

The Spanish railway industry faces the new Safe, Sustainable and Connected Mobility Strategy



SPECIAL

Virtual Rail Live! 1st and 2nd December 2020



MAFEX INFORMS

Mafex held its annual General Assembly on November, 11st 2020



INTERVIEW

José Luis Ábalos, Ministry of Transport, Mobility and Urban Agenda

WE ARE TALENT

Great infrastructure is the product of the vision and effort of exceptional people.



A talent that enables us to improve the mobility and the quality of life of millions of people, every day.

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RAILACTIVATION PROJECT**

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EPROMAT PROJECT

New cell of composites manufacturing of high efficiency in productivity and materials.

STAFFER PROJECT

Mafex is a member of the Railway Alliance to define the working skills required to promote a single European railway space.

EXXTRA PROJECT

The initiative seeks the professionalisation of the competencies and services of clusters towards world-class cluster consolidation.

MAFEX 2020 GENERAL ASSEMBLY

The Association informed the Annual Members Meeting about last year's progress, the incorporation of new companies and the evolution of their more than 200 actions last year.

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MOBILITY STRATEGY 2030**

The Safe, Sustainable and Connected Mobility Strategy 2030, published on 17th September 2020, constitutes the framework that will guide the debate on mobility in Spain, enriched by the contributions of the different stakeholders in the mobility ecosystem.

**THE SPANISH RAILWAY INDUSTRY
IN THE FACE OF THE NEW STRATEGY
OF SAFE, SUSTAINABLE AND
CONNECTED MOBILITY**

Contribution of the railway industry to the Mobility Strategy.

Mafex companies' representatives provides us with their view on the role of railway as the main character of sustainable mobility and what they expect from the Public Administration in the new Strategy of Safe, Sustainable and Connected Mobility.

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JOSÉ LUIS ÁBALOS, MINISTER OF
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The railway: backbone of the boost to the economy and sustainable mobility

The year 2020 enters its final stretch. In a global context such as the current one, national and international administrations have highlighted the importance of designing investment programmes that help achieve a more sustainable economy. Within the recovery plans that are carried out, one of the objectives is to achieve a more environmentally friendly transport with the railway at its core. This is one of the reasons why this December the leading representatives of the sector meet once again on Rail Live! 2020, a professional platform, whose virtual edition on this occasion will serve to analyse the role this mode will play in the new mobility policies and the challenges to which it must respond. The event, organised by Terrapinn in collaboration with Mafex, reaches new highs, as it is expected that 4,000 people from more than 85 countries will be able to join the event. Under the slogan "Technology, innovation and strategy for the railway supply chain", experts will again take the pulse of one of the leading sectors, the railway.

The growing importance of sustainability and digitalisation is also reflected in the transport plans of various countries such as Spain. Thus, the new "Mobility Strategy 2030: Safe, Sustainable and Connected" was born. José Luis Ábalos, the Minister of Transport, Mobility and Urban Agenda, (MITMA), lays out in the interview given to Mafex magazine all the details of this guide that will mark the actions of his area during the next decade. This report also reflects the position and proposals of the Spanish railway industry in the face of

this new strategy. In addition, there is the opinion of a wide range of Mafex partners on the importance that the railway will have in the future of mobility.

This last issue of 2020 takes stock of our different activities. On November 11th we held the annual Members Meeting where last year's progress was presented, as well as the incorporation of the new members and the evolution of activities 2020 – 2021.

In terms of innovation, the RailActivation project is making progress successfully. Mafex has also become a new member of the Railway Alliance to define the working skills required to promote a single European railway space. And in this line of cooperation, we take part in the EXXTRA project that aims to contribute to the professionalisation of the competencies and services of clusters.

Along with the progress of the association, 17 member companies present on these pages their latest projects and developments and seven others publicise R&D projects in which they work.

We end a year marked by an unprecedented situation where the sector has been able to respond effectively and to provide a service with the highest safety guarantees. It is now the turn to look to the future with hope, to work hard and to build a sustainable mobility for all.

At the forefront of Rails Solutions

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

ArcelorMittal's main trending topics for railway:

- **Corporate Social Responsibility:** ArcelorMittal has received the Ecovadis Gold rating.
- **R&D:** ArcelorMittal operates a dedicated rail research and development unit which includes pilot plants and prototyping facilities. Its Rail Excellence Centre also includes a dedicated welding centre which can provide advice and support for current and future grades for its customers.
- **Digitalisation:** ArcelorMittal Rails & Special Sections is extending its 4.0 transformation with the launch of several digital tools.
- **Increasing the length of rails:** in order to provide further track safety, welding, track laying and maintenance cost savings.
- **Increasing the service life of rails:** with the most appropriate solution related to different applications; LCV (Low Carbon Vanadium) for tramway or new hardness grades for heavy haul applications.

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MANAGEMENT: MAFEX.

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RailActivation project promotes innovative transformation of twenty European railway SMEs

The railway industry is key in Europe to ensure a sustainable transport sector in the EU. And since the success of the digital revolution means that railway industries must use the best available technologies, focusing on the human factor, the role of workplace innovation stands as a driving force to deliver innovative services and to promote technological development.

In that context, the European RailActivation project, led by Mafex and involving a consortium of 4 partners (Tecnalia, Rail.S, Ditecfer and the Association of Italian Universities Quinn) launched last year with the aim of creating and testing railway business and organizational mechanisms to enable SMEs in the sector to adopt innovation in the workplace.

The objective of the project is to develop and experience a research model based on the concept 'Workplace Innovation', since the great challenge of the railway industries is to offer innovative products that deliver speed and flexibility to respond to the changing demands of the environment.

The pilot framework, mechanisms and tools have been developed during the project to help companies to anticipate and adapt themselves to the environment. To aid its development, Mafex defined the specifications to be met by the framework based on a quantitative and qualitative analysis carried out in the sector to determine, together with Tecnalia, the mechanism and innovation tool for the sector.

In order to test pilot plans in the business environment, the project launched an open call to test it in 20 SMEs. After receiving the no-

THE EUROPEAN RAILACTIVATION PROJECT, LED BY MAFEX, WILL TEST IN TWENTY EUROPEAN SMES IN THE RAILWAY SECTOR THE MECHANISMS AND TOOLS THAT HAVE BEEN DESIGNED DURING THE FIRST PHASE OF IMPLEMENTATION OF THE PROJECT. THESE TOOLS AIM TO ANTICIPATE THE EFFECTS OF DIGITIZATION ON THE INDUSTRY AND TO DESIGN THE TRANSFORMATION OF THEIR INNOVATION PROCESS AROUND THE CUSTOMER.



minations on September 30th, the pilot programmes will be tested in the twenty selected companies over a period of ten months.

To this end, a calendar of working groups has been established where University Consortium QUINN will develop different methodologies for participating companies to exchange their experiences in relation to workplace innovation. Participating companies will be able to exchange information with different profiles of professionals from companies located in six different coun-

tries: United Kingdom, Spain, Germany, Romania, Italy, and Greece.

The project is supported by an Advisory Board made up of expert members in the field of innovation and railway operators who support the project through their knowledge and experience. Finally, within the framework of the virtual Rail Live! exhibition that will be held in December, the consortium members will present a roundtable to disseminate the project and its preliminary results in order to further promote workplace innovation.

EPROMAT, new cell of composites manufacturing of high efficiency in productivity and materials

The EPROMAT Project will develop a new manufacturing cell based on advanced and intelligent organizational models for the automation of large composite manufacturing processes.

The project is developed with the support of the HAZITEK 2020 programme and has a consortium of 9 industrial partners, 1 cluster (MAFEX) and 2 RVCTI agents, led by POLIKEA, a company manufacturer of complete components and modules for the railway and shipping industry.

THE FUTURE OF THE GLOBAL COMPOSITE MARKET PRESENTS ATTRACTIVE OPPORTUNITIES IN VARIOUS SECTORS SUCH AS TRANSPORT, CONSTRUCTION, ENERGY OR CONSUMER GOODS. THE GLOBAL COMPOSITE MARKET IS EXPECTED TO REACH AN ESTIMATED VALUE OF \$114.7 BILLION BY 2024. THE CHALLENGE IN THE NEW MANUFACTURING PROCESS DEVELOPMENTS FOR COMPOSITE PARTS IS TO ACHIEVE A BALANCE OF PROCESS COSTS, LEVEL OF INVESTMENT REQUIRED AND PRODUCTIVITY, ESPECIALLY WHEN IT COMES TO LARGE PARTS.



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Mafex, member of the railway alliance to define the working skills required to promote a single european railway space

The railway sector is recognized as an important driver in achieving the European objective of smart, ecological, and sustainable growth, and is expected to be the key pillar across the transport system. Digitization is developing rapidly and is leading to an increased demand for ICTs, (Information and Communication Technologies) and technical skills. In addition, there is a growing need for skills related to the modernization of railway infrastructure, traffic management and rolling stock.

Despite the existing opportunities, the sector is experiencing a shortage of skills and a need for updating. On the one hand, around 30% of its workers are expected to retire in the next decade, while career appeal should increase.

In turn, the process of transformation driven by research and innovation requires incorporating the right skills and competencies. In this context, one of the main challenges to face is the diffi-

culty in hiring staff, including groups represented by women and young people. This is particularly due to two aspects: a negative and widespread perception of working conditions on the railway, and a low awareness of the high-tech employment opportunities offered by the sector.

To meet this challenge, the STAFFER project combines key stakeholders in the railway industry to closely cooperate in anticipating the training needs and improving the dialogue between the education sector and the labour market. The project lasts for 4 years and the consortium consists of 7 infrastructure managers/operators, 8 railway industry providers, 2 associations, a consultancy firm and 14 educational institutions (higher education and secondary education institutions). Among the members of the consortium, we would highlight the participation of CAF, ALSTOM, BOMBARDIER, SIEMENS MOBILITY, CER, UNIFE, DEUTSCHE BAHN, SNCF and ÖBB.

The final result of the STAFFER project is the creation of a stakeholder railway partnership - Skill Alliance. The purpose of this consortium is to develop a comprehensive Blueprint strategy to recognize the current needs and the new skills required to achieve a single European railway area. Such strategy will help to overcome the fragmentation of the railway sector and it will enable the railway industry and educational institutions (vocational training and universities) to design and take concrete measures to meet the need for skills.

On the other hand, and in order to promote talent in the railway sector, MAFEX collaborates with the University of Cantabria in its first edition of the Master in Railway Engineering. The main objective of the master is to train professionals working in different areas of the railway sector, developing specific and cross-cutting competencies in different disciplines.

Mafex supports the collaborative model among railway clusters through the EXXTRA project



Clusters are an exceptional network to stay at the forefront of technological developments and establish partnerships. It has been shown that the European railway sector must remain at the forefront of R&D&I. It must face industrial transformation, digitization, skills scarcity and a level playing field in terms of internationalization in order to preserve its leadership and continue to be able to successfully compete against foreign suppliers.

In addition, SMEs represent more than 90% of the railway industry and clusters are increasingly important stakeholders for them. The development and sustainability of SMEs and start-ups depend on their

ability to stay ahead of technological developments, which has been a booming field in recent years. As a result, SMEs and clusters need to engage in broad and diversified networks to be able to adapt their solutions to the main trends and specific needs of a sector.

MAFEX, aware of the importance of this collaborative model participates in the EXXTRA project. The objective of this project is to help in the professionalization of the competencies and services of clusters towards the creation and consolidation of world-class clusters in the field of Railway Technologies. The project also has a pilot mobility programme based on the "ERASMUS" model called "ClusterXchange". The programme allows short-term exchanges with other European organisations. It facilitates transnational cooperation, inter-party learning, networking, and the adoption of innovation among stakeholders from different industrial clusters across Europe.

PROJECT MEMBERS

DITECFER - Italia (Coordinador)
ARUS - Turquía
CenSEc - Denmark
I-TRANS - France
MAFEX - España
RAILGRUP - España
RAILS E.V. - Alemania

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MAFEX Revista corporativa de Mafex
Asociación Ferroviaria Española





MAFEX General Assembly

MAFEX, the Spanish Railway Association held its annual General Assembly on 11th November in online format, where more than 65 member companies were present. During the session, there was a review of the work that the association has been carrying out in its various groups and committees over the last year, which focuses on key subjects such as internationalisation, competitiveness and communication.

A balance was also drawn up of the more than 200 actions that were organised and/or coordinated by MAFEX. It should also be noted that, within the framework of this annual General Meeting, 11 companies that joined MAFEX since the General Meeting last year were present/presented (dependiendo respectivamente de si el original se refiere a que las empre-

IN THIS ONLINE SESSION, WHICH WAS ATTENDED BY 65 COMPANIES, THE MORE THAN 200 ACTIONS CARRIED OUT BY MAFEX IN 2019 WERE PRESENTED, AS WELL AS THE WORK THAT HAS BEEN CARRIED OUT IN ITS VARIOUS GROUPS AND COMMITTEES OVER THE LAST YEAR, WHICH FOCUS ON KEY ISSUES SUCH AS INTERNATIONALISATION, COMPETITIVENESS AND COMMUNICATION.

sas estuvieron presentes, o si se refiere a que se presentó a esas empresas): Agui, AIMEN Centro Tecnológico, CEIT, Enyse, Electran, Goal Systems, Ingeniería Viesca, Lantania, NRF España, SGS Spain and Tekniker.

All of them are companies with headquarters or established in Spain that have an important export component in the railway field.

The association currently has 93 partners, whose railway turnover in 2019

amounted to more than 5.5 billion euros - 80% of which was in foreign markets and employing more than 30.000 people. For MAFEX, these results are an example of the intensification of the R&D policies of its partners, its commitment to the international market, as well as the strength of a leading industry, highly qualified and with a great competitiveness and capacity to excel. These figures reflect that the consolidation takes place in the big companies as well as the SMEs. 🚂

Mafex Innovation Committee

The Innovation Committee comprises 20 companies and technology centres. The committee will continue to act as a facilitator of activities that make its partners more competitive, innovative and technologically advanced companies.

In this field, there is a commitment to technological and non-technological collaboration to advance in key aspects such as sustainability, digitalisation and industry 4.0, the identification of strategic projects (technological surveillance) as well as new business models that favour the digital transformation of the sector. 🚂

LAST FEBRUARY MAFEX APPOINTED THE NEW MEMBERSHIP OF THE MAFEX INNOVATION COMMITTEE FOR THE NEXT TWO YEARS.

| Members | |
|---------------|--------------------------|
| Aimen | Patentes Talgo |
| ArcelorMittal | Sener |
| Bombardier | Siemens |
| Caf | Tekniker |
| Ceit | Telice |
| Gaiker | Thales |
| Indra | TPF Getinsa-Euroestudios |
| Ingeteam | Typsa |
| Inse Rail | Vicomtech |
| Mgn | Zeleros |



Alstom Spain joins the Spanish Hydrogen Association

ALSTOM SPAIN
Alstom has joined the Spanish Hydrogen Association, whose aim is to foster, promote and drive the technological and industrial development of hydrogen technologies in our country. By joining, Alstom once

again shows its commitment to sustainable mobility and the promotion of hydrogen as an energy vector in the decarbonization process of our society.

Pioneers in the use of green hydrogen for mobility, Alstom is the only manufacturer to put fuel cell-powered trains into commercial service. Alstom's first hydrogen train, the Coradia iLint,

began operating with passengers in September 2018, with two vehicles in regular service in Lower Saxony, Germany. After a year and a half of tests and more than 180,000 kilometres travelled, the manufacturing of 14 series trains has already begun, and will be delivered to the customer from 2022, to replace the current diesel units and meet the zero emission targets

Bombardier and Carlos III University present the 7th edition of their Master in Railway Engineering

BOMBARDIER SPAIN
Bombardier Transportation and Universidad Carlos III de Madrid continue to collaborate in training and attracting railway talent with the launch of the seventh edition of the Master in Railway Engineering, which this year will be imparted through the University's online platform.

The Master's Degree provides training in all railway engineering areas, from the design and calculation of rolling stock to traction and signaling systems, safety, and maintenance. The teaching methodology has a double aspect, theoretical and practical, complemented by internships



in companies of the sector, including Bombardier. 100% of the students who started the Master's in unemployed have obtained a job in the sector. Furthermore, approximately 60% of these jobs are, directly or indirectly, at Bombardier.

Bombardier is also present in the Master in Railway Engineering organized jointly by the University of Cantabria and Mafex, where it will share its knowledge and experience, teaching in several modules.

Ardanuy Ingeniería to carry out the Power Supply Connection for the Torrejón de Velasco Substation

ARDANUY INGENIERÍA
ADIF Alta Velocidad has awarded Ardanuy Ingeniería with a new contract. The Company will carry out different Consultancy and Technical Assistance Services required for the Project's environmental processing apart from elaborating the Preliminary and Detailed Designs for the power supply connection to the Torrejón de Velasco Substation located within the Atocha – Torrejón de Velasco section.



This section is part of the high-speed railway access expansion project to connect the Spanish Capital, Madrid, with the Southern areas of the country, most notably with the lines of the Levante and Andalusia. The

Works for the Atocha – Torrejón de Velasco section have received financing from the European Regional Development Fund (ERDF) and well as from the EU's funding instrument "Connecting Europe Facility (CEF)".



Europe selects the consortium led by CAF for the development of a hydrogen train prototype

CAF
The Fuel Cells and Hydrogen Joint Undertaking (FCH JU) of the European Commission has selected the project FCH2RAIL to start negotiations for an EU grant agreement valued at 10million EUR.

FCH2RAIL would be technically led by CAF and would benefit from the European funding under the H2020 Program to work on the development of a railway vehicle prototype powered by hydrogen.

The selected Consortium is formed by the companies CAF, DLR, RENFE, TOYOTA MOTOR EURO-

PE, ADIF, IP, CNH2 and FAIVELEY Stemmann Technik. This proposal includes the design and manufacturing of a prototype based on the existing RENFE's Civia commuter train.

The new power generator system will be based on the hybridization of hydrogen fuel cell systems and LTO batteries.

IDOM is working on the design of the Cork Light Rail System

IDOM

IDOM, together with the engineering firms Jacobs and SYSTRA, has been awarded the Cork tram project for Transport Infrastructure

Ireland (TII). This project is part of the Cork Metropolitan Area Transport Strategy (CMATS) to serve various areas of the city of Cork, such as: University College Cork (UCC), Cork County Council, Cork University Hospital (CUH) or the Cork Institute of Technology (CIT).

IDOM will design the alignment of the tram line layout, the stops, the urban integration of the platform, the bridges and viaducts; the telecommunications, signaling, operation and maintenance system, as well as the traction systems and substations.





SHIFT2RAIL INNOVATION DAYS

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Ceit participates in Shift2Rail Innovation Days' High Level Panel

CEIT

Shift2Rail Innovation Days were held on 22 and 23 of October with the aim of defending the crucial role of the railway in the mobility of the future and presenting the

master lines of Shift2Rail's successor program from 2021 on. Juan Meléndez, General Director of Ceit, participated in the High Level Panel moderated by Carlo Borghini (Executive Director of Shift2Rail) and also involved Henrik Hololei (Director General for Mobility and Transport, European Commission)

and Henri Poupart Lafarge (CEO of Alstom) among others. Ceit, during its speech, stressed the importance of transferring to the industry the technology generated within Shift2Rail, underlining the creation of a new technology-based company called MainRail Solutions.

Progress of the work on the Light Train in Mexico

COMSA

COMSA Corporación continues to make progress in the specialised maintenance work on the section of the Mexican Light Train between Azteca Stadium and Xochimilco. The works are at 85% completion and the section is expected to be operational by the end of this year.

On October 31, the Director General of Electric Transport of Mexico City, Guillermo Calderón, and the Secretary of Mobility, Andrés Lajous, visited the location together with the Director of the Mexican delegation of COMSA, Jordi Frigola, where they were able to see the track rehabilitation work being carried out.

The project includes the complete replacement of

the tracks, the renovation of the platform and drainage, and the complete rehabilitation of the 8 vehicle crossings, among other maintenance tasks. Once the work is

completed, travel time between the Azteca Stadium and Xochimilco will be reduced by 40% and the service offered will reach 130,000 users per day.



Teltronic to supply on board TETRA radios for new Finnish Railways locomotives

TELTRONIC

Stadler, company awarded to manufacture and supply 60 new locomotives for the government-owned railway company in Finland, VR Group, has selected Teltronic as provider of the on-board TETRA (Terrestrial Trunked Radio) equipment.

Specifically, the Spanish company will supply a total of 60 units of the RTP-300, an EN50155 / EN45545 compliant and compact on-board radio equipment, which offers voice and data services as well as a set of functionalities that enable its integration with other railway subsystems.

In addition, another 60 units of the RCC-3000, an advanced touch screen control console, as well as

the necessary audio accessories for drivers to develop their voice communications, will be supplied.



The section 2 of the Mayan Train subcontracted to an engineering consortium led by TPF Getinsa Euroestudios

GETINSA
Within the framework of the National Development Plan 2019-2024, the National Fund for the Promotion of Tourism (FONATUR) and its subsidiary FONATUR Tren Maya are the federal government entities responsible for the development and implementation of the Mayan Train Project, which involves the construction of a railway line for the transportation of passengers and freight. The section 2 of the Mayan Train was awarded to the consortium formed



by Operadora CICSA, S.A. de C.V. and FCC Construcción, S.A., who in turn subcontracted the services to an engineering consortium led by TPF Getinsa Euroestudios in order to conduct the studies and designs required

for the section 2, which runs from Escárcega Station to Calkiní Station and covers a total length of 222 km. The assignment includes 2 stations, 4 viaducts and a maintenance workshop in Campeche.

Icon Multimedia implements its information system on the Metro Valencia tram network

ICON
The Valencian public railway company, Ferrocarrils de la Generalitat Valenciana (FGV), will feature ICON Multimedia's information system for passengers, DENEVA, on its tram lines, which will include requests for real-time communication on waiting times, as well as other service rela-

ted notifications such as incidents or recommendations.

All this information will be integrated into DENEVA platform, already implemented in FGV's control center, through which all the subway stations and also more than 100 above ground stations in the Metrovalencia network are managed in a centralized way. In addition, DENEVA allows different means of transport to be

unified in the same system, with a commitment to intermodality.

This action will begin to be implemented through the installation of LED remote indicators at the stops of lines 4, 6 and 8 of the tram network, which also incorporates a new system for visual impaired passengers which enables the information displayed to be audible, in order to facilitate the contents accessibility.



Monitoring of new HS lines in Turkey

CETEST
In November CETEST began the inspection of a new high-speed line in Turkey, owned by the state company TCDD. It is a new double-track line built by the Turkish companies DOĞUŞ and YAPI MERKEZİ, with a total of 700 km, which connects the cities of Ankara with Sivas.

Also, in this case for the company TCDD Teknik, a total of 1.250 Km at the high-speed lines between Ankara and Istanbul, as well as between Ankara and the Turkish city of Konya, have been inspected.

These inspections on high-speed lines include the measurement of the track geometry, including the calculation of equivalent conicity, as well

HS lines inspection by CETEST in Turkey.



as the measurements of the dynamic behaviour and current collection, for which the interaction between pan-

tograph and catenary is analysed by measuring contact forces, uplift and number of arching.



Indra will develop the Traffic Management System of the railway network in Estonia

INDRA
Eesti Raudtee, the state-owned company that manages the Estonian railroad network, has awarded

Indra a contract amounting to 18.4 million euros to carry out the design, development, implementation, and start-up of the system that will manage and control the rail traffic on the 1,214 kilometers national railroad network.

The solution offered by Indra integrates centralized traffic control, planning, and regulation, facilitates automation, improves the network use, reduces operating costs, and enhances safety, traveler services, punctuality, incident management, and maintenance.

The passengers can check the occupancy of Tenerife Tram in real time

METRO DE TENERIFE
Metrotenerife has activated a digital tool that allows users to consult the percent of tram occupancy in real time. This service is available on the web app (tranviaonline.metrotenerife.com) and on the app ten+móvil (section next stop). A campaign has showed the operation of this tool on social networks and with posters at stops and on trams.

As the company's managing director, Andrés Muñoz de Dios, explains, when the tram occupancy reaches the current capacity limitation of 66% (maximum allowed by actions against propagation of covid19), this service will recommend to the passengers to wait the next tram. If the capacity is reaching the limits allowed it will showed a text message in the app and a voice warning at tram stop. This app contributes to avoid crowds of people in order to keep to the recommendations of the health authorities.



TranviaOnline is a web app that reports in real time the locations of trams besides information of each one. Users may choose

the tram stop and the app will show the time remaining for the arrival and the occupancy percent in real time.

SENER in the Salvador monorail in Brazil

SENER
SENER will draft the detailed project for the railway systems of the Salvador monorail, in Bahia (Brazil), under contract with BYD. With a length of 23.6 km and 25 stations the new monorail will connect the two existing metro lines (Line 1 and 2) that will be joined in the Acceso Norte Station and from there, it will go to the Ilha de São João Station. SENER will carry out the detailed projects for the: rail systems; high, medium and low voltage systems; drive system; third and fourth rail; grounding, or atmospheric discharge protection system; signalling; communications; and platform doors. Previously, SENER drafted the



conceptual projects, both for the construction and the systems, of

this key mobility project for the city of Salvador.

Siemens Mobility – GRK Rail Consortium to renew the CCS systems on Estonian Railways infrastructure

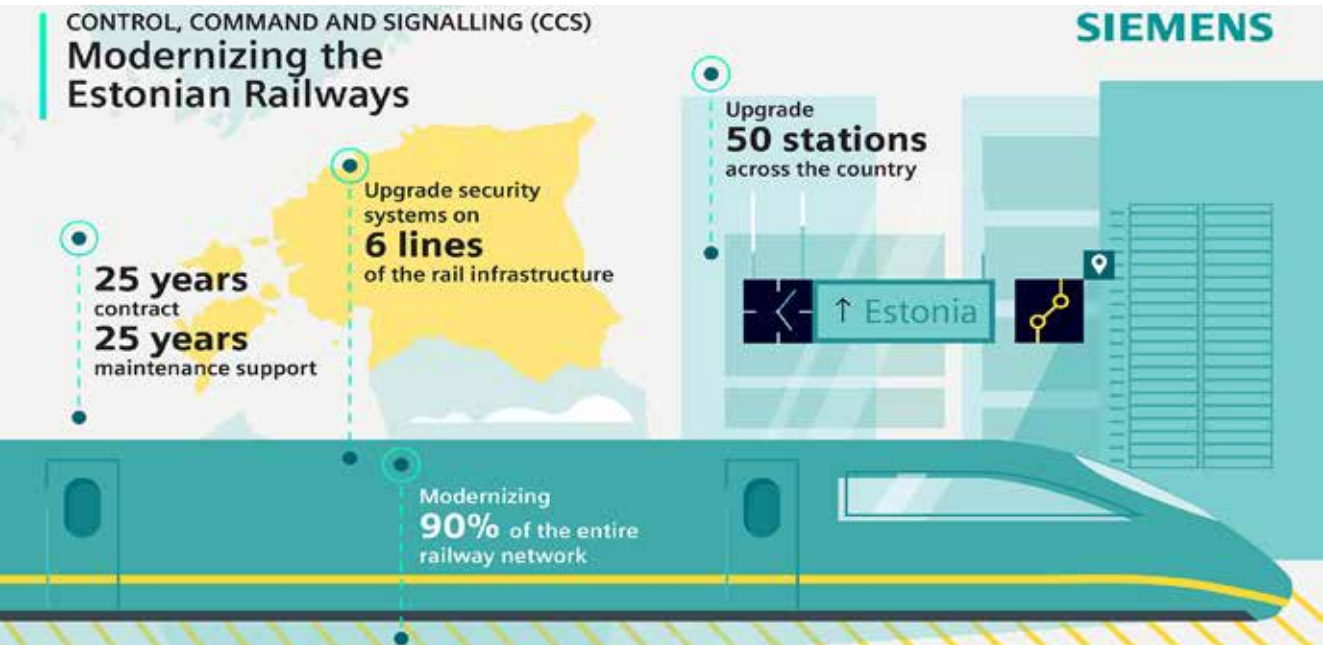
Siemens Mobility
The Consortium Siemens Mobility-GRK Rail has been awarded by Estonian Railways Ltd (Eesti Raudtee) the CCS contract, with a total cost of little over € 115 million, 25 years of duration and including the deployment of certified

Control, Command and Signalling (CCS) systems, spare parts needed throughout the contract period and 5 years of support and maintenance services.

Estonian Railway's renewal program is planned to be performed in three stages. Contract is related to stages one and two and it lays foundation for the whole network's transition to the European Rail Tra-

ffic Management System (ERTMS/ETCS) in stage three.

Siemens Mobility's and GRK Rail's joint delivery include engineering, delivery, installation and testing of the new signalling system. Siemens Mobility is responsible for the system delivery and overall project management and GRK Rail is responsible for all installations and site management.



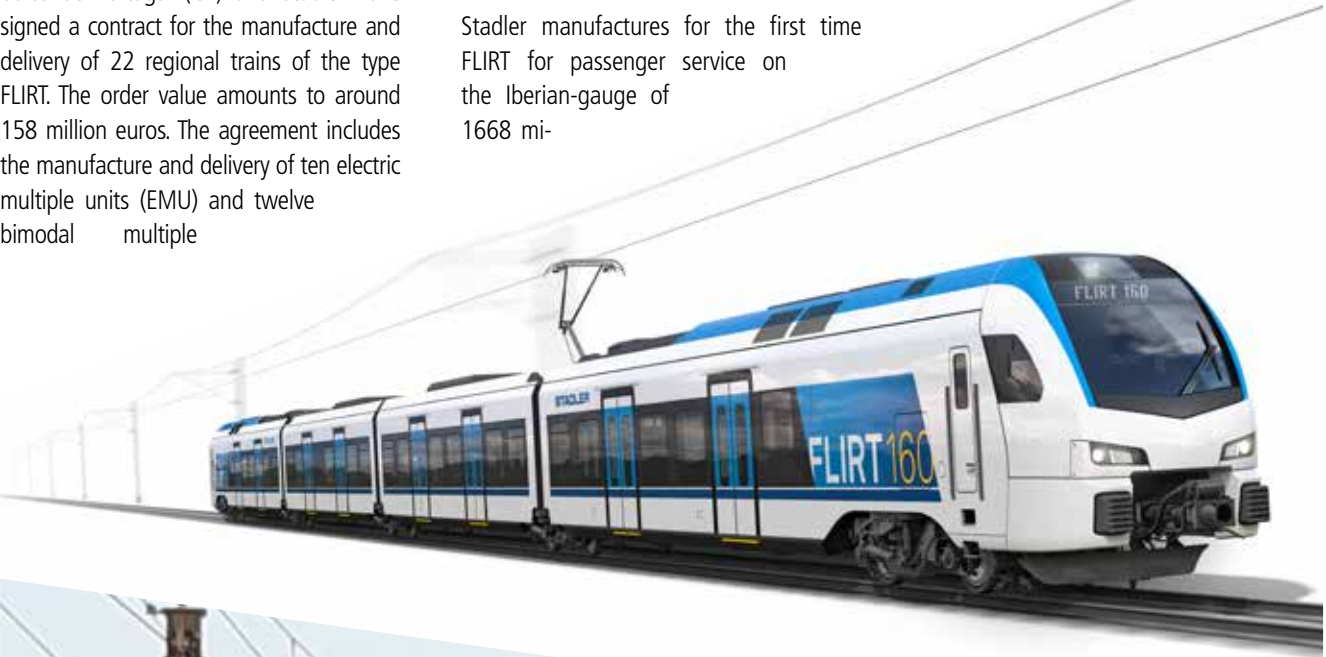
Stadler signs the contract for 22 regional trains for Portugal

STADLER
The state-owned railway company Comboios de Portugal (CP) and Stadler have signed a contract for the manufacture and delivery of 22 regional trains of the type FLIRT. The order value amounts to around 158 million euros. The agreement includes the manufacture and delivery of ten electric multiple units (EMU) and twelve bimodal multiple

units (BMU), maintenance services for at least four years and training services. The order will serve to renew the regional train fleet and is part of the rolling stock renewal plan of the Portuguese operator.

Stadler manufactures for the first time FLIRT for passenger service on the Iberian-gauge of 1668 mi-

lлиметres. The FLIRT is Stadler’s bestseller and is extremely popular with customers all over the world. To date, Stadler has more than 1900 FLIRT trains in 21 countries.



Thales ERTMS technology will reduce the duration of train journeys between Madrid and the Northwest of Spain

THALES
Travelers using the Madrid-Galicia line experienced a reduction in travel times, when the Zamora-Pedralba high-speed section opens, corres-

ponding to the Madrid-Galicia High Speed Corridor. In addition, with the completion of this section it is possible to use the Pedralba de la Pradería interchange to get to Orense.

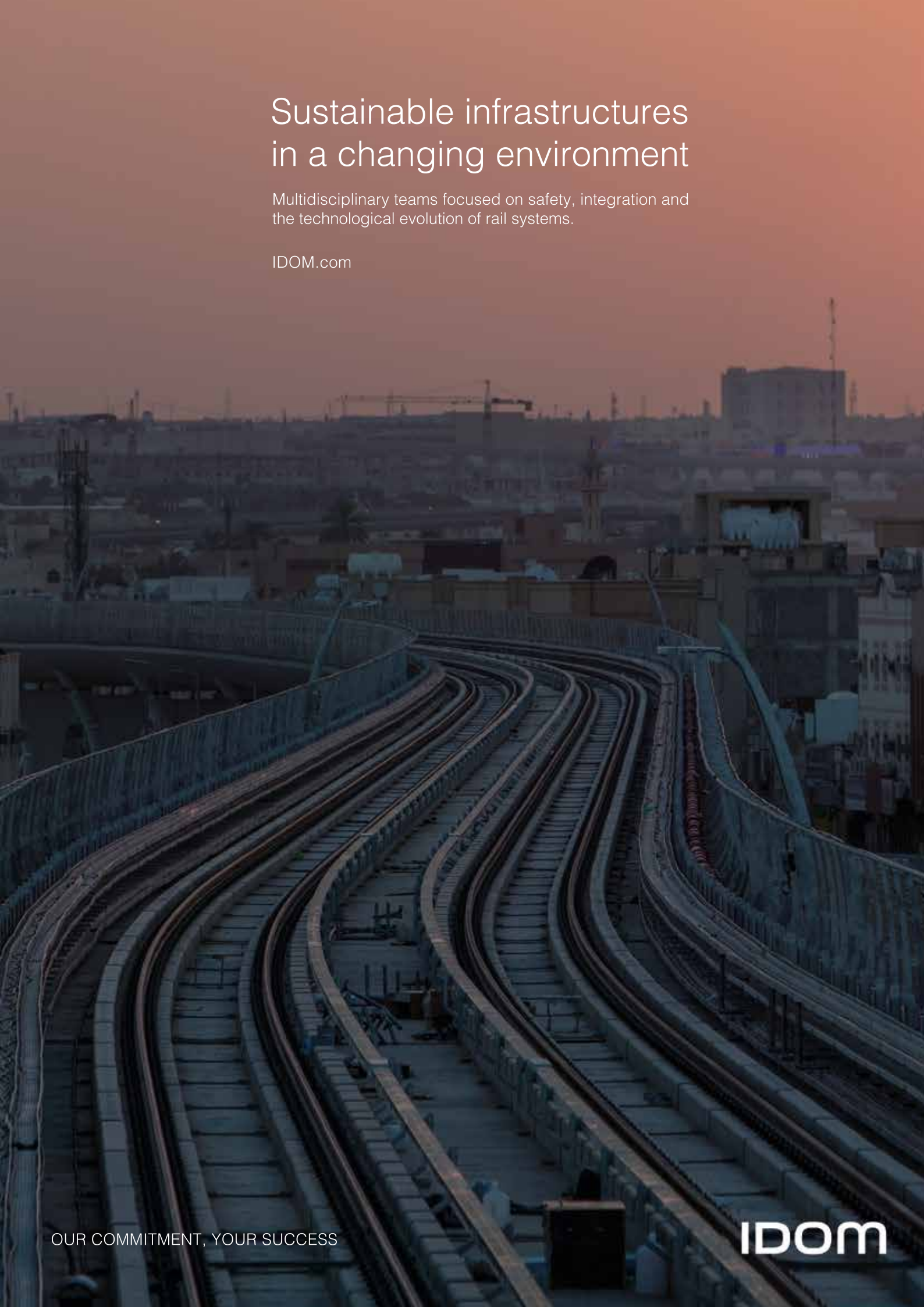
With this commissioning, the travel time from Madrid to all the Galician capitals is reduced from 24 minutes to 1h 26 minutes.

The Madrid-Orense line becomes one of the most ERTMS level 2 kilometers in commercial service in Spain, as the operation of this technology begins on the Madrid Chamartín - Zamora - Pedralba. With the launch of these new 110 kilometers, 340 kilometers are exceeded with this technology on the line.

Sustainable infrastructures in a changing environment

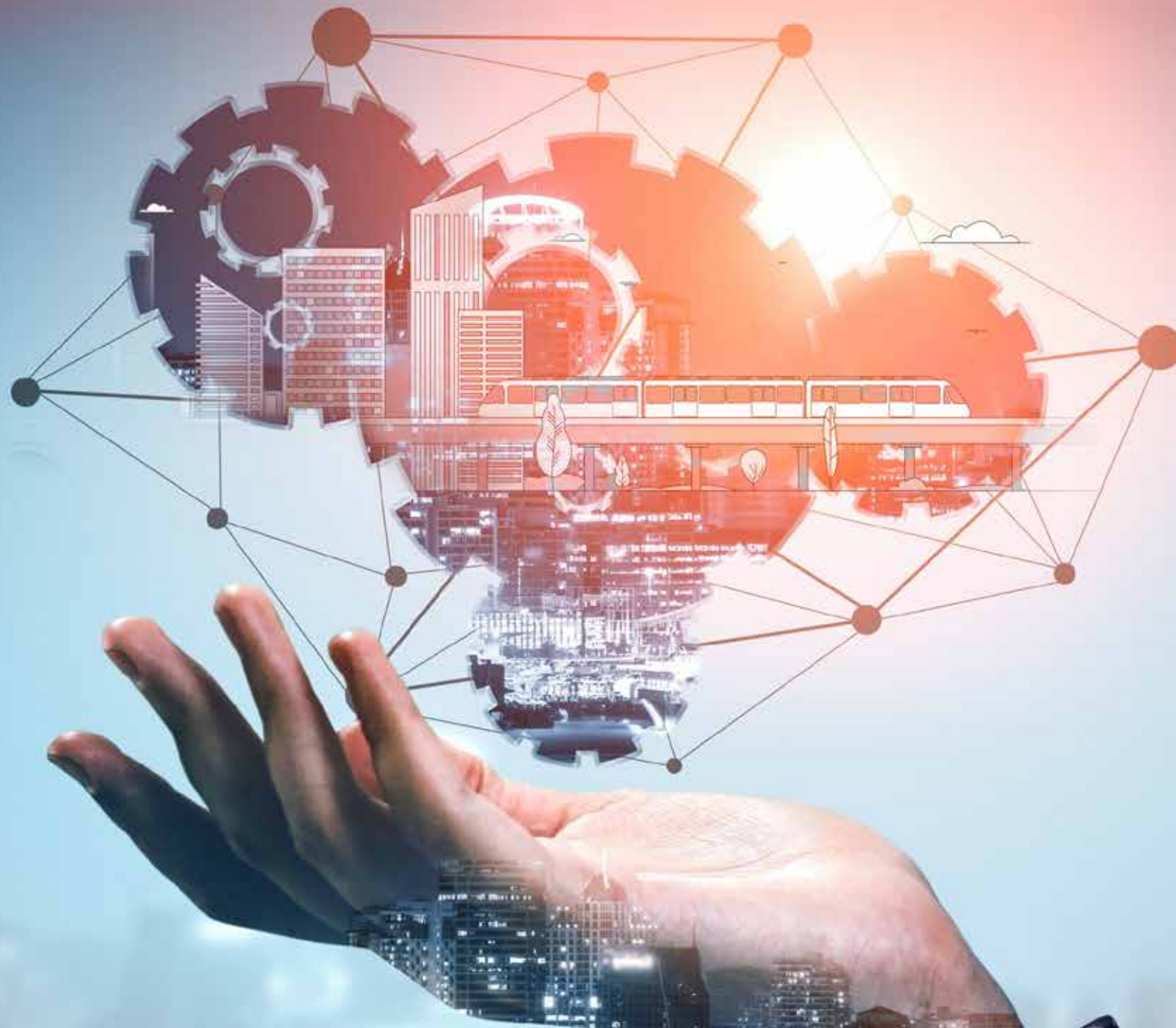
Multidisciplinary teams focused on safety, integration and the technological evolution of rail systems.

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RAILLIVE! 2020

New global event with innovation and the future of the railway

Rail live! 2020 Celebrates a new edition from 1st to 2nd december, where the leading representatives of the international railway sector will meet online.

December has a special appointment with the railway sector. The main event of the year, which this time will be in virtual format, brings together the leading representatives of the international railway sector on 1st and 2nd December. Under the slogan "Technology, innovation and strategy for the railway supply chain", this professional platform will gauge an industry with great growth prospects in the face of growing global investments in the area of sustainable mobility.

Rail Live!, organised by Terrapinn in collaboration with Mafex, reaches new highs in number of participants, speakers and presentation of news and services. It is expected that 4,000 people from more than 85 countries will be able to join the event.

In addition, more than 200 speakers will announce the most relevant transport projects being carried out around the world, as well as the progress being made in the railway networks, both in major lines and in urban systems.

This international platform will focus on conducting an in-depth analysis of the great transformation that the railway is experiencing through discussion about the most critical issues of future developments.

Administrations, companies, operators, and experts share experiences once again in a forum where this year aspects such as R&D, sustainability or safety will have a very special weight.

Broad institutional support

As in all previous editions, there is support from numerous collaborating entities such as the Railway Infrastructure Administrator (Adif), Renfe Operadora, Ices Spain Trade and Investment, The Spanish Railways Foundation (FFE), the Spanish Railway Technological Platform (PTFE), Madrid Metro and the City Council of Madrid.

This broad group also includes the National Association of Independent Builders (ANCI), the Association of Infrastructure Contractor and Concessionaires (Seopan), Shift2-Rail, Teciberia, the European Rail Supply Industry Association (UNIFE) and the Union of Public Transport and Rail (UTP) of France.

For two consecutive days, the major challenges facing the sector will be addressed in the face of the unstoppable growth of new developments.

Topics and trends

This event has established itself as one of the main forums for discussion on the present and future of the railway sector. For two consecutive days, there will be discussions about the great challenges facing the sector in the face of the unstoppable growth of new developments, the need to commit to environmentally friendly mobility and the new scenario due to the current context.

Virtual exhibition

In addition, there will be a space for digital exhibition with stands of the companies participating in the edition. There will also be different activities carried out in this area, which will encompass the entire railway value chain.

The exhibition represents all sub-sectors: consultancy and engineering services; technology suppliers; rolling stock manufacturers; and telecommunication, signalling or security companies, among many other fields. Visitors have a new opportunity to learn about the latest trends, products and related services in areas as diverse as new materials, intelligent maintenance systems, the Internet of Things (IOT), data

PATROCINADORES PLATINO

analysis and digital construction methodologies. Among the exhibitors it will also be possible to learn

more about the complete activity of Mafex, which will have its own stand at the fair.

1-2 December | Virtual Event

RAIL LIVE!

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A comprehensive agenda with speakers from the five continents

ONE MORE YEAR, RAIL LIVE! HAS DESIGNED A CONFERENCE WITH A COMPLETE PANEL THAT WILL INVOLVE MORE THAN 200 SPEAKERS. THE OBJECTIVE, TO ADDRESS THE MOST RELEVANT ISSUES ASSOCIATED WITH THE NEW TRENDS IN MOBILITY, AS WELL AS THE MEGA RAILWAY PROJECTS THAT TAKE PLACE ON THE FIVE CONTINENTS.

The Rail Live conference panel has the main players in the railway industry from the five continents. A very representative variety involving senior officials of public administrations, railway operators, infrastructure managers and members of associations and entities linked to the world of transport. Also involved are suppliers of technologies, manufacturers, consultancy, and engineering services.

Official opening

The opening ceremony will have guests such as the Minister of Transport, Mobility and Urban Agenda, José Luis Ábalos; the Transport Advisor of the Community of Madrid, Ángel Garrido García and the delegate of the Government Area of

Environment and Mobility of the city of Madrid, Borja Carabante.

Immediately afterwards there will be welcoming words by the organisers, which will be delivered by the president of Mafex, Victor Ruiz, and the director of Terrapinn, Sean Willis.

Round tables

Alongside the numerous conferences scheduled, Rail Live has designed an attractive model of communication between attendees so that they can delve into those topics that are of interest to them.

These are round tables where small groups of experts will make open video calls which attendees can join to

Mega railway projects from around the world will be presented at the conference.

discuss a particular topic in an interactive format.

Topics of the sessions

The first day of the conference will focus on the debate on the most critical and most popular issues within the sector such as integrated mobility and ticketing, energy and sustainability or the advancement of light rail

system and urban railway networks.

This comprehensive agenda will also set out the transport and stations mega projects that are being developed in countries around the world, as well as their financing, as well as the changes implemented by the digitisation process and the advances introduced in the sector by concepts such as the Internet of Things (IoT).

Forum: Spanish leaders

The first of the conference blocks will be a forum with the Spanish railway leaders. This will involve one-to-one interviews to learn more about the future plans and the projects of infrastructure ma-

SPEAKERS

| NAME | POSITION | COMPANY |
|---------------------------------|--|--|
| Adolfo Rebollo Gomez | Chief Executive Officer | Ingeteam, S.A. |
| Alain Quinet | Chief Operating Officer | SNCF Reseau |
| Albert Tortajada | Infrastructure Director | FGC |
| Alex Burrows | Managing Director | Rail Alliance |
| Alex Barron | Associate Director | Imperial College London |
| Alexey Ozerov | Head Of International Cooperation Department, Jsc Niias | Russian Railways |
| Alfred Assil Anis | Chairman | Menarail Transport Consultants |
| Alla Reddy | Deputy Chief, Data Research & Development | New York City Transit |
| Amar Vora | Space Applications Engineer | European Space Agency |
| Ana Maria Moreno | General Manager | Los Tranvías de Zaragoza |
| Andres De Leon | Chief Executive Officer | Hyperloop Transportation Technologies |
| Andrés Muñoz De Dios | Managing Director | Metropolitano de Tenerife |
| Ignacio sanz Junoy | Subdirector Comercial Servicios Logísticos | ADIF |
| Andrew Mcnaughton | Professorial Fellow | University of Southampton |
| Andy Billington | Innovation & Sustainability Director | Rail Baltica |
| Andy Lord | Managing Director | London Underground |
| Anette Granström | | Uppsala Region |
| Ángel Garrido García | Regional Minister of Transport, Mobility and Infrastructures | Comunidad de Madrid |
| Angeles Tauler | Gerente PTFE-Subdirectora Estrategia, Innovación y Formación | FFE |
| Ankala Saibaba | CE | Indian Railways |
| Anna Paltauf | Head Of IT | ÖBB-Personenverkehr AG |
| Antonio Núñez | Dir. Técnica. JA Mantenimiento Predictivo, | ADIF |
| Astrid Bunt | Director Of Stations | ProRail |
| Axel Sondermann | Executive Director Consulting | Deutsche Bahn AG |
| Bertrand Minary | Chief Innovation And Digital Officer | Fret SNCF |
| Borja Carabante Muntada | Delegado del Área de Gobierno de Medio Ambiente y Movilidad | City of Madrid |
| Brian Kelly | Chief Executive Officer | California High Speed Rail Authority |
| Bruce Cheng An Lee | Commissioner | Dpt. of Rapid Transit Systems New Taipei City Gvt. |
| Carel Jonckheere | Smart Railway Project Director | Infrabel |
| Carl Silfverhielm | Rail Strategist - Strategic Dev. Traffic and infrastructure Dev. | Stockholm City |
| Kaspars Briškens | Head of Strategy & Development | Rail Baltica |
| Carlo Borghini | Executive Director | Shift2Rail Joint Undertaking |
| Santos Nunez Del Campo | Head of Energy & Sustainability | Renfe |
| Carlos Andrés Sierra | Contract Manager | Zitron S.A. |
| Carmen Librero | President | INECO |
| Carolin Holland | Project Manager Autonomous Vehicles | SBB |
| Carsten Wiebers | Global Head Aviation, Mobility And Transport | KfW IPEX-Bank |
| Chris Perry | Associate Director | KPMG |
| Christian Schlehuber | Manager Governance CyberSecurity & Co-Chair ER-ISAC | Deutsche Bahn AG |
| Christ-Olivier Tussevo | Engineering Project Manager | SNCF |
| Daniel Forsmann | Head of Fundamentals for Large Project Management | DB Netz AG |
| Daniel Sanchez Ortega | CAF Rail Digital Services Analytics Manager | CAF |
| Das Mootanah | Chief Executive Officer | Metro Express Mauritius |
| David Alvarez Diez | Marketing and Business DEvelopment | ArcelorMittal |
| Dieter Michell-Auli | Chief Sales Officer | DB Engineering & Consulting |
| Donald Mishaxhiu | Associate Director, Senior Banker Infrastructure Europe | EBRD |
| Doris Chevalier | Chief Executive Officer | Infraboost |
| Douglas Young | Head Of Asset Management And Information | East West Railway |
| Elena Razzano | Space Applications Engineer | European Space Agency |
| Elisabeth Werner | Director for Land Transport | European Commission |
| Elizabeth Briceno Jimenez | Executive President | Incofer |
| Eloy Tabares | Head Of Engineering (Track And Civils) | East West Rail Company (EWR Co) |
| Endre Angelvik | Vice President Mobility Services | Ruter |
| Eneida Elezi | Foreign Affairs responsible | Albanian Railways - Hekurudha Shqiptare |
| Enzo Blonk | Director Industry Engagement, Technical Industries | G.S1 Germany |
| Erni Basri | Head of Railway eng. center for western java | MoT Indonesia |
| Esmé Kalshoven | Ertms Program Director | NS |
| Esther Bravo Barquero | Programme Manager | Shift2Rail Joint Undertaking |
| Fabrice Morenon | Chief Executive Officer | SNCF Hubs & Connexions |
| Felipe Sanjuan | Transport Business Development Director | Teltronic |
| Fernando Morales | Strategic Engineering and Critical Infrastructure Coordinator | Metro de Madrid |
| Fernando Mele | Business Development Director | Datastar Argentina SA |
| Florian Kappler | Program Lead SR40 | BLS AG |
| Frank Sennhenn | Chairman and Chief Executive Officer | DB Netz AG |
| Frank Heibel | Founder and Director | Doc Frank |
| Garazi Carranza Ruiz de Loizaga | Head Of Competitiveness And Innovation | Mafex |

nagement, the railway operator and engineering services.

Smart mobility

Rail Live will also analyse the advances that new technologies make to achieve the implementation of intelligent mobility. In this sense, Rail Live will rely on the experience of the MTR company that will explain how they seek to improve the passenger experience through investments in connectivity and smart stations and how artificial intelligence, IoT and other technological advances have an impact on the operations and the daily life.

This block has also included a panel dedicated to the challenge of diversification of transport operators and the joint work with start-ups in designing the mobility of the future. At this point we will talk about aspects such as the change introduced in the mobility business paradigm by digital platforms or the need to create partnerships with the R&D value chain to increase the level of flexibility and to provide new services on demand. All this, also analysing whether these changes are possible by preserving mass public transport as a backbone.

Mega connected cities

The second day will begin with a panel around the challenge that urban transport organisations around the world have to provide a cleaner, more connected, and more timely service for the mega cities of the future. This expert meeting will draw conclusions on which railway projects can be used as high-quality digital implementation benchmarks with tangible benefits for passenger operations and experience.

There will also be discussions about how metro and commuter train leaders around the world can adopt disruptive technologies and incorporate them into systems already implemented or what is the role of stations in the future of mobility.

| SPEAKERS | | |
|---------------------------------|---|---|
| NAME | POSITION | COMPANY |
| Geir Arild Engh-Hellesvik | Ciso | Vy |
| Gerald Schinagl | Digital Innovation Manager | ÖBB Austrian Federal Railways |
| Giancarlo Scaramelli | Chief Customer and Innovation Officer | TRANSDEV |
| Giorgio Travaini | Head of Research & Innovation | Shift2Rail Joint Undertaking |
| Gonzalo Martín de Miguel | Rail Technician, Technical Directorate – Infrastructure&Track | ADIF |
| Haluk Gokmen | General Manager | Enekom |
| Hans Cruse | Director | Spårvagnsstäderna |
| Helmut Hohenbichler | Consultant | Boom Software AG |
| Henk Swarttouw | Dutch Ambassador To Denmark And Vice President | European Cyclists' Federation |
| Henrik Plougmann Olsen | Chief Executive Officer | The Metro Company Metroselskabet I - S |
| Ignacio Monchón López | Gerente de Obra | Agencia de Obra Publica. Junta de Andalucía |
| Ignacio Sanz Junoy | Passenger Stations Directorate | ADIF |
| Ignas Degutis | Interim-Chief Executive Officer | Rail Baltica |
| Isaac Centellas | Manager of the Engineering and Maintenance | Metro de Madrid |
| Isabel Pardo De Vera Posada | CEO and Chairwoman | Adif and Adif High Speed |
| Isabella Grahsl | H.of Business Performance &Transformation | Deutsche Bahn |
| Isaias Taboas Suarez | Chairman | RENFE Operadora |
| Itay Segev | VP of Products and Marketing | Datamate Ltd |
| Jacob Kam | Chief Executive Officer | MTR Corporation |
| Jaime Pereira | East R. Signalling and ERTMS Manager | ADIF |
| James Brown | Data And Performance Engeineer | Angel Trains |
| Javier De La Cruz Garcia Dihinx | H. of Rail Services Engineering & Manager | CAF |
| Javier Lozano Lopez | Development and new Projects M. | ADIF |
| Javier Garcia Fortea | Deputy Director, Services Logistics Center | ADIF |
| Jeremy Haskey | Chief Architect | Nomad Digital |
| Jesús Esnaola | Commercial General Director | CAF |
| Jim Baker | Project Lead, Integrated Travel Program | California State Transportation Authority |
| Johan Torfs | Government Business Lead | Microsoft Corporation |
| Johnny Schute OBE | Chief Operating Officer | Rail Safety & Standards Board |
| Jon Alzate | Director – On-board Systems Business Unit | CAF Signalling |
| Jonathan Chatfield | Head Of Policy | Rail Delivery Group |
| Jörg Marienhagen | H.of Bid M. International Markets | DB Engineering & Consulting GmbH |
| Jorge Maroto Gómez | Managing Director & O&M Director | Metro de Sevilla |
| Jose Bertolin | Technical Affairs Manager | UNIFE |
| José Luis Ábalos | Minister for Transport, Mobility and Urban Agenda | MITMA |
| Jose Manuel Anguita Jimenez | Commercial Director | Indra |
| Jose Miguel Rubio Sanchez | Director | Indra |
| Josef Doppelbauer | Executive Director | European Union Agency for Railways |
| Juan Antonio Sánchez Corrales | Technical Directorate | ADIF |
| Juan Antonio March Garcia | Urban & Interurban Transport Director | Indra |
| Juan Carlos Sanchez | Technical Director | JEZ |
| Juan De Dios Sanz Bobi | Departamento Ingeniería Mecánica | Universidad Politécnica Madrid |
| Juan Francisco Paz Pascual | Smart Stations Director | SENER |
| Juan Jose Gainza | Product Manager | ArcelorMittal |
| Julie Shainock | Global Leader Travel and Transportation Industry | Microsoft |
| Julio Gómez-Pomar | Chairman | IE Center |
| Julius Norkunas | CEO | Mobility Innovation Centre |
| Karolina Korth | CDO and Head of Strategy for South-West Europe | Siemens |
| Kaspars Briskens | Head of Strategy & Development | Rail Baltica |
| Lena Erixon | General Director | Trafikverket |
| Libor Lochman | Executive Director | CER |
| Lies Alderlieste | Chief Information Security Officer | Nederlandse Spoorwegen |
| Liza Altena | Head of international Business development | DB Engineering & Consulting |
| Lluís Alegre | Mobility Director | ATM Barcelona |
| Magdalena Szymańska | | Municipal Office Gdansk |
| Malcolm Taylor | Expert Adviser, Digital | Crossrail International |
| Manel Villalante Llaurado | Chief Strategy And Development Officer | Renfe |
| Manuel Felipe Gutiérrez Torres | | CEO Government of Colombia |
| Marcial Bustinduy | Transport Sector Specialist | European Investment Bank |
| Marco Wilfert | Head of Financial Engineering and Public Funding | DB Netz AG |
| Marco Tagliabue | Sales Director, Emea | Fluidmesh |
| Margus Oun | Innovation Manager | AS Operail |
| María Peña | Chief Executive Officer | ICEX |
| Maria Luisa Dominguez | MD Corporate Strategy & Projects | ADIF |
| Mario Ferreira | National Railway Project Manager | INECO |
| Marise Bezema | Manager Services Ns Stations | NS |

| SPEAKERS | | |
|----------------------------|---|---|
| NAME | POSITION | COMPANY |
| Mark Langmead | Director, Compass Operations | TransLink Vancouver |
| Mark Thurston | Chief Executive Officer | HS2 |
| Martha Lawrence | Senior Railway Specialist | The World Bank |
| Martin Frobisher | Group Engineering Director | Network Rail |
| Martin Runow | Managing Director - Global Head – Digital Banking | Barclays Bank PLC |
| Martin Zsifkovits | Head Of Innovation Management | Rail Cargo Group |
| Matthew Vickerstaff | Chief Executive | Infrastructure & Projects Authority |
| Matthew Yarger | H. of Mobility and Automotive Market | IOTA Foundation |
| Mauro Alabuenas | Vice President | Subterraneos de Buenos Aires |
| Maximilian Kaiser | International Sales Manager | Siemens Mobility GmbH |
| Mikel Alza | Responsible of Hardware in the loop laboratory | CAF Power & Automation |
| Mimmi Mickelsen | Tram Security Expert, Trafikkontoret | Goteborgs Stad |
| Monica Muñoz Rodriguez | CBTC System Manager | CAF Signalling |
| Naeem Ali | Engineering Director & Principle Consultant | CBTC Solutions |
| Nalinaksh Vyas | Chairman, Technology Mission | Indian Railways |
| Nico Van Paridon | Vice President | Vervoerregio Amsterdam |
| Nicolas Furio | Head Of Technical Affairs Unit | UNIFE |
| Nir Hayzler | Vice President, Head Of Strategic Industries Lob | RADWIN |
| Olivier De Visscher | Cybersecurity Expert, Chairman Of Er-Isac | Independent |
| Ollie Pendered | Director | Riding Sunbeams |
| Ondřej Škuta | Sales And Marketing Director | Ingeteam |
| Pablo Ramos | Europe Account Director | ineco |
| Patricio Pérez Gómez | Managing Director | EFE Empresa de Ferrocarriles del Estado |
| Pavel Popov | The Head of Center | J.S.C. NIIAS |
| Pedro Fortea | General Director | Mafex |
| Peter Verlič | Chairman | SEESARI |
| Philip Wilson | Deputy Director, Corporate Finance Advisory Team | Dpt. for Business, Energy & Industrial Strategy |
| Philippe Citroen | Director General | UNIFE |
| Phillip Mainga | Managing Director | Kenya Railways Corporation |
| Raitis Busmanis | Bim Manager | Rail Baltica |
| Ramon Castells Malla | Director del Area de Estrategia y Desarrollo de Metro | TMB |
| Randy Sac | Former Head of Information Management & Technology | Light Rail Manila Corporation |
| Richard Kujan | Chief Information Officer | Slovak Railways |
| Richard Stock | Milling Technology Manager | Linsinger |
| Robert Jan Ter Kuile | Strategic Adviser | G.V.B. |
| Roland da Silva | Strategy Advisor | Independent |
| Rolf Härdi | Chief Technology Innovation Officer | Deutsche Bahn AG |
| Sanjeev Kumar Lohia | Managing Director & CEO | Indian Railway Stations Development Corp. |
| Sean Willis | Managing Director | Terrapinn |
| Senior Director | Manager | Taipei Rapid Transit Corporation |
| Shewangizaw Kifle Mulugeta | Director: Business Development | Ethiopian Railways Coporation |
| Silvia Roldan | Chief Executive Officer | Metro de Madrid |
| Silvia Dominguez | ERTMS Senior Project Manager | INECO |
| Simon Blanchflower | Chief Executive Officer | East West Railway |
| Sonia Miguel | Product Manager | Teltronic |
| Stefanie Brickwede | Head Of Additive Manufacturing | Deutsche Bahn |
| Stephan Lewisch | General Operation Manager | Wiener Linien |
| Stéphane Callet | Director Signalling Projects | SNCF |
| Stuart Hillmansen | Senior Lecturer | University of Birmingham |
| Sviatoslav Butskyi | Blockchain And Dlt Solutions | Deutsche Bahn |
| Sylvain Baro | Senior Design Engineer | SNCF Reseau |
| Teresa Riesgo | Secretary General of Innovation | Ministry of Science and Innovation |
| Terry Morgan | Chairman | Crossrail Ltd |
| Thomas Blomqvist | Project Manager | Uppsala Kommun |
| Tim Wood | Northern Powerhouse Rail Director | Transport for the North |
| Tim Keith | President | Texas Central |
| Tim Flower | Professional Head of Maintenance | Network Rail |
| Timothy Papandreou | Founder | Emerging Transport Advisors |
| Tobias Fischer | Head Of Rolling Stock Technology | Deutsche Bahn AG |
| Trond Hovland | Managing Director | ITS Norway |
| Victor Ruiz | President | Mafex |
| Vinay Kumar Singh | Managing Director | National Capital Region Transport Corporation |
| William Dachs | Chief Operations Officer | Gautrain Management Agency |
| Xavier Forne | Director | Feda Solucions |
| Yves Tanguy | Senior System Engineer | SNCF Reseau |

MEGA PROJECTS AND STATIONS

The construction and modernisation of transport networks often involves the realisation of mega projects that need a large investment. All aspects related to this area will also be dealt with at the conference. On the one hand, the European Investment Bank (EIB) will explain the financing work of such programmes.

On the other hand, concrete examples will be set out such as the analysis of how it is being proposed to finance in Albania the future of its infrastructures. Guest speakers will also discuss the steps that must be taken at international level to ensure that the "boom" of railway transport will continue around the world. Other issues included in this part of the conference will be the relevance of high-speed networks in the post-COVID era or the key points for building new systems of these characteristics in a sustainable way.

In addition, there will be a specific panel to discuss the future of financial innovation in this industry, how to attract private capital and the role of green bonds.

Rail Live! 2020 will have an exhibition area where technological advances and services in the sector will be announced.

METRO

The top metro network representatives from around the world and the industry experts will discuss the future of these systems.

The success of transport services in cities such as New Delhi and the key challenges in major capitals such as Copenhagen will be assessed. In addition, the process of digital transformation of Madrid Metro and its positive impact on management will be presented, as well as the importance of technology to improve safety, sustainability, and passenger experience.

This block will also bring together the Spanish leaders of networks such as Tenerife Metro, Seville Metro or Ferrocarrils de la Generalitat de Catalunya (FGC). In this block there will also be presentations of technological innovations for diversions with pneumatics for metros.

TELECOMMUNICATIONS

The Rail Live 2020! programme will focus on issues of particular relevance such as telecommunications. There will be a discussion about the future of communications technology, signalling and network management; the opportunities provided by the ATO over ETCS or CBTC Radio connections.

Examples of progress will include the case with the good results of the modernisation of signalling systems in Paris, as well as the consolidation of ERTMS in Spain and its future challenges.

The panel includes a section to discuss new solutions for new broadband communications demands in the transport market, the reality of autonomous railway technology (research, testing and applications) and the application of satellite technology to this industry.

LIGHT RAIL SYSTEM

Urban transport, especially light rail systems, has a specific section on Rail Live 2020! agenda.

These sessions will discuss continuous improvement in commercial operation, the future of a connected digital system

or universal accessibility to such networks. There will also be an example of how this system is implemented in countries such as Sweden or Israel, or how in Spain it has had a very positive effect in environmental terms.

STATIONS

The evolution of locations as key as railway stations will also have an exclusive space in the 2020 conference programme. These presentations will cover how a hyper connected intermodal station can be created or how to make them the centre of the customer experience on their door-to-door journey. Other topics to be covered will

be plans to develop electric car charging points.

In addition, the experience of the ambitious plan to modernise these infrastructures in France or their role within the United States high-speed network will be presented.

ENERGY AND SUSTAINABILITY

The contribution of transport to an emission-free future will also be one of the main issues for the congress to analyse. Guest speakers will explain how infras-

tructure is prepared to apply the highest standards in sustainability, the role of this concept, and the future of railway to combat climate change.

BIM AND DIGITAL RAILWAY

The Rail Live! Conference Room has scheduled a section to talk about the BIM (Building Information Model) collaborative methodology.

It will begin by explaining the success story of the Spanish high speed in the complete integration of design, development, and construction with this technology. Other examples to be covered are the story of the creation of a digital railway in Crossrail's, the application of BIM to accelerate railway construction in Germany or the engineering and the digital twin with cases such as the Rail Baltica project and in East West Railway EWR.

GOODS

Together with the passenger transport analysis, the 2020 edition devotes an exclusive section to goods. In this section, speakers will reflect on the role of digitisation and present cases such as the FEDeRATED project for the improvement of logistic processes in land transport.

SMART INFRASTRUCTURES

Rail Live 2020! attendees will have the opportunity to talk about what the railway systems of the future will look like, the next-generation technology or the predictive maintenance of advanced digital platforms. This section will dedi-

cate a space to other topics such as infrastructure monitoring and inspection or 3-wire track maintenance and mixed diversions. As an example of smart infrastructure, the Infrabel (Belgium) "Strategy 2020" will be explained.

FORUMS ON AFRICA AND LATIN AMERICA

Together with the topics about the different areas of the railway chain, Rail Live! dedicates in this edition a special forum around the emerging markets of Africa and Latin America.

The first will provide details on the second phase of the expansion of the Gautrain railway network (South Africa). There will also be a discussion about how Ethiopia uses innovative funding to increase connectivity in the most strategic areas of the country. The

programme dedicates a specific panel for management leaders and operators on this continent to discuss aspects such as developing projects, which initiatives should be priorities and ways to cover future projects (PPPs, mixed models, etc.).

With regards to Latin America there will be a discussion about the future of Colombia's railway industry, transportation plans in Sao Paulo (Brazil) and the future of transportation throughout the region.

DIGITISATION AND IOT

The digitisation panel includes aspects such as the development of the smart networks of the future.

These sessions will address the growing role of technologies such as artificial intelligence, the Internet of Things (IoT) and Blockchain. There is also space reserved to discuss how to contact the "gigabit trains"

of the future and how intelligent maintenance establishes itself both, in the case of rolling stock and all predictive work. There will also be talks about the development of innovative training programmes through Virtual and Augmented Reality, TrainLab's successful advances and the "open innovation" in the railway industry.

INTEGRATED MOBILITY

One of the topics that arouses the most interest among industry experts is "integrated mobility".

For this reason, Rail Live's agenda this year dedicates a specific block to delve into how data can help set up intelligent multimodal transport networks and provide the passenger

with a unified door-to-door service, according to their needs. As an example, there will be discussions on how the MaaS concept develops in Spain and Andorra.

The role of self-driving vehicles in the future of mobility will also be addressed with the example of SBB.



Spain designs its roadmap to respond to mobility challenges

Transport is one of the sectors that must undertake the greatest transformation in the coming decades to respond to the main challenges of society. These changes are marked by trends such as the accelerated pace of technological evolution, the fight against climate change or the concentration of the population in large urban areas. It is also necessary to take into account the emergence of new concepts such

as Mobility as a Service (MaaS), which places the passenger at the centre of the whole system or the "healthy" alternatives that the traveller seeks to complete their itineraries.

This is coupled with special situations, such as the present one, due to the pandemic, which show the effectiveness of making a dynamic, resilient transport system available to passengers, and equipped with

the latest developments to ensure safety, full information and coordination at different levels.

Spain, with one of the most cutting-edge railway infrastructures in the world, is aware of these challenges and of the need to design a policy in this area that adapts to the new reality and requirements of the citizens. For this reason, the Ministry of Transport, Mobility and Urban Agenda (MITMA) has set a priority



ONE OF THE LEADING COUNTRIES IN RAILWAY INFRASTRUCTURE WORKS ON AN AMBITIOUS MOBILITY STRATEGY TO ADDRESS THE CHALLENGES OF THE 21ST CENTURY. THE OBJECTIVE, TO BE THE FLAG BEARER OF CHANGE AND TO ADVANCE IN KEY ASPECTS SUCH AS DIGITALISATION, SUSTAINABILITY, CONNECTIVITY AND SAFETY.

to work on the planning of a new global mobility policy that provides real solutions to the main social and technological trends and that makes the most of today's networks.

From an economic point of view, it is also worth noting the importance of this programme, due to the key role that the transport sector plays. According to data provided by MITMA, it accounts for 4.53% of GDP and generates some 812,000 jobs in Spain (4.5% of total employment).

Sustainable Mobility Act

En la actualidad, desde el Ejecutivo se trabaja en el diseño de la "Ley de Movilidad Sostenible y Financiación del Transporte". Uno de los primeros pasos para su aprobación ha sido la apertura de una consulta pública al anteproyecto, que finalizó el 15 de noviembre de 2020, con el fin de contar con la participación de los ciudadanos y las organizaciones más representativas del sector en el proceso previo a la elaboración del correspondiente borrador.

Currently, the Executive is working on the design of the "Sustainable Mobility and Transport Financing Act". One of the first steps for its approval has been the opening of a public consultation to the preliminary draft, which ended on 15th November 2020, in order to have the participation of the most representative citizens and organisations in the sector in the process prior to the preparation of the corresponding draft.

This ambitious Act will be the normative basis of "es.movilidad" the concept with which it defines the new "Mobility Strategy: Safe, Sustainable and Connected 2030". This is a guide that will mark MITMA's actions in this field over the next decade and it is based on three key concepts: safety, sustainability, and connectivity.

Its structure has been divided into nine priority pillars that will be deve-



One of the main purposes is to meet the environmental commitments made.

loped through more than 40 lines of action and more than 150 concrete measures. This strategy highlights the importance of mobility as "an element of social cohesion and economic growth". For this reason, the aim is to analyse where the focus and efforts should be placed to optimise the resources that will go towards the improvement of one of the world's leading transport networks.

In view of the many fields of action included in this Strategy, the Ministry wants to focus on prioritising investments in order to achieve the greatest social benefit in this area. Hence, aspects such as the maintenance and conservation of the current infrastructure, digitalisation, intermodality, safety, emission

reduction or solutions to the problems of daily mobility of citizens are a priority. The objective is to take another step to implement a transport network of high reliability and quality in the services, efficient, sustainable, and connected for the present and for future generations. It should also be noted that one of the four main purposes pursued is to fulfil the environmental commitments made by Spain internationally. These include the United Nations Sustainable Development Goals and the Paris Agreement, as well as the European Green Deal. In addition, various national plans such as the Change Agenda, the Spanish Urban Agenda, the Demographic Challenge and the Strategic Energy and Climate Framework will also be implemented.

A MODEL BASED ON PARTICIPATION AND DEBATE

The Spanish authorities want to lead the debate that must be raised about the mobility model, even more so at a time when one of the priorities is to meet the environmental challenges and changes in society due to the digitalisation and growth of urban environments.

For this reason, citizen and institutional participation has been called upon through the creation of a tool called "Document for Discussion". The idea is to generate a meeting point for reflection and dialogue so that an idea-sharing and a global diagnosis of the current situation can be carried out among all.

In addition, they consider this method to be an ideal way for the most pressing changes to be proposed, in order to choose well the steps to be taken in this strategy and to establish the objectives and measures that need to be taken. MITMA's integrative approach seeks the cooperation of all the actors involved in the mobility ecosystem,

from organisations and group entities, to associations such as Mafex, academies,

business organisations, the private sector and civil society.



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A FRAMEWORK DOCUMENT WITH AN EYE ON 2030

In order to move towards the new paradigm of mobility, the strategy was born with the idea of having a "framework document" that provides a long-term vision, with 2030 on the horizon.

However, the measures will be implemented in the short and medium term. In this way, as they are implemented one can learn from the experience gained, evaluate the progress, and make the adjustments

that are deemed necessary to achieve the objectives set. For this reason, the concrete measures contained in each of the nine pillars will be proposed with three-year goals.



A STRATEGY BASED ON THREE KEY PRINCIPLES

The implementation of the "Safe, Sustainable and Connected Mobility Strategy 2030"

is based on the three key concepts that are comprised under its own name.



Safety

One of the main ideas that will guide the actions of this strategic plan is safety. The aim is to ensure greater protection of people and property. For this reason, there will be investment in aspects such as the improvement of standards and the reduction of accident rates. This area includes work on infrastructure safety and commercial operation, as well as in cases of emergencies and crises, illegal acts, and cybersecurity.



Social, economic, and environmental sustainability

The lines of action carried out in this area will be marked by priorities that promote daily mobility respectful of the environment and the socio-economic equity. The objective is to combat climate change by increasing energy efficiency and reducing emissions in both passenger and freight transport. To this end, greener modes such as rail, climate resilience or the circular economy, among other aspects, will be boosted.



Connectivity

This key concept will be taken into account from a threefold aspect. On the one hand, digitalisation and technological advances are seen as a great opportunity for the transformation of the transport sector. On the other hand, it is considered that this connectivity must be with Europe and the world. And thirdly, it must also be associated with the idea of multimodality to unite the different types of networks.



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Nine pillars to achieve a new transport model

This pillar explains MITMA's cultural and organisational change to adapt to the new concept of mobility. In addition to having a new name "Ministry of Transport, Mobility and Urban Agenda", new roles are assumed and the organisation is restructured to promote aspects such as digitalisation, knowledge management, training, etc. This transformation is also external and incorporates the values of open and inclusive government to coordinate actions with other administrations (transparency, citizen participation, international visibility, etc.).

Employment and social aspects are also among the nine main pillars. Pillar 8 brings together lines of action associated with awareness and awareness-raising, employment in the sector (identification of required profiles, boost to training, working conditions, etc.).

This section includes a specific area dedicated to the role of women in the field of transport and mobility. The goal is to achieve a fair transition in all productive sectors.

The new strategy also seeks to facilitate the connection with European and global markets. This pillar, made up of four lines of action and 17 measures, focuses on enhancing the work that must be done to effectively implement this international network. The "Construction of a Single European Transport Area" concerns the development of cross-border sections of European corridors, the deployment of high-capacity digital networks or the completion of the TEN-T Basic Network at national level.

THE SAFE, SUSTAINABLE AND CONNECTED MOBILITY STRATEGY WILL BASE ITS DEVELOPMENT ON NINE PILLARS, WHICH DEVELOP THROUGH 40 LINES OF ACTION AND 150 CONCRETE MEASURES.

PILLAR 1

The first of the pillars focuses on providing public mobility solutions "accessible and affordable for all citizens and in all territories." This point has a special impact on everyday traffic routes as well as on inclusive mobility. To achieve these objectives, six lines of action have been established encompassing 24 concrete measures. The initiatives will focus on aspects such as sustainable mobility planning, incentives to discourage private car usage or improved collective and shared means of transport at the intercity and rural level

PILLAR 2

The planning and strategic management of the investments of the Mobility Act are contained in the five lines of action of the second pillar and the 13 concrete measures detailed in them. It is noted that the provision of infrastructure in Spain is high, hence its modernization should be analysed. For this reason, clear criteria are sought to prioritise funds. This pillar highlights the need to complete the processing of the Railway Indicative Strategy and includes an agreement between the Ministry of Development and Adif-Adif Alta Velocidad, in view of the substantial increase in resources for the maintenance of the entire network.

PILLAR 3

Safety, from a comprehensive point of view, is one of the key areas of this Strategy. Pillar 3 is structured in nine lines of action and 29 measures. It includes a strengthening of the investments and the supervisory and control organisations, as well as of the surveillance against illegal acts. Proposals include the development of a Strategic Railway Transport Safety Plan. The digitalisation process is also taken into account with the support for R&D&I (Big Data, Artificial Intelligence), and cybersecurity. In addition, the adaptation of Infrastructure to climate change becomes important.

PILLAR 4

Sustainability is at the heart of Pillar 4. There is a stimulus from Alternative and Sustainable Energy Sources (electric, hydrogen vehicle) and lower emission means, such as the railway and where the renewal of the current vehicle fleet is being considered. In addition, there is a sustainability boost in terminals, buildings, and other transport facilities (almost zero energy consumption building in the new construction, audits for energy saving, etc.). These lines of work seek to reduce air pollution and the carbon footprint associated with mobility.



PILLAR 5

The incorporation of technology as a key support to mobility policies is reflected in this pillar. MINTRA wants to strengthen its role as a facilitator of mobility as a service through initiatives such as the publication of open data or the intelligent management of infrastructures, terminals and stations (BIM methodology in civil works, predictive maintenance tools, improvement of user experience and accessibility of terminals, intelligent energy management systems, etc.). In addition, other lines are included such as transport and logistics automation, the boost to drones, connected and self-driving vehicles.

PILLAR 6

The objectives of Pillar 6 are the improvement of node-to-node connectivity and the application of technology to optimise the efficiency of the logistics sector. The four lines of action, which are broken down into 16 measures, have several objectives. On the one hand, to effectively increase railway freight transport to achieve average European quotas and promote an intermodality policy. On the other hand, it is also sought to reformulate Road Transport and Urban Distribution of Goods (UDG) to make it more sustainable and to digitalise the intermodal logistics chain.

The Spanish railway industry faces the new Safe, Sustainable and Connected Mobility Strategy

SPANISH RAILWAY COMPANIES ARE A GLOBAL BENCHMARK IN THE DESIGN, CONSTRUCTION AND MAINTENANCE OF RAILWAY NETWORKS, EQUIPPED WITH THE LATEST TECHNOLOGIES

The Spanish railway industry

The Spanish railway industry has a long tradition in our country. With some 30,000 direct jobs and a turnover of more than 15 billion euros (more than 8% of the industrial

GDP), it is a key and driving sector for both our economy and our country image. It is also an innovative sector that invests, on average, 2% of its turnover in R&D&I, and an export booster for small and medium-

sized enterprises through the driving industries, whose export has reached 90% in some cases.

Thanks to all this, our companies are today a world leader in the design, construction, and maintenance of railway networks, equipped with the latest technologies, which allow us to talk about well-being and social cohesion, sustainability, and safety.



Railway plays a decisive role in the fight against climate change.

Our intention with this document is to draw attention to the challenges and opportunities arising in the context of the ambitious Sustainable Mobility Strategy that the Government is designing, and whose legislative body, the Sustainable Mobility and Transport Funding Act, will regulate, and at the heart of which should be a mode of transport that excels in environmental and economic aspects: the railway.

The contribution of the railway industry to the Mobility Strategy

The transport sector is one of the largest consumers of energy and one of the main causes of greenhouse gas emissions (GHGs). In Spain, the transport sector is the main CO2 emitter with more than 27% of the emissions.

On the contrary, and according to the European Environment Agency, railway transport is the mode of collective transport with the lowest-emission per passenger and, therefore, it plays a decisive role in the fight against climate change.

As a conclusion, only by promoting railway as the backbone of national transport and sustainable mobility policies can the objectives set by the European Union (Green Deal) and the International Community (SDP – Sustainable Development Goals) be achieved.

Next, we highlight the contribution of railway transport to the main strategic pillars.

Pillar 1 Mobility for all



Railway is a mode of transport that stands out in the pillar of "mobility for all" because of its alignment with the three principles:

- Civil right and social cohesion: because of its general nature of public transport, accessible to society as a whole and with a network deployed with social criteria and territorial cohesion. It is undoubtedly the backbone of mobility in metropolitan areas and between regions.
- Sustainable, safe, and reasonable solutions on cost: "sustainable" for its unmatched energy efficiency thanks to its ability and low resistance to advancement, as well

as for its ability for carbon neutrality thanks to the ease of electrification of guided transport. "Safe" as the figures show, it is the transport with the lowest accident rate per passenger and per kilometre.

And "reasonable in cost" thanks to that efficiency, but also to its great ability for collective transport.

- Universal accessibility: this is a prominent principle on the railway in all its forms, trams, metros, commuter trains, medium-distance or high-speed. On the one hand, for all people with some kind of reduced mobility, from wheelchair users to senior citizens or passengers loaded with luggage or with pushchairs: street access of tramway networks, or level access at metro stations, or accessible vehicles on new commuter tra-

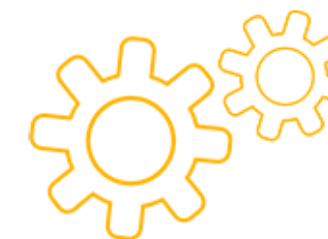
ins with level access, or reserved areas on medium-distance and high-speed trains. On the other hand, by adapting itself to the full spectrum of disabilities, both sensory and cognitive, applying the principles of universal design and digitization in a way that given its characteristics (including space on board and guided character) it allows solutions that no other mode is able to offer.

In addition, railway systems are prepared for an ever-changing future, where today's needs of "mobility for all" will not be the same as those of tomorrow.

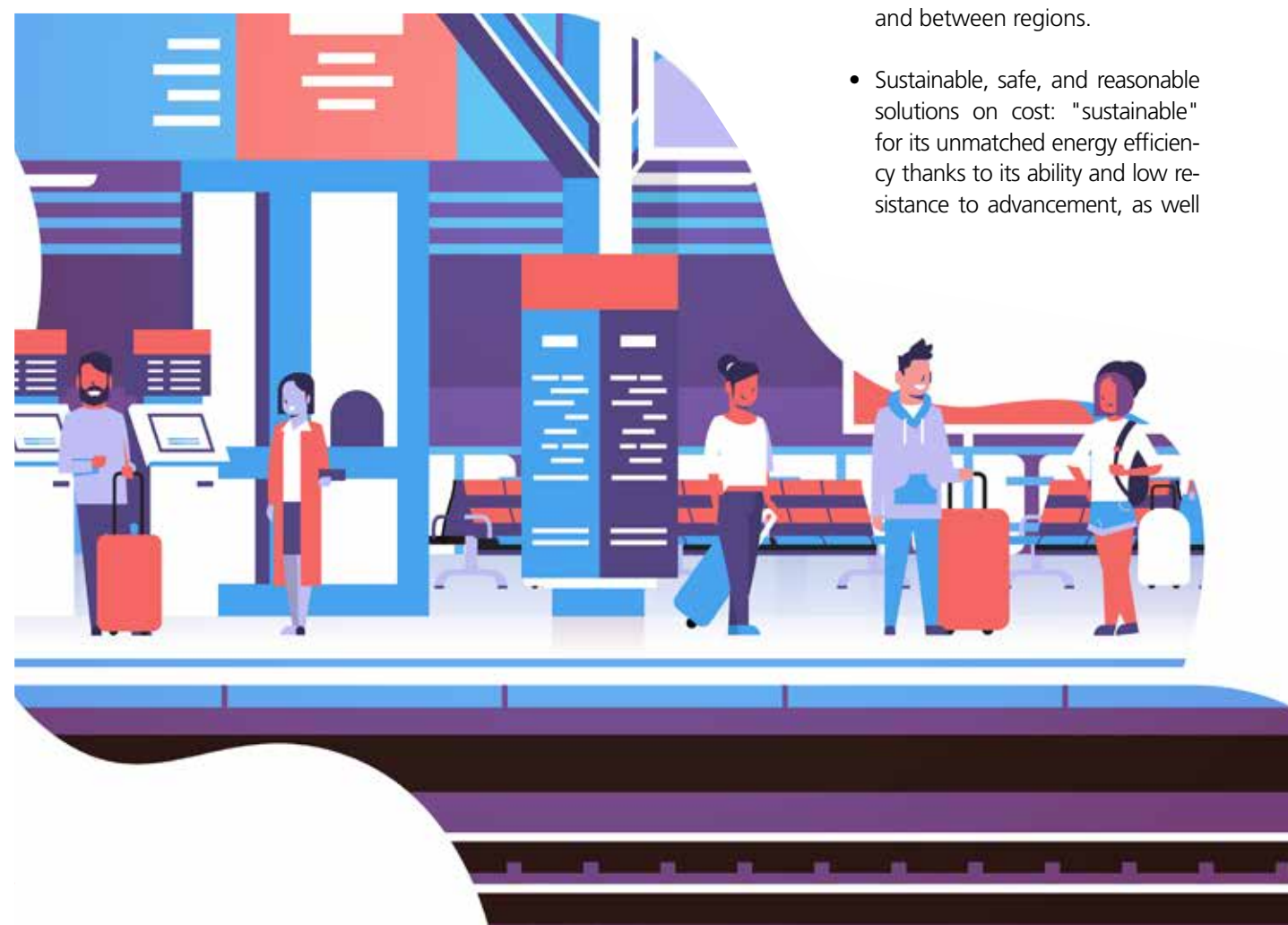
For decades it has been shown how infrastructures have adapted to changes, and that flexibility is being accentuated in the modern mobile material, which is easily configura-

ble and flexible to adapt itself to the needs and changes in the demand expected in each case.

Pillar 2 New Investment Policies



In order to contribute to the global objectives in the fight against climate change assumed by Spain in its Mobility Strategy, it is necessary to place railway transport, both of people and goods, as the backbone of national urban and intercity transport policies, as well as to promote its greater implementation and development.



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Public resources annually allocated to infrastructure conservation are lower than those required to compensate for the effective deterioration of such infrastructure, raising the risks associated with the generation of externalities, such as an increased accidentality, among others. In addition, an intelligent investment in modernization of maintenance systems can result in a lower total cost of the operation as well as an increased system productivity.

To achieve the Sustainable Development Goals (SDGs) set up by the United Nations would require signi-

ficant investment in areas of mobility improvement and, in many cases, railway investment is much more effective in terms of SDGs, because of its carbon neutrality, efficiency, accessibility and strong social cohesion component.

While we recognize the importance of the paradigm shift toward "mobility investment," or the efficiency of limited resources and financial balance, it is important to execute that change intelligently and appropriately. Partially deployed infrastructures should be carefully analysed, and investment maintained to complete those that can result in both impro-

ving the financial balance as well as increasing the efficiency of already invested resources, as well as other objectives, such as social cohesion. Some examples:

- Completing a tramway infrastructure (to connect it to the nearby commuter network, to join two networks of the same city, to reach the urban centre, to connect to a university area, etc.), can result in a significant increase in demand and a modal transfer from the private vehicle.
- Completing a high-speed corridor already initiated can significantly increase traffic in the

existing leg, both due to the modal transfer and the induced demand. This strengthens the role of railway as a backbone and as complementary to other modes of mobility, with several positive effects: it improves the financial balance of railway infrastructure managers; transferred mobility reduces emissions, improves safety, and decongests infrastructures; it contributes to economic activity both within the industrial and the tourism sectors; it generates demand for complementary mobility modes at both ends; and it reinforces territorial and social cohesion.

- Renovating the commuter and medium-distance train fleet

enables a significant increase in the transport capacity of the city and of the regional network, while at the same time improving accessibility and onboard experience, including the recovery of confidence in collective transport. In this way a significant modal transfer can be achieved from other more polluting modes of transport that overload roads.

It is important to approach these aspects with perspective, taking into account the current situation, but considering the overall long-term situation. While there may be some discrepancies in terms of deadlines, all forecasts suggest that the mobility situation, severely affected by the health crisis, will recover in a few years. In this context, the need of investment to increase airport infrastructure can be avoided if its congestion can be prevented by reducing short-distance flights and, without a doubt, if the streets and avenues of many cities and metropolitan areas, as well as roads, highways and motorways, can be decongested. And above all, favouring a mode of transport that is key to the objectives of sustainable mobility, and which is the backbone and source of demand for so many other modes of transport through intermodal travel.

On the other hand, it is appropriate to establish clear and stable models of public-private collaboration (PPC), which in times of economic slowdown has been very efficient. The PPC is focused on economic efficiency from the point of view of value for money, taking into account the fact that such initiatives incorporate

a greater knowledge and cost control, not only throughout the life of projects, but even earlier, from the dialogue that is established on a preliminary basis between the public and private sectors to weigh up the feasibility of their funding and implementation. By linking planning and funding, we make the case for rethinking the traditional public commitment in the area of transport.

It is also necessary to strengthen investment in R&D&I to deploy innovative solutions on a large scale. Thus we will be able to address digital transformation, the redefinition of transport security, the use of data, the management and control of railway traffic or the use of artificial intelligence in different aspects (ventilation of infrastructures, passenger flow management, protection of level crossings, detection of objects falling onto the tracks, etc.)

Pillar 3 Safe mobility



In terms of accidents and according to data from UIC (International Union of Railways), railway transport is also the safest mode of transport, hence, to invest in railway is to improve mobility safety. In this sense, it is necessary to pay special attention and strengthen investment in those technologies and systems that favour the safe and uninterrupted

An intelligent investment in modernisation of maintenance systems will be very positive.



movement of passenger and goods trains, as well as the maintenance and improvement of infrastructures. Some of the main lines for developing this pillar would be:

- Deploying the new continuous monitoring and communication technologies (ERTMS) already present in high-speed and part of the commuter network, in the rest of the railway network of general interest.
- Introducing technologies to increase security against wrongdoing, including artificial intelligence in video surveillance, sensorizing infrastructure and vehicles, strengthening and providing new technologies to central checkpoints, reinforcing cybersecurity, including demand-based transportation planning technologies to avoid crowds, etc.
- Promoting the use of new technologies in vehicle and infrastructure maintenance: introducing

real-time asset monitoring, condition-based maintenance, and even prediction for anticipation of corrective measures and maintenance optimization.

Pillar 4 **Low Emission Mobility**



We understand that low-emission mobility solutions must be given the highest priority, and in that respect railway transport will be reinforced by the principle of internalization of negative externalities.

Railway transport is inherently sustainable (based on objective and measurable criteria) because of its high energy efficiency coming from the low resistance to advancement (guided transport, wheel/rail con-

tact...) and its high transport capacity, and also for the ease of electrification.

However, there is still room for improvement in the optimization of railway systems. In line with the European guidelines on Low Emission Mobility, in order to optimise transport and improve its efficiency, the creation of intelligent transport infrastructures, of systems that further improve the efficiency of the railway itself and its intermodality with other modes should be promoted. This should increase the overall efficiency of the transport system, promoting coordination and management of the flow of people from an integrated point of view that contemplates door-to-door mobility and including all available modes.

In addition, the railway can still improve its emissions on unelectrified tracks. On the one hand, it is true that diesel trains and locomotives are efficient because of the characteristics of the railway (wheel/rail, guided

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system, high capacity...). But on the other hand, it is necessary to take into account that railway rolling stock has life cycles of 30 and 40 years or even longer, so trains that are now manufactured will be in commercial service beyond 2050 and therefore must meet the European carbon neutrality target. It is therefore necessary to already address the strategy of migration to carbon-free technologies, both in the newly built material and the adaptation of the existing one.

In addition, it is important to note that railway projects have the potential to be wide-reaching projects for other industries, and they can also be deployed quickly thanks to the leadership and investment capacity of public administrations, so emission-free railway initiatives such as hydrogen or battery trains can be a major catalyst for the development of the associated industry in other sectors.

Pillar 5 Smart Mobility



An integrated public transport network should be considered as a priority, with a comfortable, fast, safe, and reliable urban and intercity railway as a smart and sustainable mobility solution for Smart Cities.

It will also be necessary to integrate into this ecosystem of the smart mobility the new agents that are emerging and that also have an impact on mobility (carsharing, park and ride, etc.)

The new digital technologies are going to transform the way we think

New digital technologies are going to transform the way we think about mobility.

about mobility. This should be done under a perspective that puts users at the centre of the processes offering the best mobility experiences. Providing the most efficient solution at all times by integrating data from various infrastructure sources and the city for an easy and simple intermodality, that allows moving towards new mobility paradigms until reaching the Mobility as a Service.

We recommend committing to integrated mobility platforms, which offer multimodal solutions to the traveller according to their own needs and convenience, and where collective transport can be combined with shared bikes, walking routes, car-sharing, etc. always offering an integrated transport from the first to the last mile, with public transport options

accessible throughout the passenger journey.

Likewise, in addition to platforms for travellers, we recommend supporting coordination and synchronization initiatives of the different transport systems. Measures such as the strengthening of transport consortia, integration into them of railway transport and micro-mobility operators, regulation of the exchange of data by operators, provision of control and supervision tools, transfer of competences as provided for by the public transport funding law, etc. in short, tools that allow to really coordinate the multimodal mobility of cities, metropolitan areas and regions, not only from the point of view of planning but also of the real-time management of incidents, controlling security.



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ty and with the centralized ability to communicate with the traveller.

Pillar 6 Intelligent Intermodal Logistics Chains



In Europe, freight transport is expected to increase by 30% by 2030, while the European Commission has set a target for that same year of reducing at least 40% of greenhouse gas emissions compared to 1990.

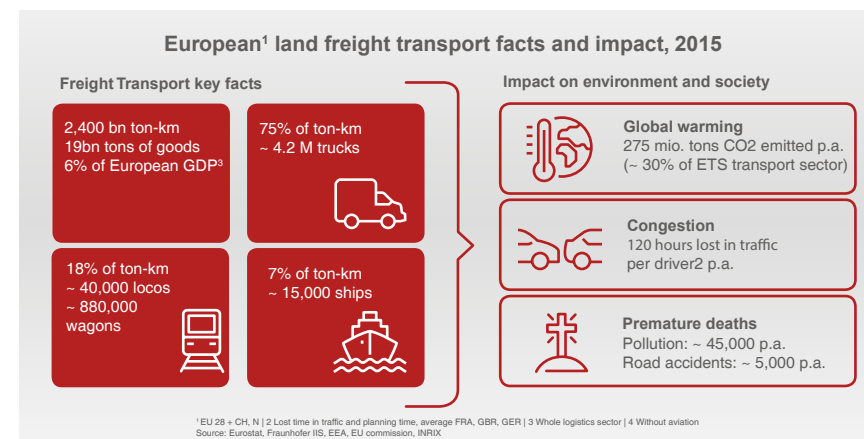
Freight transport by train should be promoted because of its efficiency, high performance, and for being sustainable and efficient for a European multimodal logistics solution.

Freight transport is a sector of utmost importance and impact on society and the environment. According to the European coalition Rail Freight Forward, 4.2 billion lorries travelled the roads in 2015. In the same year, only 18% of the goods transported were moved by railway. The environmental impact is huge, with the estimation that freight transport emits 30% of the total CO2 generated by the transport sector.

Pillar 7 Connecting Europe and the World



The railway unites territories, either within the European Union or its own Member States and it contributes to mobilizing goods and passengers. To this end, it is key to equip itself with the necessary infrastruc-



tures strengthening the investment in them and taking advantage of instruments such as the CEF (Connecting Europe Facility), whose calls for bids attract projects that allow to join ports, logistics terminals and Spanish industrial areas through railway connections that facilitate such mobility of people and goods at European and global level.

Completing the railway corridors of the TEN-T network is essential given the technological breakdowns intrinsic to the Spanish and Portuguese railways, imposed mainly by the track gauge and catenary voltage. Unlike other European borders, there are still physical barriers between the Spanish railway and that of its neighbouring countries. The start of the high-speed interoperability on the Barcelona-French Border line (still pending 150 km of high-speed between Perpignan and Montpellier), is yet to arrive on the border of the Basque Country and in the corridors towards Portugal. The same way as it happens with goods, especially between France and Spain. In addition, this high-speed interoperability with European networks creates internal barriers within the Spanish territory, so it is urgent to complete the pending sections of the high-speed transport system (such as the Mediterranean Corridor or the connections to the Basque and Galician networks), not only because of territorial cohesion but also because of the connection of all regions with the rest of Europe. Intermodal connection is also important. The connection

between airports and a high-speed networks iparticularly important for the movement of people, and the improvement of railway connections at major ports is equally important for the movement of goods.

Pillar 8 Social and Employment Related Aspects



Efficient and quality public transport removes social barriers facilitating cohesion, as we are all potential users for work purposes, leisure, etc. The railway is also a productive sector in itself, with an important industrial and technological component, and a significant and permanent export activity. Its structure around wide-reaching companies generates employment in an extensive auxiliary industry, and it is an export booster especially for small and medium-sized enterprises.

In addition, intermodality and shared mobility are often poles of attraction for start-ups and medium size companies.

In short, providing support to railway mobility projects is to invest in quality employment and high added value.



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Mafex members give their opinion on the importance that railway will have in the future of mobility

REPRESENTATIVES FROM MAFEX COMPANIES PROVIDES US WITH THEIR VISION ON THE ROLE OF RAILWAY AS THE MAIN PLAYER OF SUSTAINABLE MOBILITY AND WHAT THEY EXPECT FROM MANAGEMENT IN THE NEW SAFE, SUSTAINABLE AND CONNECTED MOBILITY STRATEGY.



CARLOS ALONSO
CEO
ARDANUY INGENIERÍA



Apart from providing low or zero-emission transport, railway travel is a key ally in the fight against climate change.

Sustainable mobility is a principle concern on a global level. In Spain, a new strategy is already being worked on in this field to respond to environmental challenges, apart from the opportunities brought forth by the digital transformation in all processes and operations. Furthermore, this roadmap is aligned with the European Green Deal and the UN's Sustainable Development Goals (SDGs).

Apart from providing low or zero-emission transport, railway travel is a key ally in the fight against climate change. Due to its numerous advantages in terms of efficiency, rail transport will be a fundamental element in promoting a connected and intermodal system that respects the environment.

An investment policy made to modernise of our railway infrastructures, one of the most advanced in the world, will also boost the reactivation of a green economy, in line with current challenges.

While moving forward on this path of change, counting on the expertise of Spanish engineering companies is an added value in the decision-making process when implementing different measures along these lines.

The know-how acquired in the development of the most modern transport networks, both inside and outside our borders, will be of utmost importance in responding to the new mobility model and turn our country into a benchmark for sustainable transport.

ÓSCAR VÁZQUEZ
CHIEF COMMERCIAL OFFICER
(CCO) AT BOMBARDIER
TRANSPORTATION
AND PRESIDENT FOR SPAIN
AND PORTUGAL



Mobility is a key factor for social cohesion and economic growth in any country.

As the means of public transport which generates the least emissions per passenger, and in the fight against climate change, it is crucial that the railway, both in terms of passengers and goods, are positioned as the backbone of sustainable mobility in national transport policy and contribute to achieving the overall objectives of sustainability, which are part of the policies and initiatives promoted by the European Union.

The future is autonomous transport; safe, driverless mobility with automated control systems offering a very high frequency to meet the demand for public transport. But above

all, the future is sustainable mobility. We are trying to develop autonomous vehicles that are increasingly lighter, more energy-efficient, generate fewer emissions and are better integrated with the environment, while working on fully integrated transport systems.

Mobility is a key factor for social cohesion and economic growth in any country. We hope that the New Strategy for Safe, Sustainable and Connected Mobility offers solutions to the real problems of citizen mobility and contributes to increasing the resilience

of the sector, prioritizing those investments that bring the greatest social benefit. We value very positively this initiative of the Ministry of Transport, Mobility and Urban Agenda and we understand that it will make investment in the railroad one of its priorities. The railway sector and the New Mobility Strategy share fundamental pillars: safety, connectivity and social, economic and environmental sustainability; which we are convinced will mean that investment in the railroad sector will play a leading role in the reform programme to access its share of the European Union's recovery fund.

ANDRES ARIZKORRETA
CHAIRMAN & CEO
CAF



The present and near future of the sector involves addressing the development of new green energies.

The railway sector must clearly focus on the development of more sustainable and more environmentally friendly technologies since these will mark the future of public transportation.

The present and near future of the sector involves addressing the development of new green energies such as hydrogen, energy accumulation, automation and the use of new materials, as well as promoting intermodality in transport systems.

It is necessary that the administrations help in the financing and execution of technological and innovation projects, mainly those that may be more relevant in the field of new mobility.

The different stakeholders and the administrations must work together establishing different forms of collaboration to achieve the capacities that allow us to compete and become a benchmark in the strategic sector of the mobility of the future.

JOSE MIARNAU
CEO OF COMSA
CORPORACIÓN



We are immersed in a social transformation that will completely change our conception of mobility.

In the current context of combating climate change, the railway has emerged as a great solution for the transport of people and freight due to its potential in the process of decarbonisation of the economy. At COMSA Corporación we have been developing railway projects for more than 125 years, so we have always been confident in the role of the railway as a promoter of green, efficient and safe mobility.

We are immersed in a social transformation that will completely change our conception of mobility and that is why it is necessary for all the agents involved in the sector to show our commitment to the development of this infrastructure as a key part of the new sustainable gear. Investment in the railway must be a priority if it is to play a leading role in this process.

ENRIQUE HORNOS
CEO
ICON MULTIMEDIA



It is essential to create synergies in the industry that will help efficiently to manage urban and interurban transport traffic.

"Mobility, safety and environmental strategies require new solutions that will place the Spanish railway industry at the forefront. The application of new technologies contributes decisively to this objective, although it does not exclude the implementation of other complementary measures undertaken by the Public Administration.

In the face of this, there are many companies that are devoting great efforts (both human and economic) towards this purpose, because we firmly believe in it.

At ICON Multimedia we are aware that the "new reality" we are experiencing has led to a "new mobility", which

has been reduced in favor of private transport. Therefore, for us, as providers of crucial infrastructure services such as Passenger Information Systems, it is essential to create synergies in the industry that will help efficiently to manage urban and interurban transport traffic, promoting intermodality and connectivity, and helping to improve mobility by making it not only more sustainable and accessible, but also safer from a social and health perspective, since a perfectly informed citizen is a responsible and efficient user in his or her journeys."

BERTA BARRERO
HEAD OF THE TRANSPORTATION
DEPARTMENT
INDRA



A more sustainable mobility requires increasing the competitiveness of the railroad so that it captures a greater market share.

Spaniards lose up to 150 hours a year in traffic retentions, 10% of the working day, at a cost of 5,5 billion euros per year. Adding this to the environmental and accident costs, it represents losses of almost 30 billion euros per year derived from the problems of the Spanish mobility model.

A more rational use of the different modes of transport, increasing that of the railroad as the most efficient and clean means of transport, would reduce these costs and generate important benefits in environmental terms.

Regulations that will emerge from the New Mobility Law need to take a stand in this regard, especially in the field of goods and logistics, establishing, for example, a sustainable transport certification.

duce emissions, CAPEX (investment) and OPEX (operating expenses) through new business models, and protect critical infrastructure.

We need solutions that take advantage of the existing rail infrastructure, and increase the frequency of the rail services offered, specifically the capacity of freight transport and commuter services. It is also a priority to improve global safety, also in health terms, with a global management of rail transport that automates and secures decisions.

At the same time, it is key to invest in a progressive digitization of passenger services and in a vision of global, multimodal and integrated mobility, with the railway as its backbone.

IÑIGO PARRA
CEO
STADLER RAIL VALENCIA S.A.



The railway contributes to social and territorial cohesion and is the most sustainable land transport mode.

The railway contributes to social and territorial cohesion and is the most sustainable land transport mode due to its efficiency, high capacity, and low emissions. But there is room for improvement that will be achieved with the support and financing of the Public Administrations for R&D projects. Rail projects also have the potential to be tractor projects for other industries and can serve to the country's reindustrialization strategy.

At Stadler Valencia we are aware of our social responsibility towards sustainable mobility and the creation of quality

employment. Therefore we constantly strive to provide innovative, sustainable and durable rail vehicles for mainline and urban transport.

The paradigm shift towards the concept of mobility as a right, as well as the need to configure a mobility model that responds to the challenges of sustainability, digitization and safety constitute a great opportunity for the modernization of our mobility system. This initiative is worth a positive valuation on our behalf.

JESÚS SÁNCHEZ BARGOS
COUNTRY DIRECTOR
THALES SPAIN

The railway will be positioned as the best backbone alternative for any mobility strategy to achieve decarbonisation objectives.

Taking into account the sustainable development objectives assumed by the Spanish Government under the 2030 Agenda and in line with ODS 11, being one of its goals providing access to safe, affordable, accessible and sustainable transport systems, the railway will be positioned as the best backbone alternative for any mobility strategy.



tegy to achieve decarbonisation objectives, playing a decisive role in the fight against climate change as the means of transport having the least emissions per passenger and as one of the most efficient in terms of capacity.

One of the main challenges to reach a global and sustainable mobility scenario is the incorporation of different actors both from different administrations and civil society and especially from industry, which will require a legal and financing framework that allows clear planning and

definition of investments and new contracting models that also support innovation and technological development of transport.

LEOPOLDO MAESTU
MANAGING DIRECTOR.
ALSTOM SPAIN AND PORTUGAL

Rail collective transport, with the lowest CO2 emissions per passenger, will play a decisive role in the fight against climate change.

The health or economic crisis should not make us forget the fact that climate change remains the huge threat to our society. In this context, there is an urgent need to reduce the environmental impact of mobility. And we are only going to achieve this reduction with efficient, non-polluting collective transport systems, such as the railways, without a doubt.

Rail collective transport, with the lowest CO2 emissions per passenger, will therefore play a decisive role in the fight against climate change and in the design of inter and intra-urban mobility.

In coming years we will see new mobility formulas appear, new solutions, both individual and collective, for a demand that, once these "non-mobility" times are overcome, will grow exponentially. However, at Alstom we believe that the railway will continue to play a transversal and central role in this new mobility. The incorporation of new traction



systems, such as hydrogen, will help consolidate it as the most environmentally and sustainably efficient means of transport.

The transition towards a more sustainable, safe and connected mobility is an opportunity to boost the industry located in Spain. The Spanish railway sector has a consolidated value chain, talent, capacity for innovation, and an industrial and technological base that allows us to respond to the needs of this new mobility, generating wealth, economic development, jobs, etc.

The crisis generated by COVID has highlighted precisely the importance of strengthening our business fabric through its tractor companies. We must work hand in hand, both the private sector and public institutions, to make the most of the opportunity we now have, to present industrial projects that generate value, wealth, employment; projects focused on sustainability and digitization.

CARLOS PALACIO ORIOL
PRESIDENT
TALGO

Rail is the only realistic and immediate response to the need to minimize the carbon footprint of transport

Since her foundation Talgo has been committed to develop efficient, intelligent and sustainable mobility solutions. Our technological quest for the lightest trains has finally been aligned with the need to face the climate



emergency, and to do so by ensuring a fast and fair transition to a low-carbon economy.

Rail is the only realistic and immediate response to the need to minimize the carbon footprint of transport in Spain. That is why we are now committing ourselves to an ambitious strategic concept that fully inserts us in a country-wide project, in a radically new industrial chain: the hydrogen economy.

In 2023 we will make available Talgo Vittal One, the first hybrid

electric and fuel-cell Commuter/Regional train, which will also be able to operate on secondary and non-electrified lines, and which will provide the connectivity that regions demand and deserve.



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

TECHNICAL ASSISTANCE AND ENGINEERING SERVICES

International and national projects

Railway engineering services

Technical assistance in Operation and Maintenance

- Clients' portfolio: operators and Transport Authorities in Europe, America, Africa and Middle East



An integral ticketing system on your customer's smartphone

SIMOVE
On-board Vehicle Speed Monitoring System

The solution to avoid accidents due to over speeding

LUIS MANUEL CORRALES
DIRECTOR GENERAL
LANTANIA



We find very useful having a medium and long-distance railway net for daily use.

We live in a changing world facing a new paradigm of work. Beyond the introduction of teleworking, new generations of workers have evolved in their motivations for their professional development. They value flexibility, sustainability or social responsibility above many other traditionally highly appreciated aspects, such as financial benefits. In this context, the role of the railway becomes vital to achieve the flexibility demanded by these new generations of workers and these changing environments.

Nowadays we do not need to go to the offices daily, so having a good railway infrastructure has changed, if we understand it as the need to have a metro or suburban

or two days a week to the offices for which the railroad is a clear backbone.

Investments in infrastructure help the development of the areas over which they exert influence, their inhabitants perceive clear benefits from the moment they are put into operation. Additionally, they are a necessary source of development and work in the present times.

Public administrations linked to investments in mobility play a double role, helping to boost the economy by generating quality work and also giving tools to companies and employees so that their work can be more flexible.

station nearby. We find very useful having a medium and long-distance railway net for daily use. In the coming years we will see many professionals who live far from major population centers, thus helping rural development and sustainability, moving one

LUIS RODRÍGUEZ LLOPIS
PRESIDENT
IDOM



We consider the entire life cycle of a project, with solutions that are resilient and safe

At IDOM, we aim to provide designs and projects that contribute to the achievement of the sustainable development goals of the United Nations. For us, as professionals, this is a social responsibility and a legacy for future generations. We consider the entire life cycle of a project, taking a comprehensive approach to implementing railway projects, with solutions that are resilient and safe, reducing the impact of climate change.

We face climate and energy challenges that, if managed properly, will improve the quality of life for all people. Within an integrated intermodal transport system, railways have the potential to be spaces for

Any strategy that is proposed to tackle the climate and energy challenges that we are facing today must be supported by the pertinent authorities and involve all the relevant entities and industry. For its implementation and to achieve the objectives, the most up-to-date knowledge must be available to bring about change as soon as possible. In IDOM we are ready to play our part. We believe it is important to launch and put projects into operation that bring together mobility and the generation with clean energies, alternatives to fossil fuels (H₂, wind, tidal wave, ...), thereby optimizing not just the structuring of the territory but also the generation and use of sustainable energies.

clean mobility, providing universal accessibility, connectivity and proximity for citizens. They are a key element in optimizing the use and generation of energy, reducing CO₂ emissions. From our point of view, all these aspects make rail the backbone of sustainable, intermodal and carbon-free transport.

At IDOM, the global approach we take when designing any railway infrastructure is paramount. Therefore, we understand that this new strategy must be based on the principles of resilience and safety, while making a com-

mitment to a more sustainable future to create hybrid spaces for clean mobility, where the latest technologies offer integrated operation, improving energy efficiency and the experience of the passengers and social inclusion.

AGUSTÍN ESCOBAR
CEO SIEMENS MOBILITY
SPAIN AND SOUTH-WEST
EUROPE REGION



It is essential that digitalization is the pivot on which this new mobility strategy is based.

At Siemens Mobility we have always defended the role of the railway as the main axis of a more sustainable mobility for the coming years, both in the urban and interurban areas. Rail transport not only means making cities and regions more accessible, it means making them more sustainable and making mobility more inclusive for people, with a lower ratio of noise pollution, accidents or other related risks.

In terms of sustainability, passengers rail transport generates only 0.5% of total greenhouse gas emissions, making it the less polluting transport.

For this reason, we believe that, if rail transport is to be the main axis of sustainable mobility in the future, it is essential its immersion in digitalization, since this will promote greater automation and connectivity between railway systems elements, provide greater availability and reliability as well as an increase in frequency and capacity according to demand. This will allow operators to optimize not only the vehicles operation, but of the entire infrastructure.

At Siemens Mobility we think that the aim of this vision must be one that enables integrated, safe, reliable and sustainable transport, from the first to the last mile. We believe that railway systems must be the cornerstone of a new Mobility as a Service (MaaS), intermodal and passenger adapted, but it is also about making a collec-

tive effort to move forward together with other mobility suppliers.

We believe that, in general, the document for discussion in the public consultation process of this new mobility strategy is on the right track. Even so, we demand a long-term commitment and concrete measures, especially in aspects such as the financing of public transport and the promotion of R&D&I.

Regarding the latter, we see the impulse that is being given as very positive, something that we have been demanding for a long time for our sector and which we believe should include public-private collaboration.

In the same way, it is essential that digitalization is the pivot on which this new mobility strategy is based. It is a very good news that the public sector intends to promote, for example, the use of data in an open way for the mobility applications and services development.

Another aspect to consider is the impact on our sector of the Covid-19 crisis, which has marked a turning point and which requires long-term measures.

But we believe that, like all the strategies developed by the Spanish administration, the new Safe, Sustainable and Connected Mobility Strategy needs specific policies and budget so that the objectives they set can be carried out.



JOSÉ LUIS ÁBALOS MECO
Ministry of Transport, Mobility and
Urban Agenda

The railway is the best mode in terms of social coherence and the most environmentally sustainable

Mafex Magazine: In the present context, marked by the pandemic, the Board defends that the transport sector should play a key role in the European recovery plan. Consequently, what will be the main pillars underpinning this new mobility?

José Luis Ábalos: The Government has prepared the Recovery, Transformation and Resilience Plan based on 4 guidelines: ecological transition, digital transformation, gender equality, and social and territorial cohesion. Pillars that the Government has placed at the centre of its policy from the beginning and that fully comply with the European crisis exit strategy.

But these are only some guidelines and we should not lose sight of the fact that the transport sector is facing a period of profound changes,

which will increase over the coming decades.

The investments included in the budget proposal and in the European recovery plan respond to both short-term and long-term needs. This situation will pass, our way of life will return to normal and, at the same time, mobility and traffic will begin their progressive growth.

Besides, the orientation that we are giving to investment is not designed for a large increase in traffic but to make infrastructures and mobility safer, more sustainable, more resilient. In short, to modernise them.

New technologies, environmental challenges and the increasing concentration of the population in large urban centres are causing a disruptive transformation in mobility policies.

The Spanish transport system is among the best in the world. We are the European country with the most kilometres of high-capacity roads, and also European leaders in high speed. Given the advanced degree of development of our infrastructures, the Ministry of Transport, Mobility and the Urban Agenda (MITMA) must now focus on optimising their use, providing real citizen mobility solutions.

Our current role goes beyond the mere provision of infrastructures, as we have evolved and set the goal of planning mobility as a whole, so that our legacy is a safe, sustainable and connected transport system for future generations.

Mafex Magazine: They have recently presented the draft State Budget for 2021, which reaches

the highest level of expenditure in the last ten years. The new growth model is based on innovation and ecological transition. How important is transport in this programme?

José Luis Ábalos: The Budgets presented are actually historical and their investment, as is rightly said, reaches the highest level in the last 10 years. They are, therefore, a radical change in trend that allows us to give a decisive boost to recovery.

Specifically, the set of actions of the Ministry and its companies amounts to € 16.664 million. In addition to representing an increase of 53% with respect to current Budgets, this also means allocating almost 13 billion in investments in transport and mobility, which will allow us to decisively promote policies and transformations in which we have already been working. It will allow us, on the one hand, to advance in the promotion of public transport, in the decarbonisation of cities, in providing aid to companies for the digitisation of logistics, improving the services provided by our public companies and the intermodal connection of the different modes.

Mafex Magazine: Among the different modes, the railway monopolises a significant investment, which is something that Mafex has always defended as a mode that favours economic and social development. But why did MITMA decide to focus on this means of transport?

Because the railway is the best mode in terms of social coherence and the most environmentally sustainable. Cohesion implies equal opportunities, not penalising citizens for the place where they live or circumscribing their life and professional horizons to their place of residence.

In an advanced society, mobility is a basic right and the railway is the public transport that best ensures this right. It has a social and ecological

dimension and promotes competitiveness, as well as being the backbone of Spain.

Within the modes of transport, this Government's commitment to the railway is public and notorious. The railway represents 42% of the total investment of the Ministry, with which we have consigned railway activities valued at 5.876 million euros, 1.567 million more than in 2020.

This railway investment will bring advantages to Spanish society from many different perspectives. It will be beneficial both to improve long-distance travel, daily mobility and, of course, freight traffic. It will be a territorial and socioeconomic backbone. In addition, citizens' mobility will be greatly improved by providing them with services, connections and frequencies that are much better than the current ones, and by creating new itineraries as we expand the network and complete corridors.

This investment will therefore contribute to the improvement of commuter and medium distance services in the main cities and metropolitan areas, and it will also allow us to proceed with less carbonised, more efficient and diversified logistics processes; we consider these to be key elements for the security, competitiveness and resilience of our industrial and foreign sectors.

Mafex Magazine: What role do you think this mode of transport should have as the backbone of mobility in the sustainable future? Is our country's focal point in line with the European green strategy (Green Deal)?

Within the modes of transport, this Government's commitment to the railway is public and notorious.

It will play a central role. It is a backbone of the territories and the main engine of development of many of them. As of today, the railway's share in the transport system is relatively modest compared to its actual capacity. Making the investment of the last decades profitable will bring economic, social, territorial and environmental benefits.

As I said before, the Ministry's commitment to the railway is fully in line with the European green strategy since rail is a sustainable mode of transport.

Achieving a reduction in polluting gases is a key to the 2030 goals and we must not forget that road transport in Spain is responsible for emitting 25% of greenhouse gases and that its reduction is a challenge to which both Europe and this Government is committed.

It is a social necessity to move towards environmental sustainability, where the railway will play a key role in reducing congestion, accidents and noise, especially in metropolitan environments.

It is no coincidence that 2021 will be the year of the railway throughout the European Union. This will allow us to convey these ideas to the public to arouse their awareness and participate in the benefits of this means of transport.

Mafex Magazine: The funds allocated to the railway are expected to increase by 1.567 million euros, 36.4% more than in 2020. Could you tell us what the priorities are in this item?

Of course. Some of our priorities

concerning the railway are clearly outlined in the Budget.

The two key pillars for the development of the railway sector are, in the first place, Cercanías (the commuter belt), which is the jewel in the crown, a mode of transport associated with daily mobility that is used by 90% of railway users in Spain. We invested a record figure of 1.5 billion euros to it, increasing its budget by 160%.

Secondly, for the development and improvement of the entire Trans-European Network, as well as for intermodality and logistics activities (rail access to ports, terminals, digitisation of logistics chains and other activities included in the Goods-30 Plan), to which that we allocated 4.370 million.

All this without forgetting the more than 1.2 billion euros allocated to Public Service Obligations (PSO) that, although not included in the investment section as such, allow us to offer the public with a more attractive and consistent service to meet their needs.

Mafex Magazine: How much of these funds will go to each of the subsectors (rolling stock, infrastructure, digitisation, etc.)?

Mainly and roughly speaking, out of the total 5.876 million euros, we have consigned about 4.7 billion to ADIF and ADIF High Speed.

This enabled us to double the investment budget in conventional rail travel with more than 1.8 billion euros, in what I dare say is the most ambitious budget in history to modernise a network that had been forgotten for years, as well as maintain our commitments to high speed with more than € 2.8 billion.

Meanwhile, Renfe has recorded actions valued at 857 million, in addition to the 1.2 billion that I mentioned before for PSO.

The two key pillars for the development of the railway sector are "Cercanías" and the development and improvement of the entire Trans-European Network.

Mafex Magazine: One of the most outstanding aspects in terms of infrastructure development is the promotion of the Atlantic and Mediterranean Corridors, with an investment of 1.259 million euros. What plans do you have to achieve this goal? What are the sections that you plan to complete in the coming years?

The Atlantic and Mediterranean Corridors are an absolute priority for the Government and for the European Commission. As part of the trans-European transport network, these corridors are a key element in reducing emissions and achieving greater sustainability in transport, which is a goal that this government pursues to achieve the European Green Deal. Given the progress of several sections and the planned investment included in the budget plan, we are working towards completing the two corridors and there will be many sections that we will be terminating during this term.

The section that requires immediate completion in the Mediterranean Corridor is the Monforte-Elche-Orihuela, whose commissioning will take place after machine operator training carried out in December.

As for the Atlantic Corridor, our next milestone is the completion of the Pedralba - Campobecerros and Campobecerros - Taboada road in this same month and, in December, we will complete the catenary, which brings us closer to commissioning the Pedralba-Orense service as a continuation of the recent commissioning of Zamora-Pedralba.

Mafex Magazine: Spanish industry has been a very important lever in recent years to position our railway network as one of the most modern in the world, both in high speed and urban mobility. What measures are contemplated so that this continues in the future? How will investment in innovation be reinforced?

The Ministry and the companies of the MITMA group must take advantage of the opportunity that "digital transformation" offers us and explore the use of innovation and technology as tools and not as ends in themselves to solve the great mobility challenges (efficiency, sustainability, security). All this without forgetting the social and economic component, where we place the user and the general interest at the centre of our policies.

The availability of accurate information, in real time and on all types of interconnected digital platforms, provides users with information on all services offered and enables them to plan their mobility according to their circumstances, which will imply an increase in social, economic and environmental transport efficiency. With this increase in efficiency we intend to improve both passenger and freight services, as well as reduce the transport-related setbacks such as congestion, emissions, accidents, etc.

In addition, we will invest in lines of work that will improve the experience of users of public transport. Our goal is to offer users and companies new technologies and



digitisation. We will promote intermodality, allowing door-to-door and "barrier-free" travel, and we will move towards mobility as a service.

We will also invest in the automation of transport and logistics, which will result in greater system efficiency and greater accessibility to flexible

and personalised mobility for population groups that previously lacked it, or the development of new mobility guidelines and new business models.

To achieve all this, MITMA intends to identify and support projects that contribute to decarbonised mobility

The Atlantic and Mediterranean Corridors are an absolute priority for the Government and for the European Commission.

through innovation, adopting a role of facilitators to promote innovation in mobility, without intending to replace private initiative or other ministerial departments or Administrations with whom we will, of course, collaborate.

Mafex Magazine: With the ambitious investment plan you are considering, how do you see the future of the transport sector in our country? Will it continue to be an exportable model?

The Transport sector is a very important pillar of our economy. It generates more than 800,000 jobs and represents around 4.5% of our GDP.

In line with the above and in relation to what I said at the beginning of this interview, we are facing a disruptive transformation in mobility policies. That leads to dynamism, on the other hand... and, of course, opportunities.

This appearance of disruptive technologies in traditional business models forces us to increase investments in R+D+i to guarantee the competitiveness of MITMA and its dependent companies, but also of private companies.

We must seize the opportunities offered today by recent innovations, especially in the area of information management, bearing in mind that different advances, methods and technologies will be based on intensive use of information and data. Accordingly, the use of Big Data techniques will be essential in the use of transport data.

As in all sectors subject to a change of paradigm, everything that is at the forefront will be exportable, so it will be all of us, public and private companies, citizens and companies, who must jointly face this challenge and fight with all our strength and intellect to position our industry at the forefront of Europe.



Advancements in improving cybersecurity and rail interoperability

The 4SECURail Project is a public and privately funded R&D initiative which is part of the European Union's Shift2Rail Programme. Ardanuy is in charge of coordinating the consortium made up of seven different European companies hailing from Spain, Italy, the Netherlands and France. The other six members of the consortium are CNR, FIT, Hit Rail, SIRT, Tree Technology and the International Union of Railways (UIC).

The objective of the project is to design collaborative processes and tools to be able to coordinate a joint response from all European railways in the face of a possible cyberattack. With this in mind, a formal methods demonstrator is being developed in order to provide the best level of interoperability available for signalling systems, thus ensuring railway safety and efficiency.

The project has three main goals, the first and most important being

THE ENGINEERING CONSULTING FIRM, ARDANUY INGENIERIA, LEADS IN COORDINATING THE EUROPEAN CONSORTIUM FOR THE 4SECURAIL PROJECT. THIS R&D INITIATIVE IS PART OF THE EUROPEAN UNION'S SHIFT2RAIL PROGRAMME.

to develop a Formal Methods (FM) demonstrator. Likewise, the project aims to identify railway signalling subsystems through the use of standard interfaces and, lastly, to specify and evaluate the cost-benefit ratio and learning curves needed to be applied for the correct inclusion of the demonstrator on the rails.

The company Hit Rail B.V., specialised in railway technology, along with its partners the UIC and the R&D company, Tree Technology, are focused on designing and testing a new computer security incident response team (CSIRT). This team manages and coordinates the cybersecurity responses for different railway secu-

rity teams. The CSIRT has improved this collaboration, which will be tested during 2020/2021, to guarantee the future feasibility of implementing this team by Shift2Rail and its work on the X2RAIL3 as a backup system for the Information Sharing and Analysis Center (ISAC) and the rail industry of the EU.

At the same time, the Consiglio Nazionale delle Ricerche (CNR) is working conjointly with Ardanuy, FIT Consulting and SIRT to provide a demonstrator which can evaluate the impact of using formal methods to specify railway infrastructure, signalling and their components in terms of cost-benefit criteria and other learning curves.

Multi-system locomotives with Spanish propulsion for Poland

Bombardier Transportation has completed the delivery of the first three BOMBARDIER TRAXX MS locomotives to CARGOUNIT (a trademark of the Industrial Division), a leading supplier of locomotive and passenger rolling stock leasing based in Gdansk, Poland.

Bombardier's factory in Trápaga (Vizcaya) is where the traction converters and auxiliary converters for these three locomotives are manufactured, and where the operational project management is also carried out. The Center of Excellence in Trápaga covers everything from selecting suppliers and stockpiles to the final testing and shipping of the converters, including the intermediate stages of supply, manufacture, testing, and final inspections.

THE MS2 SERIES OF CONVERTERS HAS BROUGHT ITS EXPERIENCE AND RELIABILITY TO BEAR ON THE BOMBARDIER TRAXX 3 PLATFORM'S EVOLUTION.

The plant located in Vizcaya is currently the Center of Excellence for manufacturing high-powered converters for Bombardier's TRAXX locomotive platform. Among them, it is worth mentioning the AC3 converter families, the DC3 for direct current supply, as well as the MS2 (which are the ones used in CARGOUNIT locomotives) and the modern MS3 (last generation of multi-system locomotives).

The MS2 series of converters has brought its experience and reliability

to bear on the BOMBARDIER TRAXX 3 platform's evolution, the most modern four-axle locomotive platform in Europe. Its three models (TRAXX AC3, TRAXX MS3, and TRAXX DC3) also offer Last Mile functionality, enabling them to run on the last sections of track where there is no catenary. In addition to these converters for the TRAXX family, Trápaga also manufactures the converters for the 17 new dual ALP45-DPT4 locomotives for New Jersey and those for the modernization of the LKAB IORE fleet in the mines of northern Sweden.



New driving simulator for Metro Barcelona



Alstom has developed a driving simulator for Barcelona metro operator (TMB) that incorporates the latest virtualization, gamification and virtual reality technologies to train metro staff and automatic line operation technicians.

The simulator reproduces real situations (routes, conditions and obstacles) and create realistic scenarios employing virtual reality technology commonly used by video games developers. It also includes a full-scale reproduction of the driver's cabin of the Alstom Metropolis trains currently running on Barcelona Metro 9 & 10 lines, the only driverless lines in operation in Spain.

IMPROVES STAFF TRAINING AND ACCELERATE INCIDENT RESOLUTION IN AUTOMATIC LINES.

With this new technology, TMB will train its teams technicians in the rapid and efficient resolution of incidents on automatic lines, where the reaction time is key to preventing an impact to service. Throughout the trainings, instructors will be able to simulate traffic conditions and real situations, programming all kinds of variables, such as train breakdowns, signaling conditions, environmental incidents, and even the density of passengers.

Thanks to this simulation, technicians will be able to practice the skills required to solve incidents and maintain railway safety, without needing to stop traffic or perform power cuts on the metro lines. The tool will faithfully reproduce specific sections of the railway network with exact replicas of stations, junctions, signals, cables, points of interest, etc.

SIEMENS
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The future of mobility in our globally networked world calls for seamless, sustainable, reliable, and secure mobility solutions. We're leveraging the benefits of digitalization, engineering excellence, and our entrepreneurial spirit to master this challenge. Trusted by our partners, we're pioneering transportation, moving people sustainably and seamlessly from the first mile to the last. And we always go the extra mile to help transport services all over the globe move beyond the expected.

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CAF Signalling already has started exploring (developing and testing) computer vision (CV) and artificial intelligence (AI) enhanced technologies for fully autonomous train operation (visual odometry, automatic object and traffic signal detection and identification, rolling stock automatic coupling...) in order to offer to its clients, the benefits of operation cost reduction, railway products life-cycles enlargement and safety increase.

CV&AI technologies are facing up different Validation and Verification (V&V) challenges due to they are based on non-deterministic algorithms. All AI-enhanced algorithm must to V&V under diverse scenarios in order to get certified. However, it is not easy to collect a real database containing different real scenarios to validate computer vision-based AI techniques. In other to conduct a research in this field, CAF Signalling joined VALU3S project consortium. The ECSEL JU project VALU3S aims to evaluate the state-of-the-art V&V methods and tools, and design a multi-domain framework to create

CAF SIGNALLING HAS BEEN WORKING IN CV&AI BASED RAILWAY SIGNAL DETECTOR/IDENTIFIER TECHNIQUES.

a clear structure around the components and elements needed to conduct the V&V process. The main expected benefit of the framework is to reduce time and cost needed to verify and validate automated systems with respect to safety, cybersecurity, and privacy requirements. This is done through identification and classification of evaluation methods, tools, environments and concepts for V&V of automated systems with respect to the mentioned requirements.

CAF Signalling has been working in CV&AI based railway signal detector/identifier techniques:

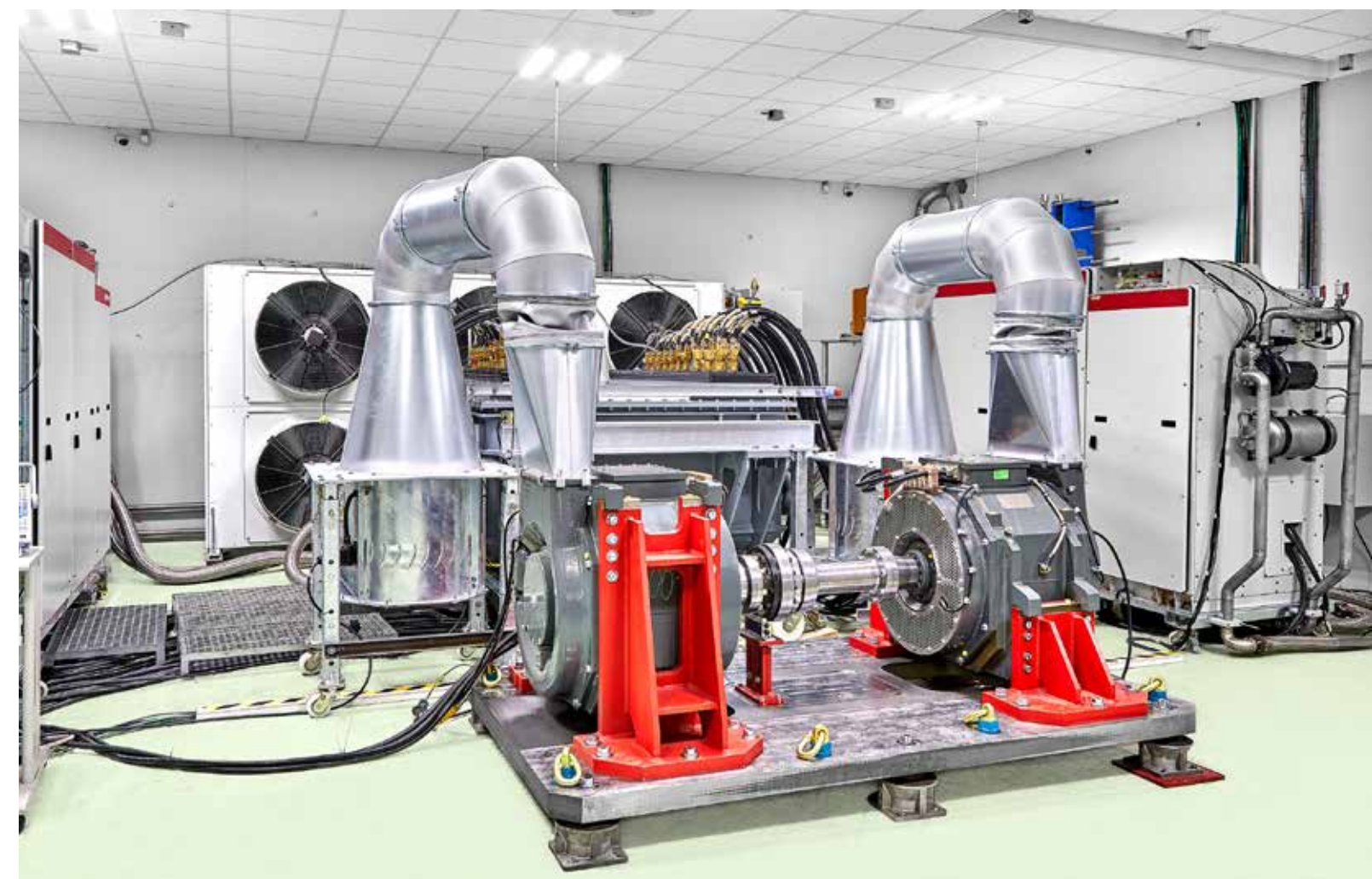
- light signals (green, red, orange),
- static speed restrictions panels,
- platform stopping point signals,
- platform proximity signals...

Although, the resulting models show accurate performances in no-

minimal scenarios, they must be tested in higher variety of situations, extreme conditions and hazard situations in order to consider them really validated and vitrified.

CAF Signalling will use the VALU3S V&V approach on AI-enabled verification and validation processes to simulate in virtual environment all possible scenarios, especially those scenarios that are unprovable (not real imagery database to test them) but critical from a safety point of view (i.e. people crossing railways, reduce visibility due meteorological conditions...).

VALU3S project has received funding from the ECSEL Joint Undertaking (JU) under grant agreement No 876852. The JU receives support from the European Union's Horizon 2020 research and innovation programme and Austria, Czech Republic, Germany, Ireland, Italy, Portugal, Spain, Sweden, Turkey.



New investments

Since inaugurated, the Company has developed tests on different traction systems based on INGETRAC power converters. Those operations require from all the elements of the traction chain and a cooling unit, that are installed on a specially-purposed facility.

The traction system test is required by IEC 61377-1 and also delivers inputs from the traction chain behaviour:

- Route simulation.
- Traction system behavior on real traction & braking conditions.
- Validation of control algorithms,

INGEteam will increase in the next months, its capacity to carry out traction system tests on its facilities.

- Modulation / Transformer & Motor Models / Protections/ Noise Behavior.
- Validation of protections, diagnosis system & "fail safe".

Absolute limits of traction chain components.



Energy Efficiency in railway systems

Energy Efficiency in the railway is initially achieved with the electrification of the railway networks, the use of regenerative braking of rolling stock and, later, with the implementation of reversible DC substation systems.

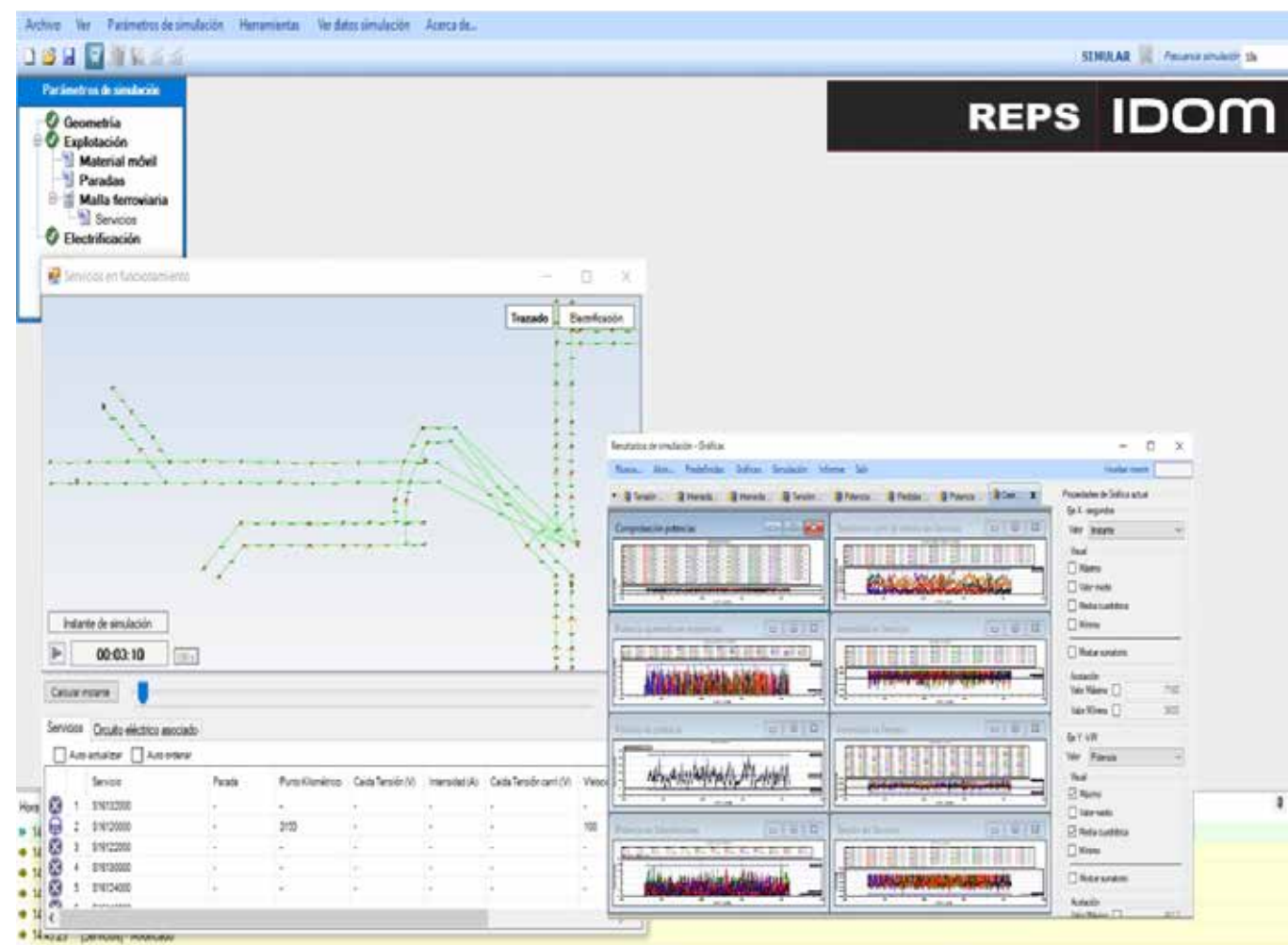
This chain in the permanent search for energy efficiency requires computer tools that allow us to model all these elements as a whole and optimize the railway energy system, considering different scenarios and/or operations phases.

IDOM introduces energy optimization methodology into all its projects.

IDOM INTRODUCES ENERGY OPTIMIZATION METHODOLOGY INTO ALL ITS PROJECTS.

In Ireland, where the railway system renovation plan includes the electrification of the DART (Dublin Area Rapid Transit) network, or in the Barcelona Metro, a project involving the study of the traction system of the 5 conventional lines, including the analysis of the effect of the use of reversible substations and the optimization of the location based on the

modes of operation both on working days and on holidays. Thanks to the use of the latest technology, energy efficiency of railway systems is just improved, but the use of this energy is also optimized.



Capacity control automation to protect passengers from Covid-19



Indra has developed a new system for Metrovalencia that enables train capacity to be restricted automatically, by locking the station's turnstile access control system.

Thanks to this solution, it will be possible to automatically lock the turnstiles when the maximum number of passengers allowed is reached, according to the expected train capacity level, and re-open them - also automatically - during the following interval. In order to do so, Indra's solution will count the number of times it is accessed and cross-reference it with the capacity figure set by Metrovalencia.

The solution, which will come into operation in October, is integrated with an information system by means

INDRA'S NEW DEVELOPMENT FOR METROVALENCIA IS AN EXAMPLE OF ITS COMMITMENT TO INNOVATION WITHIN INDRA'S TRANSPORTATION DIVISION.

of screens located at the entrances to stations, which will keep users informed of the blocking of entrances and of the estimated time they will remain blocked before they go to the platforms.

In this way, Indra's technology - developed in record time - will help protect the public and will reduce the risk of infection, as well as maintaining and enhancing Metro's security, functionality and quality of service. Indra's new development for Metrovalencia is an example of its commitment to innovation within Indra's

transportation division. The company is leading the efforts to make the integrated payment for all means of transport through mobile phones and other advanced systems become a reality, participating in such ambitious innovation initiatives as is the Shif2Rail, the main European RDI initiative for the railway sector.

Indra also works to offer the best service to passengers, which means increased use of public transport, with a consequent improvement in mobility and a reduction in gridlocks and polluting emissions in cities.

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- Aimen Centro Tecnológico
- Colin Buchanan Consultores, S.A.
- Goal Systems SL
- Tekniker

- Segula Technologies España, S.A.U.
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- Dominion
- Funor, S.A.
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- Sener Ingeniería y Sistemas, S.A.

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- Cunext
- Dominion
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Track assembly

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TRAFFIC CONTROL AND SIGNALLING SYSTEMS, COMMUNICATION, PASSENGER INFORMATION AND TICKETING

Traffic control and signalling (safety)

- Alstom Transporte, S.A.
- Bombardier España
- Cables de Comunicaciones Zaragoza, S.L.
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- Telice, S.A.
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Protection (security) and infrastructure monitoring

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- Telice, S.A.
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- Vicomtech

Systems and equipment for collection, ticketing and access control

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- Ikusi SLU
- Indra Sistemas, S.A.
- Inserail, S.L.
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Communications

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- Comsa Corporación
- Dominion
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- Eurogestión
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- Siemens Rail Automation, S.A.U.
- Tectronic, S.A.U.
- Telice, S.A.
- Thales España Grp, S.A.U.
- Vicomtech

Passenger information and on-board entertainment systems

- Alstom Transporte, S.A.
- Bombardier España
- Dominion
- Turnkey & Engineering, S.L.
- Gmv Sistemas, S.A.U.
- Icon Multimedia, S.L.
- Indra Sistemas, S.A.
- Inserail, S.L.
- Ikusi SLU

- Revenga Ingenieros S.A.
- Sice Tecnología y Sistemas, S.A.
- Siemens Rail Automation, S.A.U.
- Tecnivial 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.
- Bombardier España
- Caf-Construcciones y Auxiliar de Ferrocarriles, S.A.
- Patentes Talgo, S.L.
- Siemens Rail Automation, S.A.U.
- Rosni S.L.
- Zeleros

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

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

Urban and suburban trains

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

Freight wagons and Locomotives

- Alstom Transporte, S.A.
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- Caf-Construcciones y Auxiliar de Ferrocarriles, S.A.
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- Rosni S.L.
- Siemens Rail Automation, S.A.U.
- Stadler Rail Valencia, S.A.U.
- Talleres Alegría, S.A.
- Zeleros

Vehicles for infrastructure maintenance

- Alstom Transporte, S.A.
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- Patentes Talgo, S.L.
- Rosni 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.

- Artech (Electrotécnica Artech Smart Grid, S.L.)
- Bombardier España
- Caf Power & Automation, S.L.U.
- Flexix, S.A.
- Ingeniería Viesca S.L.
- Ingeteam Power Technology, S.A.
- Mgn Transformaciones del Caucho, S.A.
- Rosni S.L.
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Control, auxiliary and diagnostic systems

- Aimen Centro Tecnológico
- Albatros, S.A.U.
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- Bombardier España
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- Indra Sistemas, S.A.
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- Kimua Group
- NGRT S.L.
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Assembly equipment

- Agui S.A.
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- Fundiciones del Estanda, S.A.
- Funor, S.A.

Mechanical components

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Interiors

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- Bombardier España
- Colway Ferroviaria, S.L. (Nexus Management)
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- Fundación Gaiker
- Satys Interiors Railway Spain, S.A.
- Technology & Security Developments

Safety

- Agui S.A.
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- Dsaf - Dinamicas de Seguridad, S.L.
- Endavamientos y Señalización Ferroviaria ENYSE S.A.U.
- Fundación Gaiker
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MAINTENANCE: EQUIPMENT, MAINTENANCE SERVICES AND REFURBISHMENT

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- Grupo Trigo
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- Stadler Rail Valencia, S.A.U.
- Talleres Alegría, S.A.
- Talleres Zitrón
- Technology & Security Developments

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

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- Bombardier España
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- Caf Turnkey & Engineering, S.L.

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- Dominion
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- Ikusi SLU
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Maintenance of systems, equipment and vehicles components

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- Caf Turnkey & Engineering, S.L.
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- Patentes Talgo, S.L.
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- Satys Interiors Railway Spain SA
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- Stadler Rail Valencia, S.A.U.
- Technology & Security Development

Supply of maintenance equipment

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- Electrosistemas Bach, S.A.
- Kimua Group
- Ingeniería Viesca S.L.
- Nem Solutions
- Newtek Solidos S.L.
- Patentes Talgo, S.L.
- Rosni S.L.
- Tecnivial S.A.



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AGUI is a B2B subcontractor and manufacturer of complex integrated assemblies for OEMs. In recent years we have evolved from being a reactive subcontracting firm, adaptable to clients' needs, to become a subcontracting services partner, anticipating to market needs; innovation and continuous adaptation. AGUI currently provides services in more than 10 different sectors including lifts and railway, exporting production to more than 25 countries. Within the Railway sector, AGUI is certified in ISO-3438 and EN-15085, which positions us as a reference supplier for complex welded assemblies.

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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.

- Martinez Villergas, 49 - Edificio V - 28027 (MADRID)
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More than 20 years of experience in the railway sector guarantee Aquafrisch as a manufacturer of train washing tunnels, bogies, WC extraction systems and other equipment for the maintenance of rolling stock in railway workshops. Our equipment is installed in more than 30 countries on 5 continents. Aquafrisch is also a reference in industrial water treatment, potabilization and purification. In Aquafrisch we take care of the design, manufacture, installation, commissioning, training and maintenance of the machines according to the customer's needs. Aquafrisch is certified in ISO9001:2015, ISO14001:2015 and OHSAS2007.

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- www.aquafirsch.com

**ARCELMITTAL**

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 a specialist in rail for high-speed net, with over 1 million tons produced, and presence in infrastructure of over 30 countries, the high technologic quality allows participating in the more demanding tenders all over the world. ArcelorMittal has its own R&D Rail Excellence Centre for developing new products and processes.

🚩 **ArcelorMittal Asturias. Edif. de Energías, 2 pl. 33691 Gijón (ASTURIAS)**
 ☎ +34 985 187 750
 📧 rails.specialsections@arcelormittal.com
 🌐 <https://rails.arcelormittal.com/>

**ARDANUY 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.

Ardanuy Ingeniería develops activities worldwide, in more than 60 countries in all 5 continents.

🚩 **Avda. Europa, 34 28023 (MADRID)**
 ☎ +34 91 799 45 00
 ☎ +34 91 799 45 01
 📧 madrid@ardanuy.com
 🌐 www.ardanuy.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 (VIZCAYA)**
 ☎ +34 946 011 200
 ☎ +34 946 155 628
 📧 marketing@arteche.com
 🌐 www.arteche.com

**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, trams and buses.

🚩 **J.M. Iturrioz, 26 20200 Beasain (GUIPÚZCOA)**
 ☎ +34 943 880 100
 ☎ +34 943 881 420
 📧 caf@caf.net
 🌐 www.caf.net

**CAF POWER & AUTOMATION**

CAF Power & Automation designs and develops electric traction systems, energy storage systems and control & communication, which guarantee adaptable reliable and committed solutions with transport. Our systems are modular and flexible and can be integrated both in new vehicles and in those in service or that need refurbishment. Traction systems; Energy Storage (GREENTECH) and Control & Communication (COSMOS). Railway systems modernisation and refurbishment: Equipment and components, system integration, installation, maintenance and guarantee. Railway system maintenance: Technical support, spare parts, training courses, test benches.

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

**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 onboard 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
 📧 cafsignalling@cafsignalling.com
 🌐 www.cafsignalling.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

**BOMBARDIER TRANSPORTATION**

Bombardier is today a key company of the Spanish railway industry, with around 1,000 employees between direct and indirect job positions, in its offices, workshops and factories located in Trápaga (Centre of excellence in propulsion equipment), San Sebastián de los Reyes (Centre of excellence in signaling systems), Alcobendas and Pinto (fleet maintenance). The company's activity ranges from the design, manufacture and sale of railway vehicles, propulsion and traction control systems (diesel and electric) and signaling systems, to the delivery of railway maintenance services for fleets, repair and modernization of railway material.

🚩 **Miniparc 3 – Edificio K C/Caléndula, 93 28109 Alcobendas (MADRID)**
 ☎ +34 91 658 55 00
 ☎ +34 91 650 75 18
 📧 javier.hinojal@rail.bombardier.com
 🌐 www.bombardier.com/en/worldwide-presence/country.spain.html

**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.

🚩 **Poligono de Malpica, C/D, 83 50016 (ZARAGOZA)**
 ☎ +34 976 729 900
 📧 j.alzorric@cablescom.com
 🌐 www.cablescom.com

**CAF TURNEY & 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 (VIZCAYA)**
 ☎ +34 946 819 550
 ☎ +34 94 623 29 29
 📧 comercial@cafte.com
 🌐 www.cafte.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

**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 (GUIPÚZCOA)**
 ☎ +34 943 212 800
 ☎ +34 943 213 076
 📧 ualvarado@ceit.es
 🌐 www.ceit.es

**CETEST, S.L. Centro de Ensayos y Análisis**

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

🚩 Lazkaibar, s/n Edif. CETEST 20200 Beasain (GUIPÚZCOA)

☎ +34 943 028 690



✉ emartinez@cetestgroup.com

🌐 www.cetestgroup.com

**CITEF**

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

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

🚩 José Gutierrez Abascal, 2, 28006 (MADRID)

☎ +34 91 336 32 12



✉ citef@etsii.upm.es

🌐 www.citef.es

**COLIN BUCHANAN CONSULTORES, S.A.**

Buchanan is a Transport Planning consultancy established in Spain in 2007, which origins date back to the innovative study "Traffic in Towns", conducted by a team of researchers led by Sir Colin Buchanan in 1963, on urban mobility in the society of the future..

In railways, Buchanan provides expert advice on pedestrian and crowd simulation studies at metro & rail stations, modal interchanges, rolling stock (boarding & alighting studies), using the leading pedestrian simulation software, LEGION (Bentley Systems Ltd.) of which Buchanan is the only global accredited distributor.

🚩 Infanta Mercedes 73, bajo D 28020 (MADRID)

☎ +34 910 133 808



✉ info@c-buchanan.com

🌐 www.c-buchanan.com

**DANOBAT S.COOP.**

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

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

🚩 Arriaga Kalea, 21 20870 Elgoibar (GUIPÚZCOA)

☎ +34 943 748 044



✉ +34 943 743 138

✉ danobat@danobat.com

🌐 www.railways.danobatgroup.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 (ÁLAVA)

☎ +34 945 466 314



✉ +34 945 466 314

✉ info@dsaf.es

🌐 www.dsaf.es

**DOMINION**

Dominion, founded in 1999, is a global provider of multitechnology services and specialised engineering solutions. It combines knowhow, technology and innovation to help its customers make their productive processes more efficient, either by fully outsourcing them ("Services") or by implementing solutions underpinned by specialised technology and platforms ("Solutions"). Application of know-how, technology and innovation to improve customers' productive processes. Focus on selective digitalisation as a tool for driving efficiency gains. Stable presence in 35 countries with the ability to execute projects anywhere. Services and Solutions in three lines of activity: T&T, Industry and Energy.

🚩 Ibañe de Bilbao 28, 8A-B - 48009 Bilbao (VIZCAYA)

☎ +34 944 793 787



✉ +34 944 793 783

✉ inigo.zorriketa@dominion.es

🌐 www.dominion-global.com

**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)

☎ +34 91 353 21 20

☎ +34 91 350 49 54

✉ jalvarez@comsa.com

🌐 www.comsa.com

**CUNEXT COPPER INDUSTRIES**

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

🚩 Av. de la Fábrica, s/n 14005 (CÓRDOBA)

☎ +34 957 499 300



✉ josep_anfruns@cunext.com

🌐 www.cunext.com

**DF RAIL, S.A.**

DF Rail is a company specialized in the design and manufacture of turnout systems for metro, conventional, heavy haul and even high speed lines up to 350 kph.. DF Rail has its own designs and patents thanks to an intense effort in research and development, and its technologically advanced facilities, with more than 56,000 m² for the design, manufacturing and assembling of turnout systems as well as machining and flash-butt welding of Mn steel crossings, machining of switches and stock rails. Besides, it designs and manufactures locking systems, fastening systems, wear devices, insulated glued joints and transition rails. Our products are installed in more than 21 countries.

🚩 Pol. Ind. Fábrica de Mieres 33600 Mieres (ASTURIAS)

☎ +34 985 456 331

☎ +34 985 456 164

✉ dfrail@dfrail.com

🌐 www.dfrail.com

**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

**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

**EQUIPOS LAGOS, S.A.**

In Cabinas Lagos we are experts in the design of processes and products for surface treatment (sanding, metallizing, shot blasting, painting, drying, polishing). Since 1982 we have been growing and evolving until become a leading company with our own technological development, capable of developing important projects in rail, wind, aeronautical, etc ... sectors.

Parroquia de Rois, B-24 Pol. Ind.
Bergondo 15165 (LA CORUÑA)
+34 981 784 909
daniel.gallego@cabinaslagos.com
www.cabinaslagos.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, silent-blocks, 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 (VIZCAYA)
+34 944 977 180
+34 944 977 190
flexix@flexix.com
www.flexix.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

**GANTREX SPAIN, S.A.**

Gantrex is the global market leader in production, distribution installation and maintenance of high quality crane rail solutions. Gantrex products are used in many different applications and end-markets including ports, shipyards, steel mills aluminium smelters railway depots and heavy industries.

Pol. Ind. Izarza, 4N 48150 Sondika (VIZCAYA)
+34 944 535 084
info.bilbao@gantrex.com
www.gantrex.com

**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 - (GUIPÚZCOA)
+34 943 748 060
+34 943 744 182
sales@geminislathes.com
geminislathes.com

**GLOBAL QUALITY ENGINEERING SER. UNA COMPAÑÍA DE TRIGO GROUP**

TRIGO Spain is a supplier of quality services and support in the supply chain in industrial sectors. Founded in 2001, it offers quality assurance services in products, maintenance, industrial means management and metrology with more than 600 quality professionals in Spain. TRIGO GROUP is present in 25 countries with a team of more than 10,000 professionals. TRIGO Spain exports to the railway sector good practices of high added value developed in sectors such as aerospace and automotive.

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

**FUNORSA**

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

Condado de Treviño, 41 Pol. Villalonguejar, 09001 (BURGOS)
+34 650 665 302
comercial@funorsa.es
www.funorsa.es

**GAIKER CENTRO TECNOLÓGICOS**

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

Parq. Tecnológico Edif., 202 48170 Zamudio (VIZCAYA)
+34 946 002 323
+34 946 002 324
alonso@gaiker.es
www.gaiker.es

**GAMARRA, S.A.**

GAMARRA S.A. is one of the foremost producers of Low Alloy Carbon Steel Castings in Europe. We produce Steel castings for most Railway Carriage and Locomotive Manufacturers throughout Europe and beyond. We also produce a wide range of castings for Commercial Vehicles, Off-Road Construction Machinery, Public Works, Ministry of Defence, Lifting and Farming Machinery and General Industrial requirements. Our products can be supplied in rough cast, machined or assembled with other accessories. We produce more than 7,000 tonnes of castings per year in the range of 10 kg to 300 kg and dimensions up to 1,100 x 1,100 mm.

Portal de Vergara, 6 01013 Vitoria-Gasteiz (ÁLAVA)
+34 945 251 677
+34 945 274 948
comercial@gamarrasa.es
www.gamarrasa.es

**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

**GOAL SYSTEMS SL**

Goal Systems is a company dedicated for 27 years to the production and implementation of software solutions for optimization of human and material resources, especially in the transport sector, as well as to the provision of services related to such projects. These systems form part of the Intelligent Transportation Systems (ITS) family of software for infrastructures and operations in the world of transport.

PC/ Agustín de Foxá, 25, 11º PI
+34 91 725 30003
marketing@goalsystems.com
www.goalsystems.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)**

☎ +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 (VIZCAYA)**

☎ +34 944 797 600

☎ +34 944 761 804

✉ cortega@idom.com

🌐 www.idom.com

**IKUSI, S.L.**

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.

🚩 **Paseo Miramón, 170 20014 San Sebastián (GUIPÚZCOA)**

☎ +34 943 448 800

☎ +34 943 448 816

✉ preventa.comercial@ikusi.com

🌐 www.ikusi.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@ingenieriaiviesca.com

🌐 www.ingenieriaiviesca.com

**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 (VIZCAYA)**

☎ +34 944 039 600

☎ +34 944 039 837

✉ traction@ingetteam.com

🌐 www.ingetteam.com

**INSE RAIL S.L.**

Inse Rail is an engineering firm that is highly specialized in the railway industry and specifically its installations and systems. Founded in 1994, it is dedicated to engineering, consulting and project management in the railway, industrial, energy and building construction industries, carrying out its activities in the different stages of planning, design, construction and operation of investments. Inse Rail participates in the international development of the High Speed Rail and metropolitan transportation, with a strong specialization in electrification, signaling, security and communication systems, and other railway transport installations.

🚩 **Avda. de Burgos, 12 7º DCHA. 28036 Madrid (MADRID)**

☎ +34 91 302 95 40

✉ cggarciaj@inserail.es

🌐 www.inserail.es

**IMPLASER 99 SLL**

IMPLASER is a Spanish manufacturer of security signaling products specialized in railway projects. Innovation and quality are our greatest exponents; our design, manufacturing and service procedures have been certified according to ISO 9001:2000 since 2001. Furthermore, we are the first SME being certified in R+D+i in Spain. Our wide range of products is certified by AENOR with photoluminescent values of 150, 300, 580 and 720 mcd/sqm. We are also specialized in the manufacturing of security, informative and accessibility decals for installation inside and outside the railway coaches.

🚩 **Pol. Ind. Borao Nave 5 50172 Alfajarín (ZARAGOZA)**

☎ +34 976 455 088

☎ +34 976 455 088

✉ chuerta@implaser.com

🌐 www.implaser.com

**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

✉ enavarroj@indra.es

🌐 www.indracompany.com

**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)**

☎ +34 91 452 12 00



✉ internacional@ineco.com

🌐 www.ineco.com

**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)**

☎ +34 954 677 480

☎ +34 954 999 728

✉ hispacold@hispacold.es

🌐 www.hispacold.es

**JEZ SISTEMAS FERROVIARIOS, S.L.**

JEZ is 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. At JEZ we fit our developments to meet clients' needs.

🚩 **Arantzar s/n Llodio (ÁLAVA)**

☎ +34 946 721 200

☎ +34 946 720 092

✉ infor@jez.es

🌐 www.jez.es

**KIMUA ENGINEERING, S.L.**

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

🚩 **Pol. Irurzubi 7, 20490 Lizartza (GUIPÚZCOA)**

☎ +34 943 691 396



✉ lucas@kimuagroup.com

🌐 www.kimuagroup.com



LA FARGA YOUR-COPPERSOLUTIONS, S.A.

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

La Farga is a family-run metallurgical company, with more than 210 years of history. We produce 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, 39005 (SANTANDER)
 ☎ +34 620 12 30 24 / +34 942 20 18 28
 📠 +34 942 20 18 18
 ✉ jose.casado@unican.es
 🌐 https://ladicim.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.

🚩 Portuetxe 23A, local B3 20018 San Sebastián (GUIPÚZCOA)
 ☎ +34 943 217 491
 📠
 ✉ lander@landersimulation.com
 🌐 www.landersistimulation.com



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



NEM SOLUTIONS | NUEVAS ESTRATEGIAS DE MANTENIMIENTO, S.L.

NEM Solutions offers digital solutions to maximize productivity of train fleets; to lengthen life-cycle and to optimize maintenance and operational strategy. The principal purpose is to attain maximum profit, which facilitates the decision-making process and management. Through A.U.R.A. technology NEM Solutions provides real time predictive analytics. The operator gets total data control and enables the decision-making process and the follow-up of set objectives, in real time, with a global vision of the fleet situation. NEM Solutions look after the safety and efficiency of 250 train fleets, which means looking after 4,4M train passengers managing more than 67.000 assets in 25 countries.

🚩 Parque Tec. de Miramón Pº Mikeletegi. 54
 1ª pl. 20009 San Sebastián (GUIPÚZCOA)
 ☎ +34 943 309 328
 📠 +34 943 309 326
 ✉ azevallos@nemsolutions.com
 🌐 www.nemsolutions.com



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
 🌐 ngrt.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)
 ☎ +34 91 035 35 86
 📠
 ✉ joaquin.navarro@lantania.com
 🌐 www.lantania.com



LUZNOR DESARROLLOS ELECTRONICOS, S.L.

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

🚩 Paduleta 47 - Pol. Ind. Jundiz Vitoria (ÁLAVA)
 ☎ +34 945 200 961
 📠 +34 945 200 971
 ✉ iarbeloa@luznor.com
 🌐 www.luznor.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 (GUIPÚZCOA)
 ☎ +34 943 333 755
 📠 +34 943 333 751
 ✉ info@mtc.com
 🌐 www.wabtec.com/business-units/metalocaucho-mtc



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 (GUIPÚZCOA)
 ☎ +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



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

**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)
 ☎ +34 91 343 03 48
 📧 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)
 ☎ +34 945 258 431
 📧 pretenorte@pretenorte.com
 🌐 www.pretenorte.com

**SCHNEIDER ELECTRIC**

At Schneider Electric, we believe access to energy and digital is a basic human right. We empower all to make the most of their energy and resources, ensuring Life Is On everywhere, for everyone, at every moment. We provide energy and automation digital solutions for efficiency and sustainability. We combine world-leading energy technologies, real-time automation, software and services into integrated solutions for Homes, Buildings, Data Centers, Infrastructure and Industries. We are committed to unleash the infinite possibilities of an open, global, innovative community that is passionate about our Meaningful Purpose, Inclusive and Empowered values.

🚩 Bac de Roda, 52 Edificio A 08019 (BARCELONA)
 ☎ +34 93 484 31 00
 📧 +34 93 484 33 16
 🌐 www.se.com

**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 (ÁLAVA)
 ☎ +34 678 771 259
 📧 jmartin@segula.es
 🌐 www.segula.es

**SOCIEDAD ESPAÑOLA DE MONTAJES INDUSTRIALES, S.A.**

Activities in 2018/2019: *Execution of Works and maintenance SS/EE traction and autotransformer centers associated with, for the section: Plasencia-Badajoz in the High Speed railway Madrid-Extremadura. *Electrification, safety installations and telecommunications of Medina del Campo – Salamanca – Fuentes de Oñoro Line, in section Salamanca – Fuentes de Oñoro. *New SS/EE traction in Parets del Vallés at the p.k. 20/285 of Barcelona-French border line. Innovations in 2018: Design and development of a new overhead contact line C-200, powered to 25 kV and versatile in their different sections.

🚩 Av. de Manóteras, 6 2ª Pl. 28050 (MADRID)
 ☎ +34 91 308 93 35
 📧 +34 91 701 77 71
 📧 ferrocarr@semi.es
 🌐 www.gruposemi.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 91 806 18 10
 📧 +34 91 804 19 55
 📧 marketing@revenga.com
 🌐 www.revenga.com

**ROSNI S.L.**

ROSNI has the necessary capabilities to manufacture, repair and provide design on railway elements of significant dimensions, considered basic in structures and equipment. In addition, ROSNI is considered autonomous, as an important base in the manufacturing, both in the configuration of mechanical welding, as well as in machining, shot blasting, priming and painting, in addition to having the capacity to provide the corresponding quality documentation. certificates, welding, painting, in addition to others that may be required.

🚩 Antigua Carretera de Extremadura Km 20,800 28935 Móstoles (MADRID)
 ☎ +34 91 647 24 21
 📧 alvaroquinones@rosni.com
 🌐 www.rosni.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.

🚩 Isla de Jamaica, 8 28034 (MADRID)
 ☎ +34 91 334 15 90
 📧 +34 91 358 05 64
 📧 mvega@satys.com
 🌐 www.satys.com

**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 (VIZCAYA)
 ☎ +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

**SDEA SOLUTIONS, S.L.**

SDEA Solutions is a technical consulting firm specialized in providing engineering and design solutions for the railway sector, Energy and Transport mainly. We have a team of highly qualified engineers working in 3 main areas, Rail Sector Designs and BIM projects for linear works; Advanced Calculation and Simulation (FEA/FEM and CFD Calculations); Process Engineering and Thermo-mechanical designs. With our participation we hope to provide new knowledge using tools that the sector is demanding, especially in the development of BIM methodology with international presence and bidding for the R+D development.

🚩 Avda. Gran Vía 161-1ºH 36210 Vigo (PONTEVEDRA)
 ☎ +34 653 942 425
 📧 info@sdeasolutions.com
 🌐 www.sdeasolutions.com

**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/ Trespaderna, 29, 3º Edificio Barajas I, 28042 - MADRID
 ☎ +34 913 138 000 / +34 607 845 281
 📧 maha.salemsoliman@sgs.com
 🌐 www.sgs.com



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).

🚩 **Sepúlveda, 6 - 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
☎
✉ www.siemens.es/siemens-mobility



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



TECHNOLOGY & SECURITY DEVELOPMENTS

Technology & Security Developments (TSD) is a Spanish company localized in Herencia (Ciudad Real) which operates in more than 80 countries in the world and has an experience of more than 30 years in the sector of the design, development, fabrication and maintenance of special vehicles. TSD offers adapted solutions to the security forces, security companies and another fields of the physical security. Since 10 years ago, TSD has a line of product specialized in railway. Under the name of TSD Rail, the activity is focused on the fabrication of new components, restoration and makeover process, as well as the rehabilitation and maintenance of these vehicles.

🚩 **Polígono Industrial Calle los Jaboneros,**
14 13640 (Herencia) CIUDAD REAL
☎ +34 926 574 720
☎ +34 926 572 493
✉ tsd@tsdinternational.com
🌐 www.tsdinternational.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.

🚩 **Anabel Segura 11, Edif. A, 3ª Pl. Oficina**
B 28108 Alcobendas (MADRID)
☎ +34 91 084 17 07
☎ +34 987 264 407
✉ telice@telice.es
🌐 www.telice.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)
☎ +34 976 465 656
☎ +34 976 465 720
✉ fsanjuan@teltronic.es
🌐 www.teltronic.es



Talleres Alegría, s.a.

TALLERES ALEGRÍA, S.A.

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

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 Corporate Image projects according to the needs of the customer; design & installation.

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



TEKNIKER

R&D center oriented to technology transfer through research projects. Specialization areas:
- Advanced manufacturing: laser processes, LMD coating and repair, cutting processes
- Surface engineering: friction and wear studies, physical-chemical coatings seeking to improve anti-corrosion, wear, easy cleaning, anti-adherence, optical and aesthetic characteristics
- ICTs: solutions for inspection and measurement based on vision and AI techniques, O&M, condition monitoring, data management, Smart components, sensor development
- Product engineering: new product development, tribological testing, fault diagnosis.

🚩 **Iñaki Goenaga, 5, 20600 Eibar**
(GIPUZKOA)
☎ +34 943 206 744
☎
✉ inaki.bravo@tekniker.es
🌐 www.tekniker.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, been 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)
☎ +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)
☎ +34 91 418 21 10
☎ +34 91 418 21 12
✉ internacional@tpfingenieria.com
🌐 www.tpfingenieria.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, San Sebastián de los Reyes**
28703 (MADRID)
☎ +34 91 722 73 00
☎
✉ exterior@typsa.es
🌐 www.typsa.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

**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 (GUIPÚZCOA)

☎ +34 943 309 230

☎ +34 943 309 393

✉ mtlinaza@vicomtech.org

🌐 www.vicomtech.org

**WSP SPAIN**

As one of the world's leading professional services firms, WSP provides engineering and design services to clients in the Transportation & Infrastructure, Property & Buildings, Environment, Power & Energy, Resources and Industry sectors, as well as offering strategic advisory services. Our experts include engineers, advisors, technicians, scientists, architects, planners, surveyors and environmental specialists, as well as other design, program and construction management professionals. With approximately 49,000 talented people globally, we are uniquely positioned to deliver successful and sustainable projects, wherever our clients need us.

📍 Albert Einstein 6, 39011 Santander, (CANTABRIA)

☎ +34 942 290 260

☎ +34 942 274 613

✉ Mario.Perez@wsp.com

🌐 www.wsp.com/es-ES

**ZELEROS**

Zeleros is the Spanish company developing a hyperloop transport system, already considered as "the fifth means of transport". Its focus on the vehicle optimization allows to reduce infrastructure costs and to operate at safer pressures for the passengers. Zeleros has already raised substantial private and public support, and collaborates with companies such as Renfe (Trenlab) and Altran, research centers (Universitat Politècnica de València, CIEMAT, UPM) and is supported by investors such as Plug and Play, Angels or ClimateKIC. Currently Zeleros is preparing the construction of its own 2-kilometer test-track in Sagunto to demonstrate the system at high speed.

📍 Muelle de la Aduana s/n, Edificio Lanzadera 46024 (VALENCIA)

☎ +34 633 386 733



✉ info@zeleros.com

🌐 www.zeleros.com

**ZITRON, S.A.**

ZITRON is a world-wide leading company in designing, manufacturing, commissioning and maintenance complete ventilation systems for metro and tunnels. ZITRON has the world's biggest aerodynamic test bench, certified by AMCA, for testing fans at full load and 100 % speed. ZITRON's extensive reference list includes more than 500 metro and tunnel projects. The latest and more significant ones are Crossrail in London and Doha Metro. Experience and 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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Your Way
TO FUTURE MOBILITY

Photo: Kaohsiung Tramway System – CAF Turnkey Project