It is a solution based on the 5G+ network and Artificial Intelligence (AI) to improve the passenger's experience, facilitating mobility in a railway station.

The solution makes it possible to optimally guide passengers in the stations in real time, considering their accessibility features, to access the train and services.

It also promotes interaction, as it allows to add stops to a route, which will be recalculated straight away.

It also offers the possibility of providing new functionalities for all types of customers, including Adif staff, related to the management of businesses, the better location of information panels, the optimisation of maintenance activities and the control of people in unauthorised areas, among others.

'RENFE SMART SECURITY STATION' (RS3) PROJECT

Renfe is also working on improving video surveillance equipment at almost 500 commuter stations (*Cercanías*). The new procedure collects images from the stations that are integrated into a video analytics system, where they are processed and analysed with artificial intelligence algorithms. Afterwards, the processed images are deleted straight away. In total, this project includes the installation of 6,451 devices for the implementation of a CCTV closed-circuit and an intelligent video analytics system.

EUROPEAN RAILS PROJECT

The RAILS project works on the potential of Artificial Intelligence to contribute to the definition of roadmaps for future research in the next signalling, operational intelligence, and network management systems. It aims to showcase the opportunities for AI in the holistic railway system, including traffic planning and management, passenger mobility, predictive maintenance, autonomous driving, safety, and transport policies, and it also includes main railways and high-speed ones, metro, tram, and Hyperloop.

To do this, it will combine various applications, including machine learning, neural networks, evolutionary algorithms, computer vision, and knowledge-based approaches to railway transport. In addition, it is envisaged that both, pure AI models and hybrid ones will be combining AI and optimisation.

AUTONOMOUS DRIVING OF FREIGHT TRAINS

The leading train builders have launched pioneering projects in this area. In 2020, the automatic train control (ATO) system was tested for the first time in the world in Germany on regional passenger trains with two Coradia Continental units from Alstom, owned by RGB. In 2021, Deutsche Bahn (DB) and Siemens Mobility unveiled the world's first self-operating train, as part of DB's Digital Rail for Germany project.

In 2022, Zaragoza became the first city in the world to start testing for the development of an autonomous tram, by CAF, within the Compass project. In the area of freight, a test of an autonomous and remote driving system began in Belgium in 2023 on the Betuweroute line.

The technology used combines the use of sensors, which monitor everything that happens in the environment, with information processing using artificial intelligence. The extensive data processing capacity provides a high level of security, even in the face of unexpected obstacles.

DAYDREAMS PROJECT

Daydreams' goal is to advance the integration and use of data and reliable artificial and human intelligence, along with HMI displays, for prescriptive intelligent asset management systems (IAMS). In May 2023, the results were presented during the final conference in Brussels. This project was part of the European R&D Shift2Rail programme.

RENFE FLEET OPTIMISATION

Renfe Viajeros has launched a project to optimise its vehicle fleet. This initiative is carried out by the UPintelligence startup, selected in the "TrenLab" open acceleration programme. The solution is based on the creation of a fleet prediction and optimisation model, accompanied by a visualising system for temporal and future data. The objective is to provide a decision-making tool that offers an improvement in scenario predictions, based on the development and use of advanced artificial intelligence algorithms such as Machine Learning or Deep Learning.

ACCESSIBLE INFORMATION SYSTEM FOR THE HEARING IMPAIRED

Renfe has another pioneering project underway to improve accessibility at its stations. It is an accessible information system for the hearing impaired.

A series of elements involved in accessibility are involved in its operation, such as artificial intelligence, emergency signal lamps, Wi-Fi bulbs, Wi-Fi strips or information signs.

This solution is developed by Visualfy, winner of one of the open innovation program-

me 'TrenLab' competitions, with which the operator promotes projects proposed by the participating startups.

The system is based on sound recognition and can detect any alert, such as a fire or evacuation alarm, by sending visual and sensory notifications to customers' smartwatches and smart bands, and to Wi-Fi lamps installed in various locations of the station. Using a coloured light code, the app converts sounds into colours and visually reinforces the information.

SOME MAFEX MEMBERS WITH

Artificial Intelligence to diagnose the health of railway infrastructures**► ALSTOM**

Alstom Spain's Data Science team has developed a new artificial intelligence solution that provides early warning of track degradation and avoids service limitations or possible derailments.

When exposed to extreme temperatures, railway tracks can suffer sudden deformations. Until now, the most reliable method of predicting this type of deformation has been based on weather forecasts, with speed restrictions to allow train drivers to stop the train in the event of a sudden buckling.

The Alstom solution uses the data collected by the track circuits in real-time to make a prediction based on the state of the tracks rather than on external conditions. Therefore, it is possible to reduce the number of incidents and traffic restrictions and deploy a team to the area before the buckling occurs to minimize damage.



Rail buckle caused by high temperatures.

This technology has already been implemented in the United States, where

rail buckling causes approximately 30 annual derailments.

DiGAV: artificial intelligence for track inspection**► INECO**

Ineco has been using artificial intelligence for nearly ten years, both in projects for clients and in developing its own solutions such as DiGAV, a device for automated inspection of railway tracks and data processing with artificial intelligence.

The device has seven cameras, plus three stereoscopic cameras, which enable the generation of 3D models. From the information collected by these devices it is possible to visualise the rail from all angles, as well as to perform measurements on the generated models.

All this collected information represents a qualitative increase when assessing the condition of the track as it allows, for example, to see the track web in detail, which is not possible with other on-board equipment that only takes/captures zenithal information of the track body.

Thanks to analytical processes, based on artificial intelligence and image processing algorithms, it is possible to process all the information collected and automatically detect defects such as missing assets, correct positioning, automatic asset inventory or ballast shoulder assessment.

All the information collected is stored in the servers allowing its evaluation and analysis and opening the possibility of developing

predictive maintenance models or generating digital twins. In addition, thanks to its continuous shooting system, this prototype makes it possible to increase the inspection speed to 3.5 km/h, which reduces the duration of track runs by 30-40% (in an area of 200 km of double track we would go from the current ten weeks to less than seven weeks) and generates an increase in the quality of graphic and analytical data collection that does not depend on the human factor.



ARTIFICIAL INTELLIGENCE PROJECTS

Artificial Intelligence for intelligent train configuration according to demand**► SEGULA TECHNOLOGIES**

With the aim of studying the potential use of artificial intelligence in the railway sector, SEGULA Technologies plans to initiate this 2024 a project focused on the intelligent configuration of seats in urban rolling stock. To achieve this, SEGULA will build upon two previously designed seat concepts, the "KATHISNEA" module and the "GECKO" seat, both capable of blocking in various ways to increase the space available for standing passengers. With information obtained from control cameras (from stations or even the train's CCTV) and the operator's own data (usage statistics, pos-



sible events, etc.), the system will be able to predict occupancy and adapt seats to anticipate space demand, by blocking or unblocking seats to restructure the specific areas of the train where they are installed

(for example, to maximize space available for standing passengers, to enable an area for people with reduced mobility or for a baby stroller, or even to ensure social distancing in a pandemic situation).

Broadband communications for the train of the future**► TELTRONIC**

The massive introduction of IoT elements and the sensorisation of both the rolling stock and the infrastructure itself, as well as their analysis in real time through AI applications, will enable maintenance and safety operations to be automated, improving the efficiency of the operation.

The monitoring of different subsystems in real time requires new broadband communication systems that allow the transmission, reception and use of increasing volumes of data, and that offer minimum latencies to be the enabling technology for all the applications that arise in the field of railway digitisation. Teltronic, in line with FRMCS (Future Railway Mobile Communication System), is developing 4G



and 5G private network solutions that will support the train of the future.

Artificial Intelligence in the railway sector**► SIEMENS MOBILITY**

Talking about artificial intelligence (AI) in the railway sector means opening the door to one of the most promising horizons with the greatest potential in the history of this mode of transport.

Today, although we do not have a formal and universally accepted definition of AI, we could say that we are talking about computer systems that can perform tasks that require human intelligence and cognitive abilities such as learning, reasoning, memory or perception.

The availability of this type of systems, which will enable reliable prediction and decision-making based on data and experience, will

represent a very significant evolution in fields as varied as predictive maintenance, energy consumption or optimization of railway operation, improving maintenance and operation costs, performance and availability of the network. An example is the intelligent traffic regulation system called AIRO, a solution to adapt in real time the number of vehicles on a line based on service demand

with a learning algorithm based on artificial intelligence.

Although AI has not yet been widely deployed, the first results are very positive. The political context and the acceleration of innovations in this area will bring about a transformation for all players in the sector.



Alstom and Creática join forces to promote STEM education among children and teenagers

Alstom Spain and the Madrid-based NGO Creática celebrated their first year of collaboration in January 2024. The agreement between the two entities aims to increase interest in STEM subjects (science, technology, engineering, and mathematics) at an early age.

Thanks to this agreement, 13 educational meetings with 7 schools have been held in 2023, with the participation of 250 students and 64 Alstom volunteers. In each of these sessions, the students learned about the company's activities, with special emphasis on the new technologies that make rail transport the most sustainable and safest.

These meetings took place at the participating schools, at the Alstom sites in Madrid (Services site in Pinto and Signalling Excellence Centre in



Students visit Alstom offices in Madrid.

Madrid), or at external events (such as the Railway Museum, on the occasion of the European Researchers' Night, or at IFEMA during the celebration of Rail Live! 2023).

In all of them, the students could participate in a "Smart Train" workshop. This dynamic, which

uses robotics technology adapted to children, is based on a small set of tracks and intelligent trains to explain, in a playful way, the basic concepts of railway operation. Students could learn the automation mechanisms implemented to allow, restrict, or modify the transit of trains.

Teltronic obtains the Aragón Circular Seal of Approval

In 2023, Teltronic was awarded the Aragón Circular Seal, a public recognition mark which, through the Department of Economy, Planning and Employment, is granted by the Government of Aragon to companies, local administrations and entities for their commitment to the circular economy model, the performance of good practices and actions to improve their circularity.

This recognition, which is for an initial period of two years and may be renewed, represents a further step in Teltronic's commitment to contribute to achieving a decarbonised, resource-efficient and competitive

economy, all within the framework of excellent, innovative and sustainable management.

For the awarding of the seal, the degree of implementation of the

principles of the circular economy in management, its impact throughout the value chain and its contribution to achieving a more sustainable and efficient economy in the use of resources in Aragon have been assessed.

"Due to the very nature of its activity, Teltronic is not a polluting company that generates large volumes of waste or requires intensive energy consumption, but it is firmly committed to a circular model and to minimising the use of natural and energy resources", explains Jorge Ochoa, head of the company's Environment Department.



ArcelorMittal signs contract with Sarralle to build new electric arc furnace in Spain

ARCELORMITTAL HAS SIGNED A CONTRACT WITH INDUSTRIAL ENGINEERING COMPANY SARRALLE, TO BUILD A NEW ELECTRIC ARC FURNACE (EAF) IN GIJÓN, AS PART OF THE COMPANY'S DECARBONISATION PLAN FOR SPAIN.

Once the new, 1.1 million tons EAF is operational – which is expected in the final quarter of 2025 – the site will be able to switch to producing low carbon-emissions steel for the long products sector, specifically rails and wire rod, making the site highly competitive, in particular for sectors with stringent carbon criteria for public procurement contracts.

Currently, these products are made via the blast furnace route. In addition, a de-dusting system and waste heat recovery unit will be installed by Sarralle, as part of the project

and in order to maximise energy efficiency in the new EAF. The project is part of ArcelorMittal Europe's commitment to reduce CO2 emissions by 35% by 2030.

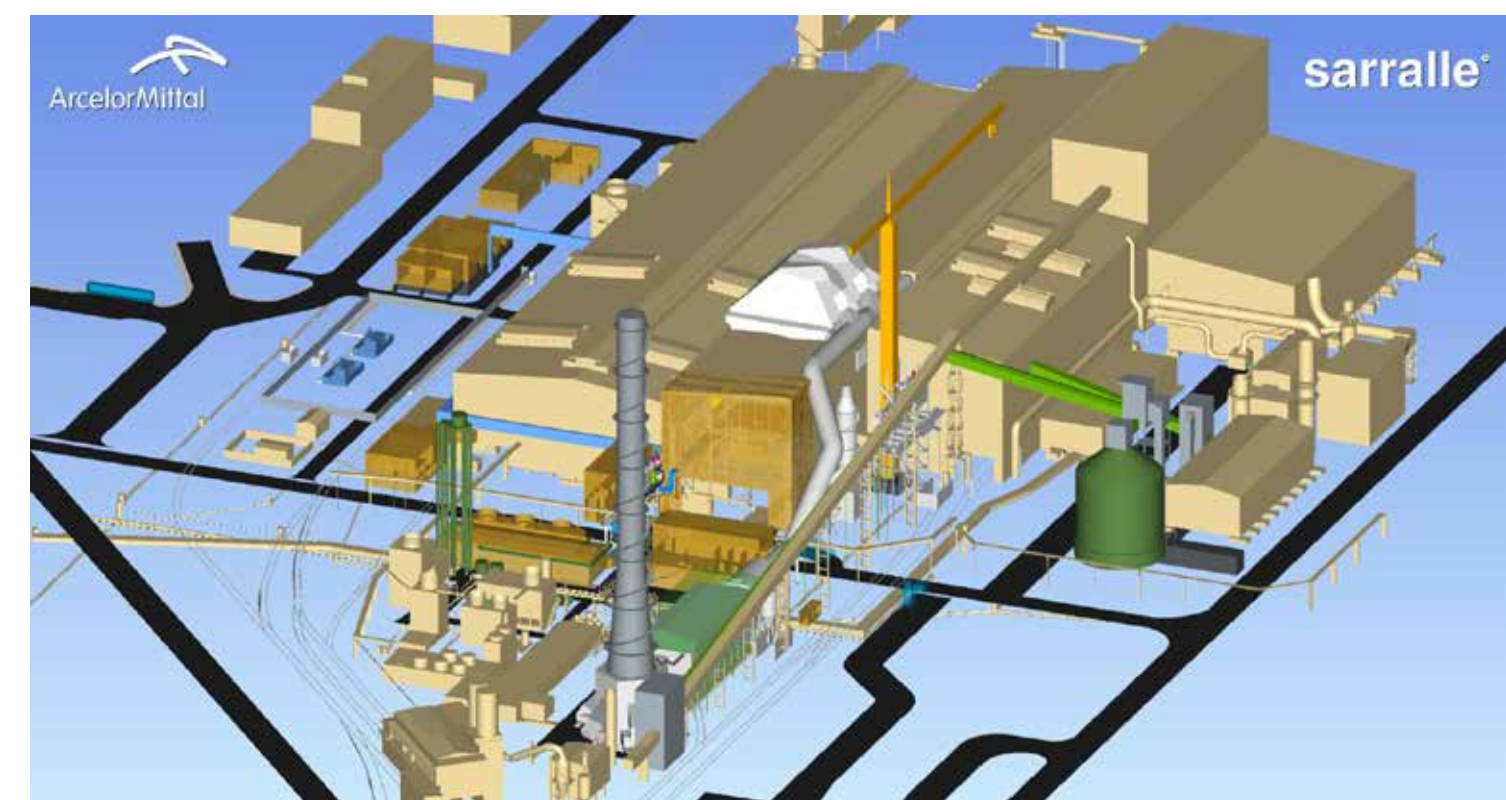
"This is an important part of the decarbonisation programme for the company's steelmaking operations in Spain. We would therefore like to thank all the stakeholders for their ongoing cooperation on this project", said Philippe Meyran, CEO ArcelorMittal Asturias.

Eliás González, CEO of Sarralle, said: "This is a very special project for us. It is the first decarbonisation

project in Spain, which will be carried out with Spanish technology. It constitutes a very important step for the future of the steel industry in Spain, oriented to very high added value products".

Jordi Torné, CEO ArcelorMittal Europe - Long Products in ArcelorMittal Asturias, commented: "This project places the Long Products business in Asturias at the forefront of decarbonization. The installation of this state-of-the-art technology will allow us to produce high added value rails and wire rods, building a sustainable future for our activity, while operating to the highest safety standards".

The new facility in Gijón will be well-placed to support increasing demand for rails, in particular rails made from low carbon-emissions steel, under the EU Green Deal.





The Three Wise Men are in Thales Spain's Transport Area

Through its collaboration with the NGO Cesal, which promotes the human development of the most disadvantaged people in the world, the Transport area of Thales Spain has once again launched a solidarity action during the Christmas event it organises annually for its professionals in Madrid.

Thales has been collaborating with this NGO for more than 10 years, among other actions in the Christmas solidarity event, where it has been the beneficiary of various actions to collect food or toys depending on the need of the moment. In 2023, this collaboration has been reinforced, once again launching a collection of toys, books and dolls.

THIS SHOW OF SOLIDARITY HIGHLIGHTS THALES SPAIN'S ONGOING COMMITMENT TO THE WELL-BEING OF THE COMMUNITIES IN WHICH IT OPERATES, FULFILLING THE SUSTAINABLE DEVELOPMENT GOALS: REDUCING INEQUALITIES (SDG10) AND PARTNERSHIPS TO ACHIEVE THE GOALS (SDG17).

Each attendee of the event was invited to participate with a solidarity gift, destined to brighten the Christmas of those children whose families are experiencing financial difficulties.

The solidarity of Thales Transport employees made it possible to collect 400 toys, board games, dolls, books, etc. in this last edition. All these gifts were added to the "Te invito a cenar" programme, an initiative organised by different entities which was attended, as every

year, by more than 1,000 people without resources. At this event, families facing difficulties had the opportunity to celebrate Christmas in a special way.

This show of solidarity highlights Thales Spain's ongoing commitment to the well-being of the communities in which it operates, fulfilling the Sustainable Development Goals: Reducing Inequalities (SDG10) and Partnerships to Achieve the Goals (SDG17).

Lantania obtains ISO 20400 certification for Sustainable Procurement

Lantania has obtained the ISO 20400 Sustainable Procurement certification that accredits its good practices in supply chain management. With this standard, the Group endorses its commitment to the principles of social sustainability and those of the United Nations (UN) through its procurement strategy and processes.

The company became the second in the construction sector to obtain this certification awarded by the Spanish Association of Purchasing, Contracting and Procurement Professionals (AERCE) under the guidelines of the International Federation of Purchasing and Supply Management (IFPSM). Both entities guarantee responsibility for the sustainable and efficient management of the Group, as well as the generation of added

THE COMPANY BECAME THE SECOND IN THE CONSTRUCTION SECTOR TO OBTAIN THIS CERTIFICATION AWARDED BY THE SPANISH ASSOCIATION OF PURCHASING, CONTRACTING AND PROCUREMENT PROFESSIONALS (AERCE) UNDER THE GUIDELINES OF THE INTERNATIONAL FEDERATION OF PURCHASING AND SUPPLY MANAGEMENT (IFPSM).

value both for its direct value chain and for society.

With the collaboration of the consultant Fullstep, the Lantania Group has carried out an exhaustive 12-month process to analyse its management model and carry out the necessary modifications to obtain the certification.

The standard, which is private and valid for three years, provides guidelines for integrating sustainability into an organisation's procurement strategy, and defines the principles of

sustainable procurement in terms of accounting, transparency, respect for human rights and ethical behaviour.

Obtaining this certification demonstrates "the process of continuous improvement of Lantania's Procurement division, in line with the Group's strategy of sustainability, ethics and social responsibility. Achieving this also allows us to have greater supply chain security and supplier risk monitoring to ensure that our procurement is responsible," says Lantania's Chief Procurement Officer, Ignacio Chacón.



Technology to improve the inclusivity of railway environments

Alstom Spain, in collaboration with the Bidons Egara Chair of the Miguel Hernández University (Elche) and Instead Technologies, a UMH Science Park company, presented the innovation project INT4ALL. This project aims to facilitate assistance to people with disabilities in railway environments.

THIS PROJECT AIMS TO FACILITATE ASSISTANCE TO PEOPLE WITH DISABILITIES IN RAILWAY ENVIRONMENTS.

The system consists of a Bluetooth device placed in a bracelet for the user; and a series of sensors installed in the station that detect the device when a user accesses the perimeter. When a person needs help, they press the button on their wristband, their position is located via the security cameras, and an operator moves in to assist.

If the station has to be evacuated, the person will be assisted immediately without pressing the wristband. In addition, the device is removable and can be attached to other assistive devices such as a smart cane, a wheelchair, crutches, or guide dog collar.

This project reflects Alstom's commitment to creating more inclusive and safer environments for people with disabilities. The development of accessible and universal mobility solutions that meet the needs of all passengers is among the company's strategic priorities.



INT4ALL uses a Bluetooth device and sensors installed in the station to facilitate assistance in real time.



Soil consolidation under a railroad track in Switzerland

As part of the project for a new industrial railway plant (NSIF) in Castione (Switzerland), it was necessary to cross the railroad embankment and the road with a 1.4 m diameter reinforced concrete pipe under the line.

To avoid ground subsidence that could be caused by driving the pipe, it was necessary to consolidate the foundation soil of the embankment with injections of Uretek Geoplus® expansive resin. The Uretek Deep injections® technology and the Uretek Multipoint® injection system were used for this purpose.

Thanks to the innovative Uretek Multipoint® injection system, it was possible to achieve capillary diffusion of the resin. The result was a homogeneous treatment over the

TERRENO, QUE PERMITIERA MANTENER LAS CARACTERÍSTICAS ÓPTIMAS DEL TERRAPLÉN. THANKS TO THE INNOVATIVE URETEK MULTIPOINT® INJECTION SYSTEM, IT WAS POSSIBLE TO ACHIEVE CAPILLARY DIFFUSION OF THE RESIN. THE RESULT WAS A HOMOGENEOUS TREATMENT OVER THE ENTIRE TERRAIN, WHICH ALLOWED TO MAINTAIN THE OPTIMAL CHARACTERISTICS OF THE EMBANKMENT.

entire terrain, which allowed to maintain the optimal characteristics of the embankment.

Uretek's intervention, which was fast and minimally invasive, also made it possible to carry out the intervention while the adjacent track was in operation. This avoided problems with the railway infrastructure.

The intervention was divided into the following phases:

- Horizontal drilling and grouting of approximately 7.5 m

in length carried out from the slope on the downstream embankment, under track 482 (in operation). These operations lasted 3 days.

- Drilling and vertical injections of 4.5m in length, carried out directly from the platform of line 382, already blocked for railway maintenance operations. Only one day was necessary to carry out these operations.

www.uretek.es

The importance of AI in security solutions



In most productive sectors, artificial intelligence has become a relevant topic for the transformation of processes and optimization of business resources, making them more agile and efficient. This path towards modernization revolutionizes not only the technology developed by companies, but also their security and interaction with the user.

On the technology side, for Teldat, incorporating AI in its communications solutions is a cross-cutting task in all business lines, product teams and R&D engineering efforts. The company applies cloud, security (NGFW) and advanced networking services for demanding and high demand sectors such as transport, banking, large enterprises, and energy, to name a few.

CELER RAIL AND H5 RAIL SHOW HOW, ALONGSIDE 5G CONNECTIVITY, AI IS A FUNDAMENTAL TOOL FOR CREATING A SAFE ENVIRONMENT.

To achieve this level of user confidence, part of the components that make up the Teldat solution are supported by leading companies in the market, such as Google, so that applications such as facial recognition, voice recognition and predictive maintenance are a reality.

Teldat has been developing a powerful AI product roadmap in line with the demands of the rail market. New generations of products such as Celer Rail and H5 Rail show how, alongside 5G connectivity, AI is a fundamental tool for

creating a safe environment. In this context, unwanted object recognition, predictive system analytics and XDR self-healing cyber techniques are the most common use cases in this sector.

Finally, Teldat's innovation efforts have enabled it to obtain the "Cybersecurity made in Europe" seal thanks to the "European Digital SME Alliance", a network alliance of European ICT companies. Teldat thus complies with strict data protection and cybersecurity standards, adding value to European and Spanish companies.

Lastorn technology enables additive manufacturing and turning on one machine

What is LASTORN technology?

The integration of an additive technology device on a Gemini CNC lathe.

The processes tested in the LASTORN project include Laser Cladding (LC) and High Speed Laser Cladding (HSLC). These have proven effective on a variety of alloys, including austenitic stainless steel (AISI 316L) and hot work tool steel (AISI H13). In addition, the use of the Ni superalloy Inconel 625 is being developed.

Advantages of LASTORN technology

One of the most outstanding advantages is the efficiency of powder

deposition, which can reach up to 95% in both LC and HSLC. This translates into deposition rates of up to 1 kg/h, enabling fast and efficient production.

der deposition, which can reach up to 95% in both LC and HSLC. This translates into deposition rates of up to 1 kg/h, enabling fast and efficient production.

Main features of the HSLC module

- High deposition rate
- Solid coatings with good adhesion
- Absence of significant defects (porosity between tracks, pores

- and cracks)
- Minimal heat affected zone and distortion on coated parts
- Final product with improved quality and durability

LASTORN technology applications

LASTORN technology has several potential applications in industry. It can be used to improve the wear and corrosion resistance of industrial parts, and for the repair of damaged or worn parts.



Optimization of environmental efficiency in transport networks: the case of Barcelona Metro and Respira

GUILLEM PERIS – Responsible for the Respira solution from Sener

Urban mobility plays a fundamental role in smart cities. Public transport and underground infrastructure are two of the biggest challenges to guarantee an efficient and sustainable mobility model in large cities. And, delving into these challenges, the ventilation of these spaces is crucial for the well-being of users. This field has benefited in recent years from important advances in technological innovation, with the application, for example, of data analysis, sensors and artificial intelligence to achieve greater environmental efficiency.

There are success stories in Spain that support the development of these tools, one of them being the Barcelona Metro network, which has deployed Respira, a platform based on artificial intelligence, which anticipates problems and optimizes ventilation in underground stations, improving the passenger comfort and reducing energy consumption by collecting temperature, humidity and pollutant data through IoT sen-

THIS SOLUTION NOT ONLY BALANCES ENVIRONMENTAL VARIABLES SUCH AS TEMPERATURE, HUMIDITY AND AIR QUALITY, BUT ALSO OPTIMIZES ENERGY CONSUMPTION AND IMPROVES PASSENGER COMFORT.



sors as well as integration with the infrastructure's SCADA System.

The system deployed by Metro de Barcelona addresses the challenges of underground ventilation by predicting environmental conditions and intelligent management of ventilation equipment distributed throughout the metro network. Its objectives include the reduction of energy consumption and the improvement of thermal comfort and air quality, as well as the identification of improvement points in the network, proposing investments based on cost-benefit analysis.

Advanced engineering for a complex challenge

Respira is based on sophisticated artificial intelligence algorithms that allow precise and adaptive control of

ventilation in real time. This solution not only balances environmental variables such as temperature, humidity and air quality, but also optimizes energy consumption and improves passenger comfort.

Respira's ability to efficiently predict and manage environmental conditions in subway tunnels and stations has been critical to its success in the demanding and dynamic environment of underground public transportation. Since its deployment in the Barcelona Metro, Respira has demonstrated a series of tangible results that reflect its positive impact on the operation and sustainability of the transportation system. Thanks to its implementation, a notable reduction in energy consumption has been achieved, with an annual saving of 6.2 GWh, equivalent to 25.1%.

Indicator	Profit obtained
Temperature	-1.3 °C
Passenger satisfaction	+10.7°C
Fan performance	+20.9%
Annual energy savings	6.2 GWh (2.1%)
Annual financial savings	1.7 million euros
Reduction of annual CO ₂ emissions	1,616 tonnes

Innovation at Siemens Mobility

SIEMENS MOBILITY WORKS TO ACHIEVE SUSTAINABLE, DIGITAL AND INTERCONNECTED MOBILITY THAT HAS A POSITIVE IMPACT ON THE PLANET AND ITS PEOPLE.

Siemens Mobility works to achieve sustainable, digital and interconnected mobility that has a positive impact on the planet and its people. All this considering the railway as the backbone, as it is the most sustainable means of mass transport.

The company's commitment to innovation is evident in its large investments in R&D, which allow it to develop solutions such as, for example, the hydrogen train based on the Mireo Plus H platform, a solution for non-electrified lines and without generating polluting emissions.

Still in the field of optimizing energy consumption, the ATO operation on ETCS, with open interfaces, stands out. This can increase the performance of an existing line by up to

30% and could be combined with solutions for operation under ETCS Level 3.

The organization is also working on the possibility of increasing infrastructure capacity and reducing costs throughout the entire life-cycle. More than a year ago, the first cloud-enabled interlocking, based on the DS3 (Distributed Smart Safe System) platform, went into operation in Austria. In Spain, this solution has also been put into operation for Ferrocarrils de la Generalitat de Catalunya at the Sant Boi de Llobregat station. This is the first digital interlocking system in the cloud in southwest Europe.

In terms of intelligent traffic regulation systems, AIRO stands out, a solution for adapting the number of

vehicles on a line in real time according to service demand with a learning algorithm based on artificial intelligence.

In the area of maintenance, the OMNES solution, a digital service platform for the predictive maintenance of signaling systems, which enables 100% service availability to be achieved.

Also outstanding among the innovative projects led by Siemens Mobility Spain is dōcō, an intermodal platform promoted by Renfe and developed in joint collaboration with NTT DATA, which allows users to plan, book and pay for journeys on different modes of public and private transport through a single app.

The company's commitment to innovation is also reflected in the 25 active patents it currently holds, which allow enable it to be at the forefront of development and export innovation and Spanish talent to more than 25 countries.



MEMBERS DIRECTORY

ENGINEERING, CONSULTANCY AND CERTIFICATION

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

- ▶ ACYGS Sales Management, S.L.
- ▶ Aimen Centro Tecnológico
- ▶ Air Rail
- ▶ Ardanuy Ingeniería, S.A.
- ▶ Asea Brown Boveri, S.A.
- ▶ Caf Signalling, S.L.
- ▶ Caf Turnkey & Engineering, S.L.
- ▶ Calmell, S.A.
- ▶ CEIT
- ▶ Create Human Resources
- ▶ Citef (Fundación para el fomento de la innovación industrial)
- ▶ Dsaf-Dinámicas De Seguridad, S.L.
- ▶ Elecnor Deimos
- ▶ Mieres Rail, S.A.
- ▶ Endavamientos y Señalización Ferroviaria ENYSE, S.A.U.
- ▶ HaslerRail (Secheron Hasler Group)
- ▶ Ibérica Tecnología en Sistemas de Seguridad Ferroviarios, S.L. (ITSS)
- ▶ ICF - Ingeniería y Control Ferroviario
- ▶ Idom-Engineering, Consulting, Architecture
- ▶ Ikusi, S.L.U.
- ▶ Indra Sistemas, S.A.
- ▶ Ineco-Ingeniería y Economía del Transporte, S.A.
- ▶ Ingerop T3, S.L.U.
- ▶ Kruch Sidos, S.L.
- ▶ Luznor Desarrollos Electrónicos, S.L.
- ▶ Scalian Consulting Spain, S.L.
- ▶ Segula Technologies España, S.A.U.
- ▶ Sener Ingeniería y Sistemas, S.A.
- ▶ SGS Group Spain
- ▶ Tecnival, S.A.
- ▶ Teldat, S.A.
- ▶ Teltronic
- ▶ Tekniker
- ▶ GTS Transportation SPAIN
- ▶ TPF Getinsa Euroestudios, S.L.
- ▶ Trigo Group
- ▶ Typsa - Técnica Y Proyectos, S.A.
- ▶ Syneox Rail, S.L
- ▶ Vicomtech

Systems, environmental, financial management and IT consulting

- ▶ Aimen Centro Tecnológico
- ▶ Aquafisch, S.L.
- ▶ Ardanuy Ingeniería, S.A.
- ▶ Asea Brown Boveri, S.A.
- ▶ Citef (Fundación para el fomento de la innovación industrial)
- ▶ Elecnor Deimos
- ▶ Idom-Engineering, Consulting, Architecture
- ▶ Ineco-Ingeniería y Economía del Transporte, S.A.
- ▶ Ingerop T3, S.L.U.
- ▶ Kruch Sidos, S.L.
- ▶ Main Rail, S.L.
- ▶ Scalian Consulting Spain, S.L.
- ▶ Segula Technologies España, S.A.U.
- ▶ Sener Ingeniería y Sistemas, S.A.
- ▶ SGS Group Spain
- ▶ SQS (Software Quality Systems, S.A.)
- ▶ TPF Getinsa Euroestudios, S.L
- ▶ Vicomtech

Technical Specifications Drafting and supervision of rolling stock manufacturing

- ▶ Aimen Centro Tecnológico

- ▶ Ardanuy Ingeniería, S.A.
- ▶ Asea Brown Boveri, S.A.
- ▶ Bureau Veritas Inspección y Testing (Grupo Bureau Veritas)
- ▶ Caf Turnkey & Engineering, S.L.
- ▶ Hispacold, S.A.
- ▶ Idom-Engineering, Consulting, Architecture
- ▶ Ineco-Ingeniería y Economía del Transporte, S.A.
- ▶ Ingerop T3, S.L.U.
- ▶ Segula Technologies España, S.A.U.
- ▶ Sener Ingeniería y Sistemas, S.A.
- ▶ SGS Group Spain
- ▶ Trigo Group

Work supervision

- ▶ Aimen Centro Tecnológico
- ▶ Ardanuy Ingeniería, S.A.
- ▶ Asea Brown Boveri, S.A.
- ▶ Caf Turnkey & Engineering, S.L.
- ▶ Idom-Engineering, Consulting, Architecture
- ▶ Indra Sistemas, S.A.
- ▶ Ineco-Ingeniería y Economía del Transporte, S.A.
- ▶ Ingerop T3, S.L.U.
- ▶ Job Impulse España
- ▶ Segula Technologies España, S.A.U.
- ▶ Sener Ingeniería y Sistemas, S.A.
- ▶ SGS Group Spain
- ▶ Sice Tecnología y Sistemas
- ▶ Syneox Rail, S.L
- ▶ Tpf Getinsa Euroestudios, S.L
- ▶ Typsa - Técnica y Proyectos, S.A.

Product and process certifications

- ▶ ACYGS Sales Management, S.L.
- ▶ Aimen Centro Tecnológico
- ▶ Ardanuy Ingeniería, S.A.
- ▶ Bureau Veritas Inspección y Testing (Grupo Bureau Veritas)
- ▶ Certifer Belgorail, S.A. Sucursal en España
- ▶ Cetest, S.L.
- ▶ Citef (Fundación para el fomento de la innovación industrial)
- ▶ Dsaf-Dinamicas De Seguridad, S.L.
- ▶ Idom-Engineering, Consulting, Architecture
- ▶ Ineco-Ingeniería y Economía del Transporte, S.A.
- ▶ S.A.E. Ibertest
- ▶ Sener Ingeniería y Sistemas, S.A.
- ▶ SGS Group Spain
- ▶ SQS (Software Quality Systems, S.A.)
- ▶ Trigo Group
- ▶ Virlab

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

- ▶ ACYGS Sales Management, S.L.
- ▶ 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.
- ▶ Idom-Engineering, Consulting, Architecture
- ▶ Ineco-Ingeniería y Economía del Transporte, S.A.
- ▶ Ingerop T3, S.L.U.
- ▶ Scalian Consulting Spain, S.L.
- ▶ Segula Technologies España, S.A.U.
- ▶ SGS Group Spain
- ▶ Syneox Rail, S.L
- ▶ Tekniker
- ▶ Tpf Getinsa Euroestudios, S.L
- ▶ Typsa - Técnica y Proyectos, S.A.

Training and simulations tools

- ▶ Aimen Centro Tecnológico
- ▶ Asea Brown Boveri, S.A.

- ▶ Create Human Resources
- ▶ HaslerRail (Secheron Hasler Group)
- ▶ Ingerop T3, S.L.U.
- ▶ Job Impulse España
- ▶ Kruch Sidos, S.L.
- ▶ Lander
- ▶ S.A.E. Ibertest
- ▶ Scalian Consulting Spain, S.L.
- ▶ Segula Technologies España, S.A.U.
- ▶ Syneox Rail, S.L
- ▶ Tekniker

INFRASTRUCTURE AND SUPERSTRUCTURE

Civil works (platforms,stations, depots)

- ▶ Aimen Centro Tecnológico
- ▶ Azvi, S.A
- ▶ Caf Turnkey & Engineering, S.L.
- ▶ Comsa Corporación
- ▶ Elecnor SyP
- ▶ Funor, S.A.
- ▶ ICF - Ingeniería y Control Ferroviario
- ▶ Imathia Construcción, S.L.
- ▶ Lantania
- ▶ Luznor Desarrollos Electrónicos, S.L.
- ▶ Sener Ingeniería y Sistemas, S.A.
- ▶ Uretek Soluciones Innovadoras, S.L.U.

Electrification

- ▶ Alstom Transporte, S.A.
- ▶ Azvi, S.A.
- ▶ Asea Brown Boveri, S.A.
- ▶ Caf Turnkey & Engineering, S.L.
- ▶ Comsa Corporación
- ▶ Cunext
- ▶ Elecnor SyP
- ▶ HaslerRail (Secheron Hasler Group)
- ▶ ICF - Ingeniería y Control Ferroviario
- ▶ Ingeteam Power Technology, S.A.
- ▶ La Farga Yourcoppersolutions, S.A.
- ▶ Lantania
- ▶ Mosdorfer Upresa Rail, S.A.U.
- ▶ Syneox Rail, S.L
- ▶ Telice, S.A.
- ▶ Valdepinto, S.L.

Infrastructure and superstructure equipment and components

- ▶ Aimen Centro Tecnológico
- ▶ Air Rail
- ▶ Alstom Transporte, S.A.
- ▶ Amurrio Ferrocarril y Equipos, S.A.
- ▶ Arcelormittal España, S.A.
- ▶ Artech (Electrotécnica Artech Smart Grid, S.L.)
- ▶ Asea Brown Boveri, S.A.
- ▶ Azvi, S.A.
- ▶ Cables de Comunicaciones Zaragoza, S.L.
- ▶ Caf Turnkey & Engineering, S.L.
- ▶ CEIT
- ▶ Comsa Corporación
- ▶ Create Human Resources
- ▶ Cunext
- ▶ Dsaf-Dinámicas De Seguridad, S.L.
- ▶ Elecnor Deimos
- ▶ ICF - Ingeniería y Control Ferroviario
- ▶ Mieres Rail, S.A.
- ▶ Flexix, S.A.
- ▶ Funor, S.A.
- ▶ Ikusi, S.L.U.

MEMBERS DIRECTORY

- ▶ Laditim
- ▶ Lantania
- ▶ Llallo
- ▶ Mosdorfer Upresa Rail, S.A.U.
- ▶ Precon - Prefabricaciones y Contratas, S.A.U.
- ▶ Pretensados del Norte, S.L.
- ▶ S.A.E. Ibertest
- ▶ Salicru, S.A.
- ▶ Syneox Rail, S.L
- ▶ Talleres Alegría, S.A.
- ▶ Talleres Zitron
- ▶ Tecnival, 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 Corporación
- ▶ Create Human Resources
- ▶ ICF - Ingeniería y Control Ferroviario
- ▶ Imathia Construcción SL
- ▶ Lantania
- ▶ Pretensados del Norte, S.L.
- ▶ Talleres Alegría, S.A.
- ▶ voestalpine Railway Systems JEZ, S..L.

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.
- ▶ CEIT
- ▶ Create Human Resources
- ▶ Endavamientos y Señalización Ferroviaria ENYSE, S.A.U.
- ▶ Electrans, S.A.
- ▶ HaslerRail (Secheron Hasler Group)
- ▶ ICF - Ingeniería y Control Ferroviario
- ▶ Ikusi, S.L.U.
- ▶ Indra Sistemas, S.A.
- ▶ Luznor Desarrollos Electrónicos, S.L.
- ▶ Revenga Ingenieros, S.A.
- ▶ S.A.E. Ibertest
- ▶ Scalian Consulting Spain, S.L.
- ▶ Salicru, S.A.
- ▶ Segula Technologies España, S.A.U.
- ▶ Sice Tecnología y Sistemas
- ▶ Siemens Rail Automation, S.A.U.
- ▶ Tecnival S.A
- ▶ Teltronic, S.A.
- ▶ Telice, S.A.
- ▶ GTS Transportation SPAIN
- ▶ voestalpine Railway Systems JEZ SL

Protection (security) and infrastructure monitoring

- ▶ Alstom Transporte, S.A.
- ▶ Azvi, S.A.
- ▶ Asea Brown Boveri, S.A.
- ▶ Caf Turnkey & Engineering, S.L.
- ▶ Comsa Corporación

- ▶ Create Human Resources
- ▶ Dsaf-Dinamicas De Seguridad, S.L.
- ▶ HaslerRail (Secheron Hasler Group)
- ▶ ICF - Ingeniería y Control Ferroviario
- ▶ Indra Sistemas, S.A.
- ▶ Main Rail, S.L.
- ▶ Salicru, S.A.
- ▶ Scalian Consulting Spain, S.L.
- ▶ Segula Technologies España, S.A.U.
- ▶ Siemens Rail Automation, S.A.U.
- ▶ Telice, S.A.
- ▶ GTS Transportation SPAIN
- ▶ Vicomtech

Systems and equipment for collection, ticketing and access control

- ▶ Asea Brown Boveri, S.A.
- ▶ Caf Turnkey & Engineering, S.L.
- ▶ Calmell, S.A.
- ▶ Comsa Corporación
- ▶ Gmv Sistemas, S.A.U.
- ▶ Ikusi, S.L.U
- ▶ Indra Sistemas, S.A.
- ▶ Revenga Ingenieros, S.A
- ▶ Salicru, S.A.
- ▶ Scalian Consulting Spain, S.L.
- ▶ Sener Ingeniería y Sistemas, S.A.
- ▶ Sice Tecnología y Sistemas
- ▶ Siemens Rail Automation, S.A.U.
- ▶ Telice, S.A.
- ▶ Vicomtech

Communications

- ▶ Azvi, S.A.
- ▶ Cables de Comunicaciones Zaragoza, S.L.
- ▶ Caf Turnkey & Engineering, S.L.
- ▶ CEIT
- ▶ Cellnex Telecom, S.A.
- ▶ Comsa Corporación
- ▶ Elecnor SyP
- ▶ Endavamientos y Señalización Ferroviaria ENYSE, S.A.U.
- ▶ Gmv Sistemas, S.A.U.
- ▶ HaslerRail (Secheron Hasler Group)
- ▶ ICF - Ingeniería y Control Ferroviario
- ▶ Ikusi, S.L.U
- ▶ Indra Sistemas, S.A.
- ▶ Revenga Ingenieros, S.A.
- ▶ Salicru, S.A.
- ▶ Scalian Consulting Spain, S.L.
- ▶ Sener Ingeniería y Sistemas, S.A.
- ▶ Sice Tecnología y Sistemas
- ▶ Siemens Rail Automation, S.A.U.
- ▶ Teldat, S.A.
- ▶ Teltronic, S.A.U.
- ▶ Telice, S.A.
- ▶ GTS Transportation SPAIN
- ▶ Vicomtech

Passenger information and on-board entertainment systems

- ▶ Alstom Transporte, S.A.
- ▶ Caf Turnkey & Engineering, S.L.
- ▶ Elecnor Deimos
- ▶ Elecnor SyP
- ▶ Gmv Sistemas, S.A.U.
- ▶ Icon Multimedia, S.L.
- ▶ Indra Sistemas, S.A..
- ▶ Ikusi, S.L.U

- ▶ Revenga Ingenieros, S.A.
- ▶ Salicru, S.A.
- ▶ Scalian Consulting Spain, S.L.
- ▶ Sice Tecnología y Sistemas, S.A.
- ▶ Siemens Rail Automation, S.A.U.
- ▶ Tecnival, S.A.
- ▶ Teldat, S.A.
- ▶ Telice, S.A.
- ▶ Vicomtech

ROLLING 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.
- ▶ Caf-Construcciones y Auxiliar de Ferrocarriles, S.A.
- ▶ Patentes Talgo, S.L.
- ▶ Siemens Rail Automation, S.A.U.

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

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

Urban and suburban trains

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

Freight wagons and Locomotives

- ▶ Alstom Transporte, S.A.
- ▶ 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.

Vehicles for infrastructure maintenance

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

MANUFACTURERS OF VEHICLE COMPONENTS, AUXILIARY EQUIPMENT AND SYSTEMS

Traction and propulsion components

- ▶ Aimen Centro Tecnológico
- ▶ Alstom Transporte, S.A.
- ▶ Ariño Douglass, S.A..
- ▶ Artech (Electrotécnica Artech Smart Grid, S.L.)
- ▶ Asea Brown Boveri, S.A.
- ▶ Flexix, S.A.
- ▶ Forging Steel Products, S.L.
- ▶ HaslerRail (Secheron Hasler Group)
- ▶ Ingeniería Viesca, S.L.
- ▶ Ingeteam Power Technology, S.A.
- ▶ Mgn Transformaciones del Caucho, S.A.
- ▶ Siemens Rail Automation, S.A.U.
- ▶ Trafag España, S.L.

MEMBERS DIRECTORY

Control, auxiliary and diagnostic systems

- Aimen Centro Tecnológico
- Alstom Transporte, S.A.
- Artech (Electrotécnica Artech Smart Grid, S.L.)
- Asea Brown Boveri, S.A.
- CEIT
- Endavamientos y Señalización Ferroviaria ENYSE, S.A.U.
- Faiveley Transport Iberica (Wabtec Corporation)
- Gmv Sistemas, S.A.U.
- HaslerRail (Secheron Hasler Group)
- 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.
- Inspectrail, S.L.
- NGRT, S.L.
- NRF España, S.A.
- Stadler Rail Valencia, S.A.U.
- Teldat, S.A.
- Trafag España, S.L.

Assembly equipment

- Agui, S.A.
- Aimen Centro Tecnológico
- Artech (Electrotécnica Artech Smart Grid, S.L.)
- Asea Brown Boveri, S.A.
- Danobat, S. COOP.
- Faiveley Transport Iberica (Wabtec Corporation)
- Forging Steel Products, S.L.
- Fundiciones del Estanda, S.A.
- Funor, S.A.
- Gurutzpe Turning Solutions S.L.
- Trafag España, S.L.

Mechanical components

- Agui, S.A.
- Alstom Transporte, S.A.
- Caf-Construcciones y Auxiliar de Ferrocarriles, S.A.
- Faiveley Transport Iberica (Wabtec Corporation)
- Flexix, S.A.
- Forging Steel Products, S.L.
- Funor, S.A.
- Fundiciones del Estanda, S.A.
- Hispacold, S.A.
- Metalocauchos, S.L.
- Mgn Transformaciones del Caucho, S.A.
- Stadler Rail Valencia, S.A.U.
- Talleres Alegría, S.A.
- Trafag España, S.L.
- Vogelsang, S.L.U.

Interiors

- Agui, S.A.
- Ariño Duglass, S.A.
- Colway Ferroviaria, S.L.
- Flexix, S.A.
- Hexis Graphics España
- Satys Interiors Railway Spain, S.A.
- Trafag España, S.L.

Safety

- Agui, S.A.
- Alstom Transporte, S.A.
- Artech (Electrotécnica Artech Smart Grid, S.L.)
- Dsaf - Dinámicas de Seguridad, S.L.
- Endavamientos y Señalización Ferroviaria ENYSE, S.A.U.

- Faiveley Transport Iberica (Wabtec Corporation)
- HaslerRail (Secheron Hasler Group)
- Hexis Graphics España
- Indra Sistemas, S.A.
- Luznor Desarrollos Electrónicos, S.L.
- Trafag España, 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.
- Caucho Industrial Verdú, S.L.
- CEIT
- Comsa Corporación
- Create Human Resources
- Elecnor SyP
- ICF - Ingeniería y Control Ferroviario
- Inspectrail, S.L.
- Imathia Construcción, S.L.
- Job Impulse España
- Ladicim
- Main Rail, S.L.
- Mieres Rail, S.A.
- Smart Motors
- Trafag España, S.L.
- Uretex Soluciones Innovadoras, S.L.U.

Rolling Stock maintenance

- Aimen Centro Tecnológico
- Alstom Transporte, S.A.
- Artech (Electrotécnica Artech Smart Grid, S.L.)
- Azvi, S.A.
- Caf - Construcciones y Auxiliar de Ferrocarriles, S.A.
- Caf Turnkey & Engineering, S.L.
- Comsa Corporación
- Create Human Resources
- Gurutzpe Turning Solutions S.L.
- Grupo Trigo
- Hexis Graphics España
- Hispacold, S.A.
- Job Impulse España
- Patentes Talgo, S.L.
- Siemens Rail Automation, S.A.U.
- Stadler Rail Valencia, S.A.U.
- Talleres Alegría, S.A.
- Talleres Zitrón
- Vogelsang, S.L.U.
- Trafag España, S.L.

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

- Aimen Centro Tecnológico
- Alstom Transporte, S.A.
- Artech (Electrotécnica Artech Smart Grid, S.L.)
- Azvi, S.A.
- Caf Signalling, S.L.
- Caf Turnkey & Engineering, S.L.
- Dsaf-Dinámicas de Seguridad, S.L.
- Electrans, S.A.
- Elecnor Deimos

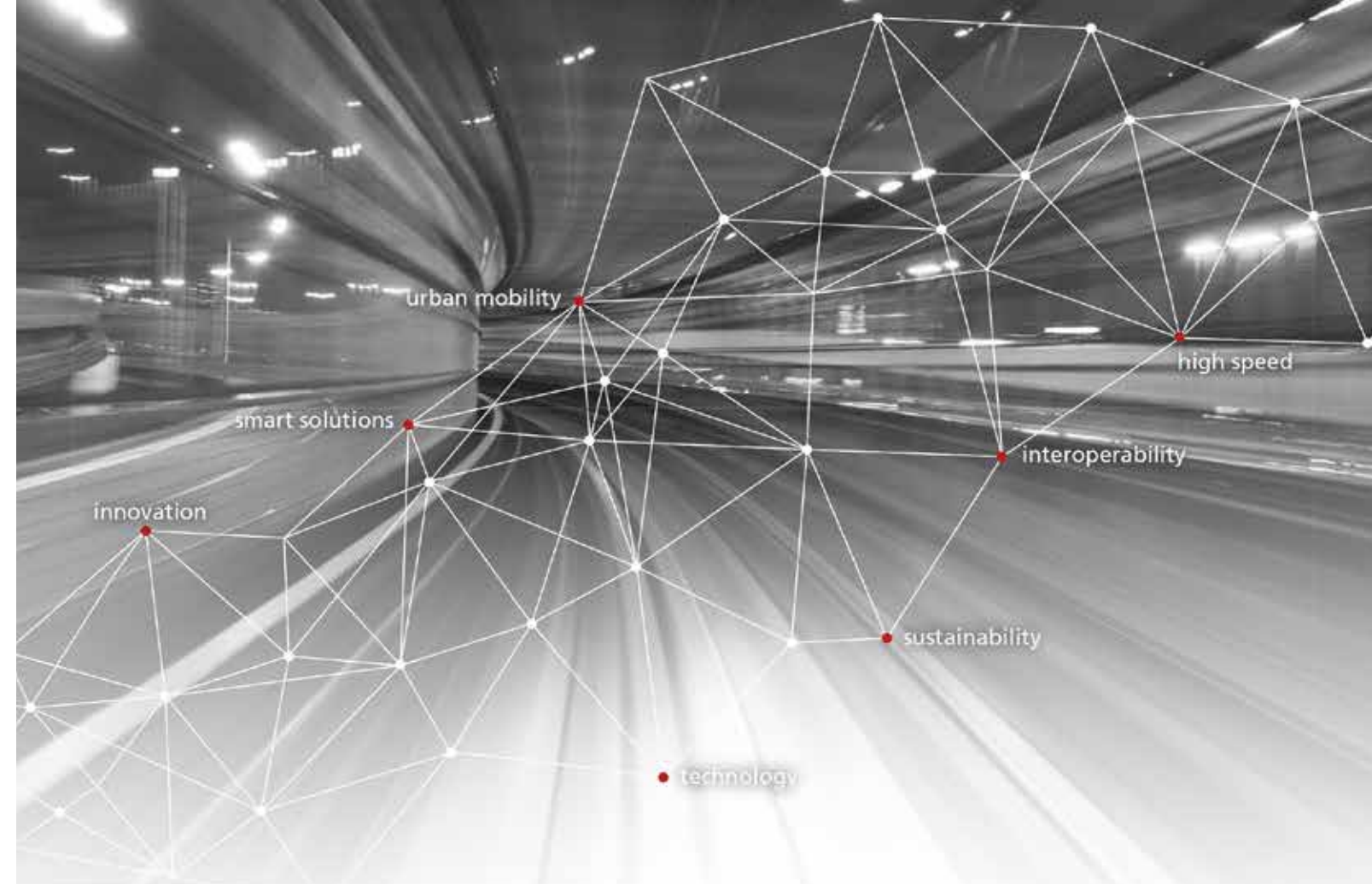
- Elecnor SyP
- Gmv Sistemas, S.A.U.
- ICF - Ingeniería y Control Ferroviario
- Ibérica Tecnología en Sistemas de Seguridad Ferroviarios, S.L. (ITSS)
- Ikusi, S.L.U.
- Indra Sistemas, S.A.
- Job Impulse España
- Luznor Desarrollos Electrónicos, S.L.
- Patentes Talgo, S.L.
- Salicru, S.A.
- Sice Tecnología y Sistemas, S.A.
- Siemens Rail Automation, S.A.U.
- Smart Motors
- Telice, S.A.
- voestalpine Railway Systems JEZ, S.L.
- Vogelsang, S.L.U.

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

- Aimen Centro Tecnológico
- Alstom Transporte, S.A.
- Artech (Electrotécnica Artech Smart Grid, S.L.)
- Caf-Construcciones y Auxiliar de Ferrocarriles, S.A.
- Caf Turnkey & Engineering, S.L.
- Enclavamientos y Señalización Ferroviaria ENYSE, S.A.U.
- Faiveley Transport Iberica (Wabtec Corporation)
- Gmv Sistemas, S.A.U.
- Géminis Lathes
- Grupo Trigo
- HaslerRail (Secheron Hasler Group)
- Hexis Graphics España
- Hispacold, S.A.
- ICF - Ingeniería y Control Ferroviario
- Indra Sistemas, S.A.
- Ingeteam Power Technology, S.A.
- Job Impulse España
- Mgn Transformaciones del Caucho, S.A.
- NGRT, S.L.
- NRF España, S.A.
- Patentes Talgo, S.L.
- Satys Interiors Railway Spain, S.A.
- Sice Tecnología y Sistemas
- Smart Motors
- Stadler Rail Valencia, S.A.U.
- Trafag España, S.L.
- Vogelsang, S.L.U.

Maintenance of systems, equipment and vehicles components

- Aimen Centro Tecnológico
- Air Rail
- Alstom Transporte, S.A.
- Aquafirsch, S.L.
- Danobat, S. COOP.
- Electrans, S.A.
- Faiveley Transport Iberica (Wabtec Corporation)
- ICF - Ingeniería y Control Ferroviario
- Ingeniería Viesca, S.L.
- Mosdorfer Upresa Rail, S.A.U.
- Newtek Solidos, S.L.
- Patentes Talgo, S.L.
- Tecnival, S.A.
- Trafag
- Vogelsang, S.L.U.



Find out more about all the activities and services we have prepared for 2022 to promote Internationalization, Competitiveness and Innovation.

mafex@mafex.es | 00 34 944 706 504

**ASEA BROWN BOVERI, S.A.**

Rail is being rediscovered as a sustainable and energy-efficient form of transport. We understand the importance and implications of running these railway networks.

We provide complete solutions that protect your infrastructure, and meet the expectations of users and transport stakeholders for all key applications. These include infrastructure, passenger stations, control and signaling units, tunnels and rolling stock.

🚩 C/ SAN ROMUALDO, 13 - 28037 (MADRID)

☎ +34 915 81 93 93



✉ contact.center@es.abb.com

🌐 new.abb.com/railway/abb-solutions-for-transportation-rail-and-infrastructure

**ACYGS SALES MANAGEMENT, S.L.**

ACYGS is an engineering services consulting company dedicated exclusively to the railway sector and specialized in all the consulting and engineering services associated with a rolling stock maintenance workshop. We offer a personalized railway engineering service for each client, adapting to the needs of each workshop and project, developing its activity at an international level carrying out projects in the 5 continents, providing global solutions backed by the experience of more than 20 years in the rolling stock maintenance sector of the professionals who are part of Acygs.

🚩 C/ Loeches , 65 - Oficina 7 Madrid (MADRID)

☎ +34 914 85 52 88



✉ jleon@acygs.com

🌐 www.acygs.com

**AGUI, S.A.**

A family-owned company specialised in production processes and complex assembly of railway interiors for OEMs.

AGUI provides a comprehensive service to the client: Support in product design, prototyping, industrialisation and manufacturing, managing the entire supply chain. ISO-3834 and EN-15085 certified.

🚩 Pol. Ind. Lintzirin-Gaina. Parcela B-1. 20180 Oiartzun - (GIPUZKOA)

☎ +34 943 335 811 / 663 775 753



✉ +34 943 552 066

✉ sac@agui.com

🌐 www.agui.com

**AMURRIO FERROCARRIL Y EQUIPOS, S.A.**

Design, production, installation of turnouts, track devices, crossings. For all type of purpose. Metro, tram, regional, conventional, high speed, heavy haul, ports and industrial.

🚩 Maskuribai, 10 01470 Amurrio (ARABA/ÁLAVA)

☎ +34 945 891 600

☎ +34 945 892 480

✉ comercial@amufer.es

🌐 www.amufer.es

**AQUAFRISCH, S.L.**

More than 25 years of experience in the railway sector endorse Aquafrisch as a manufacturer of train washing systems, bogies washing cabins, WC extraction systems (CET) and other products 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 leader in industrial water treatment and purification. Aquafrisch takes care of the design, manufacture, installation, commissioning, training and maintenance of the machines according to the customer's needs. Aquafrisch is certified ISO9001:2015, ISO14001:2015 and ISO 45001:2018.

🚩 Margarita Salas 7, 28521 Rivas-Vaciamadrid (MADRID)

☎ +34 91 380 03 33

☎ +34 91 7780 60 02

✉ aquafrisch@aquafrisch.com

🌐 www.aquafrisch.com

**ArcelorMittal****ARCELOMITTAL**

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 are 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. Edif. de Energias, 2 pl. 33691 Gijón (ASTURIAS)

☎ +34 985 187 750



✉ rails.specialsections@arcelormittal.com

🌐 https://rails.arcelormittal.com/

**AIMEN CENTRO TECNOLÓGICO**

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 clients and associated companies. Our accredited laboratories provide analysis and testing services, especially failure analysis and in-service behavior of industrial components.

🚩 C/ Relva 27 A - Torneiros | 36410 O Porriño (PONTEVEDRA)

☎ +34 662 489 181



✉ aimen@aimen.es

🌐 www.aimen.es

**AIR RAIL**

AIR RAIL is a company specialised in the manufacture and distribution of machinery, working in the airport and railway sector. Within the railway industry, its activity is divided between the manufacture of its own products and the distribution of important brands in the sector. In terms of manufacturing, AIR RAIL specialises in railway washing systems, bogie washing cabins, water treatment units and blowing booths, among others. In its distribution activities, it represents Zephir shunters, IME Autolift lifting systems and SAMS re-railing equipment.

🚩 C/ Alsasua 16, 1º Izda. 28023, Madrid, (MADRID)

☎ +34 913 234 629



✉ mmartinez@air-rail.org

🌐 www.air-rail.org

**ALSTOM SPAIN**

As a promoter of sustainable mobility, Alstom offers a complete range of solutions (from high-speed trains to metros, tramways and e-buses), passenger solutions, customized services (maintenance, modernization), infrastructure, signalling and digital mobility solutions. The company recorded sales of €8,2 billion in the 2017/18 fiscal year. Alstom is present in over 60 countries and employs 38,900 people. In Spain Alstom employs around 2,000 people on 18 sites, including a rolling stock manufacturing site and 4 innovation centres where it runs R&D programmes for rolling stock and railway signalling, safety, security, digital mobility and services.

🚩 Martínez Villergas, 49 - Edificio V - 28027 Madrid (MADRID)

☎ +34 91 334 58 00

☎ +34 91 334 58 01



✉ www.alstom.com

**ARDANUY INGENIERÍA, S.A.**

Ardanuy Ingeniería, S.A. is an engineering consulting firm specialized in studies, projects, works management, safety engineering (ISA), operation / maintenance studies; and technical guidance for railways (high-speed, conventional, freights, metros, trams, cable cars), electrical engineering (sub-stations and high-voltage lines), roads (highways, freeways, BRT's, streets, etc.), buildings (architecture and facilities) and telecommunications.

The company was established in 1992 and is comprised of a permanent team of more than 200 professionals.

🚩 Avda. Europa, 34 28023 Madrid (MADRID)

☎ +34 91 799 45 00

☎ +34 91 799 45 01

✉ madrid@ardanuy.com

🌐 www.ardanuy.com

**ARIÑO DUGLASS, S.A.**

50 years' experience behind us as a company specialised in glass for architecture and railway. An extensive presence in the Spanish, European and world markets has enabled us to obtain the knowledge and know-how in order to offer the most technologically advanced products of high quality.

It is in our DNA to continuously research and develop technology that allows us to adopt the very latest manufacturing methods, resulting in business excellence and ongoing innovations. In partnership with a number of organisations and institutions, we collaborate, cooperate and lead different research projects.

🚩 Pol. Ind. Royales Bajos, S/N, 50171 La Puebla de Alfindén (ZARAGOZA)

☎ +34 634 860 681

☎ +34 976 455 085

✉ felix.fernandez@duglass.com

🌐 www.duglass.com

**ARTECHE**

The Arteche Group is focused on offering equipment and solutions for the electricity and railway business worldwide. The expertise of more than 70 years manufacturing instrument transformers and electromechanical relays gives the client the assurance of a technological leader. With projects over more than 40 countries, our dedicated range of railway relays are designed to meet the highest standard requirements of the sector and its reliability and durability allow them to be used not only as general purpose relays, but also in all kind of safety functions, both for on-board and signalling applications making them suitable to be used in circuits requiring up to SIL-4 safety integrity level.

🚩 Derio Bidea, 28 48100 Mungia (BIZKAIA)

☎ +34 946 011 200

☎ +34 946 155 628

✉ marketing@arteche.com

🌐 www.arteche.com

**AZVI**

Azvi is the company which undertakes construction within Grupo Azvi. For over 100 years, Azvi has carried out a significant number of large scale civil engineering and building projects. Azvi has extended its activity to all construction areas in Europe, America and the Middle East, without losing sight of its origins and railway background. By applying principles of responsibility to the whole business sphere, seeking the creation of value, maintaining a strong commitment to all its stakeholders in all countries where it is present and investing in R&D Azvi continues constructing a company capable of facing the new challenges of an increasingly globalised market.

🚩 Almendralejo, 5. 41019 (SEVILLA) /
Maudes, 51, 2º. 28003 (MADRID)
☎ +34 954 999 320 / +34 91 553 28 00
☎ +34 926 88 47 06
✉ azvicentro@azvi.es
🌐 www.azvi.es

**BUREAU VERITAS INSPECCIÓN Y TESTING (GRUPO BUREAU VERITAS)**

BUREAU VERITAS INSPECCIÓN Y TESTING is a Bureau Veritas company based in Madrid, Spain. BUREAU VERITAS INSPECCIÓN Y TESTING is a world leader in conformity assessment services as Notified Body (NoBo) and Designated Body (DeBo), as well as Inspection Body to perform Independent Safety Assessment (ISA) and Risk Assessment (AsBo). Bureau Veritas has an extensive experience in the rail sector, with presence in more than 140 countries, more than 75,000 employees worldwide, and a network of 1400 offices and laboratories. Bureau Veritas is in a unique position to offer a global solution to its customers in the railway sector.

🚩 C/Valportillo Primera 22-24, 28108
Alcobendas (MADRID)
☎ +34 91 270 22 00
✉ infoesp@bureauveritas.com
🌐 https://www.bureauveritas.es/nuestros-mercados/automocion-y-transporte/ferroviario

**CABLES DE COMUNICACIONES ZARAGOZA, S.L.**

Cables de Comunicaciones is one of the main European companies dedicated to the design, manufacturing and commercialisation of telecommunication, signalling and optic fibre cables. Ever since its foundation in 1971, it has contributed to the development and extent of the telecommunications infrastructures. Railway companies from the main European countries entrust us with the manufacture of their cables. Among them, they stand out: Adif, SNCF, NetworkRail, Infrabel etc. Cablescom undertakes its activity in Zaragoza, in the Malpica industrial park, over a surface of 77,000 m2, which includes a production plant, offices and warehouses, de producción, oficinas y almacenes.

🚩 Polígono de Malpica, C/D, 83
50016 Zaragoza (ZARAGOZA)
☎ +34 976 729 900
✉ j.alzorriz@cablescom.com
🌐 www.cablescom.com

**CALMELL, S.A.**

The Calmell Group is the leader in access control and identification, through its companies Calmell S.A., Affix S.L., Idoneum S.A., which are respectively engaged in producing the supports (tickets, cards,...), developing specific software and hardware, personalization and security. In the public transport sector it works for integrators and operators supplying any kind of support for ticketing and reader/writer systems. With a strong international presence through its network of representatives and distributors, the Calmell Group is able to satisfy your needs on a global level.

🚩 Pol. Ind. Pla d'en Coll C/ Fresser, 12 C
08110 Montcada i Reixac (BARCELONA)
☎ +34 93 564 14 00
✉ dsala@calmell.net
🌐 www.calmell.net

**CAUCHO INDUSTRIAL VERDÚ, S.L.**

Caucho Industrial Verdú is a company with more than 50 years of experience in the rubber market. We produce a wide range of products in rubber and rubber-metal, and we are focused in the infrastructure sector. We design and manufacture elastomeric bearings, pot bearings and expansion joints for bridges and other structures. In addition, we manufacture resilient elements for railway applications, as underballast mats (UBM), slab track mats (STM) and undersleeper pads (USP). All these products are manufactures using recycled rubber (90%) from used tyres. Our technical staff can design and advice about the best solution for the client's needs, always based on the standards EN, DIN, ASSHT

🚩 Fila Benimerins, 32, Alcoy (ALICANTE)
☎ +34 965 520 950
✉ miguel.belda@gruposolidad.net
🌐 www.cauchoverdu.com

**CEIT**

We are a basque Technology Center founded by the University of Navarra, whose main objective is to develop applied R+D+i projects with companies to improve their competitiveness. We are part of BRTA (Basque Research & Technology Alliance), which includes 16 agents that constitute the Basque Network of Science, Technology and Innovation (RVCTI). We also participate in Shift2Rail Joint Undertaking as associated members. We focus our R+D+i activity within the railway sector in the following topics: energy efficiency, maintenance, railway dynamics, component design and characterisation, embedded systems (SIL4), positioning, data intelligence.

🚩 Paseo Manuel Lardizábal 15, 200018
Donostia-San Sebastián (GIPUZKOA)
☎ +34 943 212 800
☎ +34 943 213 076
✉ ualvarado@ceit.es
🌐 www.ceit.es

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

CAF is one of the world leaders in the design and implementation of comprehensive transit systems. CAF provides comprehensive project and engineering management throughout all stages of the project including feasibility analysis and investigations, system design, civil work, signalling, electrification and other electromechanical systems, rolling stock supply and system operation and maintenance. In terms of rolling stock, CAF supplies and maintains high speed trains, regional and commuter trains, locomotives, metro units, tramways and buses.

🚩 J.M. Iturriz, 26 20200 Beasain
(GIPUZKOA)
☎ +34 943 880 100
☎ +34 943 881 420
✉ caf@caf.net
🌐 www.caf.net

**CAF SIGNALLING, S.L.**

CAF Signalling, the technological subsidiary of the CAF Group, designs and provides Integral Signalling Solutions, both in Spain and abroad. The company has its own advanced technology products, both for on-board and wayside applications that make up the core of its integral solutions. As a result of a significant and growing effort in R&D&I, particularly in the area of critical safety systems, CAF Signalling promotes continuous innovation and customer focus. CAF Signalling, boasts the Company's own in house engineering and expertise to take on "turn-key" railway signalling projects.

🚩 Avda. de la Industria, 51 28108
Alcobendas (MADRID)
☎ +34 91 789 27 50
☎ +34 91 661 37 51
✉ cabsignalling@cabsignalling.com
🌐 www.cabsignalling.com

**CAF TURNKEY & ENGINEERING**

CAF Turnkey & Engineering was created in 2007 with its head office in the Technological and Scientific Park of Biscay (Zamudio). It began its business in Integrated Engineering of Transport Services and in 2015, after merging with the company CMFS (Mexico), it increased its portfolio of services with the inclusion of EPC projects for both civil works and subsystems. Following solid and constant growth, the company currently has a workforce of 200 with offices in Zamudio, Madrid and Mexico, providing service to both companies within the CAF Group and national and international private and public customers.

🚩 Parque Científico y Tecnológico de Bizkaia,
Laida Bidea, Ed. 205. 48170 Zamudio (BIZKAIA)
☎ 0034946819550
☎ +34 94 623 29 29
✉ info@cafte.com
🌐 www.cafte.com

**CELLNEX TELECOM, S.A.**

Cellnex manages a portfolio of more than 130,000 sites – including forecast roll-outs up to 2030 – in Spain, Italy, the Netherlands, France, Switzerland, the United Kingdom, Ireland, Portugal, Austria, Denmark, Sweden and Poland. Cellnex's business is structured in four major areas: telecommunications infrastructure services; audio-visual broadcasting networks, security and emergency service networks and solutions for smart urban infrastructure and services management (Smart cities and the "Internet of Things" [IoT]).

🚩 Passeig de la Zona Franca, 105, 08038
Barcelona (BARCELONA)
☎ +34 935 03 10 00
✉ global.bids@cellnextelecom.com
🌐 www.cellnextelecom.com

**CERTIFER BELGORAIL SA SUCURSAL EN ESPAÑA**

Certifer Belgorail SA is a certification, inspection and safety evaluation entity for the guided transport sector, both conventional railways and subways and trams. We are an accredited body for the certification of interoperability (NoBo), national regulations (DeBo), safety evaluations under CENELEC standards (ISA) and under CE Regulations (AsBo). We are part of the Certifer Group, with a presence, in addition to Spain, in Belgium, France, the Netherlands, Germany, Austria, Italy, Sweden, Turkey, Algeria, Brazil, Australia, Vietnam, the United Arab Emirates and China.

🚩 Pº de la Castellana, 127 M 2 º A
28046 Madrid (MADRID)
☎ +34 91 764 72 21 / 626 683 435
☎ +34 91 770 88 67
✉ info.spain@certifer.eu
🌐 www.certifer.eu

**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 (GIPUZKOA)
☎ +34 943 028 690
✉ emartinez@cetestgroup.com
🌐 www.cetestgroup.com


CITEF (FUNDACIÓN PARA EL FOMENTO DE LA INNOVACION INDUSTRIAL)

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.

🚩 José Gutierrez Abascal, 2, 28006 Madrid (MADRID)
 ☎ +34 91 336 32 12
 📧 citef@etsii.upm.es
 🌐 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


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 Philippines, Taiwan, Malaysia, India, etc.

🚩 Julián Camarillo, 6A 2ª planta 28037 Madrid (MADRID)
 ☎ +34 91 353 21 20
 📧 +34 91 350 49 54
 📧 jalvarez@comsa.com
 🌐 www.comsa.com


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. Goiaín 01170 Legutiano (ARABA/ÁLAVA)
 ☎ +34 945 466 314
 📧 +34 945 466 314
 📧 info@dsaf.es
 🌐 www.dsaf.es


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)
 ☎ +34 91 490 13 83
 📧 +34 916 619 296
 📧 enyse@enyse.com
 🌐 www.enyse.com


ELECNR DEIMOS

Elecnr Deimos is the technological subsidiary of the Elecnr Group that operates in the railway transportation sector, information and telecommunications systems, space, aeronautics and defense. In the railway sector, Elecnr Deimos is responsible for the development and evolution of passenger information platforms and remote station management. In addition, the company is specialised in delivering comprehensive turnkey projects as well as the development, implementation, and maintenance of these systems.

🚩 Ronda de Poniente 19, Edificio Fiteni VI, Tres Cantos (MADRID)
 ☎ +34 918 06 34 50
 📧 +34 918 06 34 51
 📧 tra.all.deimos@elecncor.es
 🌐 https://elecncor-deimos.com


CREATE HUMAN RESOURCES

Railway and business training consultant, approved since 2009 by the State Agency for Railway Safety (AESF) of the Ministry of Development to provide the necessary training to obtain and maintain the different qualifications of railway personnel, as well as all kinds of technical training and specific to the railway sector.

🚩 C/ Astronomia 1, torre 3, plata 9 ofc 7-8 Sevilla (SEVILLA)
 ☎ +34 650 711 407 / +34 697 497 404
 📧 aragon@createhr.es / pnavarro@createhr.es
 🌐 www.createhr.es


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 as Cordoba for copper products, Vitoria and Brescia for aluminium products.

🚩 Av. de la Fábrica, s/n 14005 Córdoba (CÓRDOBA)
 ☎ +34 957 499 300
 📧 josep_anfruns@cunext.com
 🌐 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 (GIPUZKOA)
 ☎ +34 943 748 044
 📧 +34 943 743 138
 📧 danobat@danobat.com
 🌐 www.railways.danobatgroup.com


ELECNR SYP

Elecncor has become one of the most outstanding European business groups and a benchmark in the infrastructure sectors, with more than 60 years of continuous growth (25,000 employees and 3,5 billion Euros turn over) and presence in 55 countries. Elecncor promotes, develops and constructs all manner of infrastructure on all continents including concessional projects. Elecncor Group's long experience in the railway sector enables it to engage in turnkey projects for electrification, signal and interlocking systems, communications, and control systems. Elecncor has been involved during 30 years in the development of electrification railway projects as a technologist providing solutions to industry.

🚩 C/ Arturo Soria 343 28033 (MADRID)
 ☎ +34 91 453 28 46
 📧 cgmengual@elecncor.com
 🌐 www.elecncor.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)
 ☎ +34 93 574 74 40
 📧 jmyera@electrans.es
 🌐 www.electrans.es


FAIVELEY TRANSPORT IBÉRICA

Faiveley Transport Iberica, as member of Wabtec Corporation offers the complete portfolio of products of the Corporation in Spain and Portugal, as well as all service activities related. Design, manufacturing, repair and maintenance of rolling stock systems. Braking Systems, Access Doors, Platform Screen Doors, HVAC, PIS/CCTV, Power Collection, Sanitaries, Event Recorders, Beacon Readers, Relays. With Headquarters in La Selva del Camp (Tarragona), offices in Madrid and service centers in Madrid, Barcelona, Valencia, Seville, Beasain and Lisbon.

🚩 Pol. Ind. La Drecera, C. Mecànica 23, 43470 La Selva del Camp (TARRAGONA)
 ☎ +34 977 01 10 00
 📧 jon.amutxastegi@wabtec.com
 🌐 https://www.wabteccorp.com

**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, silentblocks, joints, bumpers, axles, links, valves, bearings. MIXTURES: NR, SBR, EPDM, CR, H/ NBR, ECO, AEM, ACM, Silicone, FPM.

Pol. Ind. Pinoa 1-D 48170 Arteaga-San Martín Zamudio (BIZKAIA)

+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 (BIZKAIA)

+34 946 300 211

k.zabala@forgingsteelproducts.com

www.forgingsteelproducts.com

**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.

Antzizar, 17 20200 Beasain (GIPUZKOA)

+34 943 880 500

+34 943 889 587

lfdiego@estanda.com

www.estanda.com

**GLOBAL QUALITY ENGINEERING**

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 (SEVILLA)

+34 954 526 195

antonio.peco@trigo-group.com

www.trigo-group.com

**GMV SISTEMAS, S.A.U.**

GMV is a leading firm in the design, development, implementation and rollout of Intelligent Transportation Systems (ITS) guaranteeing compliance with the railway sector standards. Main products and services: On board units for location and communications, Fleet Management Systems, Fare Collection Systems, Passenger information systems, CCTV systems, PA & Intercom system, Systems for security reinforcement, Eco-driving systems, Software for planning and scheduling of services. Conceived for all railway modes (tram, metro, commuter train, long distance, high speed trains...)

Juan de Herrera, 17 PTB 47151 Boecillo (VALLADOLID)

+34 983 546 554

+34 983 546 553

jagg@gmV.com

www.gmv.com

**HASLERRAIL (SECHERON HASLER GROUP)**

Sécheron Hasler Group is a leading global supplier of electrical and electronic safety components and solutions and traction power systems for the railway industry and also provides solutions for renewable energy, DC grid, and other industrial systems. HaslerRail is the world's leading supplier of innovative On-Board Electronics, Data Acquisition and Recording, Speed Sensors and Odometry, Visualisation solutions and Speed Indicators, Energy Metering, Control, Protection and I/O, Software and data management solutions, and Cybersecurity for the railway industry. Our solutions are backed by our extensive global service and support network.

Calle Calidad, 42 | P.I. Los Olivos 28906 - Getafe (MADRID)

+34 91 620 79 58

info@haslerrail.com

www.haslerrail.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.

Condado de Treviño, 41 Pol. Villalonquejar, 09001 Burgos (BURGOS)

+34 650 665 302

comercial@funorsa.es

www.funorsa.es

**GEMINIS LATHES, S.A.**

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 - (GIPUZKOA)

+34 943 748 060

+34 943 744 182

sales@geminislathes.com

geminislathes.com

**GURUTZPE TURNING SOLUTIONS, S.L.**

GURUTZPE is a company specialized in the manufacturing of high value-added heavy-duty Turnmills for machining strategic pieces in demanding industrial sectors. With over 60 years of experience, GURUTZPE provides customized and innovative manufacturing solutions on an international level.

The company specializes in maintenance and manufacturing of wheels, axles, and wheelsets for the railway sector, operating both nationally and internationally.

Pol. Ind. Q8, 20829 Itziar, (GIPUZKOA)

+34 943 19 90 80

gurutzpe@gurutzpe.com

www.gurutzpe.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.

Pol. de Asipo Parcelna, 48 33428 Cayes Llanera (ASTURIAS)

+34 985 260 473

+34 985 260 905

paco@hicasa.com

www.hicasa.com

**ICON MULTIMEDIA, S.L.**

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

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.

Av. Santiago Amón, 3. bajo. 34005. Palencia (PALENCIA)

+34 979 702 906

+34 979 702 021

comercial@iconmm.com

www.iconmm.com

**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 possesses 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 decision making process.

Zarandoa, 23 48015 Bilbao (BIZKAIA)

+34 944 797 600

+34 944 761 804

cortega@idom.com

www.idom.com

**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 anticiparse a los problemas y tendencias futuras.

🚩 Paseo Miramón, 170 20014 San Sebastián (GIPUZKOA)
 ☎ +34 943 448 800
 ☎ +34 943 448 816
 ✉ preventa.comercial@ikusi.com
 🌐 www.ikusi.com

**IMATHIA**

At Ikusi, we provide complex turnkey integration project design, engineering and development services both for rolling stock and for infrastructure, with the agility and flexibility required by the rail industry. We are oriented towards improving our clients' competitiveness and innovation capacities, thanks to our deep business knowledge developed during these years.. Our business focus is the design and supply of innovative technological solutions to help vehicle builders, transport operators and authorities optimize and transform their business while guaranteeing quality of service and enhancing passenger experience in terms of security, information, comfort and accessibility.

🚩 C/Agustín de Foxá 26, 28036 Madrid (MADRID)
 ☎ +34 915 75 46 16
 ✉ imathia@imathia.es
 🌐 www.imathia.es

**INDRA**

Indra is one of the leading global technology and consulting companies and the technological partner for core business operations of its customers world-wide. It is a world-leader in providing proprietary solutions in specific segments in Transport and Defense markets, and a leading firm in Digital Transformation Consultancy and Information Technologies in Spain and Latin America through its affiliate Minsait. Its business model is based on a comprehensive range of proprietary products, with a high-value focus and with a high innovation component. In the 2018 financial year, Indra achieved revenue of €3.104 billion, with 43,000 employees, a local presence in 46 countries and business operations in over 140 countries.

🚩 Avda. de Bruselas, 35 28108 Alcobendas (MADRID)
 ☎ +34 91 480 50 00
 ☎ +34 91 480 50 80
 ✉ comercial@ingenieriaviesca.com
 🌐 www.indracompany.com

**INGENIERÍA VIESCA, S.L.**

We are specialists in design and manufacture of power electronic equipment. Our equipment work satisfactorily in all the continents with high reliability and availability, making efficient use of the available energy. We adapt our products to customer needs and requirements according with the applicable standards and the best quality.

The expected functionality is guaranteed by means of specific test protocols.

Our innovation is present in all our products: auxiliary power converters, battery chargers, flat battery starters, ...

🚩 Rumanía 5, Nave B2 - P.E. Inbisa Alcalá I. 28802 Alcalá de Henares (MADRID)
 ☎ +34 91 883 08 65
 ☎ +34 91 882 07 17
 ✉ comercial@ingenieriaviesca.com
 🌐 www.ingenieriaviesca.com

**INGEROP**

INGEROP T3 is an engineering and architecture company specialising in the sectors of transport, mobility and cities, infrastructure, building, energy and industry, which has been operating in Spain since the 1990s. It has offices in Madrid, Barcelona, Granada and Seville. INGEROP T3 belongs to a group of more than 2,300 employees, mostly engineers, with a presence in more than 70 countries. It is a totally private and independent company, whose capital is wholly owned by its managers and employees. The INGEROP T3 team offers a wide range of services for both public and private clients, from planning to operation and maintenance.

🚩 Calle Goya, 47, 8ª Planta 28001 Madrid (MADRID)
 ☎ +34 917 584 899
 ✉ maria.lorenzo@ingerop.es
 🌐 www.ingerop.es

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**INECO**

Global leader in transport engineering and consultancy, it has contributed to the development of transport infrastructures for over 50 years in more than 50 countries. Its high level technical specialisation allows its activity to diversify into new markets and reinforce its presence in those where it is already established. Its participation in the whole railway system in Spain has led the company to develop important international projects like the Makkah-Madinah high speed in Saudi Arabia, the HS2 project in the United Kingdom or the deployment of ERTMS in Europe.

🚩 Paseo de la Habana, 138 - 28036 Madrid (MADRID)
 ☎ +34 91 452 12 00
 ✉ internacional@ineco.com
 🌐 www.ineco.com

**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.

🚩 C/ La granja 74, 28108 Alcobendas (MADRID)
 ☎ +34 91 490 15 19
 ☎ +34 91 661 58 31
 ✉ ingenieria@icf.com.es
 🌐 www.icf.com.es

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**INGETEAM POWER TECHNOLOGY, S.A.**

Ingeteam is an international group specializing in power and control electronics (inverters, frequency converters, controllers and protections) and electrical engineering and automation projects. The company operates in 22 countries, with 3,900 employees. R&D is at the backbone of its business activities. In railways, the traction converters INGETRAC are based on an smart integration of proved Proved Modules, comprising all necessary elements to be fully operational, on each required application.

🚩 Pol. Parque Tecnológico, 110 48170 Zamudio (BIZKAIA)
 ☎ +34 944 039 600
 ☎ +34 944 039 837
 ✉ traction@ingetteam.com
 🌐 www.ingetteam.com

**INSPECTRAIL**

InspectRail, a technology-based startup born as a spin-off company from Ceit-BRTA Technology Center, stands as a new path to the future in the transformation of railway maintenance. Our value proposition focuses on integrating proprietary technology into any railway vehicle for infrastructure inspection and monitoring. Track, catenary, communications, signals, environment... We provide a 360-degree view of the infrastructure's health condition, generating quality data that enables more efficient, cost-effective, and safer operations.

🚩 Paseo Mikeletegi 48 - 20009 - San Sebastián (DONOSTIA)
 ☎ +34 656 719 879
 ✉ unai.alvarado@inspectrail.es
 🌐 <https://inspectrail.es>

**INTERNACIONAL HISPACOLD, S. A.**

Hispacold, a World leader Company for climate systems with more than 40 years' experience is specialized in passengers comfort. Hispacold designs and manufactures HVAC solutions for all rail vehicles: trams, metros, EMUs, DMUs, LRVs... with proven and reliable technology solutions. Hispacold is certified in the most recognized International quality management, environment and safety standards: ISO 9001, ISO 14001, OSHAS 18001, EN 15805-2 and the prestigious IRIS ISO/TS 22163.

🚩 Avda. Hacienda San Antonio, 1 - 41016 Sevilla (SEVILLA)
 ☎ +34 954 677 480
 ☎ +34 954 999 728
 ✉ hispacold@hispacold.es
 🌐 www.hispacold.es


IBÉRICA TECNOLOGIA EN SISTEMAS DE SEGURIDAD FERROVIARIOS, S.L. (ITSS)

Founded in 2005, is a leading manufacturer and supplier of railway hazard monitoring equipment, focusing mainly on hot axle box / hot wheel and Wheel impact load / Weighing in motion detectors.

The ITSS systems use state-of-the-art infrared and fibre-optic technology. The PEGASUS HADB/ HWD multi beam system monitors the axle box and brake temperatures of coaches. The AGUILA WIM/WILD system uses fibre-optic sensors to detect off-centre wheels and flat spots. It can also report train weight and overloading. ITSS products are the model representation of a perfect combination of experience and innovation.

Avda Jerónimo Roure, 43 46520
Puerto de Sagunto (VALENCIA)
+34 961 279 280 | +34 662 128 140
+34 91 141 35 75
mail@itss.tech
www.itss.tech


JOB IMPULSE

JobImpulse, an experienced professional services company with a successful history since its founding. With 57 offices in 13 countries and more than 9. 5,000 employees worldwide. Our services with international reach focus on Outsourcing, Recruitment and Head-hunting in different markets such as Railway, Aerospace, IT and Defense. JobImpulse, can attract qualified professionals from other areas adapting them to the railway. To do this, with programs and specialists, we offer training around the world, developing technical and communication skills among employees. Thus, we break the generation gap and lack of resources that exists in the sector.

C/Aviación, 18 Edificio Morera &
Vallejo, I Calonge 41007 (SEVILLA)
+34 650 748 498
manuel.rey@job-impulse.com
https://job-impulse.es/


JUMO CONTROL, S.A.

JUMO is a leading system and solution provider in industrial sensor and automation technology. Components for the measuring ranges temperature, liquid analysis, pressure, level, flow, and humidity, as well as products for registration, monitoring, control, and automation, are used to create complete systems for a wide range of industries. Present in all industries:

- Railway Technology
- Thermoprocess Technology
- Hydrogen
- Water and Wastewater
- Heating and air-conditioning technology
- Food and beverage
- Shipbuilding industry

Berlin 15 c.P. 28813 Torres de la
Alameda (MADRID)
+34 91 886 31 53
info.es@jumo.net
www.jumo.es


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.

Portuete 23A, local B3 20018 San
Sebastián (GIPUZKOA)
+34 943 217 491
lander@landersimulation.com
www.landerrsimulation.com


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.

Sobrado, 2 28050 Madrid
(MADRID)
+34 91 035 35 86
joaquin.navarro@lantania.com
www.lantania.com


LLALCO FLUID TECHNOLOGY

Llalco Fluid Technology is one of the few manufacturers and suppliers of impact absorption technology for end of track rail lines -Buffer Stops. World Class Technology that protects people, machinery and the Environment. Their products are highly sophisticated end of rail track shock absorbers with a unique performance. Llalco has a wide range of models with gas hydraulic buffers, sliding friction shoes or a combination of both. Their technology allows to control the deceleration to the desired value. They have been delivering high quality Buffer Stop projects in Spain & Portugal since 1970 and in America and other European Countries since 2004. Llalco is also ISO9001, 14001 & 45001 Certified.

Torre de Cristal pl. 18. Pso. de la Castellana
259C, planta 18. 28046 Madrid (MADRID)
+34 917 423 057
ruben.correa@llalco.com
www.llalco.com


KRUCH SIDOS

Development of software for electric network of transport, including consultancy, technical support and marketing. EFS (Energy Flow Simulation), digital twin of the complete railway network, both infrastructure and rolling stock, parameterizing the network and responding intelligently to different cases, problems, needs that may arise, allowing to have and maintain the knowledge in the Customer's own organization.

All this oriented to energy efficiency, anticipation of problems solving, cost reduction. Dynamic tool that takes into account Traction (Infrastructure and Rolling Stock) and Medium Voltage.

Plaza Comas 7, 4º, 1º, 08028
Barcelona (BARCELONA)
+34 663 96 21 33
fernando.loizaga@kruchsidos.com
www.kruchsidos.com


**LA FARGA
YOURCOPPERSOLUTIONS, 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 semi-finished copper products and their alloys for several technological sectors.

Colònia Lacambra, s/n, 08508, Les
Masies de Voltregà (BARCELONA)
+34 93 850 41 00
+34 93 859 04 01
gustau.castellana@lafarga.es
www.lafarga.es


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.

E.T.S. Ing de Caminos, Canales y Puertos
Avda. de los Castros 44, Santander (CANTABRIA)
+34 620 12 30 24 / +34 942 20 18 28
+34 942 20 18 18
jose.casado@unican.es
https://ladicim.es/


**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.

Paduleta 47 - Pol. Ind. Jundiz Vitoria
(ARABA/ÁLAVA)
+34 945 200 961
+34 945 200 971
iarbeloa@luznor.com
www.luznor.com


MAIN RAIL S.L.

Main Rail is a high-tech start-up which develops a SAAS platform for maintaining railway infrastructures designed to optimise the day-to-day performance of railway maintainers and administrators; deployed in more than 3.200 km of Spanish Railway Network. We optimize maintenance activities, improve track safety and reduce cost. Our approach is to focus in taking advantage of the data coming from the infrastructure (inspections, measurement systems, IoT, etc) by gathering all this data, integrating, processing, and translating it into useful information for maintenance decision-making.

Parque Enamorados, 6 - 1, Pamplona/
iruña, 31014, (NAVARRA)
+34 662 574 768
jorge.rodriguez@mainrail.com
www.mainrailsolutions.com/


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 business.

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

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



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.

🚩 Candelaria, 9 28864
Ajalvir (MADRID)
☎ +34 91 887 40 35
✉ enp@mgncaucho.com
🌐 www.mgncaucho.com



MieresRail, S.A.

Diseño, fabricación y suministro de aparatos de vía, y componentes, para Metros, líneas convencionales, industriales y con alta carga por eje o de Alta Velocidad hasta 350 km/h. Diseño, fabricación y suministro de cruzamientos fundidos de acero al manganeso. Soldadura trime-tálica a tope por chisporroteo. Juntas aislantes encoladas, cupones mixtos, sistemas de fijación, sistemas de cerrojos, reglas de medición de desgastes.

🚩 Polígono Industrial Fábrica de Mieres,
s/n 33600 Mieres (ASTURIAS)
☎ +34 985 456 331
✉ +34 985 456 164
✉ mieresrail@mieresrail.com
🌐 www.mieresrail.com



MOSDORFER UPRESA RAIL, S.A.U.

Supply of catenary systems for new installations and maintenances of tramway, conventional and high speed contact lines for international and national projects (Spain, Arabia, Israel, Turkey, Ethiopia, Tanzania, Mexico, Peru, Ecuador, Bolivia, Norway, Sweden, Lithuania...). Installation of the compensated tensioning devices TENSOREX®, TENSOREX® C+ around the world.

🚩 C. de Zabaleta, 45, 28002 Madrid
(MADRID)
☎ +34669785182
✉ +34 91 437 39 10
✉ javier.iglesias@mosdorfer.com
🌐 www.mosdorfer.com



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), PARRÓS 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.

🚩 Ctra. Virgen del Monte, 1 13260
Bolaños de Calatrava (CIUDAD REAL)
☎ +34 926 88 47 05
✉ +34 926 88 47 06
✉ rocio@parros.es
🌐 www.parros.es



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.

🚩 Pº del tren Talgo, 2 28209 Las Matas
(MADRID)
☎ +34 91 631 38 00
✉ marketing@talgo.com
🌐 talgo.com

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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)
☎ +34 650 100 801
✉ info@ngrt.com
🌐 www.ngrt.com



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 client.

🚩 Pol. J Mª Korta, Parcela A1 - 20750
Zumaia (GIPUZKOA)
☎ +34 943 835 942
✉ anajera@newteksolidos.com
🌐 www.newteksolidos.com



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.

🚩 Av. Asegra, 22, 18210 Peligros
(GRANADA)
☎ +34 958 405 030
✉ a.lara@nrf.eu
🌐 www.nrf.eu



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.

🚩 Espronceda, 38 (Local 3) 28003 Madrid
(MADRID)
☎ +34 91 343 03 48
✉ +34 91 359 12 46
✉ fsanchez@precon.cemolins.es
🌐 www.preconsa.es



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 30 years' experience in manufacturing and investment that 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 incorporate the latest novelties for your complete satisfaction. Pretenorte is highly specialised in pre-stressed steel and its many applications.

🚩 Miravalles, 4 Zona Indus. de Betoño
01013 Vitoria (ARABA/ÁLAVA)
☎ +34 945 258 431
✉ +34 945 261 400
✉ pretenorte@pretenorte.com
🌐 www.pretenorte.com



REVENGA SMART SOLUTIONS

Revenge 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 from 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 countries.

🚩 Fragua, 6
28760 Tres Cantos (MADRID)
☎ +34 91 8061810
✉ +34 91 8041955
✉ marketing@revenga.com
🌐 www.revenga.com



SALICRU, S.A.

Its main mission is to guarantee a continuous, clean, economical, reliable and ecological electricity supply to its customers, for which it offers a wide range of products capable of providing solutions for the most sensitive systems and most demanding markets.

SALICRU has the widest national coverage and 10 subsidiaries abroad, selling its products in more than 130 countries, with more than 2,000,000 pieces of equipment in operation. Likewise, SALICRU is certified with ISO-9001, ISO-14001 and ISO-45001 and its products are designed and produced in a way that respects the environment.

🚩 Avda de la Serra, 100 - 08460

Palautordera (BARCELONA)

☎ +34 938 482 400

☎ +34 938 481 151

✉ salicru@salicru.com

🌐 www.salicru.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.

🚩 Avenida de la Cañada, 64-66 - Nave 1A

28823 Coslada (MADRID)

☎ +34 91 334 15 90



✉ mvega@satys.com

🌐 www.satys.com



SCREENSOR TECH

Screensor Tech is a startup committed to innovating conventional media in the field of signage and broadcasting advertising and information content. We provide tailor-made solutions to our clients, from public transport to retail, enabling them to place transparent T-OLED screens in strategic locations. With the latest display technology, we offer users a unique experience, providing them with relevant content and real-time information, while creating a new space for effective communication between brands and their audiences.

🚩 Avenida General Peron, 36 - PISO 2,

28020, Madrid (MADRID)

☎ +34 915 35 85 68



✉ info.spain@scalian.com

🌐 https://www.scalian-spain.es/



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).

🚩 La Granja, 72-Pol. Ind. Alcobendas

28108 Alcobendas (MADRID)

☎ +34 91 623 22 00

☎ +34 91 623 22 01

✉ sice@sice.com

🌐 www.sice.com



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.

🚩 Ronda de Europa, 5

28760 Tres Cantos (MADRID)

☎ +34 91 514 88 87



✉ info@smartmotors.org

🌐 www.siemens.es/siemens-mobility



SMART MOTORS

Smart Motors 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 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.

🚩 Torroella de Montgrí 17-19, 08027

Barcelona (BARCELONA)

☎ +34 675 220 603



✉ info@smartmotors.org

🌐 smartmotors.org



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.

🚩 Av. Bruselas 8 Oficina 8

01003 Vitoria-Gasteiz (ARABA/ÁLAVA)

☎ +34 678 771 259



✉ jmartin@segula.es

🌐 www.segula.es



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.

🚩 Av. de Zugazarte, 56 48930 Getxo

Las Arenas (BIZKAIA)

☎ +34 944 817 500 / +34 91 807 70 68

☎ +34 944 817 501 / +34 91 807 87 32

✉ uen_infraestructurasytransporte@sener.es

🌐 www.ingenieriaconstruccion.sener



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.

🚩 C/ Trespaderne, 29, 3º Edificio

Barajas I, 28042 - Madrid (MADRID)

☎ +34 913 138 000 / +34 607 845 281



✉ carolina.sotoramos@sgs.com

🌐 www.sgs.com



SOFTWARE QUALITY SYSTEMS, S.A.

SQS is a company specialised in software validation and verification with extensive experience in safety critical systems and, specifically, in the railway sector.

We accompany our clients throughout their development process, optimizing it and guaranteeing compliance with specific regulations and standards for their sector in terms of safety, functionality, quality, etc.

Likewise, we design and implement automated test environments and complement our offer with training activities in the field of software testing and quality.

🚩 Avenida Zugazarte 8, 1º-6, Getxo,

(BIZKAIA)

☎ +34 944804617



✉ blaiabarra@sqss.es

🌐 www.sqs.es



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.

🚩 Pol. Ind. del Mediterráneo Mitjera, 6

46550 Albuixech (VALENCIA)

☎ +34 961 415 000

☎ +34 961 415 002

✉ stadler.valencia@stadlerail.com

🌐 www.stadlerail.com



SYNEOX RAIL, S.L

Syneox was born from the merger of the railway divisions of three world-renowned companies; Grupo Cobra, Semi and Cymí.

We integrate all the technologies and systems involved in a railway line:

Energy. Leader in energy supply to all railway systems.

Signaling and auxiliary systems. Railway technologies worldwide.

Associated civil works. To the installation of railway systems

Operation and maintenance. High speed, conventional network, trams and subways.

Solutions. Turnkey solutions. Concessions and Public-Private Associations.

🚩 Calle Cardenal Marcelo Spínola nº 10,

28016 Madrid (MADRID)

☎ +34 649 724 570



✉ jesus.garciah@syneox.com

🌐 https://www.syneox.com/en/

**S.A.E. IBERTEST**

IBERTEST is a company that has been developing, manufacturing, and supplying mechanical testing systems for materials and components since 1970. We provide our systems for various sectors, including the railway industry, and consistently adhere to the highest standards of quality and technology. Additionally, we offer turnkey projects for the creation of laboratories and national reference centres for testing, quality control, research and training. Our integrated approach allows us to provide global solutions for research and quality control of a wide variety of materials and components.

🚩 **Ramon y Cajal, 18-20, Daganzo de Arriba, Madrid (MADRID)**
 ☎ +34 918 845 385
 ☎ +34 918 845 002
 ✉ arturo.cano@ibertest.es
 🌐 www.ibertest.com



Talleres Alegria, s.a.

TALLERES ALEGRÍA, S.A.

Talleres Alegria, 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 wagons.

🚩 **Peña Santa, 7 - Pol. Ind. Silvota 33192, Llanera (ASTURIAS)**
 ☎ +34 985 263 295
 ☎ +34 985 266 011
 ✉ talegria@talegria.com
 🌐 www.talegria.com

**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.

🚩 **Livorno, 19004 Guadalajara 33192, Llanera (ASTURIAS)**
 ☎ +34 639 101 699
 ☎ +34 949 252 080
 ✉ export@tecnivial.es
 🌐 www.tecnivial.es

**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 (ZARAGOZA)**
 ☎ +34 976 465 656
 ☎ +34 976 465 720
 ✉ fsanjuan@teltronic.es
 🌐 www.teltronic.es

**THALES ESPAÑA GRP, S.A.U.**

Thales is a World leader in Mission Critical Solutions for Land Transportation. Thales Spain, with more than 60 years of experience, has been pioneer and leader in the technological development of the Spanish railways, being 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.

🚩 **Serrano Galvache, 56 Edif Álamo 28033 Madrid (MADRID)**
 ☎ +34 91 273 7200
 ✉ jose.villalpando@thalesgroup.com
 🌐 www.thalesgroup.com

**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.

🚩 **Ramón de Aguinaga, 8 28028 Madrid (MADRID)**
 ☎ +34 91 418 21 10
 ☎ +34 91 418 21 12
 ✉ internacional@tpfingenieria.com
 🌐 www.tpfingenieria.com

**TEKNIKER**

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

🚩 **Iñaki Goenaga, 5, 20600 Eibar (GIPUZKOA)**
 ☎ +34 943 206 744
 ✉ inaki.bravo@tekniker.es
 🌐 www.tekniker.es

**TEL DAT S.A**

Since 1985, Teldat has been providing solutions for cloud access, remote office communications, cybersecurity and voice/data connectivity both in the office and in specific environments (industrial, railway, vehicles or public services). Teldat invests heavily in R&D&I including technologies such as network virtualisation, artificial intelligence, Federated Learning, 5G and DLT. Combined with its ability to work closely with its customers according to the specific needs of each project, it is among the European leaders in the corporate communications market. Present in more than 40 countries, it has headquarters in both Spain and Germany.

🚩 **C/ Isaac Newton 10, 28760 Tres Cantos, (MADRID)**
 ☎ +34 686 68 80 58
 ✉ ctovar@teldat.com
 🌐 www.teldat.com

**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.

🚩 **Calle de la Granja n.º 15, 2.ª planta, oficina 3 28108 Alcobendas (Madrid)**
 ☎ +34 91 084 17 07
 ☎ +34 987 264 407
 ✉ telice@telice.es
 🌐 www.telice.es

**TRAFAG**

Trafag is a Swiss manufacturer of pressure, temperature, level and SF6 gas density sensors, as well as a supplier of speed sensors.
 Present along the whole world and, managing from Spain the Iberian Peninsula and Latin America.

Sectors of activity: railway, hydrogen, hydraulics, pneumatics, renewables, shipbuilding, test benches, big engines, EX zones...

🚩 **Parque Tecnológico de Bizkaia, edif. 208B. 48170 - Zamudio - (BIZKAIA)**
 ☎ 667 843 260 / 946 414 063
 ✉ ivan.blanco@trafag.es / info@trafag.es
 🌐 www.trafag.com

**TYPESA**

Founded in 1966, TYPESA 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, TYPESA has extensive experience in building the capacity of local firms and in strengthening institutions to guarantee the sustainability of the infrastructure.

🚩 **Gomera, 9 -28703 San Sebastián de los Reyes (MADRID)**
 ☎ +34 91 722 73 00
 ✉ exterior@typsa.es
 🌐 www.typsa.es

**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.

🚩 **Príncipe de Vergara, 1261º F - 28002 Madrid (MADRID)**
 ☎ +34 900 809 933
 ✉ uretek@uretek.es
 🌐 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-relief.
- 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 service.

📍 C/ Águilas, 9 - Nave 11
28320 Valdepinto (MADRID)

☎ +34 91 691 42 68

☎ +34 91 691 57 03

✉ lauraparra@valdepinto.net

🌐 www.valdepinto.com

**VIRLAB**

Virlab is a reference laboratory for dynamic vibration and shock testing. Created in 1976 and located between San Sebastian and Toulouse and less than one hour from Biarritz airport (France), the laboratory develops accredited tests for equipment that may be subject to earthquakes or other types of vibrations and shocks.

Virlab's laboratory tests electrical, mechanical and instrumentation components, equipment and systems that, due to their use, may be subject to compliance with specific regulations under seismic, vibration or shock conditions.

📍 Polígono Industrial Asteasu Zona B,
Nº 44 20159 Asteasu (GUIPÚZCOA)

☎ +34 94 369 15 00 / 609 407 664

☎ +34 943 69 26 67

✉ dagote@virlab.es

🌐 https://virlab.es/es/

**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.

📍 Paseo Mikeletegi, 57 Parque Tecnológico de Miramón 20009 San Sebastian (GIPUZKOA)

☎ +34 943 309 230

☎ +34 943 309 393

✉ mtlinaza@vicomtech.org

🌐 www.vicomtech.org

**voestalpine Railway Systems JEZ, S.L.**

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.

📍 Arantzar s/n 01400 Llodio
(ARABA/ÁLAVA)

☎ +34 946 721 200

☎ +34 946 720 092

✉ vaRSJEZ.info@voestalpine.com

🌐 www.jez.es

**VOLGELSANG, S.L.U.**

As the inventor of the elastomer-coated rotary lobe pump and a pioneer in the area of vacuum wastewater technology, we have been supplying technical solutions whose functionality, quality and reliability set the benchmark for our competitors. Renowned railway companies such as the Deutsche Bahn among other international companies put their trust in our intelligently designed solutions for wastewater disposal and fresh water supply as well as Vogelsang's demand-oriented technical equipment. These include systems mobile solutions, maintenance for bioreactor toilet systems as well as servicing and cleaning to ensure the highest standards regarding hygiene, usability and cost-efficiency.

📍 Crta. del Pla 285 nau 20 43800 Valls
(TARRAGONA)

☎ +34 977 60 67 33

☎ +34 977 60 67 33

✉ ruben.llorente@vogelsang.info

🌐 https://www.vogelsang.info/

**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 know-how, 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.

📍 Autovía AS-II nº2386, Polígono Rocas
33211 Gijón (ASTURIAS)

☎ +34 985 168 132

☎ +34 985 168 047

✉ zitron@zitron.com

🌐 www.zitron.com



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TRANSPORT SYSTEMS
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COMPONENTS
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Your Way
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BE MOTION.

The energy transition is an unstoppable process.

To face this challenge, **The Real Dream Team** is born, a movement based on Heroes and Heroines that just like you do, share the same dream: a world where the energy production is clean.

Will you join?



THE
REAL
DREAM
team

BE PART OF
THE ENERGY
TRANSITION.
**BE A
HERO.**

Ingeteam

50 YEARS
ELECTRIFYING
A SUSTAINABLE
FUTURE