

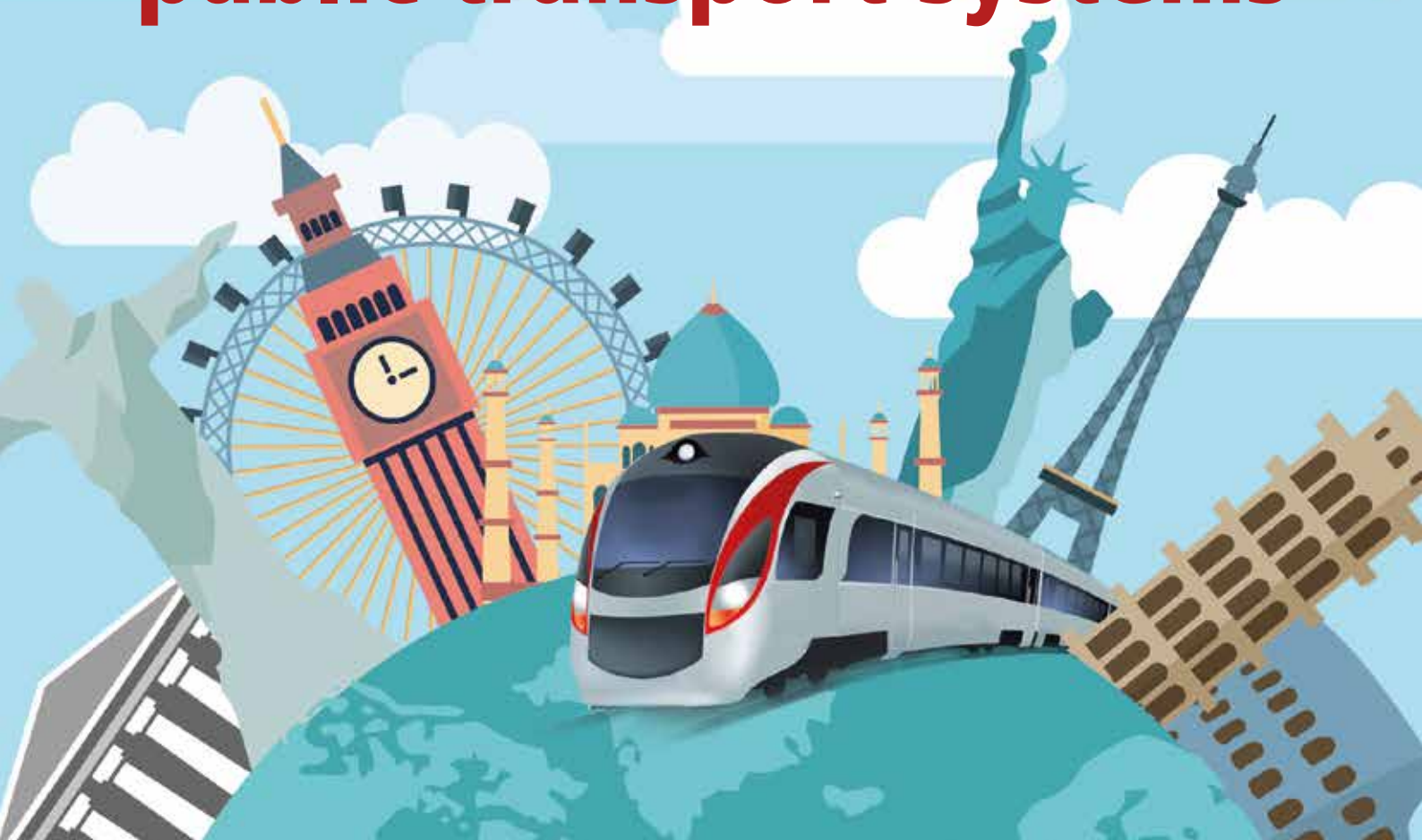


MAFEX

Mafex corporate magazine
Spanish Railway Association

Issue 15. April 2018

The **Spanish railway industry** at the forefront in innovative solutions for **public transport systems**



DESTINATION: BRAZIL

The country revives its investments in numerous railway projects.



INTERVIEW:

Pere Calvet, President of the International Union of Public Transport (UITP).



MAFEX INFORMS:

The association continues the intense agenda of activities with new trade delegations.



At the forefront of Rails Solutions

ArcelorMittal is the world leading steel and mining company, is part of a small group of rail manufacturers with rail production facilities in Spain, Poland, Luxembourg and the United States. Our production has experienced significant developments in all rail markets: high speed, tram, metro, heavy loads, urban transport and port operations.

ArcelorMittal have the widest range of products, offering a wide portfolio covering all sizes and types of steel in the best conditions of quality and service. Proximity and customer satisfaction, Research and Development focus, a wide range of premium rails and our unmatched capacity, are ArcelorMittal Long Products Europe - Rail and Special Sections strategic bases. The next time you take a train anywhere in the world, you may be traveling in rails manufactured by ArcelorMittal.

rails.arcelormittal.com

AcelorMittal es el principal productor siderúrgico y minero a escala mundial, y forma parte de un reducido grupo de fabricantes de carril, con plantas productoras en España, Polonia, Luxemburgo y Estados Unidos. Nuestra producción ha experimentado un importante desarrollo en todos los mercados de carril: la alta velocidad, tranvía, metro, cargas pesadas, transporte urbano y operaciones portuarias.

En ArcelorMittal contamos con la oferta más variada de productos, fabricando una amplia gama de dimensiones y tipos de acero en las mejores condiciones de calidad y servicio. Proximidad y la satisfacción de nuestros clientes, apuesta por la Investigación y el Desarrollo (I+D), una amplia gama de carriles premium y nuestra incomparable capacidad, son la base estratégica de ArcelorMittal Europe Long Products – Carril y Secciones Especiales. La próxima vez que coja un tren en cualquier parte del mundo, es posible que esté viajando en carriles fabricados por ArcelorMittal.

MAFEX

► Table of Contents

05 / EDITORIAL

06 / MAFEX INFORMS

BILBAO WELCOMES THE "WORLD METRO & LIGHT RAIL 2018"

Professionals from all over the world view first-hand the latest advances in metropolitan railway, light railways, tramways and regional rail networks.

MAFEX CONTINUES TO GROW

The association has 15 new partners and consolidated its trajectory.

TRADE DELEGATION FROM MAFEX TO THE PHILIPPINES AND INDONESIA

A group of 16 companies have taken part in the Mafex delegation.

NOTEWORTHY PARTICIPATION OF SPANISH COMPANIES IN THE MIDDLE EAST RAIL FAIR.

The participation in this professional engagement has served to strengthen commercial ties in this area.

PREPARATIONS FOR INNOTRANS 2018 WELL UNDERWAY

There will be 50 companies attending the world's largest exhibition in the sector, which will be held in Berlin.



AGRAGEX CELEBRATES ITS 40TH ANNIVERSARY

The association celebrates its 40th Anniversary.

RENEWAL OF THE MAFEX INTERNATIONAL AND COMMUNICATION COMMITTEES

Mafex constituted the new intake of member companies of the committees of international and communication for the next two years.

15 / MEMBERS NEWS

24 / DESTINATION BRASIL

The country fosters rail transport with the resumption of projects and the start-up of new investments.



46 / INTERVIEW
PERE CALVET, PRESIDENT OF THE INTERNATIONAL UNION OF PUBLIC TRANSPORT (UITP).

48 / IN DEPTH
SPANISH RAILWAY INDUSTRY SOLUTIONS TRANSPOSED TO PUBLIC TRANSPORT

Spanish companies are opening pathways throughout the world as consultants and suppliers of state-of-the-art technology for 21st century networks.

70 / FORWARDED
ANTONIO AIZ, DEPUTY REGIONAL MINISTER FOR INFRASTRUCTURE AND TRANSPORT OF THE BASQUE GOVERNMENT.

72 / INNOVATION
MAFEX PARTNERS PRESENT THEIR LAST PROGRESS

82 / INDUSTRY 4.0

86 / MEMEBER'S DIRECTORY



A complete range of devices for urban paths

The **tram** has returned. And other solutions have come with it, such as **metro** or **light rail**.

At AMURRIO we are proud of our contribution to this change. We have designed and produced a **complete range of products for urban rail**: turnouts, crossovers, crossings, double crossovers, comb turnouts and track expansion devices.

For **infrastructures** on ballast, embedded, with grass or concrete. And we have installed them in the streets of cities in our country and all around the world. From Alexandria and Izmir to Zaragoza, passing through Buenos Aires and Medellín (Colombia).

We have learned everything there is to know about urban layouts, and we have used it to develop **new solutions and innovative products**.

Like our new **movable point crossing for tram**, designed to achieve quieter and more efficient urban routes.

Created to beat in a more liveable, **more sustainable city**. A more human city.



Bilbao, at the fore of urban rail transport

Dear Friends,

Public rail transport is the star of the show at the 14th edition of the "World Metro & Light Rail 2018", which will be held in Bilbao and boasts the collaboration of Mafex as well as the Basque Government. The SPRI Group, ETS, Euskotren and Metro Bilbao will collaborate in the development of the event, in addition to the participation of Adif and Renfe and a significant involvement of the association's partner companies, which have undoubtedly been key in organising the event.

For two consecutive days, the city will play host to senior representatives of administrations from around the world, as well as those responsible for companies in the sector, technology centres and network operators spread over the five continents. The visitors will be able to see first-hand the solutions and innovations displayed by 80 exhibitors and to attend the presentations of the more than 150 speakers that form the congress panel.

In addition, in this issue of the magazine, we introduce you to the 15 new companies have joined Mafex so far this year. From the association, we wish to welcome all of them and we thank them for the trust placed in our work. This remarkable increase is a highly positive sign that the sector is advancing along the right path and means we continue to work with great intensity in our multiple activities carried out from within the Association.

"Mafex informs" also details the results of the trading delegation to the Philippines and Indonesia, as well as the significant participation of Spanish companies in the Middle East Rail Fair which we have

attended for the fourth consecutive year. February was also the month in which the new formation of member companies of the Mafex International and Communication Committees was established for the next two years, and these will be responsible for following up on the aims set out in the Strategic Plan in each of the indicated areas.

In the "Partner News" section, information is included on 16 associated companies who offer us their most recent news (latest contracts awarded, appointments, anniversaries, etc.). Added to this, there is an extensive report on "Brazil". The country is resuming its investments in railways and has plans to promote numerous projects, for both freight and passenger rail, which include especially the expansion of tramway systems, monorail, regional and suburban rail networks in many cities.

In the "In-depth" section, we present the major capabilities of the Spanish railway industry in urban transport and the wide range of projects in which it has participated over the five continents. Its prestige, experience and advances in R&D have made it present in the implementation of the most relevant urban systems of recent times.

Finally, in "Innovation" eight articles are published on Mafex partners' latest advances. And new to this edition, there is a section devoted to "Industry 4.0" which features contributions from experts on the introduction of digital technology in the field of mobility.

Once again, we hope that the wide-ranging content of the magazine is of your interest and serves to make aware of the strength and capabilities of our sector.

MANAGEMENT: MAFEX.

MAFEX COMMUNICATION COMMITTEE: Albatros, Alstom Transporte, ArcelorMittal, Bombardier España, CAF Signalling, Idom, Indra Sistemas, Ingeteam, Jez, La Farga Lacambra, Patentes Talgo, Siemens España, Thales España, TPF Getinsa-Euroestudios and Stadler Rail Valencia S.A.U. **ADMINISTRATION:** comunicacion@mafex.es. **ADVERTISING:** comunicacion@mafex.es. **SUBSCRIPTIONS:** comunicacion@mafex.es. Mafex magazine is not responsible for the opinions, images, texts and works of authors and readers that will be legally responsible for their content. It is understood that the signing authors have given their consent to be included, for which he or she will be responsible. Also, the magazine is not responsible for typographical errors contained in the original documents submitted by the authors.

World Metro & Light Rail 2018 arrives in Bilbao

THE TRADE FAIR, ENTITLED RAILWAY URBAN TRANSPORTATION CONGRESS WILL BE HELD AT THE BEC, BILBAO EXHIBITION CENTRE, ON THE 18TH AND 19TH OF APRIL. THE MOST SIGNIFICANT WORLDWIDE REPRESENTATIVES FROM THE SECTOR ANALYSE THE PRESENT AND THE FUTURE OF MOBILITY AND DISCOVER FIRST-HAND THE MOST CUTTING-EDGE TECHNOLOGICAL ADVANCES OF THE INDUSTRY.

The organisation of 'Live Rail', a trade fair within which the '14th World Metro & Light Rail Bilbao 2018' is framed, a little more than a few days before its celebration, enters its final phase. Work is being undertaken on finalising the details of the programme of one of the standout international professional events devoted to underground, light rail and regional rail networks. Representatives from more than 98 countries can find out more about the latest technological advances in the sector in the exhibition area. Furthermore, an extensive programme of simultaneous conferences has been prepared in which approximately 150 international speakers will give addresses.

For the first time, and after the recent events held in London, hosting will shift to Bilbao. It has the support of Mafex, from which work has been undertaken to bring the event to our country, in the organisation of the event, as well as the support of the Basque Government, the SPRI Group, ETS, Euskotren, Metro Bilbao and the collaboration of Adif and Renfe.

Railway operators, builders and suppliers, and senior management



The discussion forums will focus on key aspects for the future of public transport.

from underground and light rail systems will join together in Bilbao in this annual meeting to draw conclusions regarding the present and future of urban rail transport.

Under the title "Innovation, Technology, Action", the event will host for two days a broad debate on the present and future of global public transport. The organisation has put

together an intense agenda that will begin on April 17 with prior working sessions between delegates and companies.

The discussion forums will focus on key aspects for the future of public transport such as: sustainability strategies, advances in control systems, improvements in mobility and associated services,

as well as evolution of the IoT, in the world of transport. For this reason, there will be presentations and case studies of relevant urban rail transport entities such as Transport for London, entity in charge of public transport in the city of London, Metro Los Angeles, Metrolinx of Canada, to name just a few examples.

The official inauguration of the event will be entrusted to the Basque President, Iñigo Urkullu. Afterwards, the event will continue with a special panel formed by the four highest ranking officials at ETS, Euskotren, Metro Bilbao and Grupo SPRI under the banner: "Strategy in Innovation of Public Transport of the Basque Country", where Alex Arriola, from Grupo SPRI, Eneko Arruebarrena, from Metro Bilbao, Imanol Leza, from Euskotren and Aitor Garitano from ETS will present the Basque Government's commitment to innovation in the sector as well as a sustainable and integrated transport model as an instrument of social cohesion and socio-economic develop-

ment in the Basque Country.

Following this, and for the two days of the event lasts, many industry experts will take part in various round tables on the implementation of new technologies in urban transport and how the industry can join this change. In turn, the role of administrations, operators and agents of the sector to match trends with the needs of urban transport will also be analysed.

This edition brings exciting innovations and outstanding advances in the field of R&D in the rail sector from countries such as Iran, Germany, Mexico, Panama, Canada, Poland, Great Britain, Peru, Israel, South Korea, Ireland, France, Russia, amongst others.

Trade Fair

Along with the main conferences, "World Metro & Light Rail 2018", welcomes a trade fair in which the most cutting-edge solutions of the industry are exhibited to the international railway community. A multitude of innovative proposals will

In this edition, a wide range of Mafex partners are amongst the main exhibitors.

be on show in the area with which to improve the efficiency and modernisation of railway systems. In this edition, a wide range of Mafex partners are amongst the main exhibitors, such as CAF Group, Arce-Mittal, Ingeteam, Jez, Siemens, Teltronic, Amurrio, Bombardier, Danobat, Idom, Nem Solutions, Stadler Rail Valencia, Implaser, Sener, Telice, Arteche, Colway, Goratu, Indra, La Farga La Cambra, Luznor, Mb Sistemas, Sice, Talleres Alegria, Bigda Solutions, IK4, GMV, Cetest, Gantrex Spain, Typsa, Citef, Creativitic and Limmat Group.



15 new partners join forces with Mafex

The number of companies that join Mafex continues to increase. Below is a selection of the new partners:



AKKA TECHNOLOGIES SPAIN

Akka Technologies Spain develops engineering and consulting projects with close to 400 consultants assigned to the main technological sectors. In the railway sector, they carry out projects related to rolling stock, track infrastructure and signalling.



AOIFE SOLUTIONS (GALGUS) S.L.

Company devoted to the development of embedded software for the optimisation of WIFI networks.



CREATIVITIC INNOVA

Consulting, training and research and the development of products, systems and services based on emerging and innovative technologies using augmented, virtual and mixed reality, integrated with IoT and AI systems for technical support in industrial solutions.

THE SPANISH RAILWAY ASSOCIATION CONTINUES TO GROW WITH THE RECENT INTAKE OF 15 NEW PARTNERS. MAFEX ADDS WITH THESE ANNEXATIONS A TOTAL OF 83 FIRMS THAT REPRESENT ALL OF THE SUB-SECTORS OF A SOLID INDUSTRY PAVING THE WAY TO OPERATE THE WORLD OVER.



ENCAIX COMUNICACIÓ VISUAL, S.L.

ENCAIX is a company specialising in the manufacture of railway models.

They develop innovative marketing tools based on different disciplines; from the traditional scale model to state-of-the-art virtual reality and innovative sensor techniques to the surprising comprehensive interactivity that is revolutionising communication.



FUNDACION TECNALIA RESEARCH AND INNOVATION

Tecnalia is a leading research and technological development centre in Europe.

They offer a vision of innovation, developing alongside companies solutions that provide value through technology and competitive solutions that transform and grow businesses, improving the future of companies and society.



CITEF (FUNDACIÓN PARA EL FOMENTO DE LA INNOVACIÓN INDUSTRIAL)

CITEF was created in 1998 as part of the F2I2 (Foundation for the Promotion of Industrial Innovation) for the purposes of development, innovation, experimentation, study and training in the railway knowledge area. This is a non-profit organisation that pursues general interest aims within any relevant rail transport technology sector.



INSERAIL, S.L.

This is an engineering and consulting firm founded in 1994 and focused on the railway, energy and building sectors, developing its activity in the different stages of planning, design, construction and exploitation of investments. Inse Rail has a multi-faceted team of experts in civil engineering, electric engineering, mechanics and telecommunications, who provide each individual customer with the service and commitment to achieve their objectives.



LAGMANIERE CARGO

Spanish company with a presence through its network of collaborators and with its own offices in different markets, dedicated to international air and sea transport services, assessment and customs management



LANDER SIMULATION & TRAINING SOLUTIONS, S.A.

Lander Simulation & Training Solutions, SA, is a company specialising in the design, development and implementation of commercial simulation devices embracing cutting-edge technology geared towards professional training.



LIMMAT M&M

Limmat Group boasts extensive experience in the rail infrastructures sector, supporting the processes and projects of its clients through comprehensive solutions aimed at engineering, consulting and technological and innovative products that maximise efficiency in their engineering and consulting operations: Limmat Group is a specialist in management and consultancy and engineering activities of all types of PPP projects, with maximum specialisation in railway infrastructures.



BIGDA SOLUTIONS (METEO FOR ENERGY, S.L.)

The company undertakes development projects involving Big Data and artificial Intelligence technology to optimise companies' productive processes and energy consumption. Amongst other endeavours, they carry out advanced analytical projects, data analysis techniques, to define scenarios in real time and predict future behavioural trends. On the other hand, through machine learning techniques, they make predictions, based on a set of data that is fed back and improved with new information.



TELTRONIC SAU

Company belonging to Hytera Communications Corporation Limited, that designs and manufactures equipment and radio communications systems for Critical Mission.



UNIVERSITY OF CANTABRIA - LADICIM (LABORATORY OF THE DIVISION OF MATERIALS SCIENCE AND ENGINEERING)

The mechanical laboratory LADICIM - UC transfers to society the knowledge available in the University, through continuous advisory services and agreements with companies and institutions for the development of R&D+i, and captures the areas in which the knowledge must be further enhanced, to then offer a better service.



VICOMTECH

Vicomtech is an applied research centre, founded in 2001 and located in the San Sebastián Technology Park, which develops technological solutions in the fields of Computer Vision, Data Analytics, Computer Graphics, Advanced Interaction, and Language Technologies. The results of their research projects are applied to various sectors such as automotive, rail, intelligent transport systems, industry and advanced manufacturing and energy, amongst others.

All of its activities are regulated with the R&D+i management system, such as the continuous improvement of results and its measurement, the optimisation of technological innovation processes, as well as the transfer and generation of knowledge, thus ensuring that it uses methodologies of the very highest quality.



ZFOAM S.L.

The company provides complete solutions tailored to the needs of its customers with accurate technical support. They have equipment that covers all the specialist processes of transformation of plastic foams, along with low and high temperature insulation.

They have vertically integrated the semi-transformation and final transformation processes, so that a complete service is offered from the raw material to the final product, including the choice of the most suitable materials and the design process.

Mafex trade delegation to the Philippines and Indonesia



This trip is part of the Association's 2018 Activity Plan and has as its main purpose to present the range of products and specialised services of Spanish companies to the transport authorities of both countries. The trip to the Philippines has taken place at a time of special importance, since the infrastructure plan 2017-2022 (Philippine Development Plan 2017-2022) is in progress; a roadmap for forthcoming investments, where the railway is assigned an allocation of 9.110 billion euros. This amount includes works such as the construction of the Mindanao network, the refurbishment and expansion of the Manila light rail system or the expansion of the commuter rail network, as well as the country's first underground subway network.

Activities

Amongst the activities scheduled on the agenda in the Philippines, Mafex, in collaboration with the Commercial Office of Spain in Manila, has organised the conference entitled "Railway Technologies from

A GROUP OF 16 SPANISH COMPANIES HAVE TAKEN PART IN THE MAFEX ENTREPRENEURIAL DELEGATION TO PHILIPPINES AND INDONESIA, FROM THE 19TH TO THE 23RD OF FEBRUARY.

Spain". An event in which Spanish companies and other local businesses participated, alongside a large institutional representation led by the Philippine Ministry of Transport. The aim has been to highlight both the high technological level and the great experience accumulated by the Spanish sector in the design, development and operation of transport projects around the world, as well as the ability to adapt this knowledge to the challenges currently facing the Philippines.

Meetings

In addition, during the stay in this country there were meetings of special interest such as the meeting with the representative of the Japan International Cooperation Agency (JICA) in the country due to its leadership in the investment in railway transport projects. With regard to the stay of the Spanish delegation in Indonesia, it was also aimed at strengthening com-

mercial ties and presenting its interest in participating in infrastructure projects. Hence, meetings have been held with the main local construction companies (Jakarta Porperindo and Adhi Karya), the Transport Agency of Jakarta (under the Ministry of Transport) and PT Kai (the national railways' operator).

It is worth highlighting that the programme entitled "National Long-Term Development Plan (RPJPN 2005-2025)" which includes specific items for the fostering of the railway is now underway. This plan will require approximately 300 billion euros in investments between 2015 and 2019. These funds will be allocated to more than 3,258 kilometres of roads, for passenger and freight rail which will cross the islands of Sumatra, Java, Kalimantan, Sulawesi and Papua. They are joined by plans for the island of Jakarta, where the aim is to build the Jakarta-Bandung high-speed line and a light metro. 🚆

"BUILDING THE WORLD, BETTER"

www.tpf.eu

Metro
 Tranvia/LRT
 Cercanías
 Ferrocarril Convencional

Alta Velocidad
 Estaciones
 Ferrocarriles y Terminales de Mercancías
 Talleres y Cocheras

C/ Ramón de Aguinaga, 8
28028 Madrid-España
info@tpfingenieria.com

Tel: +34 914 18 21 10
Fax: +34 914 18 21 12

Noteworthy participation of Spanish companies in the Middle East Rail

The Spanish Railway Association, Mafex, has travelled with a delegation of Spanish companies to the Middle East 2018 Trade Fair, held in Dubai (United Arab Emirates). This is the largest exhibition and railway congress in the Middle East and North Africa, which welcomed more than 9,000 visitors and more than 300 exhibitors.

The Spanish delegation has disseminated the wide-ranging experience it boasts in the entire value chain of railway projects, from the design, to their start-up, systems supply, rolling stock and maintenance. This year, the delegation was formed by the companies Aquafrisch, ArcelorMittal, CAF, Danobat, Implaser, Sener, Talleres Alegría and Typsa. Other Spanish companies in attendance were Idom, Patentes Talgo and Teltronic.

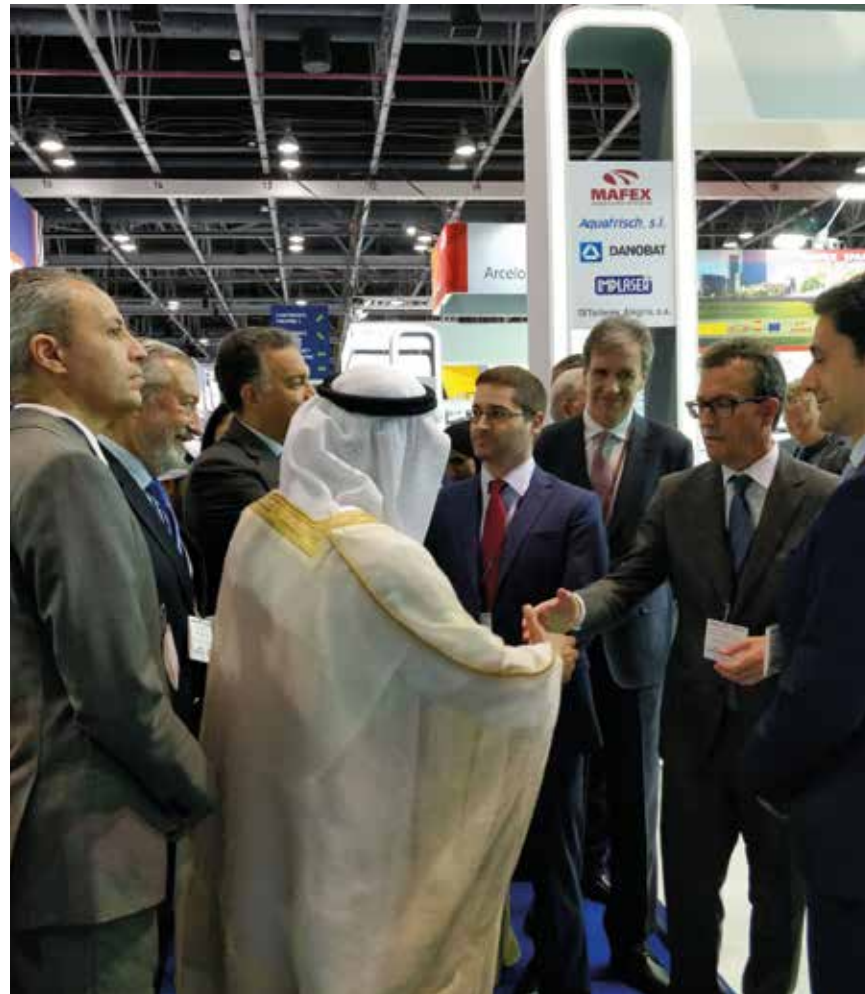
Institutional backing

In order to enhance the Spanish stance, the Secretary of State for Infrastructure, Transport and Housing, Julio Gómez-Pomar, and the CEO of Renfe, Juan Alfaro, travelled to Dubai to take part in the opening day of the trade fair and visit the companies. Spanish attendees at the fair, along with the Counsellor of the Commercial Office in Spain, Erik Rovina and the Ambassador of Spain to United Arab Emirates.

The opening of the fair was chaired by His Excellency Abdulla Belhaif Al Nuaimi, Minister of Development of Infrastructures and President of the Federal Transport Authority of the Arab Emirates.

The UAE Government has approved a new Federal Railways Law that provides a regulatory framework for future development and this law is expected to "pave the way for the participation of the

MAFEX HAS TRAVELLED TO MIDDLE EAST WITH A SPANISH DELEGATION TO PARTICIPATE IN THE MIDDLE EAST RAIL TRADE FAIR.



Above, His Excellency Abdulla Belhaif Al Nuaimi, Minister of Development of Infrastructures and President of the Federal Transport Authority of the Arab Emirates; the CEO of Renfe, Juan Alfaro; the Secretary of State for Infrastructure, Transport and Housing, Julio Gómez-Pomar and the Ambassador of Spain to United Arab Emirates, Antonio Álvarez.

private sector in rail projects in the Emirates". Emirates is interested in "learning about international best practices" and "benefitting from international experience", which it considers "plays an important role in sustainable development, especially in light of the transformation towards a knowledge-based economy and innovation." The Middle East, despite the recent slowdown in some investments in infrastructure, is one of the strategic destinations for the internationalisation

of Spanish industry. For this reason, Middle East has become an ideal showcase to promote the presence of Mafex partners in this region. Currently, the transport authorities already count on the experience and advice of Spanish companies in numerous railway projects. Amongst them, the design of the railway network of Oman, the high-speed line Medina-Mecca, the metropolitan railway systems of Doha (Qatar), Cairo (Egypt) or that of Riyadh and Jeddah (Saudi Arabia).

Agragex celebrates its 40th Anniversary

The Spanish Association of Manufacturers-Exporters of Agricultural Machinery and its Components, Greenhouses, Crop Protection, Irrigation Systems, Livestock Equipment, Animal Health and Nutrition, Forestry, Biomass and Post-Harvesting Machinery (Agragex) celebrates its 40th Anniversary. The association commemorates such a standout date with the completion of numerous projects.

Amongst these, helping, year in year out, one of the most important sectors in Spain toward its internationalisation and foreign promotion through an intense agenda of activities spread over the five continents.

According to the general director of Agragex, Jaime Hernani, the objective is to continue providing value services to the associated companies and provide the best support

MAFEX'S SISTER ASSOCIATION AND MEMBER OF THE AGEX GROUP CELEBRATES ITS 40TH ANNIVERSARY, JUST LIKE MAFEX. A HIGHLY RELEVANT DATE THAT DISPLAYS THE EXTENSIVE AND ACKNOWLEDGED ENDEAVOURS IN THE EXPORTATION AND REPRESENTATION OF THE SPANISH AGRICULTURE SECTOR.

in their promotion actions in foreign markets.

Agragex currently has 109 associated companies spread across the national

geography who are responsible for about 70% of the sector's exports, amounting in 2016 to invoicing of 928,549,203€.

Agragex, like Mafex, Fundigex and Siderex, belongs to the Agex Group, which is made up of 305 companies.



Jaime Hernani, President of Agragex and General Director of Grupo Agex.

Spanish industry prepares for InnoTrans 2018

Mafex is once again entrusted with the coordination of the presence of companies in the Official Spanish Pavilion at the InnoTrans 2018 fair, thus adding its eighth consecutive edition. On this occasion, 50 companies will be attending the world's largest exhibition in the sector, which will take place in Berlin between September 18 and 21 of this year. Forming the list of attendees are: Amurrio, Aquafrisch, ArcelorMittal, Ardanuy Ingeniería, Electrotécnica Artech Smartgrid, CAF, CAF Turnkey & Engineering, CAF Power & Automation, CAF Signalling, Ceit, Cetest, Comsa, Colway Ferroviaria, Duró Felguera, Funor, Gamarra, Goal Systems, Goratu Máquinas Herramienta, GMV, ICON Multimedia, Ingeteam Power Technology, Ikusi, Implaser, Indra, Industrial de Transformados, Ineco, Jez Sistemas Ferroviarios, La Farga La-

NEXT SEPTEMBER, BERLIN WILL ONCE AGAIN BE THE WORLD CAPITAL OF RAILWAY TRANSPORTATION. AMONGST THE CENTREPIECES THE INNOTRANS FAIR WILL BE SPANISH COMPANIES.



cambra, Lander Simulation and Training Solutions, Limmat M&M, Mb Sistemas S. Coop, MGN Transformaciones del Caucho, Nem Solutions, Newtek Sólidos, Patentes Talgo, Premium, Sice, Revenga Smart Solutions, Talleres Alegría, Talleres Corral

Mecanizados, Tecnatom, Teltronic, Thales España, Ute Ogi, Virlab Testing Laboratory, Xubi Engranajes and Uromac Systems, amongst others. Innotrans 2018 expects to reach record attendance figures this time around.

At the previous event, 137,391 professionals from 119 countries were informed during holding at the stands of 2,955 exhibitors from 60 countries regarding the innovations offered by the global railway industry. Of all of them, the Spanish solutions aroused widespread interest in the advances presented, as well as for its experience shown in the standout railway infrastructure projects throughout the world.

Renewal of the Mafex international and Communication Committees

The International Committee is composed of 16 companies and the Communication Committee is formed by 15 companies that are outlined below:

INTERNATIONAL COMMITTEE

Albatros
ArcelorMittal
Ardanuy
Azvi
Idom
Indra
Ingeteam
Kelox
La Farga Lacambra
Patentes Talgo
TPF Getinsa
Precon
Segula Technologies Spain
Sice
Stadler Rail Valencia
Tecnival

COMMUNICATION COMMITTEE

Albatros
Alstom España
ArcelorMittal
Bombardier
Caf Signalling
Idom
Indra
Ingeteam
Jez
La Farga Lacambra
Patentes Talgo
TPF Getinsa-Euroestudios
Siemens
Stadler Rail Valencia
Thales España

LAST FEBRUARY MAFEX CONSTITUTED THE NEW INTAKE OF MEMBER COMPANIES OF THE COMMITTEES OF INTERNATIONAL AND COMMUNICATION FOR THE NEXT TWO YEARS.

Amongst its aims set for this period are defending and fostering the image of the Spanish railway sector especially on an international level, through the definition of content and monitoring of the scope and dissemination of Mafex Magazine.

The main endeavours to be performed by the international Committee will focus on the accompanying

and monitoring of the development of matters involving internationalisation carried out by the Association in the coming two years, all based on the Strategic Plan 2017-2020. Within the scope of the aforesaid actions, exterior promotion, efforts aimed at institutional representation in international matters, as well as tasks relating to trading policy, will be tackled. 🚂



Engineering tomorrow's railway



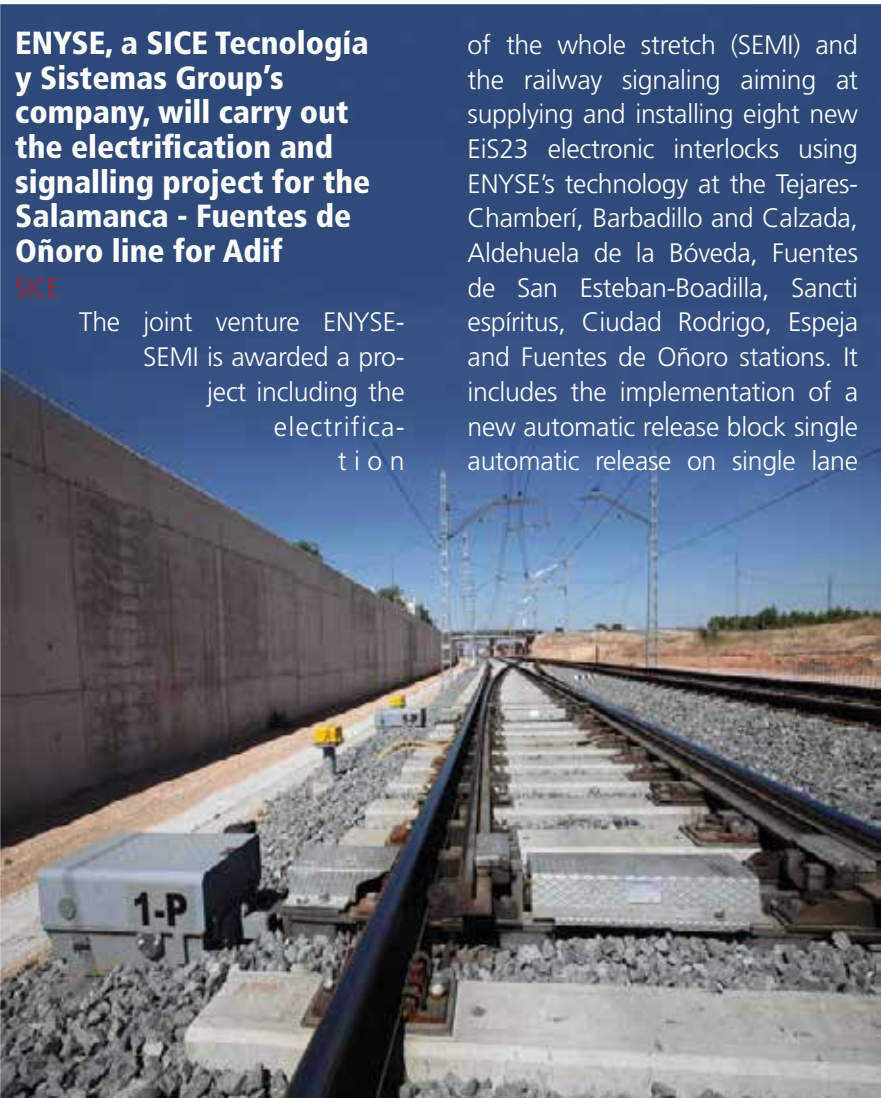
Knowledge and experience delivered by a multidisciplinary team for the design and commissioning of rail systems.

OUR COMMITMENT, YOUR SUCCESS.

idom.com

Consulting | Engineering | Architecture

IDOM



ENYSE, a SICE Tecnología y Sistemas Group's company, will carry out the electrification and signalling project for the Salamanca - Fuentes de Oñoro line for Adif

SICE
The joint venture ENYSE-SEMI is awarded a project including the electrification

of the whole stretch (SEMI) and the railway signaling aiming at supplying and installing eight new EIS23 electronic interlocks using ENYSE's technology at the Tejares-Chamberí, Barbadillo and Calzada, Aldehuela de la Bóveda, Fuentes de San Esteban-Boadilla, Sancti espíritus, Ciudad Rodrigo, Espeja and Fuentes de Oñoro stations. It includes the implementation of a new automatic release block single automatic release on single lane

(BLAU) and the supply and installation of new field elements such as audio-frequency track circuits, axle counters between stations, light signals, needle drives, ASFA, as well as a new pipeline network, construction of technical buildings and signaling cables. 1 ENYSE will provide the interlocks with a local maintenance support system. The company has also considered setting up a centralized maintenance station. In order to support the signaling facilities, modifications will be carried out on the communications network and the laying of a new 64 O. F. cable, which will provide a backup route for the existing transmission system, as well as service to the new installations. New lifting centers, local connections and uninterruptible power supply systems will be installed. With this award, more than 100 ENYSE's electronic interlocks have been worldwide installed: in Spain (ADIF, ADIF-RAM, and FGV) Chile (EFE, FESUR), Algeria (SNTF) and Egypt (ENR).

Alstom certified as one of the Top Employers España 2018

ALSTOM ESPAÑA
Alstom has received the Top Employers Spain 2018 certification, which confirms that it is one of the country's best companies to work for. Alstom was awarded the certification after attaining the standards required in an in-depth research survey conducted by the Top Employers Institute, a company that since 1991 has been globally certifying excellence in the conditions that employers create for their people. More specifically, the HR Best Practices Survey measures close to 600 practices, in order to evaluate the company's employee conditions. The international independent audit covers on nine different topics: Talent Strategy, Workforce Plan-

ning, On-boarding, Learning and Development, Performance Management, Compensation and Bene-

fits, Career and Succession Management, Leadership Development and Culture.



Bilbao Metro relies on Thales for its two Control Centres

THALES ESPAÑA
The Biscay Transport Consortium, will provide Metro Bilbao, with Thales technology to improve security of the current control centre where both of the city's Metro lines are managed. To do so, a new back-up centre located at Taller de Ariz in Basauri will also be built and shall be operational by end of 2019. Thales has been helping to manage the Bilbao Metro system for over two decades. As a result of this wealth of expertise, Thales has been able to take into account the specific traffic density conditions and passenger flow patterns of the network in the design of the new centre that is fully compatible with the central one. This will maximise



the overall efficiency of the system. It also includes a new driver management module which will expand current functionalities, such as driver shift planning and staff resource

allocation. It will also help with supervision and real-time execution, allowing for conflict detection and the immediate notification of the operator.

Luznor is lighting up Brussels and Berlin's underground

LUZNOR
The Brussels Intercommunal Transport Company (STIB-MIVB) has placed its trust in Luznor to supply the new rechargeable torch which has been specially developed for the subway system in Brussels. The model LRF-1MB-CY is equipped with a high-performance LED as main light source and two half red and blue LED crowns for front signalling functions, respecting the requested color codes. The torch incorporates an electronic circuit with a microprocessor allowing various operating modes and is powered by a nickel-cadmium battery. The battery will be charged by a special charger at 24 V c.c. with mechanical fixation to maintain the torch in place. On the other hand, The Berliner Verkehrsbetriebe (BVG) updated the cabins of their metro vehicles with the latest Luznor LR series torch. The model LR-BVG, which carries their name and logotype, contains the new LED technology as main light source and a combination of red and white LEDs as rear signalling functions. Besides, the torch

has three levels of constant lighting and three types of intermittency on the front part. Luznor used the most modern technology in its design

and construction in order to achieve both a pleasant ergonomics and aesthetics as well as great resistance and reliability.



The Spanish Royal Family accepts the Honor Committee Presidency of the 25th anniversary of ICON Multimedia

ICON MULTIMEDIA

The Spanish Royal Family have accepted the Honor Committee Presidency of the 25th anniversary of ICON Multimedia that will take place during 2018. That endorse the professional career of the company in the digital signage market applied to the railway industry.

Meeting with the Spanish Prime Minister

In this context, the Spanish Prime Minister, Mariano Rajoy held, last February, a meeting with the ICON Multimedia's leaders, which was also attended by the president of the



Junta de Castilla y León, Juan Vicente Herrera. Both were interested in the company projects within Spanish high-speed stations or the major bus stations and subway among we could highlight Medellin Metro, the new li-

nes of metro Santiago in Chile or Toluca (México), among others. In all these projects, Deneva is already running as a complete Travel Information Systems for the railway industry, which reports daily to millions of travellers.



Image: Jolanda Fisser.

INDRA will improve the experience of amsterdam's public transportation users

INDRA

GVB, the authority operating the municipal public transportation network in Amsterdam, awarded Indra a contract to install its ticketing technology for the underground, streetcar and bus network of the Dutch capital, with the purpose of improving user experience.

Indra's proposal has been selected in a public request for proposals in which another seven international companies participated, from coun-

tries such as Hungary, France, Germany, Sweden or Holland. One of the aspects that was viewed as essential during the tender process was the company's state-of-the-art proprietary technology, backed by many top companies around the world, which offers a flexibility that allows it to be fully adapted to the conceptual design proposed by the client, solely focusing on the user, as well as the company's capacity to develop and implement the solution in a record time of less than two years. Specifically, Indra will install more than 130 automatic ticket vending machines, which include units that accept pay-

ment in cash and with a credit card at underground stations, as well as units that only accept credit cards in underground stations and at streetcar or bus stops. The new systems and equipment will make it easier for users to purchase their tickets, with a more comfortable and simpler ticket purchasing system, reducing the purchase transaction time to the bare minimum. Future business opportunities are opened for Indra in Amsterdam and in the Netherlands, since its reference product is potentially valid for the entire Dutch transportation network.

Siemens to supply signaling technology for Downtown Line extension in Singapore

SIEMENS SPAIN

The Siemens Spain Mobility division is to supply signaling technology for the planned Downtown line 3 (DTL3) extension in Singapore. The order, worth around €90 Mio, comprises the delivery of Siemens' CBTC system for fully automated operations GoA4 in 2 new stations and one depot. The order also includes the Platform Screen Doors for the 2 stations.

The 2.2 kilometers Downtown Line 3 Extension, due for completion in 2024, will be connected with the Thomson-East Coast Line (TEL), providing commuters more travel options within the rail Singapore mass transit network.

The Siemens Spain Mobility division successfully commissioned the first 3 sections of Downtown Line (DTL) in Singapore last October, which is now considered the world's longest suburban metro line fully automated.

The first section of the line, the DTL 1, with more than 4 kilometers, was opened in December 2013 and comprises 6 stations between



Chinatown and Bugis. DTL 2, the second section, with 12 stations and 16.6 kilometers, connects Bukit Panjang and Rochor since December 2015. The third section of the line, the DTL3, with 21 kilometers and 16 stations, was commissioned in October 2017 and it is the longest section with 3 interchange stations in MacPherson, Tampines and Expo. With the opening of this new section, a significant improvement in the connectivity between residential and industrial areas is achieved.

The customer Land Transport Authority (LTA) awarded Westinghouse (today Siemens) in 2008 the contract for the supply, installation and commissioning of the signaling system for the DTL, which includes CBTC technology for the 34 stations and 92 trains, and the Automatic Train Supervision (ATS) system, Controlguide Rail 9000. Additionally, the project includes the installation of electronic interlockings Trackguard Westrace MkII and the supply of Platform Screen Doors.

Lamaignere develops its experience in the railway sector with the Tren Toluca project (Mexico)

LAMAIGNERE

Lamaignere, Integral Logistic Operator, has made a notable contribution to the Tren Toluca-Mexico DF project built by CAF, successfully shipping materials such as rails and fasteners, (15,000 tons of rails from the port of Gijón and 352 containers of fasteners from Rotterdam to Toluca).

For Lamaignere, headquartered in Andalusia and with offices in Spain, USA, South Korea, and Chile, it has represented a large-scale project with the essential availability of its own branch in Mexico, which has



allowed it to close several operations between both markets (Spain and Mexico).

Guillermo Lorenzo, new COMSA Corporación Chief Executive Officer of Infrastructures and Engineering

COMSA

Since the beginning of the year Guillermo Lorenzo holds maximum responsibility for the achievement of the objectives stated in the 2017-2020 COMSA Strategic Plan, targets which in the past year have been met with the restructuring of the business within the framework of the COMSA Corporación refinancing process.

Under his mandate, Lorenzo will be in charge of providing continuity to the group strategy centred in the expansion of its core activities of construction and engineering into those international markets with high demand for development and modernization of transport infrastructures.

In recent years, COMSA has in fact

diversified its portfolio in countries where it already counted with a consolidated presence. In Brazil, a territory it entered into in 2009 with rail contracts, the building company has just finalized the widening of a stretch of the Régis Bittencourt highway in the Serra de Cafezal and the doubling of the SP-345 road in Sao Paulo. It also continues to work on the second phase of Line 4 of the metro of the same city. In addition, COMSA accessed Colombia by carrying out civil engineering projects and is now undertaking the supply, installation and implementation of the electromechanical equipment and computer and radio-communication control systems for the La Línea tunnel.

In parallel, the group launched in markets with strong business opportunities, such as Denmark, with the contract for the construction of the

tram for the city of Odense; Croatia, to develop the new railway line between Gradec and Sveti Ivan Zabno; and Sweden, with the widening the Tibble – Visinge stretch of railway in Taby.



LADICIM-University of Cantabria: Spain Brand with quality seal

UNIVERSITY OF CANTABRIA

The Materials Science and Engineering Laboratory (LADICIM) of the University of Cantabria (UC) -pioneering laboratory with international recognition (UNE-EN ISO/IEC 17025 and document CGA-ENAC-LEC) to test elements of the railway superstructure as fastening systems and sleepers-, has extended its accreditation scope to verify the quality of rail welds from the mechanical and micro-structural point of view.

This quality recognition places the LADICIM-UC as the experimental reference center for many international companies and different railway administrations.

Proof of this is its contribution in the assurance of the stability and control of innovative prototypes solutions in tracks of special relevance: high speed tracks in Spain; the high-speed track in Saudi Arabia for the section between the holy cities of

Medina-Mecca; the development of the north-south route of the same country; the lines for heavy haul transportation in the United States

and Canada; or passenger and freight transport lines in Ethiopia and Senegal, among other international interventions.



ZFoam expands its productive capacity

ZFOAM

In 2017, ZFoam celebrated its twenty-fifth anniversary on the market. 25 years of constant growth and innovation in strategic sectors such as the railways. In the last two years, significant investments have been made in order to expand the productive capacity in its Alfajarín plant (Saragossa), including the increase in the manufacturing area and investments in cutting and machining machinery that will allow an improvement in the service and of competitiveness in industrial markets.

With these improvements, ZFoam is positioned as an international benchmark in the transformation and



supply of all types of insulating materials of high and low temperature

resistance for manufacturers of rolling stock.

Hispacold celebrates its 40th anniversary

HISPACOLD

Hispacold, a Seville-based manufacturer of HVAC systems for buses, coaches, and railway vehicles, recently celebrated its 40th anniversary with an institutional event attended by important figures from the world of politics, business and the passenger transport sector. Attendees of this commemorative event included First Deputy Mayor of Seville Carmen Castreño, IDEA Agency General Manager Julio Coca, and Hispacold

President Juan Carlos Cantalapiedra. This open house day was organized to show visitors the more than 10,000 m2 of the company's factory that uses Lean methodology for demand-based supply and production, optimizing the added value of its products with competitive quality and high levels of flexibility. The facilities were recently expanded with a new logistics center attached to the factory and the acquisition of adjacent land.

Since it was founded, Hispacold has been committed to innovation

and developing its own technology in partnership with universities and technology centers, which has placed it among the leading companies in its sector worldwide with pioneering products like the efficient ecoice compressor and HVAC systems, brushless motors, its complete range of control panels, and the eco3 air purifier. With a staff of nearly 200 employees, the company closed 2017 with €37.8 M in sales revenue and expects to reach €42 M in 2018, with exports accounting for more than 50%.



Bombardier appoints Luis García Casares as the new Head of the automatic train that connects terminals T4 and T4S of Barajas airportaeropuerto de Barajas

BOMBARDIER TRANSPORTATION
Bombardier has appointed Luis García Casares, up till now has been Head of ITC Services, as Director and Head of the APM (Automatic People Mover) of Barajas airport, which entered service in 2005 and operates 24 hours a day, every day of the year.
The company thus reinforces its commitment to the high availability rates



(99.6% average) and quality of this transport service without driver, that connects the terminal 4 (T4) with its

satellite building. For Luis "the challenge is to maintain these availability rates in a driverless transport system, which stands out for being 100% automatic and capable of adapting perfectly to the needs that airports demands".
In 2006 Bombardier was hired for the operation and the integral maintenance of the system for 10 years. In 2016, the contract was renewed for another 10 years. "Our actions will be aimed at reviewing maintenance plans and activities, managing obsolescence and proposing improvements and updates to the system," García Casares added.

First locomotives of Stadler Valencia for Bolivia and Italy

STADLER VALENCIA
Stadler Valencia and the Bolivian Ferrovial Andina-FCA have signed a contract for the supply of the first three state-of-the-art "SALi" (South American Light Loco) locomotives, designed specifically for the Latin American market. These are locomotives of an ultra-lightweight design and with forefront technology, to successfully face the challenges entailed in operating on metre-gauge track under conditions of great altitude (over 5,000 m above sea-level) and capable of reaching a speed of 100km/hr, combining a high-power output at great altitude with reduced fuel consumption. SALi, due to its design and performance, is destined to become the benchmark locomotive of the Bioceanic Rail Integration Corridor.



Another important milestone for Stadler Valencia was the inaugural journey of the EUROLIGHT locomotive in Italy on February 17. The locomotive, acquired by the Italian railway operator Dinazzano Po to strengthen its freight services, undertook its first journey hauling a container train between the stations of Reggio Emilia and Minucciano

Pieve Casola. The four-axle locomotive is characterised by its light weight and its high performance (engine output of 2,800 KW and high hauling capacity) enabling it to run both on main lines and on class C secondary lines. Stadler has also sold 34 units of this loco family in the UK where they constitute the Class 68.

2017 CAF results

CAF
The CAF Group closed the year 2017 with a backlog of orders at record highs. Specifically, this stood at 6,265 million euros. The bulk of this portfolio continues to be located internationally, especially in European countries. The consolidated net turnover amounted to 1,477

million euros, an increase by 12% from year 2016, with an increasing relevance of sales from Europe. The EBITDA Margin at the end of December 2017 was 180 million euros and The Company's Profit before Corporate Tax hit 68 million euros. The Net Year Profit after Corporate Tax was reported at: 43 million Euro. Suburban trains for the new line

between Mexico City and Toluca, Civity type units for NS in The Netherlands, regional trains for the Northern franchise and cars for the Caledonian Sleepers franchise, both in the UK, as well as metro units for Santiago de Chile, constitute the main manufacturing projects in progress during 2017 financial year.



Sand Filling Systems

www.newteksolidos.com
Instalaciones fijas completas
Unidades móviles autónomas
Unidades portables de baja presión

Surtidores de media presión con sistema de aspiración

Pistola universal o adaptable en acero inoxidable

Sistema autónomo de baja presión



CERTIFIED
IQNet
MANAGEMENT SYSTEM

ABNOR
E
REGISTRO DE PRODUCTOS
EN 13784/2005

NEWTEK SOLIDOS S.L.
Pol. Ind. Jose Maria Korta, Parcela A1
20750 - ZUMAIA - SPAIN

In the image a train from the Curitiba - Paranaguá line in Paraná

BRAZIL

revives its investment undertakings in railway projects

BRAZIL

THE LATIN AMERICAN GIANT RELAUNCHES ITS INFRASTRUCTURES WITH THE RECOVERY OF RAILWAY PROJECTS BOTH FOR THE TRANSPORT OF FREIGHT AND FOR THE IMPROVEMENT OF URBAN MOBILITY.

Brazil is the fifth largest country in the world and occupies almost half of South America, at 47%. With 8,515,767 square kilometres, a border area of 15,735 kilometres, long with 7,367 kilometres of coastline has an outstanding geostrategic position in the area. It is ranked first in the region in terms of population, with 206,101,000 inhabitants and is amongst the ten

largest economies in the world. Hence, the Government is highly aware that it is of the utmost urgency to provide a significant boost to infrastructure. Following the economic downturn of recent years, a gradual resumption of growth is forecast, which began to register in 2017 (0.5%), according to the International Monetary Fund, backed up by



government measures and by the increase in investment.

In spite of its magnitude, the railway transport network, of 30,600 kilometres, is small to service all this sizeable territory.

A country of these dimensions should have at least 50% more capacity than the current one to make this type of transport competitive compared to road networks. However, the construction of another 17,200 kilometres is already planned.

The lines are distributed into blocks according to their geography. The most developed is the North-South branch, while the rest of the regions are very poorly linked together.

The new projects are already made using international gauge width (1435 mm) yet while these works or reforms are carried out, different types of track coexist: narrow (1000 mm); wide (1600 mm) and mixed. The average commercial speed is 25 kilometres / hour, due, especially, to

Rail systems will be the main protagonists of the "Advancement Programme".

the numerous level crossings. According to data from the National Association of Railway Transporters (ANTF), one has been placed every 1.5 kilometres.

Currently, long distance connections are more focused on freight services. In terms of transported cargo, this reached 503.9 billion tons per kilometre in 2016. That said, passenger levels are almost negligible (1.190 billion in 2016). In this case, mobility is concentrated on short-distance urban and inter-urban routes.

Sectorial Structure

The main organisations and institutions of the rail freight sector are

Luz Station, in Sao Paulo.



the Ministry of Transport, on which the National Department of Transportation Infrastructure (DNIT); the National Agency for Land Transport (ANTT), the Planning and Logistics Company SA (EPL) are dependent, and ValecEngenharia, Construções e Ferrovias SA, which is entrusted with the tasks of construction and operation of the railway infrastructure. The latter is also responsible for the implementation and operation of several rail lines. In terms of passengers, the National Land Transport Agency (ANTT) and the Ministry of Cities, with federal powers in urban mobility, are worthy of spe-



Most of the plans will be carried out in the metropolitan area of São Paulo.

► RAILWAY SYSTEM IN BRAZIL: MAIN DATA

Network kilometres	30,600 kilometres / 17,200 kilometres planned.
Track gauge	International (1435 mm) Narrow (1000 mm), wide (1600 mm) and mixed.
Passengers (2016)	1,307 million passengers.
Freight transported	503.8 million tons.
Rail Fleet (freight)	3,043 locomotives and 102,024 wagons.
Federal programmes	2018 Advancement Programme. 2018 Cities Advancement Programme.
Projects (freight)	-Bioceanic Railway Connection (Brazil-Peru): 40 billion Brazilian reais (9.968 billion euros). -Ferroanel: North section in the Metropolitan region of São Paulo. -Ferrovia Norte-Sul (1,114 million Brazilian reais, 228 million euros). Ferrovia de Integração Oeste-Leste (FIOL), (2,760 million Brazilian reais, 688 million euros). -Ferrogao: 12.7 billion Brazilian reais, 3.779 billion euros.
Urban transport (Medium speed train)	-Sao Paulo-Americana Line. Network of 135 kilometres at average speeds (between 160 and 180 km / h). -Brazilian-Golian line. Network of 210 kilometres at average speeds (between 160 and 180 km / h).
Urban transport (Metropolitan Railway)	Under construction, expansion or planned: Metro Brasília. Metro Curitiba (planning stage). Metro Fortaleza (construction stage). Metro Goiânia (planning stage). Metro Porto Alegre. Metro Recife. Metro Rio de Janeiro. Metro Salvador (testing stage). Metro São Paulo. Metro Teresina. Metro Florianopolis (planning stage).
Urban transport (Metropolitan Railway)	São Paulo (construction stage). Recife (testing stage). Fortaleza (testing stage). Rio de Janeiro. Brasília. Macaé. Nova Friburgo. Vitória.

* Source: Ministry of Transport of Brazil / Sectorial



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, Africa and Middle East



An integral ticketing system on your customer' smartphone



On-board Vehicle Speed Monitoring System

The solution to avoid accidents due to over speeding



cial mention. Respondent to it are the companies CBTU-Companhia Brasileira de Trens Urbanos and the TRENSURB-Metro Company of Porto Alegre.

Other relevant associations and organizations are the Brazilian Association of the Railway Industry (ABI-FER), the National Association of Passenger Transporters on Railways (ANP Trilhos), the National Association of Railway Transporters (ANTF), the National Association of Public Transport (ANTP).

With regards to commercial operation, in the field of freight rail, since 2012, 29,075 kilometers have been assigned to private tender operators. América Latina Logística SA (ALL), Estrada de Ferro Carajás (EFC), VALE SA, Estrada de Ferro Paraná Oeste SA (FERROESTE), Estrada de Ferro Vitória to Minas-VALE SA (EFVM), Ferrovia Centro Atlântica SA (FCA),

Rail systems will be the main protagonists of the "Advancement Programme" that the government has put in place.

Ferrovia Norte Sul - VALEC SA (FNS), Ferrovia Tereza Cristina SA (FTC), Ferrovia Transnordestina Logística SA (FTL S / A) and MRS Logística SA In long distances for passengers there are two private companies in charge of this type of transport, both operated by VALE: Vitória / Belo Horizonte-Estrada by Ferro Vitória-Minas (EFVM) and Parauapebas / São Luís-Estrada by Ferro Carajás (EFC).

Investment plans

Aware that this sector is key to the development of the country, from the Federal Government several

plans have been devised to boost the railroad with which provides a cycle of investment in new infrastructure construction and expansion or improvement of existing. Many of these projects have been raised with the collaboration of the private sector.

To achieve these aims, the Growth Acceleration Programme (PAC) 2015-2018 was launched. Although, this year the same has been replaced by the "Advancement Programme". This was announced in November 2017, the president of Brazil, Michel Temer. This new initiative starts with

Public transport systems in the major cities will be improved.



Modern rolling stock for CBTU.

the objective of finalising a total of 7,439 works that had become paralysed and in which it is expected to invest up to 130,900 million Brazilian reais (40.928 billion euros), with a delivery period until the end of 2018. At this time, the project portfolio is composed of 104 initiatives in various fields. In all of them,

the desire is to carry out the work with the support of the private sector either through invitations to bid, Public-Private Participation (PPP) or privatisations.

More than a third of the investments (5,600 million euros) will go to the transport area. In the railway field, three important projects



Rail systems will play an important role in Brasil.

include Ferrovia Norte-Sul, Ferrovia de Integração Oeste-Leste (FIOL) and Ferrogao with an investment of 1,114, 2,760 and 12,700 million Brazilian reais respectively (228, 688,000 and 3.179 billion euros). Some of the passenger projects designed for the 2014 Football World Cup and the 2016 Olympic Games that were not given the go ahead are now contemplated under this programme.

Major backing has also been given to the Bioceanic Railway Integration Corridor (CFBI) or Bioceanic Train. An Integration Freight Network (CFBI), which will cross the countries of Brazil, Bolivia and Peru.

In parallel with these initiatives, private freight tenders have devised investment plans to increase the efficiency of their networks. In this way, their purpose is to respond to the growing demand in the transport of iron, grain, iron and steel products and containers.

On medium and long-distance journeys, a feasibility study is under way

for two medium-speed routes, travelling between 160 and 180 kilometres per hour.

The first line would be the connection of Sao Paulo-Americana, of 135 kilometres, while the second would connect Brasilia with Goliana through a route of 210 kilometres. In the field of urban mobility, the programme "Cities Advancement" includes the construction of 898 kilometres of railways.

Likewise, the transport agencies of the different states and municipalities are clearly backing the investment in railway networks that improve the networks of the city and of each region. Hence, there are a large number of projects forming the subway, light rail, commuter and regional trains development portfolio. Most of the plans will be carried out in the metropolitan area of São Paulo (expansion of the metro network, urban trains and construction of monorail branches). Other

Transportation plans include rail networks throughout the country.



networks that are also included are those of the metro in Porto Alegre, Curitiba, Rio de Janeiro, Brasilia and

Belo Horizonte. The light rail network is on the portfolio of eleven metropolitan areas.

The subway is one of the protagonists of the programmes underway.



PUBLIC TRANSPORT:

Positive outlook for Metropolitan and Light Rail Networks

BRAZIL IS THE SOUTH AMERICAN COUNTRY WITH THE LARGEST AMOUNT OF METROPOLITAN RAIL SYSTEMS. THE RETURN TO ECONOMIC GROWTH HAS REACTIVATED URBAN MOBILITY PROJECTS, WHICH STARTED FOR THE 2016 OLYMPIC GAMES.

The return to economic growth in Brazil has reactivated stagnant passenger railway projects and seen the launching of new ones. The legacy of the 2016 Olympic Games has also been key, as it has promoted a decided commitment to urban transport that now aims to seek continuance. The country's urban rail networks

are composed of 44 lines that reach 1,034 kilometres and have 557 stations. The association ANP Trilhos forecasts these networks to grow around 200 kilometres over the next five years. In addition to the projects planned for the next five-year period, there are others under feasibility study that amount to 1,266 kilometres that they wish

to have operational by 2022. At the moment, planning, construction and expansion of subway, light rail, monorail, regional and suburban projects are underway in many cities, among which are: Brasilia Metro, Curitiba, Belo Horizonte, Fortaleza, Goiânia, Porto Alegre, Recife, Rio de Janeiro, Salvador, São Paulo, Teresina or Florianopolis.

Image of the light metro in Rio de Janeiro.

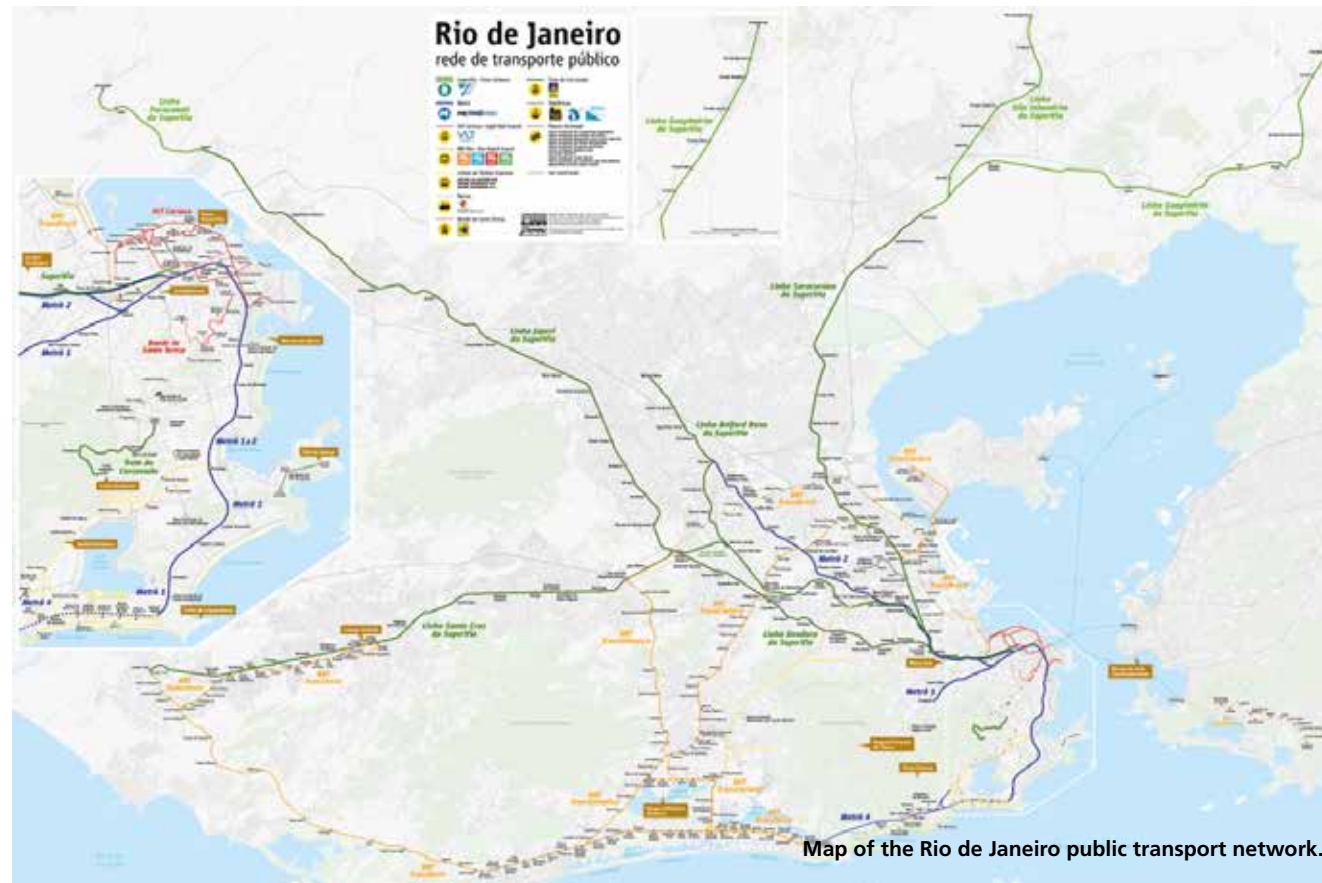


METRO AND LIGHT RAILWAY IN RIO DE JANEIRO

The second largest city in Brazil, Rio de Janeiro, plans to extend its light rail network, which currently consists of two lines. The construction of Line 3, of 8.1 km, that will connect the Central Station with the Santos Dumont Airport is scheduled for this

year. The works are being performed by the Urban Development Company of the Port of Rio (CDURP). The project will be financed as part of the total budget of 1,570 million Brazilian reais (395 M€) from a public-private partnership. In addition, there are

plans for another branch in the southern part of the city. Added to these, though still waiting for the necessary financing, is the extension of the L4 (Yellow) Underground Railway and the construction of a further 20 km reaching Recreio dos Bandeirantes.



FORTALEZA METRO

For this network, also known as "Metrofor", two new branches are planned. On the one hand, the East line, which will open its doors in 2019, will run for

12 kilometres long and will have 13 stations that will go from the Central Station to the "Chico Da Silva" station. On the other hand, the Maranguape

branch, whose inauguration date remains pending. This section will measure 7.2 kilometres and will have two stations.



BRASILIA METRO

The Ministry of Cities of Brazil has authorised the government of the Federal District to commence activities on the extension and modernization of the Brasília metro network, which has an investment of 333.4 million Brazilian reais (83.7 million euros). The project includes the modernisation of the signalling and control system in a stretch of 42 kilometres, along with the updating of the energy supply by 129 million reais (32.4 million euros). There will also be an extension of 3.68 kilometres on the branch to Samambaia with two new stations.

PORTO ALEGRE METRO AND MONORAIL

This network, which currently runs for 42 kilometres in length and boasts 17 stations transports about 130,000 users per day. Since 2015, an extension of the East line of 13.2 kilometres is under study pending the

availability of the necessary budget. In addition, there is a People Mover, APM Aeromovel System, which connects the Trensurb Airport Station to Terminal 1 of Salgado Filho International Airport.



SALVADOR METRO

The PPP project for Salvador and Lauro de Freitas (SMSL), with a 30-year tender, is considered the largest urban mobility project in Brazil, with an investment budget of 5.6 billion Brazilian reais (1.406 billion euros) to build two lines that will run for 41.5 kilometres.

The opening of the third section of Line 2, which will run from Pituáçu east to Musurunga, is scheduled for the month of October 2018. In the longer term, more extensions are forecast that would expand the network length to 42 kilometres.

In Brazil there are also several monorail projects.

www.talegria.com

115 años diseñando y fabricando
TECNOLOGÍA FERROVIARIA

APARATOS DE VÍA | MATERIAL RODANTE
TURNOUT SYSTEMS | ROLLING STOCK

Talleres Alegría, s.a.

Polígono de Silvota | C/ Peña Santa 7
33192 Llanera | Asturias | España

CURITIBA METRO

The first step for this new network will be the construction of 17.6 kilometres, with 15 stops, which will go from the CIC Sul station at the southern end of the city to Rua das Flores, in the centre. Of this entire stretch, 2.2 kilometres will be overland, and the rest, underground. It is foreseen that, once in operation, 18 trains containing five wagons each will operate; with a capacity to transport 419,000 passengers daily. The initial cost is 4,700 million Brazilian reais (1.180 billion euros). An amount that will be financed by the Federal Government, the Paraná, the City of Curitiba, and through private investment initiatives.

GOIÂNIA LIGHT RAIL NETWORK

The Goiânia Light Rail Network is in the project phase. The Northbound-Southbound line will be 15 kilometres long, with overland sections and some underground. The system will have the capacity to transport between 12,000 and 25,000 passengers per hour in each traveling direction. There is a project to create a second line, based on light rail systems, from an existing bus corridor: the Anhanguera Hub.



Goiania light rail.

BELO HORIZONTE METRO

This metropolitan rail network will boast a further 16 kilometres. There will be two new lines and the expansion of the existing one will be extended. With this project, better coverage will be given to the industrial zone, the airport and the University. The expansion foresees an investment of 950 million euros. vestment of 950 million euros.

► PROJECTS UNDERWAY

METROPOLITAN RAIL	
Salvador Metro (Bahia)	L2(Extension).
Fortaleza Metro(Ceará)	East Line (Implantation).
Recife Metro (Pernambuco)	Southbound and Central Line.
Rio de Janeiro Metro (Rio de Janeiro)	L4(Extension / Modernisation).
São Paulo Metro (São Paulo)	L2-Green (Extension).
	L4- Yellow (Extension).
	L5-Lilac (Extension).
	L6 -Orange (Implementation).

URBAN RAIL NETWORKS

CPTM (São Paulo)	L9- Esmeralda (Extension).
	L13-Jade (Implementation).

LIGHT RAIL NETWORKS

Maceió (Alagoas)	Modernisation and expansion.
Fortaleza. Parangaba-Mucuripe (Ceará)	Implementation.
Goiânia (Goiás)	Implementation
Cuiabá (Matto Grosso)	Implementation
Central and Port Area (Rio de Janeiro)	Extension
Baixada Santista (Sao Paulo)	Extension.

MONORAIL

Sao Paulo (Sao Paulo)	L15- Silver-Extension.
Sao Paulo (Sao Paulo)	L17- Gold-Implantation.
Sao Paulo (Sao Paulo)	L18-Bronze-Implantation.

► PROJECTS IN PLANNING WITH WORKS BEFORE 2022

METROPOLITAN RAIL	
Brasilia (Federal District)	Ceilândia, Samambaia, Asa Norte lines (Implantation).
Curitiba (Paraná)	L1-(mplantation).
Porto Alegre (Rio Grande do Sul)	L1-Implantation.
Belo Horizonte (Minas Gerais)	L2-Implantation.
Belo Horizonte (Minas Gerais)	L3-Implementation.
Rio de Janeiro (Rio de Janeiro)	L2-Expansion.
Novo Eldorado / Belvederi (Minas Gerais)	Implementation.
Teresina Metro (Piauí)	Modernisation.

LIGHT RAIL NETWORKS

Maceió- Airport (Alagoas)	Implementation.
Salvador (Bahia)	Remodelling
Brasília (Federal District)	Remodelling.
João Pessoa (Paraíba)	Modernisation.
Recife (Pernambuco)	Modernisation.
South Zone (Rio de Janeiro)	Implementation.
L3 São Gonçalo / Niterói (Rio de Janeiro)	Implementation.
Natal (North Rio Grande)	Modernisation.
Baixada Santista -Section 2 Sao Paulo (Sao Paulo)	Implementation.

REGIONAL TRAIN NETWORKS

Train Brasília-Goiânia (Federal District- Goiás)	Implementation.
Train Brasília-Luziânia (Distrito Federal-Goiás)	Implementation.
Intercity Trains (Sao Paulo)	Project.
Pelotas Rio Grande (Rio Grande del Sur)	Project.
Bento Gonçalves- Caxias do Sul (Rio Grande do Sul)	Project.

ource: National Association of Passenger Transporters Trilhos - ANPTrilhos

SÃO PAULO: METROPOLITAN RAILWAY, MONORAIL, LIGHT RAILWAY

One of the cities where more urban rail projects are underway is Sao Paulo. The expansion plan includes new monorail lines: L6 (Orange), L17 (Gold), L18 (Bronze), L19 (Sky Blue), L20 (Pink) and L22 (Burgundy). In addition to the extension of four existing lines. Move São Paulo is responsible for implementing this PPP project. With these plans, the aim is to double the size of the network to reach 175.1 kilometres by 2025. Regarding the metro network, progress is also being made in its expansion. The Metropolitan Transport Department (STM) of the Government of São Paulo has granted the Via Mobilida consortium a 20-year operating licence for Line 5. The contract has a value of 10.8 billion Brazilian reais (2.712 billion euros). After the works have been completed, the L5 (Lila) will have

17 stations over 20.1 kilometres, and will connect Capão Redondo to Chácara Klabin, in the southeast of São Paulo. This

consortium will also take over the future monorail L17, which will be operationally ready by 2019.



Sao Paulo is one of the cities with the most projects underway.

REGIONAL AND INTERCITY RAIL SAO PAULO (TIC)

The InterCity Train (TIC) project costing 20 billion reais (5.023 billion euros) in the state of São Paulo is developed by the consortium of Estação da Luz Participações (EDLP) and the Infrastructure Fund of BTG Pactual. The tender awarded will cover civil works, purchase of rolling stock and operations for 32 years. This train will have two lines of 477 kilometres with 24 stations centred in São Paulo. A northbound-southbound line will connect Americana with Santos, while another line eastbound-westbound will stretch from Sorocaba to Taubaté. In addition, it will connect with two main airports: Guarulhos in São Pau-

lo and Campinas Viracopos, as well as the port of Santos. On the other hand, the CPTM commuter rail network is also expanding, and it is expected that L13 (Jade), with 12.2 kilometres, will be completed in the first half of this year. The branch, which has an investment of 2.300 billion Brazilian reais (577 million euros), will reach São Paulo Guarulhos International Airport, and forecast expect it will transport around 130,000 passengers per working day. The Chinese consortium Temoinsa-Sifang supplies eight trains of eight cars for commercial operation.



View of the city of Sao Paulo.

LIGHT RAILWAY AND MONORAIL: MORE KILOMETRES FOR THE FUTURE

The future of the light rail also boasts good prospects in Brazil. Along with the projects of the large cities mentioned, there are others of special relevance as Goiani (Goias), under study; Natal (Rio Grande do Norte); São Jose dos Campos (São Paulo); Macaé (Rio de Janeiro), Nova Friburgo (Rio de Janeiro); ABC Paulista / São Bernardo do Campo (Sao Paulo), Brasília (Federal District). Added to this are projects such as the Monorail for Poços de Caldas (Minas Gerais), closed since 2000, and which is another of the networks authorities wish to reactivate. Likewise, Manaus (Amazonias) is in the planning stage.

TERESINA METRO

At the present time, the upgrading of the current tracks and of some stations is underway. In addition, the authorities of the Government of Piauí have recently acquired three of the six light railway systems that will replace the current ones. The modal shift must happen until June 2018, with which public transport will reach the municipality of Altos. The duplication of roads is also planned, along with the construction of four additional stations, and an operations control centre.

Image of the Grota Funda Cremalheira Viaduct in Brazil.



Freight rail: Networks with significant standing in Brazil

Freight networks have significant standing in Brazil. Within the "Advancements" programme, the Government is committed to tenders in the three most important projects in the country: Ferrogrão, Ferrovia Norte-Sul and the Oeste-Leste Integrated Railway. In addition, the Logistics Investment Programme is underway which, in the railway sector, implies a new investment model, a shift away from the monopoly in the provision of transport services, as well as the expansion, modernisation and inte-

gration of the network. This initiative responds to the future prospects faced by the sector. According to the Planning and Logistics Company (EPL), the movement of freight by rail in Brazil stands at 18%. The projection for 2025 is 33%, a significant leap upwards. Besides, EPL has issued a report to identify the needs for infrastructure improvement that are not included in the actions approved by the Government. The National Logistics Plan (NLP) prepared by this body establishes the need to invest more

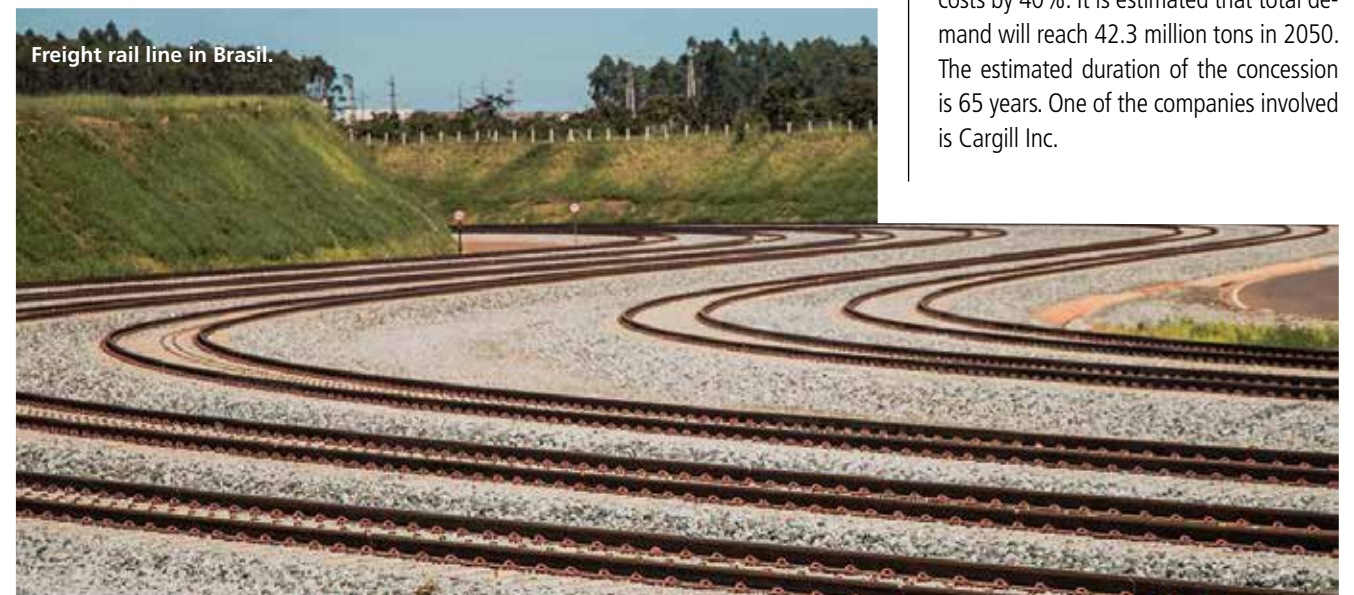
than 132,600 million reais (about 35.400 billion euros) in the modernisation of national roadways and railways until the year 2025. Thus far, 649 kilometres of railway network have been identified that will require investments not foreseen until 2025: the stretches of the Ferronorte network in Mato Grosso and a segment of the Santa Catarina network operated by the tenderer Tereza Cristina. Also, private transport tender operators also foresee improving the efficiency of their networks.

FREIGHT LINE IN PARANÁ

The Government of the State of Paraná has submitted plans for a new freight railway that will improve the flow of agricultural products from the Midwest of Brazil through the Port of Paranaguá. The new 1,000 km line will connect the Dourados region, in Mato Grosso do Sul, with the Paraná coast. The estimated cost of the construction amounts to 10 billion reais (2.5 billion euros).

Section 1 of the new railway will link Guarapuava with the Port of Paranaguá and will be 400 km long. Section 2 of 350 km, which is already a Ferroeste operated tender, will extend the line from Guarapuava to Dourados, passing through Guaíra. The project also provides for the revitalisation of the existing 250 km line operated by Ferroeste between Guarapuava and Cascavel. This section will also be outsourced to sub-contractors.

Freight rail line in Brasil.



FERROGRAO

The Ferrogrão railway project will create a corridor of 1,142 kilometres in length. This line will connect the grain-producing region (soybean and corn) of the Midwest with the State of Pará and will end at Puerto Miritituba (in the northern region of Brazil). Investments are estimated at BRL 12.6 billion (€ 3.3 billion). Once completed, the line will transport up to 20 million tons per year of grain by 2025, reducing costs by 40%. It is estimated that total demand will reach 42.3 million tons in 2050. The estimated duration of the concession is 65 years. One of the companies involved is Cargill Inc.

NORTHBOUND-SOUTHBOUND RAILWAY

This project has been designed to become the backbone of freight rail transport in Brazil. Invitations to bid will be called

for on a stretch of 1,537 kilometres, which will link Estrelad'Oeste, in São Paulo, with Puerto Nacional, in the State of Tocantins.

The aim is to strategically integrate the national territory. The project's implementation, which has a forecast investment of 2.7, has been entrusted to the firm VALE.



Transportation of soya along the Northbound-Southbound Line

SOME MAFEX MEMBERS WITH



CAF
CAF is one of the main suppliers of railway rolling stock in Brazil. The company has several references of commuter and metro trains in different

railway administrations in the country. Specifically, in recent years CAF has supplied the series 7000, 7500, 8000 and 8500 of CPTM (Companhia Paulista de Trens Metropolitanos), commuter trains for

CBTU in Belo Horizonte as well as metro units for lines 1, 3 and 5 of Sao Paulo. All these projects have been manufactured at CAF factory in Hortolandia, in the state of Sao Paulo.

INDRA
Ticketing for the Sao Paulo Subway: Indra has installed the ticketing solution for the Sao Paulo Subway's Line 5 extension. The project included the implementation of the access control and ticket validation systems for the new 11 stations. Indra's systems make it possible to simultaneously process and manage magnetic tickets as well as the Single Ticket contactless cards and the metropolitan area cards, assuring the intermodality between the subway and buses in the urban and metropolitan areas of Sao Paulo.
This project allows Indra to position itself as a technological provider of the Sao Paulo Subway, which plans to expand the current network from 74 kilometres to 338 kilometres by 2030. This strong network expansion requires new solutions in the area of control, security, telecommunications, ticketing, etc., for which Indra is one of the leading companies in the world.



PROJECTS IN BRAZIL

TYPSA

TYPSA Group has been working in Brazil for many years. In 2009, the Group set up a Brazilian subsidiary, Engecorps Engenharia S.A., through which it conducts most of its business.

TYPSA has taken part in various Brazilian railway projects. Some of the best known are the technical procurement coordination services provided in 2011 to a group of Brazilian construction companies for the Rio de Janeiro - Sao Paulo - Campinas 250 km-long high-speed line, and the track superstructure design for two sections of lines 5 and 6 of the São Paulo metro network. These two projects featured highly complex elements designed to insulate the environment against vibrations.



SIEMENS SPAIN

Siemens Projects in Brazil. 1. Signalling of the north extension of Porto Alegre Metro line 1: The Brazilian operator Trensurb (Empresa de Trens Urbanos de Porto Alegre S.A.) awarded the project for the signalling of the north extension of Porto Alegre Metro line 1 to the consortium Novavia, which trusted in Dimetronic (today Siemens) for the execution of the project, a section of almost 10 Km of extension commissioned in 2015.

The line 1 extension project included the construction and signalling of four new stations: Rio dos Sinos, Santos Dumont, FENAC and Novo Hamburgo. The installed technology included two Trackguard Westrace electronic interlocking systems, LED, track circuits with speed codes, communications and cables and power supply systems. 2. Signalling of the Line 13 of CPTM in São Paulo: Siemens is in charge of the signalling Project of the line 13 of CPTM (Companhia Paulista de Transporte Metropolitano), known as Jade line or Train of Guarulhos, as it will connect the Engenheiro Goulart station of line 12 with the São Paulo-Guarulhos International Airport. The new line of almost 13 kilometres will have three new stations and equipped with Trackguard Westrace electronic interlockings, ATP system based in speed codes, ATO track system and Controlguide

Rail9000 Centralized Traffic Control (CTC). CPTM already awarded the signalling and telecoms project for lines 8, 10 and 11 to a consortium formed by Dimetronic (today Siemens) among other companies in 2009. 3. Signalling of the line 2 of Rio de Janeiro Metro: Metrô Rio, the concessionaire of the Rio de Janeiro Metro network, has awarded Siemens the contract for the installation of its Trackguard Westrace Mk II electronic interlockings in line 2 of the Rio de Janeiro metro network. Siemens is installing the new technology in Pavuna, station terminus of line 2, replacing the existing relay interlocking, which will allow Metrô Rio to improve the operation and maintenance of

line 2, which has a length of 25 kilometers and 16 stations. 4. Signalling Project for the freight line of Rumo ALL in São Paulo: Siemens is executing the signalling project of the freight line between Pai Matias and Pantojo, in São Paulo state for the customer Rumo ALL. The project includes design, installation, test and commissioning of the signalling systems. The improvement of the signalling technology will allow the customer to increase the transport capacity of the line significantly. Rumo ALL is a Brazilian company, the largest company in Latin America focused in railway line logistics and manages almost 13,000 kilometers of rail tracks.



SOME MAFEX MEMBERS WITH

PROJECTS IN BRAZIL



► BOMBARDIER TRANSPORTATION

The propulsion and signalling systems of Bombardier Spain, present in Brazil: The Spanish Bombardier’s plant in Trápaga has had an important participation in the project of the new BOMBARDIER INNOVIA monorail in the Brazilian city of São Paulo, and supplies the MITRAC propulsion equipment. The order, which involves the design, supply and installation in São Paulo of a monorail system of 24

kilometers and 17 stations, has 54 trains of seven cars (378 cars) with capacity to transport 48,000 passengers, being the one who has the largest capacity of the world. Also from Trápaga, propulsion systems were manufactured for the renovation of 26 units of the São Paulo Metro. On the other hand, from the Railway Signalling Center of Excellence of San Sebastián de los Reyes, the BOMBARDIER



CITYFLO 650 (CBTC) train protection and control system was installed on Line 5 of the São Paulo Metro, as well as of the new ERTMS system in the suburban network of Rio de Janeiro.

► CAF SIGNALLING

CAF Signalling has taken over the signalling, including the SCADA system, in a turn-key signalling project that includes civil works, electromechanical systems and the supply of new trams for the metropolitan city of Cuiabá, in Brazil. The project was awarded to the consortium formed by CAF, CR Almeida and Santa Bárbara. This work involves a contract with a real strategic importance as it is the first turn-key tram system in Latin America and for being a big developing commitment for the passenger’s transport in Cuiabá.



► ARCELORMITTAL

Rails and Accessories manufactured by Arcelormittal are supplied worldwide for high speed tracks, heavy haul tracks, urban transport systems, metros, tramways, light systems... which has allowed us to participate in different projects throughout all the country as examples Vale Norte-Sul line and Transnordestina, VLT of Bonde Santa Terezade tram system, and Metro of Rio, Sao Paulo, Recife, Fortaleza and Brasília. ArcelorMittal has developed the most modern systems for its manufacture and control, which allows us to develop products that meet the most stringent requirements: greater reliability, geometric precision, strict flatness and the highest quality of the market.



► CETEST

CETEST has a significant presence in Brazil, where different projects have been developed for some clients (CAF, Alstom) and in different cities: Recently, CETEST has carried out complete test campaigns for the São Paulo Metro

units, Line 5 project, homologation (ride dynamics, safety against derailment, noise, structural tests...). In addition, CETEST has also taken part in various commuter train homologation for cities like Recife, Porto Alegre, and Belo Horizonte; as well as other kind of

vehicle homologation, such as the Cuiaba Tramway, in Mato Grosso. CETEST is currently testing the São Paulo S/8500 commuter trains for the company Companhia Paulista de Trens Metropolitanos, CPTM. CETEST also tested the previous 7000 serie for CPTM.

BRAZIL:

NATURAL CHARM THAT ENRAPTURES THE VISITOR



The Iguazu Falls (Brazil).

Brazil is a tourist destination that attracts numerous visitors every year. Its capital, Brasilia, which came into being in 1960 by the famous architects Oscar Niemeyer and Lucio Costa, is one of the places that arouses most interest. Declared a World Heritage Site by Unesco, it is an example of the main bastions of modern architecture of the 20th century, which can be appreciated through its wide avenues and monumental public buildings. Alongside these, you can enjoy the rhythm and beauty of **Rio de Janeiro**, known as the "Wonderful City" and its mosaic of beach alternatives, strolls along promenades and diverse cultural aspects.

Its large expanse includes other gems like **Salvador de Bahia**, with a historic centre similarly declared a World Heritage Site, paradisiacal beaches and colonial architecture; as well as Recife known as the Venice of Brazil, next to an idyllic coastline with coral reefs and warm waters. One of

the most fascinating and astounding landscapes of the country is the National Park of Iguazu, with its renowned waterfalls, and the city of Foz de Iguaçu that offer numerous adventures for lovers of ecotourism (safaris, nautical hikes, sports and excursions).

The **ruins of San Miguel de las Misiones**, popular for being the backdrop of the movie starring Robert De Niro and Jeremy Irons, correspond to the vestiges of what was one of the many missionary towns of the XVII of the Jesuit order in Brazilian, Argentinean and Paraguayan territory. Here the rain forest landscape that surrounds them never fails to surprise. Other essential places are **Ouro Preto**, vestige of an old mining city founded during the colonial era. It stands out for its urban layout, with stone streets that cross hills and slopes and baroque churches and the Municipal Park of the **Cascada de las Golondrinas**. The port and capital of the State of Amazonas, **Manaus**, boasts a privileged geographical location, in the middle of the Amazon rainforest,

NATURAL BEAUTY, RHYTHM, IDYLIC LANDSCAPES AND CITIES BRIMMING WITH CHARM. BRAZIL IS EMERGING AS A PROMISING TOURIST DESTINATION THANKS TO ITS NUMEROUS CITIES, BEACHES AND LANDSCAPES.

which allows access to ecological reserves only a few kilometres from the city. Added to this, there is the immense extension of the Brazilian coastline, with more than 2,000 beaches, many of them amongst the finest in the world. Worthy of special mention is the **"Jeri"** region (Jericóacoara, Ceará) with an unspoilt tropical landscape yet difficult to access. In addition, another paradisiacal place par excellence is the **Fernando de Noronha** archipelago, in **Pernambuco**. Amongst its most outstanding landscapes is the **Sancho Bay**, chosen by many tourists as the most beautiful beach in the area. Nor can we overlook the Copacabana or the most famous beach in Rio de Janeiro, the "Praia do Forte", in Bahia, known as "the Brazilian Polynesia", with the ecological reserve of Atlantic forest in the Sapiiranga Park. Other popular coastal destinations are: The largest beach in Ilhabela, **Castelhanos Bay**, in the state of São Paulo, which invites adventure and direct contact with nature; that of **Canoa Quebrada**, in Ceará, and that of **"Praia do Gunga"**, Maceió, which captivates visitors by the whiteness of its strip of sand between the waters of the São Miguel River and the Atlantic Ocean. A paradise well worth visiting. 🌴



Ouropreto, a popular tourism spot in Brazil.

100,000

PEOPLE RELY ON ZARAGOZA'S TRAM LINE 1 EVERYDAY FOR THEIR ROUTES



Zaragoza is the 5th city in Spain, with 700,000 inhabitants

THE TRAM WITH THE MOST USERS IN SPAIN



www.tranviasdezaragoza.es





The president of the International Union of Public Transport (UITP)

"Public transport must be ready to allow for sustainable mobility"

PERE CALVET, TELLS MAFEX WHAT THE MAIN FUNCTIONS OF THIS IMPORTANT ORGANISATION ARE AND HOW IT SEES THE FUTURE OF GLOBAL MOBILITY.

UITP is a worldwide association, created in 1885, which promotes public transport. Currently, it has more than 18,000 associates from 96 countries and represents more than 1,400 bodies and institutions. This body brings together the main players in the sector: operators, authorities, technical and research institutes, as well as representatives of the industrial and tertiary sectors. There are also 57 Spanish companies and institu-

tions holding membership.

Mafex Magazine: Since mid-2017, you have held the post of CEO at UITP. What aims have you put forward during your tenure?

Pere Calvet: UITP, as indicated in the introduction, is a worldwide organisation with a presence throughout the planet and working strategies coordinated with its members. The CEO can and must accompany the organisation in its different working lines, strengthening tho-

se aspects in which they feel most strongly identified. In my case, the improvement of the habitability of our cities through the implantation or evolution of public transport attracts me especially. Likewise, by maintaining UITP's global presence both at the geographical area level and in the different modes of transport, I feel involved in achieving greater Latin American participation in the association and UITP in Latin America.

Mafex Magazine: Since its creation in 1885, the role of the UITP in the promotion of public transport has been very prominent. How do you manage to foster and boost such worldwide representation?

Pere Calvet: On the one hand, the aims of public transport managers around the world tend to be mostly common. On the other hand, the association is based on an organisation with participation of different modes of transport and representatives of geographical areas and countries in which all associates feel represented. Finally, UITP offers a forum for the exchange of direct knowledge among professionals of the sector, highly valued by members, since in different parts of the world companies face similar challenges.

Mafex Magazine: What do you consider to be the main challenges facing urban mobility? What role does public transport play in the future of mobility?

Pere Calvet: The world population moves towards the large agglomerations and consequently public transport must be prepared to allow for sustainable mobility, to avoid, in the first place, increases in pollution and the system's sustainability, and secondly, the collapse of the megapolis.

Mafex Magazine: What contributions does the railway have in terms of urban public transport? And specifically, regarding intermodality issues?

Pere Calvet: The railroad is the backbone of any urban public transport system in densely populated areas or those that need to facilitate a high demand for mobility. Only through its large-scale capacity will demand be satisfied. However, on this basis, a variety of public transport systems must be designed to allow for capillarity adapting to each need.

Mafex Magazine: The advances of the Spanish industry have

brought with them in recent years innovative solutions in many fields such as energy efficiency, capacity, accessibility and the improvement of the user experience. How do you assess the commitment of the companies in the sector, and in comparison to the railway industry in other countries?

Pere Calvet: The Spanish industry is at the forefront in several areas and this has been roundly proven. Both the industrial sector and the people who work there are sufficiently prepared to take on the present and future challenges. The Spanish railway industry has managed to adapt to the challenge of a global market competing thanks to quality, innovation and efficiency. Nowadays nobody is surprised to see Spanish products and professionals anywhere in the world, which is undoubtedly a reflection of this evolution.

Mafex Magazine: And what is the role played in the field of R&D from the operators' viewpoint?

Pere Calvet: In a globalised world, with possibilities to carry out large industrial productions in any country, only R&D can offer interesting and differentiating options.

Mafex Magazine: In UITP there are 57 Spanish organisations. What is their input?

Pere Calvet: For UITP, all members have their contribution, some with more activity and participation, others sharing the widespread information that is produced. However, as a country, we still do not have the participation and involvement in in-

ternational organisations in relation to the weighting in our industry. This trend must change, increasing the international presence, not only in quantitative terms but also qualitatively, being active and participating in decision making and influencing decisions.

Mafex Magazine: As a renowned expert and connoisseur in the field of urban public transport, how do you see the role of metropolitan railways, tramways, and regional rail links in the future? Are they key to designing a map responding to the needs of 21st century passengers?

Pere Calvet: It is difficult to make general considerations that serve public transport worldwide, however in an attempt to group together solutions, three families of cities that allow for the visualisation of the future development of public transport can be considered:

- Major world capitals, which invest in transportation systems that allow them to decongest existing infrastructures.

- Large agglomerations, still in the growth stage, that build new infrastructures to connect new spaces that spring up.

- Cities in formation, which are the ones that must pay extra attention to the design of public transport. Their proper choice will make them the cities of tomorrow or cities that will not be habitable.

For each case there will be several technical solutions with different characteristics that will be a challenge both for those who must decide and for the industry, and in all of them the railway mode must have a fundamental role.

The Spanish railway industry has managed to adapt to the challenge of a global market competing thanks to quality, innovation and efficiency.

The Spanish railway industry, at the forefront in innovative solutions for urban public transport systems

THE FRANTIC TASKS INVOLVED IN THE IMPLEMENTATION OF A MORE ADVANCED NETWORK OF URBAN TRANSPORT IN THE WORLD HAS PROVIDED THE INDUSTRY AND ITS CORRESPONDING OPERATORS WITH A GREATER TECHNOLOGICAL LEVEL AND IMPROVED EFFICIENCY IN TERMS OF MANAGEMENT OF METROPOLITAN, TRAMWAY AND REGIONAL RAIL PROJECTS.

Urban rail transport has been one of the most resolutely followed ventures in recent years in Spain. This impulse has placed the country at the forefront in metropolitan railway, tramway, light rail and regional rail systems. Currently in medium and large-sized cities, these means have become the main axes of mobility, largely due to their overriding advantages from an environmental viewpoint, as well as their capacity, ease of use and comfort. For their development, the operators have undertaken ambitious expansion and modernisation of facilities projects; a process in which cutting-edge innovations contributed by the industry have been incorporated. These advances have resulted

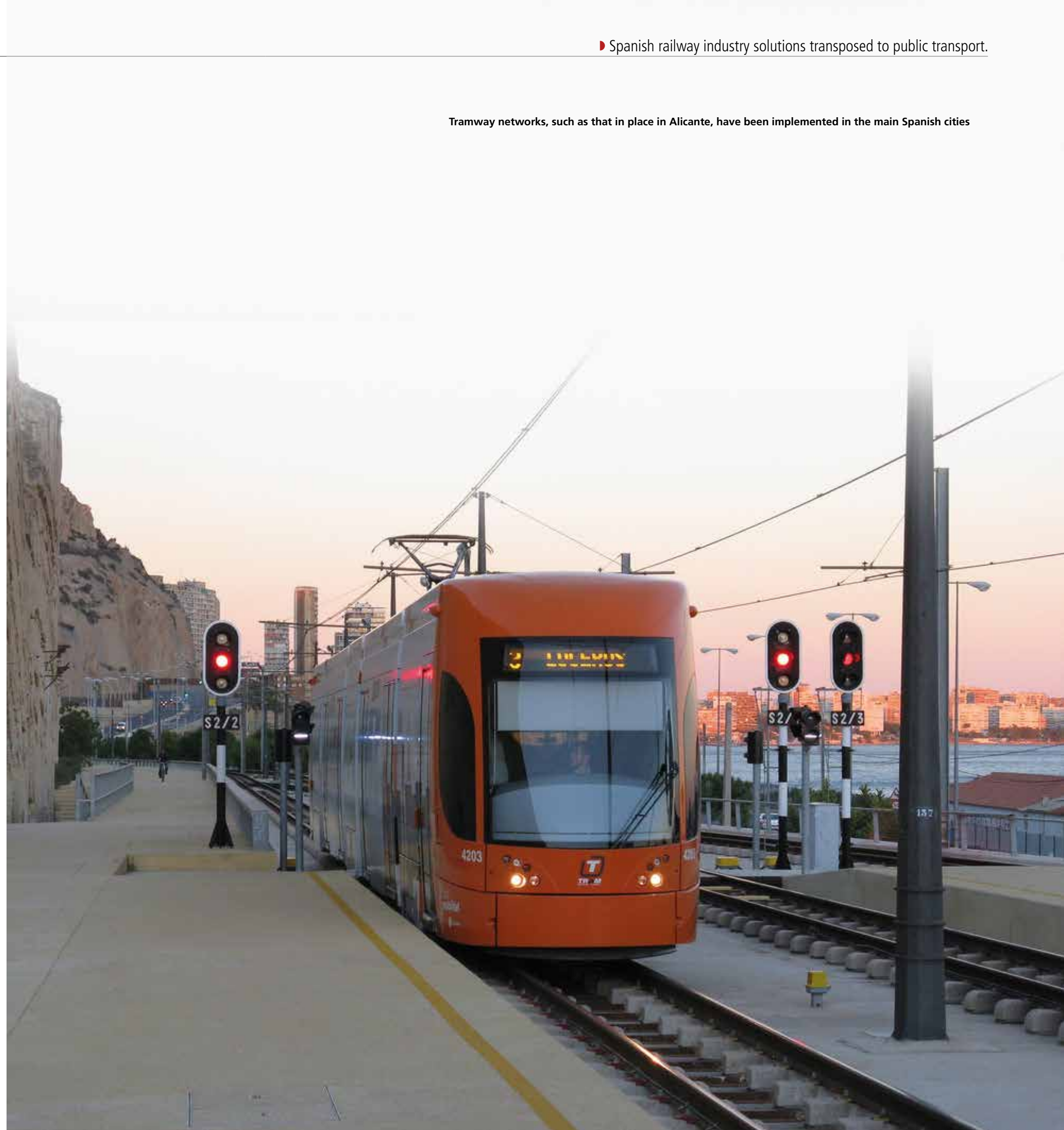
in one of the most impressive networks in the world.

Backing metropolitan railways and tramways

At present, seven Spanish cities have metropolitan railway systems: Madrid, Barcelona, Bilbao, Palma de Mallorca, Malaga Valencia and Seville. In addition, there are light rail and tramway systems in 11 cities: Madrid, Barcelona, Bilbao, Valencia, Tenerife, Saragossa, Murcia, Alicante, Seville, Vitoria and Granada.

These are joined by an extensive commuter network, run by Renfe Operadora, which is the cornerstone for the daily movements of all urban centres. In this segment, the figures indicate that it continues

Tramway networks, such as that in place in Alicante, have been implemented in the main Spanish cities



to grow at a steady pace, since in 2017 they transported 423 million passengers, with demand levels 3.6% higher than in 2016. The implementation of this extensive diversity of urban systems has led to a very high degree of excellence. For example, it has led to a reduction in the parameters of cost / km built and construction times compared to those in other countries. In the case of the Madrid Metro, these measures have served the World Bank as benchmarks in project financing. Furthermore, all these years of work have also endowed the industry and the corresponding operators with a high level of technology and efficiency in the comprehensive management of projects of this nature: design, implementation and service start-up; modernisation of control systems; accessibility, operation, network surveillance and maintenance. They have also become a leading light in terms of innovation in the means of financing infrastructures, alternative sources of income genera-

tion, profitability or in the integration of suburban as a public space of coexistence, etc.

Solutions

The Spanish commitment to R&D has also borne fruit in all areas of urban rail transport. Companies and operators have searched for the best options to enhance the metropolitan, tramway and regional rail networks as the optimal solution for mobility needs in large population areas. In this way, innovative advances have been introduced to achieve cities with sustainable, modern, efficient, respectful with the environment and high capacity networks. In Spain, challenges of special relevance have been faced and overcome that have served as an

The Spanish commitment to R&D has led to progress in all areas of urban transport



► METROPOLITAN RAIL, LIGHT METRO AND TRAMWAY LINES IN SPAIN

NETWORK	DISTANCE IN KILOMETRES
Madrid metro/Light rail	294 kilometres/27.8 kilometres
Bilbao metro	45.10 kilometres
Valencia Metro and Tramway	156.38 km (27.30 km underground and 129.08 km overground)
Palma de Mallorca metro	15.55 kilometres
Barcelona metro/tramway	119 kilometres/14.9 and 14 kilometres (Trambaix and Trambesòs)
Malaga light rail	11.3 kilometres
Alicante tram (tram train)	129 kilometres
Seville Light metro/Metro Centro	18 kilometres/2 kilometres
Murcia tramway/Vitoria tramway	18 kilometres/7.8 kilometres
Saragossa tramway	12,8 kilometres

example in the development of systems throughout the world. Amongst these, for example, the implementation of the longest network of automatic metro line in Europe, L9 in Barcelona; catenary-free tramways, such as the Saragossa one, tram-trains in Alicante, braking energy recovery systems in Barcelona and Bilbao, signalling, access controls, etc.

International consultants

This background has led many administrations to request the support of consultants and engineering to put into service new networks or expand existing infrastructures.

The extensive experience, the ready availability of highly specialised multidisciplinary teams, as well as the sturdy international reputation endorse this demand in studies, projects, work management and technical advice. The complete and integrated outlook in the development of transport systems allows them to participate in all phases, from planning to design, construction and operation of the line, and cover all the technical disciplines involved with their own professionals, boasting experts in each of them. Along the same lines, in the field of infrastructures the weighting

in design, construction, financing, operation and maintenance phases is increasing. This is reflected in the fact that the Spanish firms have spearheaded the largest metropolitan railway works in recent times (Riyadh Metro, Lima, Doha, Panama, etc.). In this segment there are also a multi-

tude of specialised products and services such as the manufacture, treatment and machining of parts and series of great technical complexity in carbon steel or manganese;

the installation of equipment, changes and crosses; high-end auxiliary relays for critical applications, electrical systems, state-of-the-art rails, track devices, etc.

In terms of rolling stock there have also been numerous advances. New generations of

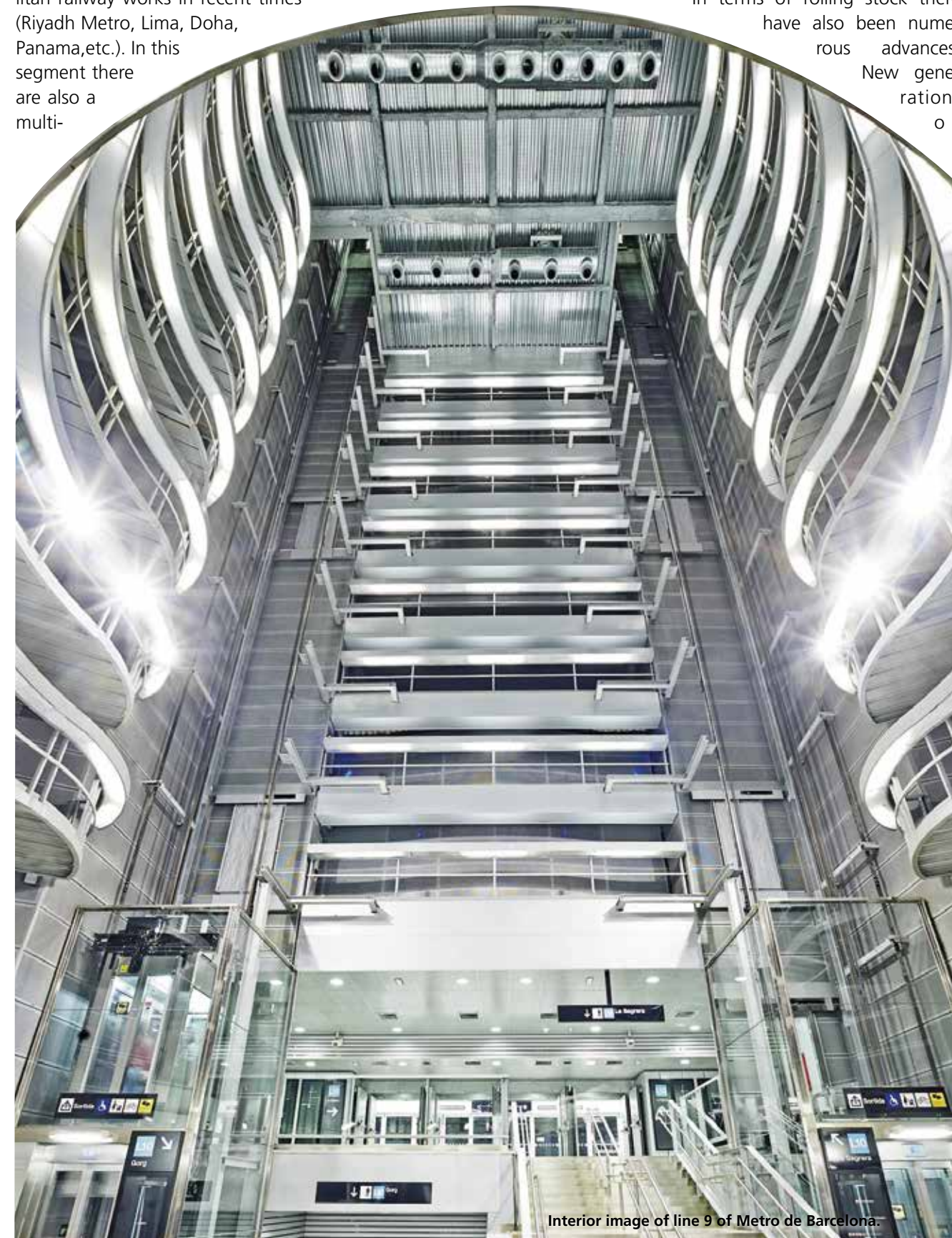
trams and light rail systems have been developed in-house at premises of different manufacturers located in Spain. These are innovative train families adapted to current needs. They stand out for their modular and flexible design, thereby being versatile and adaptable to different traveller flows.

Advancements have been made in pioneering technology such as energy storage systems that allow for the circulation of light vehicles without catenary. An achievement that contributes significantly to energy efficiency. They have also made available to the market a range of fully automatic underground rail systems, with vehicles that do not require the installation of driving cabins or personnel on board during its operation. Also worthy of special mention are the new train / tram type transport solutions. This option has been specially designed



In ticketing, information systems or communications, our industry is second to none.

The Spanish business fabric is particularly sturdy in all fields of urban rail transport.



Interior image of line 9 of Metro de Barcelona.

cafpower.com

CAF
Power & Automation

The Power of Adaptability

Train control systems

Traction systems

Train-land communication systems

Energy storage systems

LOCOMOTIVES REGIONALS SUBURBANS TRAMS METROS HIGH SPEED

to link urban centres with their populations. For this purpose, some units have been created that provide service not only along the tram lines of the city, but also connect with other urban centres, thus taking advantage of the infrastructure of regional commuter lines.

Advances in all fields

Spanish advances have contributed to key aspects such as energy efficiency. Thanks to its contributions in R&D a new system has been devised that makes it possible to recoup between 10 and 30% of the energy from the regenerative braking of vehicles and use it for the internal consumption of the facilities. A highly suitable solution for suburban rail, underground and tramway services, which feature numerous stops.

In terms of ticketing and passenger information, Spanish companies stand out for their innovative technology, with their own specialist software developments. They are leading brands in the spheres of access control and sale of transport tickets throughout the world. Amongst their most important proposals are the manufacture of tickets and magnetic cards in all formats, the widest range of smart card products on the market, contactless cards and equipment with the highest performance levels, along with the application of LED technology.

Comprehensive Solutions

In the field of signalling, wholesale solutions are provided based on advanced families of interlocking systems and platforms of integrated control centres; together with a high capacity of Engineering and integration of third-party subsystems. In this segment, systems such as Da Vinci, the result of a fully-fledged investment in R&D+I, have become the world reference platform for railway traffic management.

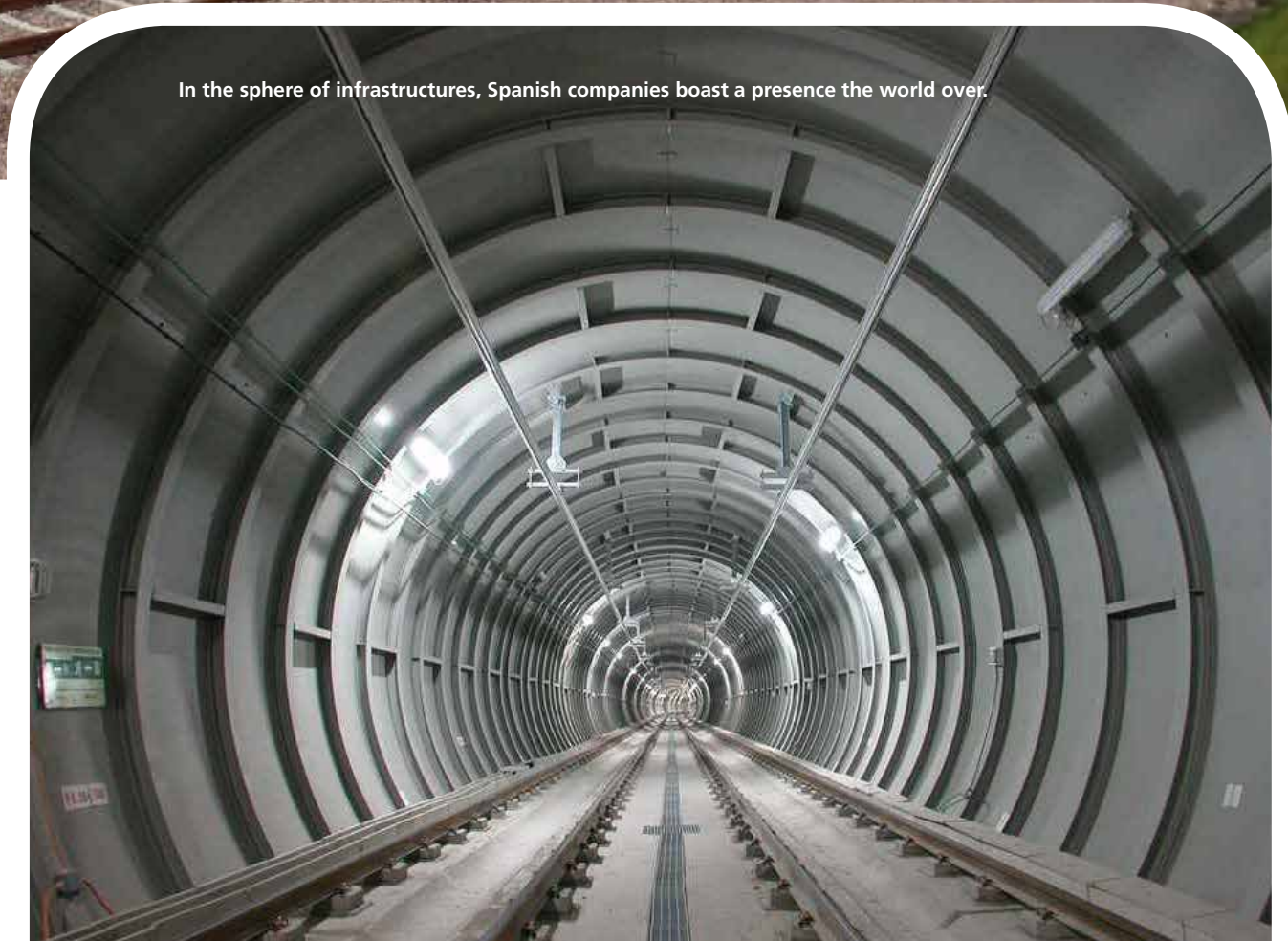


The Edinburgh light rail system has opted for the implementation of Spanish technology.

The Spanish advances have contributed in key aspects, such as efficiency and safety.

In addition, the new advances in railway signalling allow an increase in the capacity of the lines before an increase in demand and respond quickly to any incident. Compared to other conventional systems, wireless communication technology is used, which allows to substantially increase the operating frequency, and is becoming adapted on account of its greater safety and operational capacity, in all rail transport systems.

The Spanish industry is also at the fore in the introduction into the market of intelligent communication systems in the train (CBTC-Communication Based Train Control) which provides the operational flexibility necessary for an optimal use of capacity, since it allows for more trains traveling at a higher speed in a safe way and according to the fluctuation in the number of users. Furthermore, with CBTC the exact position of each train can be



In the sphere of infrastructures, Spanish companies boast a presence the world over.



Above, the catenary-free tramway in Saragossa.

accurately determined. No less remarkable are the strident efforts in the field of R&D carried out by the entire auxiliary industry chain, which has meant the companies are ranked in the highest positions. Amongst these, for example, the latest progress in the search for new materials to lighten the weight of vehicles, the equipment in railway workshops, telecommunications cables, signalling, instrumentation, data and fibre optics, solutions for water treatment both in consumption and discharges, distribution of electrical equipment, telecommunications cables, instrumentation, data and optical fibre etc. Thanks to the collaboration of companies with universities and technology centres, significant results have been forthcoming in the transport and mobility sector. For example, the development of a system of wireless charging of trams that does

not require, unlike conventional methods, any type of direct electrical contact, such as catenaries, cables or plug sockets, to recharge the trains' batteries. A long list of research projects that are part of European collaborative projects.

Challenges for the future

Beyond all these achievements, the dynamism of the Spanish railway industry continues to work towards the urban railroad of the future. Along this research line, standout projects include the participation of Spanish companies in multidisciplinary groups (manufacturers, operators, builders, suppliers, engineering, etc.) to invent this modern future.

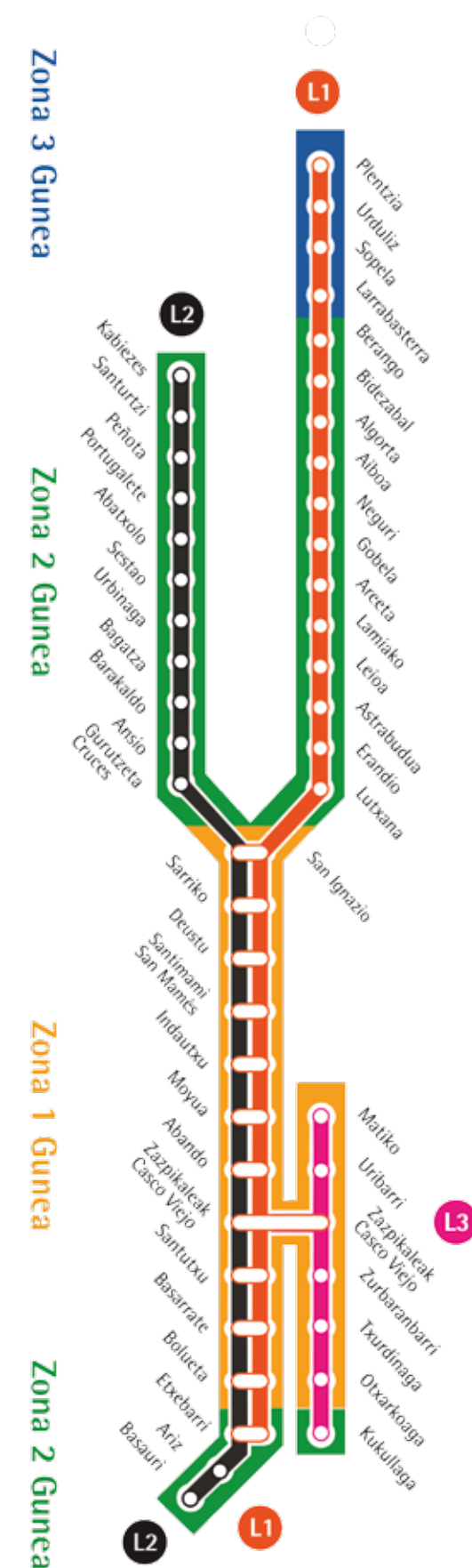
An excellent representative example of this is the Shift2Rail programme, under the auspice of the European Union, which is structured around five Innovation Programmes (IPs)

covering all the different technical and functional railway subsystems, these undoubtedly benefiting transport in major cities and their adjoining areas. In their unyielding commitment to safe, modern and endowed networks with the best advances, Spanish companies continue to devote a large part of their resources to R&D.

The aim here is to respond to the sector's needs and contribute their findings in the challenges posed in multiple fields: smart mobility, efficient infrastructure, sustainability, automation, 'Smart Track', improvements in the passenger experience, profitability of networks, etc. In short, to continue to lead the unstoppable technological evolution of urban transport.

Mugitu metroz
Muévete en metro

Move the tube
Ici, en metro



The Spanish hallmark, found on urban systems around the world



Metro of Riyadh, one of the largest-scale projects at the present time that has been based on Spanish experience and technology.

THE SPANISH ENTREPRENEURIAL FABRIC IS NOWADAYS VIEWED AS A GO-TO EXPERT IN THE SERVICE START-UP OF THE MOST MODERN URBAN TRANSPORTATION SYSTEMS. THIS IS CLEARLY UNQUESTIONABLE AS ITS SOLUTIONS ARE EXPORTED TO THE WHOLE WORLD.

The Spanish railway industry has contributed very actively to the implementation of the numerous metropolitan, tramway and regional rail networks that make up the modern public transport map in the country. Pulsing and sturdy know-how that is demanded in all corners of the globe. Along with them, even some organisations, amongst which are Metro de Madrid and TMB (Metro de Barcelona), are diversifying their business lines by exporting

their planning models to other suburban networks around the world.

America

In South America there are numerous projects of this nature underway that range from global plans, to turnkey projects, supply of rolling stock and rehabilitation of existing systems. These include, for example, the National Transportation Plan (Costa Rica) or the Strategic Mobility Plan (Ecuador).

There is also a clear presence in suburban areas such as Santo Domingo Metro (Dominican Republic), Fortaleza, Recife, Brasilia and Sao Paulo (Brazil), Santiago de Chile and Valparaíso (Chile), Bogota (Colombia), Mexico City, Guadalajara and Monterrey (Mexico), Caracas and Maracaibo (Venezuela) Quito (Ecuador) and Panama (Panama) and the future electric train in Guatemala (Guatemala). Other relevant works undertaken are the modernisation and impro-

vement of the metropolitan railways of Buenos Aires (Argentina); the supervision of the construction of 3 cable car lines between La Paz and El Alto (Bolivia), the railway signalling of Sao Paulo, and the manufacture and signalling of the Cuiabá tramway (Brazil). The imprint of Spanish companies is also in the vicinity of Belo Horizonte (Brazil), the tramway of Ayacucho (Colombia) and San Isidro (Argentina), and the Suburban Railway of the Metropolitan Zone

of the Valley of Mexico. In North America the presence continues to be felt. In the United States, it has participated in projects such as Washington Metro and Miami, articulated units in Boston, Pittsburgh, Sacramento and Maryland and the trams of Houston, Seattle, Cincinnati, Phoenix, Kansas and Cagliari, as well as the Austin light rail and Metro. St. Louis; while in Canada the seal of this industry is in networks such as the Toronto light rail or the Ottawa metro.



Picture of the Sydney tramway (Australia).

Europe, Africa and Oceania

Another continent where the solutions of the Spanish railway industry are ever more common is Asia, with the awarding of tenders for the Metros of Hong Kong, Beijing, Hangzhou, Shanghai, Xian and Binhai (China), Hanoi and Ho Chi Minh City (Vietnam), Singapore Metro (Malaysia), Delhi, Calcutta, Bangalore, Cochi, Chennai, Hyderabad and Mumbai (India). In this city they have also been part of the monorail, in addition to the catenary-free tramway of Kaohsiung (Taiwan) and the light metro in Manila (Philippines).

In Africa, it has participated in the Algiers Metro and the Ouargla tramway (Algeria) and Cairo Metro (Egypt). It should also be pointed out that in the Middle East Spanish companies are present in almost all megaprojects in the region: the construction of three metropolitan railway lines in Riyadh, the elevated section of the Doha metropolitan railway (Qatar), which is one of the largest in the world; the Lusail tram (Qatar). This emerging area has relied on the highly qualified staff this industry offers to undertake projects of major importance such as the master plan of the metropolitan railway of Kuwait City (Kuwait) and the Public Transport Master Plan for Muscat (Oman), the light metropo-

The most emblematic metropolitan railway and tramway projects boast Spanish firms in all spheres.

litan railway of Abu Dhabi and the metro in Dubai (United Arab Emirates) and the light rail system in Astana (Kazakhstan). Alongside these, it has been entrusted with the construction and design of the two most important stations and exchangers (Major Stations Project) of the Qatari network: MSheireb, in the old town, and Education City, in Doha.

In Europe the list is also very extensive: Metro Brussels (Belgium), Helsinki (Finland), Stockholm (Sweden) Rome (Italy), Rotterdam (Holland), Bucharest (Romania). They are joined by tramways and light rail systems in Amsterdam (Holland), Edinburgh

(Great Britain), Nantes (France), Athens (Greece), Warsaw (Poland), Luxembourg (Luxembourg), Antalya (Turkey), Belgrade (Serbia), Besancon (France), Birmingham (United Kingdom), Budapest and Debrecen (Hungary), Freiburg and Bielefeld (Germany), Lisbon (Portugal), Tallinn (Estonia), Utrecht (Holland), Saint-Étienne (France) and Dublin (Ireland). Finally, in Australia and New Zealand a clear implantation of the Spanish railway companies begins to take hold. The Sidney and Newcastle tramway, Camberra metro and Auckland commuter rail are a clear example of this.



Cuiabá Tramway (Brazil).

When the railway Traction travels to the future, it's *i+c*

At Ingeteam, we apply the concept *i+c* to every project we undertake – innovation to find the best solution and commitment to provide the best service.

We strive towards on offering in-house/state-of-the-art developments for **rolling stock** (Traction & Control Systems) and **infrastructure** (Energy Recovery Systems) and we aim to become the preferred technological partner for our customers: cooperation goes from conception and business case to beyond implementation, and our innovation and commitment is shown from project definition, through the study, design and engineering phases to ensure a successful turn-key supply of the complete solution.

The formula of the new energy *i+c*



www.ingeteam.com

traction@ingeteam.com

Ingeteam

READY FOR YOUR CHALLENGES

SOME MAFEX MEMBERS WITH

TYPESA

Recent years have seen a big boost in Spain's urban transport sector (metro, tram and rail) through the development of innovative solutions such as Barcelona's metro line 9 or the large-scale Madrid metro network expansion project. TYPESA's leading role in this expansion has broadened its experience, allowing the company to work in some of the world's top urban transport networks for government administrations with great interest in the Spanish approach.

Such is the case of the metro networks in Lima and Quito in South America, Riyadh and Doha in the Middle East, Sydney in Australia and Stockholm in Europe.



ALSTOM SPAIN

As a promoter of sustainable mobility, Alstom develops and markets systems, equipment and services for the transport sector. Alstom offers a complete range of solutions for urban transport (from suburban and regional trains to metros, trams and e-buses), passenger solutions to improve comfort and connectivity, customized services, infrastructure for e-mobility, signaling and security technologies, as well as digital mobility solutions for smart cities.

Among its latest rolling stock developments for urban mobility, we can find the new Aptis (a new 100% electric mobility solution based on proven tramway components that takes advantage of Alstom's electrical systems experience), the new Citadis X05 (the latest evolution of the best seller Citadis tram presents in more than 50 cities) or the Coradia iLint (the unique regional train powered by a hydrogen fuel cell)

In regard of suburban and regional operations, Alstom provides the widest range of flexible, efficient, comfortable and environment friendly solutions: the

modular X'Trapolis or Xtrapolis Mega range (an evolution of Civia Regional trains developed for Renfe) or the Coradia platform, with more than 2,300 trains currently operating in 9 European countries and in Canada.

Furthermore, the R&D regional center located in Madrid is developing innovations and digital technologies to face the challenge of mobility in smart cities.



This is the case, for example, of Mastria, a solution that allows transportation operators manage several transport modes in a coordinated and centralised manner. This enables them to optimise the public transport network capacity and efficiency and improve the end-user transport journey. Mastria orchestrates all public transport modes from rail to road: metro, train, tramway, suburban, bus, taxi.

PROJECTS IN PUBLIC TRANSPORT



CETEST

CETEST has performed test campaigns for urban transport in all five continents, using state-of-the-art technologies and postprocessing tools. In Oceania CETEST has carried out tests for Sydney, Auckland Metro, as well as for Sydney and Canberra trams. Regarding Asia, in addition to testing Riyadh, Singapur Metro, and Kaohsiung tra-

mway, CETEST presence in India should be noted. In recent years, homologation test campaigns for the Jaipur, Delhi, Calcuta, Kochi and Lucknow Metro have been performed, both for BEML and ALSTOM. On the African continent, CETEST has executed tests for the Argel Metro, for instance. In America, CETEST has carried out test campaigns for Houston, Cincinnati and

Kansas tramways, and for the Boston's light train, all of them developed by CAF. Furthermore, CETEST has tested ALSTOM Panamá and Guadalajara Metro. Finally, in Europe, CETEST has carried out several tests for urban transportation, e.g. Stockholm, Budapest and Luxemburg tramways, NS Civity Netherlands, Istanbul and Madrid Metro, among others.

SENER

SENER has worked on more than 15,000 km of railway studies and projects, 5,000 km in high speed lines, 1,200 km of metro and light rail train (LRT) lines and over 50 urban transport systems, making it one of the world's leading companies in transport infrastructures.

SENER offers integrated engineering services and implements high-tech solutions. Among its projects, high-speed contracts such as High Speed Two (HS2), in the United Kingdom, or the section between Palmdale and Burbank, in California; the Mexico City – Toluca intercity train, in conventional railway; and urban metro and transport systems, such as metros in Guadalajara (Line 3), Panama (Line 1), Santiago de Chile Lines 1, 3, 5 and 6), Algiers, Doha, Riyadh, Melbourne and Hanoi (line 3), and the Abu Dhabi LRT stand out.



SOME MAFEX MEMBERS WITH

PROJECTS IN PUBLIC TRANSPORT



SIEMENS SPAIN

Siemens technology helps develop a sustainable urban environment and a powerful and efficient public transport network to improve the quality of life of passengers and help the operator face the challenges of today and tomorrow.

-Mireo: the new regional and commuter train platform. Mireo is the new platform for regional and commuter trains specially developed for sustainable and flexible operations: adaptable and profitable, comfortable and premiumclass, is conceived as a scalable articulated train. With the help of its new aerodynamic design and quiet bogies, noise is substantially reduced. The train's lightweight construction, energy-efficient components and intelligent board network management system reduce energy consumption by 25 percent compared to predecessor models. Additionally, the driver assistance system helps to reach a 30% energy saving.

-Trainguard MT, the Siemens solution for automated metros: The demand for public services for mass transport grows continuously. To ensure the perfect functioning of mobility systems, punctuality and efficiency must be improved and, to achieve this, automation is the solution.

The automatic subway systems make it possible to shorten the interval between trains to less than 90 seconds, which translates into an increase in trains, a greater number of passengers and a more punctual service that results in customer satisfaction.

The Siemens Trainguard MT solution is the most widely used system worldwide and is serving 25 metro operators, such as in São Paulo, Barcelona, New York, Paris, Istanbul, Algiers or Guangzhou. Thanks to this technology, the capacity of a metro line can be increased up to 50% and depending on the degree of automation, energy consumption can be reduced up

to 30% while increasing train punctuality. Trainguard MT is modular and scalable and responds to all the requirements of today's urban transport, while offering the latest automation standards at different levels. It can also handle trains with different control equipment at the same time and in the same network, making it ideal for mixed traffic environments.

-Trackguard Westrace Urban: state-of-the-art electronic interlocking for light rail: Siemens offers the electronic interlocking Trackguard Westrace Urban, based on Siemens' tried-and-tested Simatic S7, a safe and innovative solution oriented to light rail transit customers.

The design of the interlocking is extremely compact and scalable. Due to its simple architecture, the Trackguard Westrace Urban electronic interlocking does not take long to implement and can therefore be configured cost-effectively and life-cycle costs are reduced.

CAF

CAF is one of the international leaders in the design and implementation of comprehensive rail transport systems. CAF has a wide range of railway products and services to ensure sustainable mobility in cities around the world.

On the one hand, CAF has the Inneo solution, a range of metros equipped with the latest technological advances in terms of safety, performance and comfort. Its design seeks maximum energy efficiency thanks to the optimization of passenger capacity per unit.

On the other hand, CAF's Urbos trams are a response to the need to have an efficient and sustainable means of public transport. The Urbos trams, thanks to an innovative and accessible design, help to enrich and modernize the image of the city in which they operate, providing it with its own personality.



SICE
TECNOLOGÍA Y SISTEMAS



Security and Communication systems for metro and railway infrastructures



Automatic Fare Collection



Railway Signalling

www.sice.com

SOME MAFEX MEMBERS WITH

INDRA

Indra has an extensive offer that includes particularly the fields of traffic control systems and transport operations, payment collection systems, planning and control systems, communications and transport networks, information systems and support for operations for all transport modes, in addition to security and protection.

When applied to traffic management and urban and interurban transport, the company's smart technology enables a safer, more efficient and more sustainable mobility by promoting the use of public transport and intermodal urban transport services, thus contributing to reducing congestion and polluting emissions and their corresponding costs.

For example, in Medellín, the intermodal public transportation platform deployed by Indra permitted the integration of the rail, bus and trolley operations, which has led to a single system for managing all vehicles, with a special emphasis on the interchanges where the different lines meet. Thanks to Indra's new ticketing systems, passengers able to access the Aya-cucho trolley, the subway, the BRT (Bus Rapid Transit) buses, the subway shuttle buses, and the three cable-propelled ae-



rial transport lines with the same contactless card.

To maintain and reinforce its leadership, Indra has an ongoing commitment to innovation in the sector, and is part of the most important national and international innovation initiatives designed to promote digitization in transport and new smart solutions based on IoT, artificial intelligence, big data and cloud computing. In addition to its participation in Shif2Rail, the main European innovation initiative in the railroad sector, the company spearheads —among others— the macro project entitled Transforming Transport, which uses big data to improve mobility; and the Harmony project, which develops technologies

to allow the real-time integration of data from different operators, transport modes and traffic to improve multimodal information services.

Over 100 cities around the world —including London, Madrid, Dublin, Medellín, Curitiba, Kuwait and Manila— have entrusted their urban mobility improvements to Indra solutions. Indra is among the world's foremost ticketing system operators, with references such as the subways in Madrid, Barcelona, Calcutta, Mumbai, Shanghai, Cairo, Santiago de Chile and Lisbon, trains in Buenos Aires, the suburban railroad in Mexico City, the monorail and subway in Kuala Lumpur, and the light rail systems in St. Louis and Austin (United States).

CAF SIGNALLING

CAF Signalling provides integral signalling solutions for tram, light trains and suburban trains as well as for lines, deposits and metro workshops based on the Quasar S3e Interlocking Family and the NAOS Integrated Control Centre Platform.

The high engineering expertise has positioned the company at the head in the field of public transport.

Within its extensive catalogue, it has developed the NAOS solution that includes traffic control posts and other SCADA systems as well as the ATO system for a better traffic management. Among the most outstanding projects in the field of urban transport, the following ones can be highlighted: Metro of Madrid (Spain), Delhi (India), Valparaíso (Chile), light trains of Cuiabá (Brazil), Kaoisiung (Taiwan) and Atalya (Turkey).

Furthermore, CAF Signalling participates in the development of a security and control

system (CBTC) for the line 3 of Bilbao Metro (Spain).



PROJECTS IN PUBLIC TRANSPORT

BOMBARDIER TRANSPORTATION

Bombardier produces in Trápaga propulsion systems of the OMNEO platform, of double-deck regional trains: The Bombardier Trápaga's factory currently manufactures and supplies the traction and auxiliary converters of the electric multiple units (EMU) of the OMNEO platform of regional trains. With this last order, there are already 240 trains of this platform to

which Trápaga will supply the propulsion equipments (72 OMNEO Premium and 168 Regio 2N).

The OMNEO Premium, double-deck, combines the high capacity of a commuter train and the comfort features of a regional train. It can travel at 200 km/h and has an interior design that optimizes the space and offers the best access to people with reduced mobility.

Thanks to the use of lightened materials and the excellent weight distribution, the axle load is minimized.

This creates flexibility for cross-border operation on all European networks. In addition, the OMNEO EMU features several of Bombardier's ECO4 technologies, reducing energy consumption and CO2 emissions.



ARCELORMITTAL

ArcelorMittal is present at main, both national and international, urban projects, with the commitment to offer our clients quick and innovative solutions, based on quality, technology and service.

Some examples are R&D projects, such as Ironess, its objective is to develop solutions for the diagnosis of the rails corrugation in curved sections of urban or interurban lines; also new developments of tram products such as the Low Carbon Vanadium Grooved rail (LCV), extending the life of the rail and reducing maintenance costs, and new Block Groove Rail (without web and less height) reducing considerably the construction costs.

SOME MAFEX MEMBERS WITH PROJECTS IN PUBLIC TRANSPORT



► SEGULA

En In the field of seats for public passenger transport there have been no revolutions in terms of use and functionality. For this reason, the seating modules developed by SEGULA represent a change in trend that

allows light trains to have flexible seating configurations. GECKO helps to maximize the load of standing passengers at critical moments with high occupancy thanks to an electronic locking system by the driver and KATHISNEA (folding module of up to

4 traspuntines) adapts according to the occupancy forecast. Thanks to these concepts developed by Segula, the passenger seats for the railway sector take a step forward providing differential and innovative added value for the projects offered by the manufacturers.

► TPF GETINSA EUROESTUDIOS

Implementation of a Tramway Line in the Avenida Diagonal of Barcelona: In Avenida Diagonal, Barcelona, we are facing the challenge to replace bus services by a tramway line, as buses have reached their maximum capacity and operate at a commercial speed that barely reaches 10 km/h. It is a corridor that could even host an underground subway line with a commercial speed of 30 km/h. To that end, the tramway, which will run on the surface and will not have an impact on vehicle and pedestrian traffic as it will be subject to traffic lights, must operate at a commercial speed of about 20 km/h, with vehicles up to 60 m in length (buses are 18 m long). For this purpose, the avenue section will be restructured to ensure that the tramway runs on a reserved right of way. Additionally, new traffic signals must be implemented to create a "green wave" for a passage interval of 120 seconds in each traffic direction.



1968-2018

THE JOURNEY HAS JUST BEGUN

We turn 50. Half a century of great projects and important challenges successfully overcome. We face the future with the hopes and motivations of the first day. Because this journey has just begun.

ineco anniversary 50



Antonio Aiz (Deputy Regional Minister for Infrastructure and Transport of the Basque Government)

“The year 2017 has been truly positive for Basque public

ANTONIO AIZ TAKES STOCK OF THE RAILWAY IN THE BASQUE COUNTRY AND FUTURE PLANS.

Question: The number of users of public transport last year denotes a recovery of the railway system. How can you explain this trend?

Antonio Aiz: 2017 has been a very positive year. The annual balance sheet confirms a 13.33% growth in the cumulative demand for Euskotren passenger services when compared to the previous year. Metro Bilbao has also grown by 1.22%, reaching a total of 88 million users. These figures are the result of the public institutions' commitment to a quality transport system. However, it

is mainly the result of the reliability of the service, of offering competitive service frequencies, and being a safe mode of transport. These are factors that citizens value very highly.

Question: April will be the first anniversary of the opening of Line 3 of Metro Bilbao, adding six kilometres and seven new stations. What assessment can you make of this first year?

Antonio Aiz: All infrastructures need time to consolidate. People

find it hard to change their habits and those changes only occur when you offer something that is really good. Delving into the data for 2017, only in Bizkaia, the railway and metro services have grown by 67.89% thanks to more than 3.2 million users of the new Line 3 and to the 19.5% rise in the demand for the Txorierra Line, with a total of 1.2 million users. We are satisfied, but we want to carry on growing.

Question: The extension of Metro Bilbao is a constant factor since it opened in 1995. What will be the next move?

Antonio Aiz: The construction of

lines 1, 2 and 3 of the Bilbao Metropolitan Railway required, in addition to the technical challenges, a very substantial investment by the Basque Government and the Bizkaia Provincial Council. The public administrations must now have a look at the state of the transport system in the region, in coordination with the city councils and the Provincial Council of Bizkaia. This will enable us to identify future requirements and determine which mode of transport will best respond to our citizens' needs.

Question: The Basque Government, through ETS, has just started to work on the railway branch of the Topo service in San Sebastian and the extension of the Vitoria-Gasteiz Tram service; what are these projects going to mean for these two cities?

Antonio Aiz: Regarding the Topo line, it will improve the intercity railway service on the Zumaia-Hendaia line; it will also improve internal transport in San Sebastian as we are connecting areas to the Topo line that lacked any previous railway service. And finally, it will lead to the urban transformation of the neighbourhood of Amara because, as it will be an underground section, we can remove tracks from the Amara Station and return 21,000 square metres of land to the city for other uses. In Vitoria-Gasteiz, we have extended the tram line to the south, reaching the campus and adding three new stops. Meanwhile, we are studying how to reach new areas, such as Salburua and Zabalgana. The Tram service, with more than 8 million passengers, is firmly consolidated in the capital of Alava.

Question: The most important project, given its size and budget, in the Basque Country regarding railways is the high-speed system. What is the situation of the Basque Y?

Question: Antonio Aiz: The Bas-

It is necessary for institutions to analyse the state of transport in the territory, in a coordinated manner.

que Y is a combined network for passengers and goods that will form part of the Atlantic Corridor, a priority project for the European Union. The Basque Government is firmly committed to its development at the technical, economic and political levels. The Basque Country has a financial system that only our self-governing system can assume thanks to the Statute of Autonomy, the Economic Agreement and the Quota.

The rigorous management of these tools regarding the HS project proves the potential that the Quota system has when it comes to building strategic infrastructure projects in the Basque Country. We are the only European region that is directly involved in defining and implementing this priority trans-European railway network. We appreciate the commitments made by the Ministry of Development in recent months, but we are talking about infrastructure that should have been open to the public some time ago.

Question: Access to the Basque provincial capitals still has to be defined. Will this be in place by 2023?

Antonio Aiz: In the Gipuzkoan section, which corresponds to the Basque Government, the construction of the platform will be completed on 12 of the 17 stages, more than 50% of the total route of the corridor, and, regarding the sections that are active, we have reached an implementation level of almost 70-80%. The challenge is now to finish the Bergara hub, which corresponds to the Ministry, and especially the arrival and integration of the high-speed lines in the capitals. San Sebastian will be the first of the three Basque Y terminals to

be built. The Basque Government, through ETS, has already tendered the construction project of the new Atotxa high-speed train station and the construction work will be awarded shortly. We have recently signed an agreement on a project for the new Abando Station in Bilbao, a complicated agreement, which has given the green light to the informative study. Finally, Vitoria-Gasteiz is in a very similar situation to that of Bilbao. The various public administrations are working to configure the project for the capital of Alava, and Adif and ETS teams are working against the clock to define the best possible station. We are still on track to be ready by 2023.

Question: How do you interpret the latest decisions of the Ministry of Development to connect the Basque Y with Pamplona via Vitoria-Gasteiz instead of via Ezkio and connect it with Burgos using only high-speed services and not combined traffic systems, thus relegating freight services?

Antonio Aiz: With regard to the connection with Pamplona, we have made the allegations to the Informative Study and we must now have discussions with the Ministry of Development; it is time to do some rigorous technical work. Both options have their pros and cons, but we still think that the connection via Ezkio is the better option.

Freight trains will also use the Burgos-Vitoria section. If this cannot be done on the new line, it will have to be done on the current line. It makes no sense in the 21st century, after modernizing the network as we are doing, that freight trains cannot travel on the international gauge lines.

Optimet Urban Map: Smarter mobility for passengers

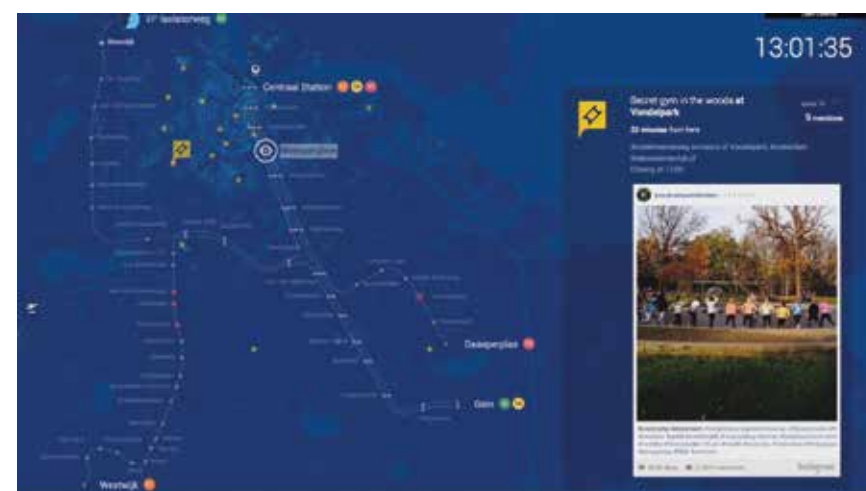


What will mobility be like in the future? Attractive, digital, accessible, clean, efficient, integrated, agile, multi-modal...Alstom innovates in order to ensure that the transport systems become more integrated, more efficient for operators and more attractive for passengers. Alstom's aim is not only to provide rolling stock, services and maintenance but to offer sustainable mobility solutions to a world in profound transformation. In this regard, Alstom Digital Mobility (ADM) and its Smart Mobility Lab in Spain have developed technologies to respond to both the requirements of passengers (punctuality, connectivity, and integration) and of operators (sustainability, fluidity, multi-modality, availability and efficiency). For passengers, Alstom offers, among others, its Optimet Urban-Map solution, a real-time dynamic information system provided to passengers in metro stations. Designed for a collective use, and located in the station, Optimet UrbanMap, allows visualising at a glance the metro network, its activi-

ty, trains position, travel times, service interruptions, and the level of comfort aboard the trains. Optimet UrbanMap also offers a dynamic vision of the city. It indicates places of special interest such as restaurants, museums, sports, etc. Optimet UrbanMap obtains traffic information

from the automatic train supervision system associated to the subway line. City life information is obtained from social media platforms such as Instagram, Twitter and Foursquare, fed by residents and visitors. Data is analysed and selected by a moderator.

from the automatic train supervision system associated to the subway line. City life information is obtained from social media platforms such as Instagram, Twitter and Foursquare, fed by residents and visitors. Data is analysed and selected by a moderator.



Low Carbon Vanadium (LCV) Grooved Rails: the best option for city transport

With a growing number of people living in urban areas, cities need various means of transport to reduce congestion in city centres. Tramways offer a good alternative as they are easier to install than underground lines, they are also less noisy, less costly and more eco-friendly than other means of transport (such as cars or buses). In line with this, ArcelorMittal proposes existing and new tramway and light rail transit (LRT) systems adapted to European operators and latest test track technology. The use of Low Carbon vanadium (LCV) rails, with the addition of very small amounts of Vanadium (less than 0.20%) provides an increased

ARCELORMITTAL PROPOSES EXISTING AND NEW TRAMWAY AND LIGHT RAIL TRANSIT (LRT) SYSTEMS ADAPTED TO EUROPEAN OPERATORS AND LATEST TEST TRACK TECHNOLOGY.

grain refinement throughout the entire rail and not just the outer surface (as rolled Head Hardened rails). This technique results in increased hardness and elongation compared to rails in grade R200, but with even lower carbon content. Also, thanks to the higher strain and grain refinement, after only six months of service, track hardness readings increases up to 30-45 HBW due to the strain hardening produced by wheel/rail interaction.

In addition, since rolling stock wheels are associated with lower speed and low axle weight, the actual wheels

do a smooth grinding on softer steel rails, effectively helping to self-maintain embedded tracks. This method avoids any Rail Contact Fatigue (RCF) or head checks commonly associated with rolled Hardened rails. In fact, experience has shown Low Carbon (softer steel) rails are most suitable for City Transit embedded tracks due to their Low Carbon content allowing for best welding and deposit welding techniques. Thus, extending the life of the rail, and avoiding the high cost of replacing embedded grooved rail and street disruption.



A new reality for railway maintenance

Thanks to the use of XM Reality (technology based on the application of augmented reality), Bombardier engineers receive advice and recommendations in real time for better decision making in the maintenance processes of its Railway Control Solutions (RCS) division, whose team works at the Railway Signaling Excellence Center of San Sebastián de los Reyes. Augmented reality (AR) is a concept where graphics is combined with live data to provide an enhanced video stream. The technology is similar to virtual reality (VR) but with the crucial difference that it provides support for two-way communication using video, audio and graphics. This technological solution allows the optimization of maintenance services, both fixed and on-board installations, making possible the

THIS TECHNOLOGY USED BY BOMBARDIER, BASED ON AUGMENTED REALITY, AS WELL AS REDUCING COSTS AND RESPONSE TIME, CONTRIBUTES TO AN INCREASE IN TECHNICAL CAPACITY, PLACING IT AT A SINGLE CLICK, GUARANTEEING THAT THE SERVICE OPERATION CAN BE DONE IN THE SAFEST AND MOST EFFICIENT WAY.

realization of these works in a faster, more efficient and economic way. The XM Reality, in addition, makes possible the exchange of knowledge in real time between engineers and technicians through the use of augmented reality. Through this system each user uses an application installed on their mobile device / PC or smart glasses. The application connects to the company's servers in the cloud and an encrypted connection between users is made. Once users are connected, they can share video sequences and provide

instructions using hands overlay technology or using text overlay. They can also capture images and on some platforms, video. The use of augmented reality allows to transfer any technical aspect to the expert, instead of making the expert who moves.

This technology used by Bombardier, based on augmented reality, as well as reducing costs and response time, contributes to an increase in technical capacity, placing it at a single click, guaranteeing that the service operation can be done in the safest and most efficient way.

BikeUp!, design and innovation towards a more sustainable urban mobility



The combination of the train and the bicycle use as a form of transport is one of the paths to achieve more sustainable urban mobility models. But for this, it is necessary that the rolling stock is adapted to transport bicycles, making the process simple for the user. The Department of R&D of SEGULA TECNOLOGÍAS, from its International Center of Excellence of the railway located in Zaragoza and in collaboration with the University of Zaragoza, has developed a new concept of bike rack, ¡BikeUp!

THE DEPARTMENT OF R&D OF SEGULA TECNOLOGÍAS, FROM ITS INTERNATIONAL CENTER OF EXCELLENCE OF THE RAILWAY LOCATED IN ZARAGOZA AND IN COLLABORATION WITH THE UNIVERSITY OF ZARAGOZA, HAS DEVELOPED A NEW CONCEPT OF BIKE RACK, ¡BIKEUP!

This system arises to cover an increasing demand from the user and manufacturer, in which the use of the light train is combined with the bicycle, placing it inside the wagon in a simple, comfortable and accessible way, maximizing the space available for the passengers.

BikeUp! is a column-shaped system with a mobile support on the vertical axis, which is fixed on the sides of the train, with a universal design, so it can be easily integrated in any type of wagon, being specifically designed to be installed in line or group, allowing to efficiently manage the train space.



New version of the tCat®, workstation for the measurement and auscultation of catenary and track

TELICE, A CONTRACTOR FOR ELECTRIFICATION, SIGNALLING AND RAILWAY COMMUNICATIONS SYSTEMS, IS CURRENTLY DEVELOPING THE EVOLUTION OF THE WORKSTATION FOR THE AUSCULTATION OF CATENARY TCAT®, MAKING USE OF LIDAR TECHNOLOGY FOR THE CALCULATION OF GEOMETRIC PARAMETERS OF CATENARY AND RAILWAY.

tCat® project

The tCat workstation has been developed to facilitate and speed up the monitoring of catenary parameters: contact wire height and offset, track width and cant, and other parameters for catenary design and maintenance.

The tCat is an easily operable device characterized in the European Norms as a "light weight track geometry measuring device" (LTGMD) which can be adapted to the three

common track gauges (1,000, 1435 and 1680mm).

Its main components are:

- An inertial measurement unit (IMU) with 6 degrees of freedom and integrates an accelerometer and a gyroscope both of three axes.
- A global navigation satellite system (GNSS).
- A differential transformer linear variation (Linear Variable Diffe-

rential Transformer LVDT) used to calculate the track axis.

- A digital camera.
- An odometer (rotary encoder) with high precision.
- A LIDAR system (Laser Imaging Detection and Ranging), that allows a great speed and precision in the measurements.
- A new battery will guarantee the autonomous operation of the equipment for at least 8 hours

Closure

TELICE once again demonstrates its innovative spirit by creating a commercial product which, even in its development phase, stands out for its ease of use, speed and precision.

Advanced tram technology for the Granada Metro

SIEMENS HAS SUPPLIED THE SIGNALING SYSTEM THAT INCLUDES ADVANCED TECHNOLOGIES SUCH AS TRAMWAY INTERLOCKINGS, CONTROL AND MONITORING SYSTEM AND AUTOMATIC PROTECTION SYSTEM.

The Granada Metro has already transported more than three million passengers since its commissioning on September 21. The line is a transport infrastructure promoted by the Ministry of Development and Housing, with almost 16 kilometers, 23 surface stops, three buried stations and a deposit. It crosses the city from north to south, interconnecting it with the municipalities of Albolote, Maracena and Armilla.

The Public Works Agency of the Junta de Andalucía (AOPJA) awarded to the Joint Venture SETRA -composed of Siemens, Act Sistemas and Acisa-

the contract for the development and installation of signaling systems, security and communications of the Granada Light Rail in 2009.

Siemens has been responsible for supplying the signaling system with backup ATP system, the energy remote control system and SCADA for fixed installations; the ticketing system; the fleet management system and the passenger information system public address and intercom, closed-circuit television and access control.

The signaling system developed by Siemens includes the most advanced technologies for trams: Trackguard

SICAS S7 tram interlockings, VICOS OC111 monitoring and control system, IMU100 inductive transmission system, ZSI127 automatic protection system, as well as track equipment such as track circuits TRACON, axle counters, IMU and IMU beacons, beacons and ATP LEU and LED signals.

The energy remote control is based on the VICOS RSC platform and the fixed installations SCADA on the WinCC OA platform, both from Siemens.

The access control system is based on the Siemens SiPASS and is integrated with the closed circuit television FlexiVideo of Siemens Building Technologies and the SCADA. All the UTE scope systems have been integrated into the SCADA environment thanks to the extensive configuration capabilities of the WinCC OA.



Photo courtesy of AOPJA.

New test bench for traction systems, at full track

Tests for medium and Low power traction equipment for European market have been already accomplished. The new test bench, has been installed in Zamudio and has required a relevant investment. It comprises the installation of cells, traction motors and control and monitoring systems, together with the traction and auxiliary converters. The main objectives of system tests are to optimize equipment control parameters, to analyze all the traction equipment characteristics and the accomplishment of

THE NEW PREMISES, ADDED TO THE EXISTING ONE AND TO THE HIGH POWER ELECTRONIC LABORATORY, WILL ALLOW US TO IMPROVE OUR PRODUCTS AND SYSTEMS AND TO GO FURTHER ON OUR R&D ACTIVITIES, ONE OF INGETEAM GROWTH ENGINES.

the required standards for every project. Optimization of energy efficiency, route profile simulations and the evaluation of the different protection systems of the equipment are other key issues that are analyzed, together with the thermal characterization and re-

sistance test to extreme weather conditions. The new premises, added to the existing one and to the High Power Electronic Laboratory, will allow us to improve our products and systems and to go further on our R&D activities, one of INGETEAM growth engines.



High security thanks to beacon technology

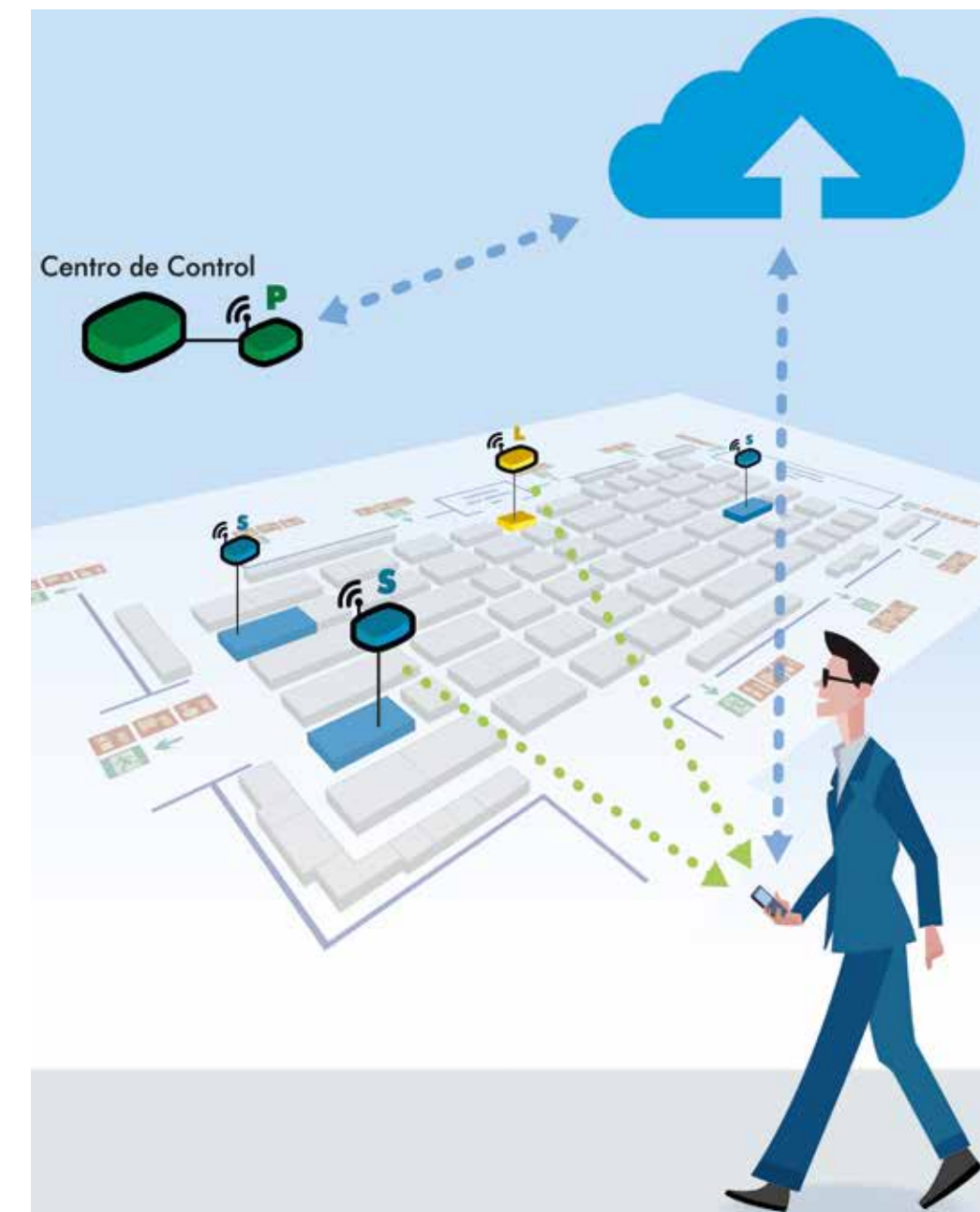
One of those intelligent products that we are working on is the security signalling with beacon technology located inside. A beacon is a small and energy-efficient wireless device that emits information through Bluetooth with a maximum scope of 50 meters. They can be detected by close devices, like smartphones or tablets and enable interaction between the signs and the user. The beacons are part of the sign. They are integrated during the production process and are invisible for the user. The system is energetically autonomous: it catches the necessary energy of the environment to feed themselves and keep them ready for operation.

Through an App that works as an interface between the beacons and the user, new and interesting features like the following can be managed:

- Guide the user. The user is given information of interest about a determined place or about the environment in general.
- To promote an accessible environment. It can provide information to visual or hearing-impaired people to ease their guiding in normal conditions and also in case of emergency.
- Guide in case of emergency. It enables a safer evacuation with the usual signalling. In determined situations, the closer emergency exit could not be the safest.
- To verify the route. It is useful for verifying the correct compliance of the surveillance tour or maintenance routines.

This product has been developed by Implaser in collaboration with the investigation group of the University of Zaragoza HowLab, and Inycom, an enterprise specialized in ICT ser-

VICES AND SOLUTIONS. THE BEACONS ARE AIMED AT THE 4.0 INDUSTRY, THE NEW TECHNOLOGICAL REVOLUTION WHICH RELIES ON THE INTERCONNECTION OF THE CONVENTIONAL SIGNS WITH THE INTERNET.



VICES AND SOLUTIONS. THE BEACONS ARE AIMED AT THE 4.0 INDUSTRY, THE NEW TECHNOLOGICAL REVOLUTION WHICH RELIES ON THE INTERCONNECTION OF THE CONVENTIONAL SIGNS WITH THE INTERNET.

cons are aimed at the 4.0 industry, the new technological revolution which relies on the interconnexion of the conventional signs with the internet.

A project that will make it possible to book a trip on different modes of transport in europe with a single **click**

The company is leading the Connective project (Connecting and Analyzing the Digital Transport Ecosystem), which plays a key role in Shift2Rail since its goal is to create the framework and tools that will support all the developments that are being undertaken in the various projects of the IP4 program "IT Solutions for Attractive Railway Services", to which it also belongs.

Connective will facilitate the digital transformation of the transport ecosystem by means of cloud-based interoperable platform on which transport networks, services and providers will share and consume information. Thanks to the use of semantic interpretation technology, service providers will be able to join the ecosystem with minimum effort and cost and make their data available to other services and users in a transparent manner.

The definition, development and implementation of this framework of reference, which not only comprises access to information without affecting existing systems but also tools

INDRA HAS STARTED WORKING ON THE DESIGN AND DEVELOPMENT OF AN INTEROPERABILITY FRAMEWORK THAT WILL LAY THE FOUNDATIONS FOR THE FUTURE EUROPEAN TRANSPORT PLATFORM THAT WILL ALLOW CITIZENS TO PLAN A TRIP AND BOOK A TICKET TO THEIR DESTINATION AT A SINGLE CLICK, INCLUDING PRIVATE VEHICLE PARKING AS WELL AS JOURNEYS BY TRAIN, PLANE, SUBWAY AND/OR BUS, AND EVEN CAR SHARING.

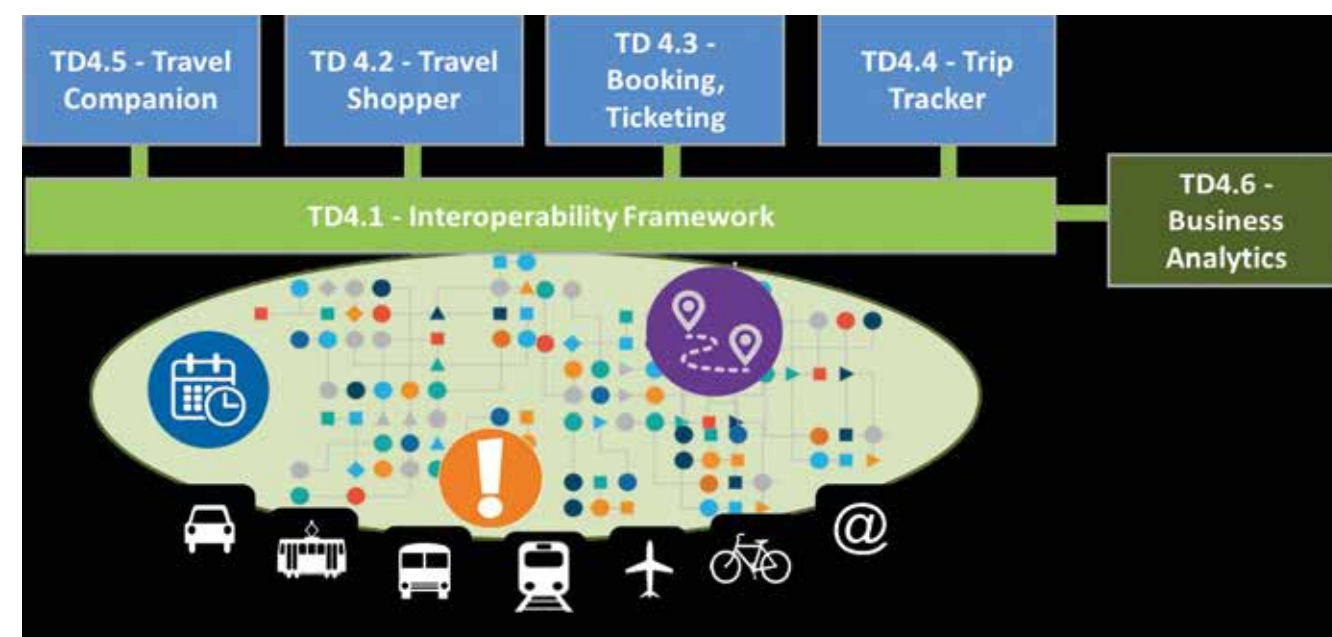
and development environments, will provide citizens with a fully integrated and customized transport experience while making railway services more attractive. The goal is to facilitate multimodal travel combining different methods of public and private transportation, connecting the first and last mile in long-haul trips.

"The goal is to facilitate the passengers' use of trains, planes, buses, and subway in international routes without having to access four different reservation systems", explains Berta Barrero, Head of the Indra Transport market. Barrero also points out that "thanks to the integration of these travel services with the support of innovative digital technologies, the user can gain access through a single point that's trans-

parent, simple and intuitive".

Fully integrated data obtained through the new framework and from users themselves will provide valuable information, while big data and business analytics technology will improve the operation of the networks and the user experience.

One of the key technologies underpinning the Connective project will be Minsait IoT Sofia2, the Internet of Things platform with big data and cloud capabilities developed by Indra's digital transformation unit, which is a technological benchmark for interoperability between networks and devices. In this case, it will be applied to transport, reinforcing Indra's experience and technology for integrated mobility management.



SIEMENS
Ingenuity for life

Intelligent infrastructures
don't just react.
They anticipate.

Thinking mobility further through advanced
software solutions.

New ideas, concepts, and technologies are in great demand with our ever-increasing need for mobility.

With over 160 years of experience in passenger and freight transportation and our IT know-how, we are constantly developing new and intelligent mobility solutions to provide greater efficiency and safety. Prescriptive monitoring systems reduce train downtime and increase availability.

Dynamic control systems optimize traffic flow and throughput. And electronic information and payment systems improve passenger experience.

It's in how we electrify, automate and digitalize transport infrastructures that we're setting the benchmark for tomorrow's mobility - today.

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

The future is already here!



Ana Santiago
CEO of Sisteplant

THE COMPETITIVE ADVANTAGE WILL NOT BE BASED ON PRODUCTIVITY AND COST REDUCTION, BUT ON THE ABILITY TO INNOVATE DIFFERENTIALLY.

res will evolve to adapt to all these changes and be emphatically more agile both in the flow of information and in decision-making; processes will have a less intensive industrial content and therefore the competitive advantage will not be based on productivity and cost reduction, but on the ability to innovate differentially, taking the customizations to the extreme, seeking through them the differentiation of our product and taking advantage of all the options that technology bestows upon us.

Our initial reflection is if, as managers, we are really prepared to dream and visualise the company disruptively, or on the contrary we feel comfortable maintaining "Business as Usual". The truth is that, in the context of our industry, a strategy geared towards advanced manufacturing has to comply with a series of essential features. On the one hand, it must ensure channels that activate creativity throughout the organisation, generating value around the intangible assets of the company, and at the same time, ensure a dual management that harmonises the short-term plans with the long-term strategy.

Some essential elements to take into account when designing the transformation plan of our companies are the following:

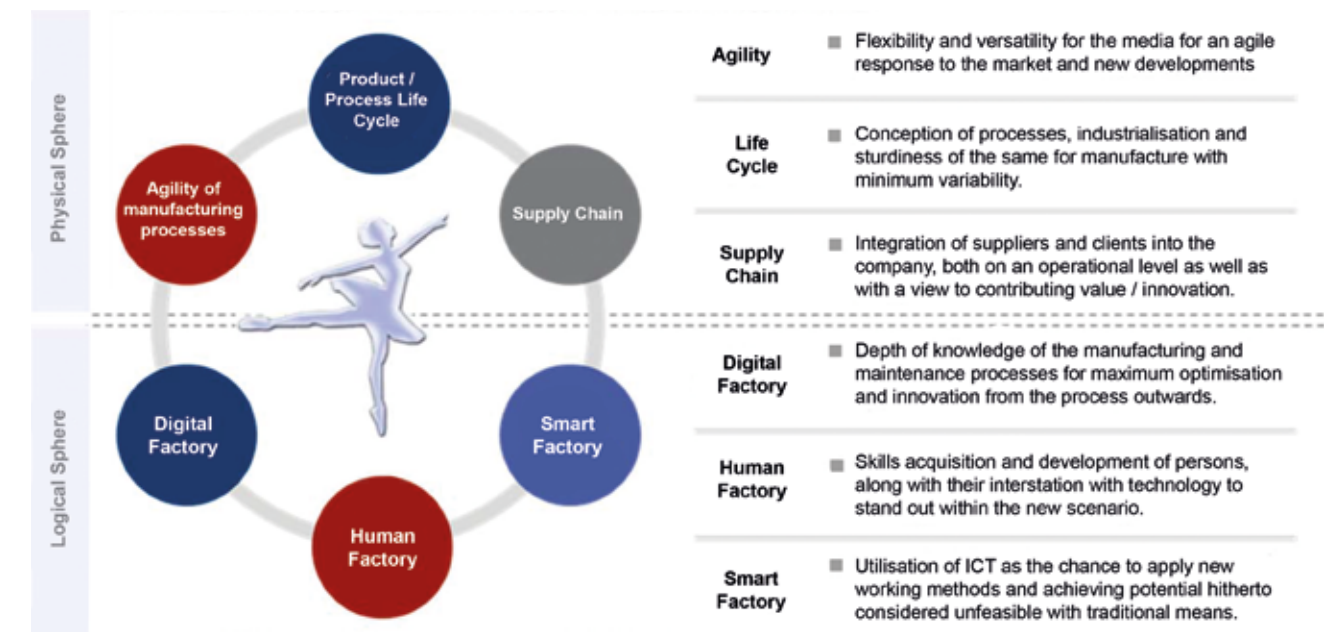
Smart elements will have to be spread out evenly. Here the measurable aim is clearly to guarantee a flow of real and effective value with innovations of scope in product and process. A flow started by many people from all layers of the organisation and not merely through the use of "gurus". The conception of functionally more integrated product-process-quality and maintenance engineering areas

and their operational operating model are critical.

Supply chains will have to be much more agile. And especially more efficiently synchronised, with this meaning preparing our organisation first so that it is ready to synchronise later with others upstream and downstream. In this section, cybersecurity increasingly takes on more weighting.

We must be unyielding against the current restrictions of our processes. To enable mass customisation, in forthcoming years, it will be key both the re-adaptability and re-configurability of the processes, as well as the work in unitary series. Today, many installations still necessarily work in batches, for this reason it will be necessary to make a work of layout of the same, working very closely with manufacturers and integrators, and relying on the agility of development of start-ups.

The implementation of continuous flow in the plant is no longer an option, but moreover a necessity. Regardless of the size of the product to be assembled, it is necessary to develop synchronised processes, where everything flows around a main line that drags the remainder of processes. Everyone knows this as manufacturing, statics conceal everything untoward. Only in this way will we obtain reliability of the final term, significant improvements in the process of industrialisation of the design, motivation of the people, both in terms of the main line of assembly and auxiliary tasks, and also their teamwork. A structured plan for the incorporation of emerging technologies is necessary, exploring the opportunities of application of some of those that nowadays are coming to the fore:



A structured plan for the incorporation of emerging technologies is necessary.

- Nano-manufacture, which will soon be applied safely by way of "doping" in situ, or in the supplier of raw materials.
- Additive manufacturing, whose application is more viable in the short term, and in many cases can transcend from the prototype to the ultra-short or unitary series of certain components.
- Anthropomorphic robotics, which can facilitate smart team work with people, mainly on assembly lines.

When new technologies or even technological enablers are discussed, the key message is that we cannot wait to incorporate them when they are already mature. In order to obtain the maximum benefit from its application, it is necessary to start "playing" with them, initially in a laboratory environment, to guarantee that whenever it is necessary to have the required knowledge. In addition, the simple fact of experimenting will help us to create and innovate.

Plus, digitalisation must not be overlooked. Smart and proactive real-time modelling and simulation

technologies of using the Promind model® at Sisteplant. The cross-influence of design variables and process parameters, of events, of quality problems, of NDTs results and of combined tolerance stacks, give them all the sense as critical tools to facilitate a distributed technological intelligence to the operators. We must forget that digitisation is a means, and not an end.

In short, it is a question of drafting a plan of integral transformation that contemplates all dimensions. The Tecnoplant transformation methodology, developed by Sisteplant, allows for the development of a strategic Road Map, with a horizon of between 3-5 years, taking into account both the physical and the logical and / or digital plane.

To finish with, I would like to make a brief reflection on some common mistakes in these transformation processes:

- Simplistic approaches that confuse the strategy towards advanced manufacturing with "smartization" or digitalisation without further ado.

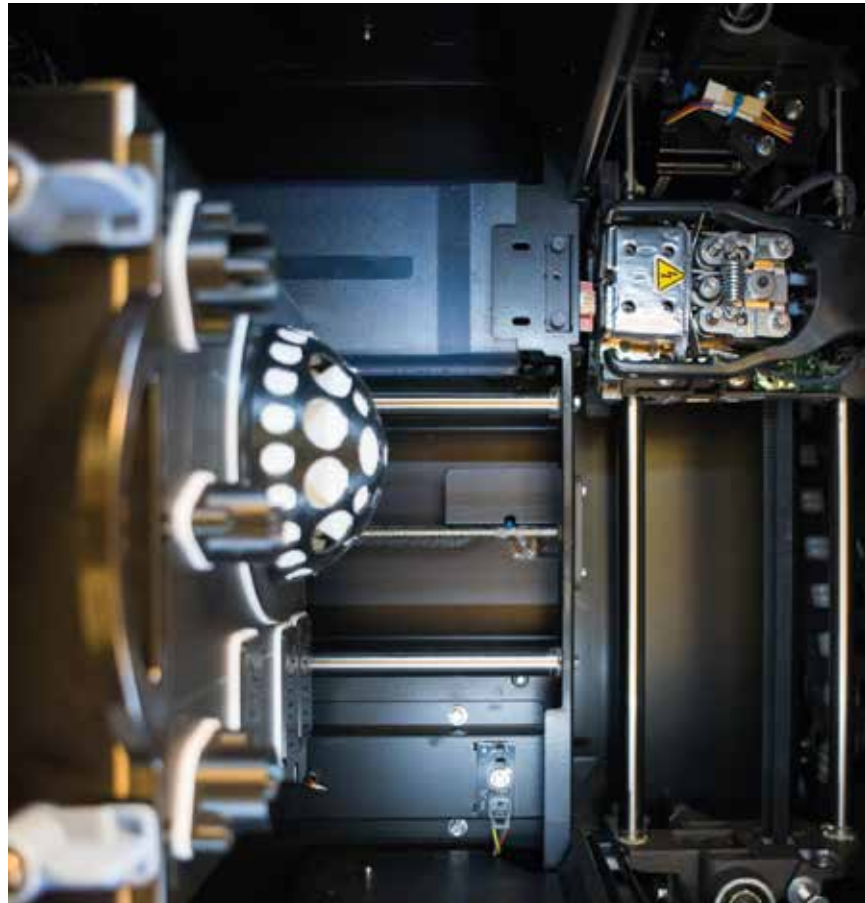
- Development plans based exclusively on the purchase of technology, which can be accessed by all and sundry.
- Overlooking the importance of people, few boast a plan that ensures the development of the capabilities that will be required within this new framework.
- Resistance to collaborative strategies or those that provide greater transparency between customers and suppliers.
- Lack of harmonisation between short-term improvement plans (the urgent) and the future factory strategy (of the utmost importance).

The "popular" vision must change: achieving agile, flexible, versatile, intelligent, ecological and profitable factories is not just a matter of investment in technologies. We will never have state-of-the-art factories with average facilities in line with the demands of today and our aptitudes and attitudes. The time has come to dream bravely. The "popular" vision must change: achieving agile, flexible, versatile, intelligent, ecological and profitable factories is not just a matter of investment in technologies. We will never have state-of-the-art factories with average facilities in line with the demands of today and our aptitudes and attitudes. The time has come to dream bravely.

The first factory 4.0 of the railway sector in Spain

IN THE FRAME OF THE "FACTORY OF THE FUTURE" PROGRAM THAT ALSTOM GROUP IS DEVELOPING WORLDWIDE, ALSTOM'S INDUSTRIAL SITE IN SANTA PERPÈTUA DE MOGODA (BARCELONA) WILL BECOME THE FIRST FACTORY 4.0 OF THE RAILWAY SECTOR IN SPAIN.

The plan includes both integrating the latest technologies and maximising its human resources through training plans. The Alstom site in Santa Perpètua has already started to applying intelligent systems in the industrial processes based on big data, 3D technologies, robotics and augmented reality, among other technologies. These advances will allow Alstom to improve its production chains and processes in order to be more competitive, to design and manufacture trains of the future and to improve the experience of passengers, drivers and operators. The plant of Santa Perpètua, inaugurated in 1994, is able to manufacture, in the same facilities, high-speed trains, regional or suburban trains, trams, metros, etc.



The future of mobility is digital

Mobility represents a basic need since the dawn of humanity. Consequently, the growing interest in how we will move tomorrow is more than a trend, for several reasons. On the one hand, the demand for mobility is expected to increase more rapidly in the future. On the other, the resources for greater growth are limited, since even the space in front of our homes for roads and railways is increasingly scarce. How can we resolve this contradiction?

Punctual, predictable, convenient journeys

Train passengers want to be informed and entertained, to use multiple modes of transport while avoiding delays and congestion, and increasingly to travel CO₂-neutrally wherever possible. Operators are responding to this bundle of requirements by increasing transport capacities, by trying to make better use of the available infrastructure, and by improving the attractiveness and thus the acceptance of public transport through a variety of individual measures. By increasing technical availability, we help to stabilize operations. By providing support with infrastructure and fleet management, we enable operators to optimize their capacity profiles. And in terms of travel convenience, we are designing our rail vehicles and equipment with the utmost flexibility.

Increasing availability and transport capacity

In every case, the starting point is digitalizing a maximum number of processes and functions. Technical availability, for example, is only possible with guaranteed, time-optimized service provision and efficient maintainan-

ce. Also essential are vehicles that intelligently send relevant service data, and analysis systems that can reach the right decisions on the basis of this data. For instance, the high-speed service between St. Petersburg and Moscow using Velaro RUS trains, which has maintained an average technical availability of 99.6 percent for years, or in Spain, where the Velaro E has over 99.8 percent availability.

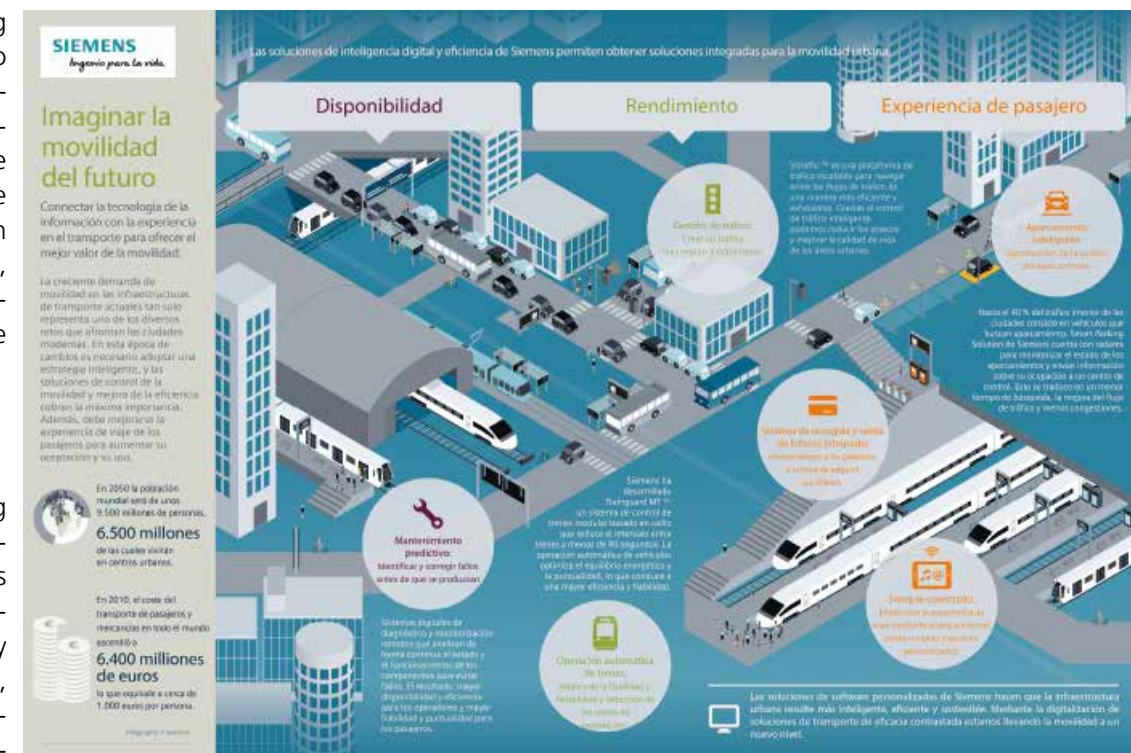
Optimizing capacity profiles is another goal that is only made possible by digitalization and powerful software solutions. The European Train Control System (ETCS) demonstrates this clearly. Standardized throughout Europe and monitored by electronic control centers, ETCS is designed to prevent trains from traveling too quickly or moving into an occupied block. At the same time, it allows for shorter headways and lower costs for maintenance and operation of stationary systems, be-

cause the conventional optical rail signals alongside the track are no longer required.

Extra convenience is simple with the cloud

For travelers, smartphones and data clouds, online ticket purchasing and journey information updates have become part of everyday travel.

This means it is now even easier to upgrade vehicles and infrastructure with convenient passenger information, entertainment and tailored services. Payment systems also continue to evolve, even electronic tickets will soon disappear from view altogether as they are replaced by Be-in/Be-out systems. Ideally travelers will be able to select any form of transport, be automatically checked in and out when they get on or switch modes, and receive a single, itemized mobility bill at the end of the month.



MEMBERS DIRECTORY

INFRASTRUCTURE

Engineering and consultancy

- AKKA Technologies Spain
- Aquafrisch, S.L.
- Ardanuy Ingeniería, S.A.
- CAF Power & Automation
- CAF Turnkey & Engineering
- Colway Ferroviaria, S.L.
- Creativitic Innova, S.L.
- Gantrex S.A.
- Idom
- Ineco
- Inserail, S.L.
- MB Sistemas, S.Coop.
- NEM Solutions, S.L.
- Newtek Sólidos
- LADICIM
- Limmat M&M S.L.
- Segula
- Sener Ingeniería y Sistemas, S.A.
- Tecnalia
- Tecnival Infraestructuras
- Teltronic, S.A.U.
- TPF Getinsa-Euroestudios
- Typsa
- Vicomtech

Civil engineering construction

- Azvi
- COMSA
- Instalaciones Inabensa, S.A.
- Inserail, S.L.
- Parrós Obras, S.L.
- PRECON - Prefabricaciones y Contratas, S.A.U.
- Pretensados del Norte

Electrification

- Alstom Transporte, S.A.
- Ardanuy Ingeniería, S.A.
- Arteche
- Idom
- Ineco
- Ingeteam Power Technology, S.A.
- Inserail, S.L.
- La Farga Lacambra, S.A.U.
- Luznor
- Parrós Obras, S.L.
- SEMI, S.A.
- Telice
- TPF Getinsa-Euroestudios
- Typsa

Fixed material: components and equipment

- Alstom Transporte, S.A.
- Amurrio Ferrocarriles y Equipos, S.A.
- Aquafrisch, S.L.
- Arteche
- Duro Felguera Rail, S.A.U.
- Elektra - Grupo Elektra, S.A.
- Gantrex S.A.
- HICASA - Hierros y Carbones, S.A.
- Idom
- Ikusi
- Ineco
- Inserail, S.L.
- ITK Ingeniería, S.A.
- JEZ Sistemas Ferroviarios, S.L.
- LADICIM
- Parrós Obras, S.L.
- Siemens Rail Automation, S.A.U.
- Talleres Alegría, S.A.
- Thales España GRP, S.A.U.
- Valdepinto, S.L.

Security

- Alstom Transporte, S.A.
- Ardanuy Ingeniería, S.A.
- DSAF. Dinámicas de Seguridad
- Ecocomputer S.L.
- Idom
- Ikusi
- Implaser 99, S.L.L.
- Ineco
- SICE
- Siemens Rail Automation, S.A.U.
- Telice
- Tecnival Infraestructuras
- Thales España GRP, S.A.U.

Signaling and traffic control

- Alstom Transporte, S.A.
- Ardanuy Ingeniería, S.A.
- Bombardier España
- Cables y Comunicaciones Zaragoza S.A.
- CAF Signalling
- DSAF. Dinámicas de Seguridad
- GMV Sistemas S.A.U.
- Idom
- Ikusi
- Implaser 99, S.L.L.
- Indra Sistemas, S.A.

- Ineco
- Luznor
- P4Q Electronics, S.L.
- SEMI, S.A.
- SICE
- Siemens Rail Automation, S.A.U.
- Telice
- Tecnalia
- Tecnival Infraestructuras
- Teltronic, S.A.U.
- Thales España GRP, S.A.U.
- TPF Getinsa-Euroestudios
- Typsa

Maintenance

- Alstom Transporte, S.A.
- Amurrio Ferrocarriles y Equipos, S.A.
- Azvi
- COMSA
- Danobat
- Duro Felguera Rail, S.A.U.
- Idom
- Ikusi
- Ineco
- Inserail, S.L.
- Instalaciones Inabensa
- LADICIM
- Parrós Obras, S.L.
- Siemens Rail Automation, S.A.U.
- Telice
- Thales España GRP, S.A.U.

Stations

- Alstom Transporte, S.A.
- Ardanuy Ingeniería, S.A.
- Idom
- Ikusi
- Ineco
- Luznor
- Parrós Obras, S.L.
- Thales España GRP, S.A.U.
- Typsa

INFORMATION AND DATA SYSTEMS

Systems and equipment for collection and ticketing

- Alstom Transporte, S.A.
- Ardanuy Ingeniería, S.A.
- Calmell Group
- Ecocomputer
- Idom
- Ikusi

- Indra Sistemas, S.A.
- SICE
- Thales España GRP, S.A.U.

Communications, Information systems and passenger information equipment

- Alstom Transporte, S.A.
- Aoife Solutions, S.L
- Ardanuy Ingeniería, S.A.
- Cables de comunicaciones Zaragoza, S.L.
- CAF Power & Automation
- Ecocomputer
- Icon Sistemas de Información y Datos
- Idom
- Ikusi
- Indra
- Ineco
- P4Q Electronics, S.L.
- SICE
- Siemens Rail Automation, S.A.U.
- Tecnalia
- Telice, S.A.
- Teltronic, S.A.U.
- Thales España GRP, S.A.U.
- TPF Getinsa-Euroestudios
- Typsa
- Vicomtech

ROLLING STOCK

Passenger car manufacturers

- Alstom Transporte, S.A.
- Bombardier España
- CAF - Construcciones y Auxiliar de Ferrocarriles, S.A.
- Cetest
- Inserail, S.L.
- Patentes Talgo, S.L.
- Stadler Rail Valencia S.A.U.
- Zfoam, S.L.

Manufacturers of freight wagons

- Alstom Transporte, S.A.
- Bombardier España
- CAF - Construcciones y Auxiliar de Ferrocarriles, S.A.
- Talleres Alegría, S.A.
- Stadler Rail Valencia S.A.U.

Locomotive manufacturers

- Alstom Transporte, S.A.
- Bombardier España

- CAF - Construcciones y Auxiliar de Ferrocarriles, S.A.
- Patentes Talgo, S.L.
- Stadler Rail Valencia S.A.U.

EQUIPMENT AND COMPONENTS ROLLING STOCK

Traction and control systems

- Alstom Transporte, S.A.
- CAF Power & Automation
- Cetest
- CITEF
- Ingeteam Power Technology, S.A.
- P4Q Electronics, S.L.
- Patentes Talgo, S.L.
- Tecnalia

Components

- Albatros, S.L.
- AL-KO Record
- Alstom Transporte, S.A.
- Arteche (Electrotécnica Arteche Smartgrid, S.L.)
- CAF Power & Automation
- Cetest
- Elektra
- Fundiciones Garbi, S.A.
- Funor, S.A.
- Gamarra, S.A.
- Hispacold
- Ikusi
- Indra
- Ingeteam Power Technology, S.A.
- Metalocaucho, S.L.
- MGN Transformaciones del Caucho, S.A.
- P4Q Electronics, S.L.
- Siemens Rail Automation, S.A.U.
- Tecnalia
- Teknorail Systems, S.A.
- Valdepinto, S.L.

Equipment and machinery for the manufacture of rolling stock

- Aquafrisch, S.L.
- Cetest
- Danobat
- MB Sistemas, S.Coop.

Interiors

- Alstom Transporte, S.A.
- Colway Ferroviaria, S.L.
- Idom

- Kelox, S.A.
- Teknorail Systems, S.A.
- Valdepinto, S.L.
- Zfoam, S.L.

Security

- Albatros, S.L.
- Alstom Transporte, S.A.
- Ardanuy Ingeniería, S.A.
- Cetest
- DSAF. Dinámicas de Seguridad
- Idom
- Ikusi
- Implaser 99, S.L.L.
- Indra
- Lander Simulation & Training Solutions, S.A.
- Luznor
- Siemens Rail Automation, S.A.U.
- Tecnatom
- Thales España GRP, S.A.U.

Maintenance

- Albatros, S.L.
- Alstom Transporte, S.A.
- Aquafrisch, S.L.
- CAF - Construcciones y Auxiliar de Ferrocarriles, S.A.
- Cetest
- Danobat
- Goratu
- Ikusi
- Ingeteam Power Technology, S.A.
- Kelox, S.A.
- Luznor
- Metalocaucho, S.L.
- NEM Solutions, S.L.
- Patentes Talgo, S.L.
- Siemens Rail Automation, S.A.U.
- Talleres Alegría, S.A.
- Tecnalia
- Teknorail Systems, S.A.
- Teltronic, S.A.U.
- Stadler Rail Valencia S.A.U.

Quality control, inspection and certification

- Tecnatom

OTHERS

- Encaix Comunicació Visual, S.L.
- Lamaignere Cargo, S.L.
- Bigda Solutions (Meteo for Energy, S.I.)

**AKKA TECHNOLOGIES SPAIN, S.L.U.**

► Martínez Villergas, 52 Bloque C
28027 Madrid (MADRID)
► P: +34 91 649 61 90
► Fax: +34 91 684 03 72
► javier.girbau@akka.eu
► www.akka-tecnologies.com

Akka Technologies Spain develops engineering and consulting projects with close to 400 consultants assigned to the main technological sectors. In the railway sector, they carry out projects related to rolling stock, track infrastructure and signalling. With regard to operational railway safety, the firm develops Certification activities, carrying out independent safety assessments (ISA) on multiple systems.

**ALBATROS, S.L.**

► Ruiz de Alarcón, 13 - 3º
28014 Madrid (MADRID)
► P: +34 91 495 70 00
► F: +34 91 495 70 06
► af@albatros-sl.es
► www.albatros-sl.es

Albatros Corporation is specialised in the design, manufacture, commercialization, and maintenance of equipment for the railway industry.

Albatros is formed by various units of engineering and manufacture in Spain as other countries.

We have a team of over 500 employees, selling over 100 million Euros a year, specially on export markets, with over 27,000 static converters, 35,000 passenger information systems, 6,000 HVAC systems, 10,000 WC modules and a variety of designs for the exterior as the interior of the trains, metros and tramways all over the world.

**ALSTOM TRANSPORTE, S.A.**

► C/ Martínez Villergas 49, edificio V
28027 Madrid (MADRID)
► P: +34 91 334 58 00
► F: +34 91 334 58 01
► german.ruiz@transport.alstom.com
► www.alstom.com

As a promoter of sustainable mobility, Alstom Transport is the only railway manufacturer present in the full spectrum of transport systems, equipment and services. The company offers a complete range of high performance products: rolling stock, signalling, maintenance and modernisation, infrastructure and integrated solutions. In Spain, Alstom Transport employs around 2000 people in 19 working sites, has a manufacturing site in Barcelona and develops R&D programmes both for rolling stock and railway signalling and safety projects. The technological laboratory located in Madrid has become a benchmark for signalling projects throughout the world.

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

► Maskuribai, 10
01471 Amurrio (ARABA)
► P: +34 945 89 16 00
► F: +34 945 89 24 80
► info@amufer.es
► www.amufer.es

Amurrio Ferrocarril y Equipos, S.A. is one of the international market leaders in the design, production and installation of railway materials. Our rolling stock interchanges and crossings are installed in high-speed rail lines, underground lines, tram lines, and conventional railways throughout Europe, Asia, America and Africa. In the area of metal foundry, we have the experience, the knowledge and the people to produce, process and mechanize machine tool parts and sets of great technical complexity in carbon steel manganese steel and other steel alloys.

**AOIFE SOLUTIONS, S.L (GALGUS)**

► Itálica, 1 Pª Planta
41900 Camas (SEVILLA)
► P: +34 955 38 23 28
► francisco.campins@galgus.net
► www.galgus.net

The software developed by Galgus, whose trading name is CHT (Cognitive Hotspot Technology), may be installed in any WiFi access point, irrespective of the manufacturer and its technology.

Upon installation of the software in a WiFi access point, this will become "smart", thus being capable of measuring what is occurring in the environment and the WiFi network itself, of sharing this information with other CHT access points and making decisions in tandem to optimise the operational functionality of the WiFi network.

Measurements taken on trains display that the use of CHT technology in WiFi access points improves the performance of a WiFi network by between 4 and 8 times.

**AQUAFRISCH, S.L.**

► C/ Ignacio Zuloaga, 10
28522 Rivas Vaciamadrid (MADRID)
► P: +34 91 380 03 33
► F: +34 91 778 60 02
► aquafrisch@aquafrisch.com
► www.aquafrisch.com

Aquafrisch is a service oriented company. Our task is to provide our customers needs with reliable results.

Aquafrisch provides a wide offer in equipment and services in both working fields for the company:

1. Aquafrisch Rail: solutions for railway equipment in depots and workshops.
2. Aquafrisch Agua: solutions for water

treatment both in consumption and waste waters.



ArcelorMittal

ARCELOMITTAL ESPAÑA, S.A.

► Apdo. 570. Edificio Energías, 2ª pl.
33691 Gijón (ASTURIAS)
► P: +34 985 18 77 50
► rails.specialsections@arcelormittal.com
► www.rails.arcelormittal.com

ArcelorMittal is the world's leading steel and mining company and it is part of a small group of rail manufactures whose production has developed notably in the specialized high-speed, heavy-haul, metro, conventional lines and other applications are light rail and tram in the different qualities of normal carbon steel, micro alloyed and head hardened rails. ArcelorMittal quality has been recognized by customers around the world, from Europe through Asia to Oceania, America and Africa.

Next time you travel by train, no matter the continent where you are, you may be doing it on rails manufactured by ArcelorMittal.

**ARDANUY INGENIERÍA, S.A.**

► Avda. Europa, 34
28023 Madrid (MADRID)
► P: +34 91 799 45 00
► F: +34 91 799 45 01
► madrid@ardanuy.com
► www.ardanuy.com

Ardanuy is a consultancy company that specializes in studies, designs, works management and technical consultancy pertaining to Rail, Metro, Tram and Cable Transport. The company was founded in December 1992 and is made up of a team of over 100 Engineers and Architects.

Other experts also act as consultants to Ardanuy staff on specific projects.

In Spain, Ardanuy carries out work from offices in Madrid, Barcelona, Valencia, Seville and Tenerife. It also has offices in Lithuania, Poland, India, Colombia, Algeria and USA.

Ardanuy has always had a marked international vocation. Currently over 90% of new contracts are won on the international market, in Western Europe: United Kingdom, Ireland and France; Central and Eastern Europe: Poland, Bulgaria, Latvia, Lithuania; America: Bolivia, Chile, Colombia, Mexico, Peru, USA; Africa: Morocco, Mozambique, Algeria, Egypt, South Africa; and Asia: India, Vietnam, Kazakhstan.

**ARTECHE (ELECTROTÉCNICA ARTECHE SMARTGRID, S.L.)**

► Derio Bidea, 28
48100 Mungia (BIZKAIA)
► P: +34 94 601 12 00
► F: +34 94 615 56 28
► aol@arteche.com
► www.arteche.com

Arteche Group's business is focused on providing equipment, applications and solutions for the electricity and railway sector worldwide. In power generation, transmission, distribution, industry, and railway technologies, the group has become a key player in the search for answers to new challenges. A position maintained by a deep knowledge of the different international electricity systems, efficient client-oriented organization and remarkable investment in research and development.

This is shown by over 50% increase in the brand references in the past five years. Arteche's decisions over the years made our group a symbol of reliability, quality and trust, both in solutions and in corporate relations.

Corporate alliances have taken a key role in Arteches's history, becoming and asset which has contributed to our international growth and to the development of innovative solutions.

**AZVI**

► C/ Almendralejo, 5 41019 SEVILLA
► P: +34 954 999 320
► F: +34 954 999 200
► azvi@azvi.es
► www.azvi.es

Azvi is a hundred-year-old Company specialised in Civil Works whose origins are in railways, forming part of the history and evolution of the railways and its infrastructures in Spain and abroad. Throughout these years, Azvi has participated in numerous construction, rehabilitation, conservation and maintenance projects over more than 1,000 kilometres of track, of which almost 450 km have been High-Speed Rail built within the last 25 years.

Azvi also has a large and modern machinery park which allows the company to carry out works with its own machines and a Logistics Centre equipped with modern facilities and state of the art resources in order to centralize a variety of support services to railway activity, such as MachineryPark, materials, maintenance, checking and repairing shops. Research and Development is also an important issue for Azvi. Through its own R&D department, Azvi invests in railway research and development, in collaboration with various public and private entities and investigation groups.

**BIGDA SOLUTIONS (METEO FOR ENERGY S.L.)**

► C/ Albert Einsten, 15 Parque Álava
01510 Miñano Álava (VITORIA)
► P: +34 945 771 085
► amaia@bigdasolutions.com
► www.bigdasolutions.com

The company undertakes development projects involving Big Data and artificial Intelligence technology to optimise companies' productive processes and energy consumption. Amongst other endeavours, they carry out advanced analytical projects,

data analysis techniques, to define scenarios in real time and predict future behavioural trends. On the other hand, through machine learning techniques, they make predictions, based on a set of data that is fed back and improved with new information.



BOMBARDIER SPAIN

► Complejo Miniparc III – Edificio K
1ª Planta C/Caléndula 93 - E28109
Soto de la Moraleja, MADRID

► P: +34 91 658 55 39

► F: +34 91 650 75 18

► susana.bargsten@es.transport.
bombardier.com

► www.bombardier.com

Bombardier Transportation, a global leader in rail technology, offers the broadest portfolio in the rail industry.

Bombardier Transportation Spain is one of the leading exporters of the Spanish railway industry, employing more than 750 people in its plants and offices in Trápaga (Biscay), San Sebastian de los Reyes and Alcobendas (Madrid), Madrid and Barcelona, and taking part in some of the major railway projects in the country. Its Propulsion Systems plant located in Trápaga (Biscay) and its Centre of Excellence in Rail Signalling Engineering located in San Sebastian de los Reyes (Madrid) are world top technological centres, leading the requests for Bombardier's propulsion and signalling systems for Spain and for the rest of the world. Exports represent already more than 85% of its activity.



CABLES DE COMUNICACIONES ZARAGOZA

► Polígono de Malpica, Calle D, nº 83
50016 Zaragoza (ZARAGOZA)

► P: +34 976 72 99 00

► F: +34 976 72 99 72

► comercial@cablescom.com

► www.cablescom.com

Founded in 1971, Cables de Comunicaciones has been steadily building its reputa-

tion as a respected business in the field of communications cables. Cables de Comunicaciones has cemented its position and its products are now used in over 50 countries around the world. The company has a wide range of products that are certified according to the standards of the leading telecomm and railway operators in the majority of countries in Europe. It is dedicated to designing and developing excellent telecommunications, signalling, instrumentation, data and fibre optic cables.



CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES, S.A.

► Padilla, 71 - 6

28006 Madrid (MADRID)

► P: +34 91 436 60 00

► F: +34 91 436 60 11

► caf@caf.net

► www.caf.net

CAF is a firm focused on investigation, development, design, production and maintenance of Rolling stocks for the railway industry. Our product range include from High Speed, to regional and suburban trains, articulated units, underground trains, LRVs, light underground trains and locomotives. Maintenance of the whole range. It boasts production premises throughout Spain (Beasain, Irun, Zaragoza, Castejón and Linares), as well as in the USA (Elmira NY), France (Bagnères de Bigorre), Mexico (Mexico Df) and Brazil (Sao Paulo) and Rail Technological Centres in Beasain and Zaragoza. CAF's projects are distributed in over 25 countries around the world in the five continents.



CAF POWER & AUTOMATION

► Parque Tecnológico de San Sebastián. Pso. de Mikeletegi, 58 -2º.
20009 San Sebastián (GIPUZKOA)

► P: +34 943 30 92 51

► F: +34 943 30 92 52

► info@cafpower.com

► www.cafpower.com

CAF P&A is a global manufacturer of electric power solutions as well as information and communications systems for the rail industry.

CAF P&A have equipped more than 5,000 vehicles world wide including, metros, light rail, locomotives and high-speed trains.

One of the main strategic lines is the development of its own technology. To do so, as a major asset, CAF P&A has a team of experienced, competent and dynamic specialists.

CAF P&A develops, manufactures and deliver high reliability solutions adapted to each and every client's specific needs in compliance with railway standards.



CAF SIGNALLING

► Avenida de la Industria, 51

28108 Alcobendas
(MADRID)

► P: +34 91 789 27 50

► F: +34 91 661 37 51

► calsignalling@cafsignalling.com

► www.cafsignalling.com

CAF Signalling, the technological subsidiary of the CAF Group, provides rail traffic signalling, both in Spain and abroad.

As such, it offers railway signalling solutions and remote control for Railway infrastructures.

CAF Signalling, boasts the Company's own in-house engineering and expertise to take on "turn-key" railway signalling projects with recognition from several Railway Administrations in Spain and other countries in Europe, America, Africa, Middle East and Asia.



CAF TURNKEY & ENGINEERING

► Parque Científico y Tecnológico de Bizkaia, Laida Bidea, Edificio 205.
48170 Zamudio (BIZKAIA)

► P: +34 946 819 550

► F: +34 94 623 29 29

► comercial@cafte.com

► www.cafte.com

CAF Turnkey & Engineering was created in 2007 with its head office is 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.



CALMELL GROUP

► Pol. Ind. Pla d'en Coll
C/ Fresser, 12 C 08110

Montcada i Reixac
(BARCELONA)

► P: +34 93 564 14 00

► F: +34 93 564 58 22

► calmell@calmell.net

► www.calmell.com

The first company of the group, Calmell, S.A. was founded in 1970, focusing its activity on the manufacture or graphic products. Currently, 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.



CETEST

► Lazkaibar, s/n

20200 Beasain (GIPUZKOA)

► P: +34 943 028 690

► cetest@cetestgroup.com

► www.cetestgroup.com

Test and analysis services for:

■ Design verification and validation.

■ Full homologation of new products and vehicles.

■ Failure analysis and optimization.

Fully accredited test lab with more than 40 years of experience in railway testing.

Test services cover the following areas:

■ Structural components.

■ Running gear.

■ Suspension systems.

■ Vehicle dynamics.

■ Noise and vibrations.

■ Aerodynamics.

■ EMC and energy consumption.

■ Mechatronics.

■ Special instrumentation (Instrumented wheelsets, instrumented pantograph).



CITEF (FUNDACIÓN PARA EL FOMENTO DE LA INNOVACIÓN INDUSTRIAL)

► José Gutierrez Abascal, 2

28006 Madrid
(MADRID)

► P: +34 91 336 32 12

► citef@etsii.upm.es

► www.citef.es

Tecnalia is a leading research and technological development centre in Europe. They offer a vision of innovation, developing alongside companies solutions that provide value through technology and competitive solutions that transform and grow businesses, improving the future of companies and society.



COLWAY FERROVIARIA, S.L.

► C/Botánica, 149-151
08908 L'Hospitalet

(BARCELONA)

► P: +34 93 414 65 12

► F: +34 936 39 8 610

► acolomerf@colway-08.com

► www.colway-08.com

Colway Ferroviaria, S.L., company belonging to the COLWAY Group, specializes in the design, engineering, manufacture, supply, installation and commissioning of turn-key railway vehicle interiors.

Through the integrated management of modular supplies, based on experience, knowledge, research and innovation, the company achieves the satisfaction of the needs and expectations of its customers: railway manufacturers and public administrations.

Colway capabilities include Modular System solutions for Rail Interiors as Toilet Modules, Front hoods, saloons, walls, Buffet, Restaurant areas, vestibules.



COMSA CORPORACIÓN

► C/ Julián Camarillo 6A,
2ª planta 28037

(MADRID)

► P: +34 913 532 120

► F: +34 913 504 954

► jalvarez@comsa.com

► www.comsa.com

COMSA is the company of COMSA Corporación specialised in the construction of railway infrastructures. Founded in 1891, the company provides a comprehensive service in the field of railway construction and maintenance, electrification, and control and communication systems of high speed rails, conventional rails, metros and tramways.

In this business activity, it is leader in Spain, where has been involved in the construction of all high speed lines, and has permanent operations in Argentina, Brazil, Lithuania, Mexico, Poland, Portugal and Turkey.

It has also taken part in a large number of projects in other markets such as Italy, the Philippines, Taiwan, Malaysia, India, etc.

This extensive experience has been the key for its consolidation in the railway sector and has enabled it to become the leader in the railway construction industry.

**CREATIVITIC INNOVA, S.L.**

► Huesca, 9 1C 26002 Logroño
(LA RIOJA) (Delegación Norte:
Lehendakari, 11 1º Dpto18 4014
Bilbao (VIZCAYA))
► P: +34 629 433 386
► jrllopez@creativitic.es
► www.creativitic.es

Consulting, training and research and the development of products, systems and services based on emerging and innovative technologies using augmented, virtual and mixed reality, integrated with IoT and AI systems for technical support in industrial solutions..

**DANOBAT**

► Arriaga Kalea, 21
20870 Elgoibar (GIPUZKOA)
► P: +34 943 748 044
► F: +34 943 743 138
► danobat@danobat.com
► www.danobat.com

Danobat Railways business unit focuses its activity in the supply of turnkey solutions for the manufacturing and maintenance of railways rolling stock, incorporating own products of leading technology, together with those manufactured by specialized companies. It gathers extensive experience and qualification in the rendering of services such as engineering services, equipment integration, complex project management, and collaboration with the customer all along the life of the project. Danobat has a strong international presence and references in the most relevant customers.

**DSAF – DINÁMICAS DE SEGURIDAD, S.L.**

► Avda. de San Blas nº 13 -
Polígono Industrial de Gojain
01170 Legutiano (ARABA)
► P: +34 945 466 314
► F: +34 945 466 314
► info@dsaf.es
► www.dsaf.es

DSAF is a company structure devoted to People's Movement Safety. It is committed to providing new technologies applied to design and project implementation, as well as initiatives that guarantee an approved evacuation safety level in this generalized risk society. Emergency signalling is DSAF's main application area; it develops photoluminescent, electroluminescent and LED signalling systems for people evacuation in risk situations and environments: tunnel evacuation safety, vessel evacuation safety, building evacuation safety... DSAF safety applications are developed in three big areas: tunnel safety (road / railway), safety in vessels, and buildings.

**DURO FELGUERA RAIL, S.A.U.**

► Pol. Ind. Fábrica de Mieres s/n
33600 Mieres (ASTURIAS)
► P: +34 985 45 63 31
► F: +34 985 45 61 64
► dfrail@durofelguera.com
► www.durofelguera.com

DF Rail is a Spanish company specialized at the design, manufacturing and supply of turnout systems and components for Metro, Conventional, Heavy Haul or High Speed Lines. Turnouts, single and double crossovers, diamond crossings, single and double slip crossings, single and double junctions, switch expansion joints, ..., on wooden or concrete sleepers; for ballasted or unballasted tracks; for single or combined gauges; with monobloc Mn steel crossings or with swing nose crossings; insulated glued joints; transition rails.

**ECOCOMPUTER S.L.**

► C/ María Zambrano 5 - Bajo -
33401 Avilés (ASTURIAS)
► P: +34 985 52 50 46
► F: 34 985 56 83 17
► sales@ecocomputer.com
► www.ecocomputer.com

Ecocomputer S.L. is a technology firm based on North Spain (Asturias and Cantabria) and focused on the design, development and implementation of IT solutions on the railways industry (ie: ticketing, booking, passenger information system) and access control and time&attendance business. Founded on 1999, it holds a wide portfolio of own products as a result of years of evolution and adaptation to customer needs. Ecocomputer provides as well onsite IT maintenance services for the railways operators and administrator infrastructure companies (Railway Control and Regulation Centres, security infrastructure, IT equipment).

**ELEKTRA-GRUPO ELEKTRA, S.A.**

► C/ Apostolado, 34
20014 San Sebastián (GIPUZKOA)
► P: +34 607 94 29 73
► railway@elektra-sa.es
► www.grupoelektra.es

Grupo Elektra is a market leader in the field of electrical and electronic equipment distribution for manufacturers of rolling stock, maintenance and railway equipment manufacturers. Being the leading company in the railway sector in the supply of electrical equipment. Your solution provider in electrical products for railway, with specific technical support. Elektra Group is composed of an extensive Spanish national network and has companies in Romania, India and USA.

**ENCAIX COMUNICACIÓ VISUAL, S.L.**

► C/ Pompeu Fabra, 10
17002 Gerona (GIRONA)
► P: +34 93 733 77 77
► elias@encaix.net
► www.encaix.net

ENCAIX is a company specialising in the manufacture of railway models. hey

develop innovative marketing tools based on different disciplines; from the traditional scale model to state-of-the-art virtual reality and innovative sensors techniques to the surprising comprehensive interactivity that is revolutionising communication.

**FUNDICIONES GARBI, S.A.**

► Bº Munsaratz, 33
48220 Abadiano (BIZKAIA)
► P: +34 94 621 54 80
► F: +34 94 681 73 86
► garbi@fundicionesgarbi.es
► www.fundicionesgarbi.es

Founded back in 1972, Fundiciones Garbi has evolved from a traditional foundry to a Global Service Company for industry. We offer a full catalogue of services starting from the casting or other materials till delivery of "ready to use" parts or assembly sets. With this aim, we have developed an organization oriented towards solid and competitive processes, ensuring quality from design phase using APQP tools. Well aware of customer satisfaction, we offer to our clients additional global services including a full range of heat treatments, machining, product inspection and testing (NDT's, etc), protection and finishing surface treatment (Painting, Metallization, Others...), including final assembly of different parts. For the Railway industry we are specialized on production of rolling stock material.

**FUNOR, S.A.**

► Pol. Ind. de Villalonguejar
C/ Condado de Treviño, 41
09001 Burgos (BURGOS)
► P: +34 947 29 84 80
► F: +34 947 29 82 93
► info@funorsa.es
► www.funorsa.es

Castings in carbon steel, alloy steel and stainless steel.

Our products:

- Steel casting.
 - Raw castings or fully machined.
- Examples:
- Bogie components.
 - Pivots.
 - Motor housings.
 - Pressure rings.
 - Axle boxes.
 - Links.

**GAMARRA, S.A.**

► Portal de Vergara, 6
01013 Vitoria (ARABA)
► P: +34 945 25 16 77
► F: +34 945 27 49 48
► gamarra@gamarrasa.es
► www.gamarrasa.es

Gamarra, S.A. at a glance: Spanish steel foundry -located at Vitoria Gasteiz- annual production: 4,000 tons - customers: European State Railways, - producers of rolling stock and their suppliers - as foundry and supplier homologated by DB AG (HPQ), ÖBB, SBB, SNCF (AFQ) (extract) as well as according to DIN EN ISO 9001: 2000 + DIN 6700 - 2. Products: brake discs, brake block shoe holders, buffers, spigots and essential steel castings for bogies.

**GANTREX, S.A.**

► Pol. Ind. Izarza 4N -
48115 Sondika - Vizcaya
► P: +34 944 53 50 84
► info.bilbao@gantrex.com
► www.gantrex.com

Gantrex Spain, S.A. is the global market leader in specialty rail tracks fixation including design, production, supply of goods and installation of turnkey contracts. Rail fixation at train workshops, embedded rails accesses for Ports or logistic terminals and private rail installations together with other Subway's and Tram's required installations are some of Gantrex Spain's main activities.

Products:

- All sections of rails
- Metallic railway sleepers
- Rail fixing Clips
- Rubber pads for rails

- Steel columns for trains maintenance
- Embedded rail fixation systems (recycled rubber)
- Embedded rail fixation systems (polyurethane)
- Hydraulic buffers

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

► Juan de Herrera, 17 - P.T.B. Boecillo
47151 Valladolid (VALLADOLID)
► P: +34 983 54 65 54
► F: +34 983 54 65 53
► ahernandez@gmv.com
► aags@gmv.com
► www.gmv.com

Since 1994 GMV provides Intelligent Transport Systems, offering turnkey solutions and specific products. GMV develops applications adapted to sector needs, including satellite navigation, mobile communications, passenger information, fare collection systems and monitoring-and-control centers. GMV's railway portfolio includes fleet management system, SAE-R®, providing operators with an all-in system for planning and management, and other products like CCTV, PA-Intercomm and Passengers Video Information, as well as electronic fare collection systems for railway sector.

**GORATU**

► P Lerun Kalea, 1, 20870 Elgoibar, Gipuzkoa
► P: +34 943 74 80 60
► sales@goratu.com
► http://www.goratu.com

Under the trademark of the prestigious market leader GEMINIS, Goratu develops horizontal and multiprocess lathes of the highest technology. We offer customized solutions for high specialization technologies. 60 years of experience and specialized knowledge in the Railway Sector have let us to the design and manufacture of lathes

for manufacture and maintenance of axles, wheels and wheelsets.



HICASA - HIERROS Y CARBONES, S.A.

► Polígono de Asipo, P48
33428 Cayés-Llanera
(ASTURIAS)
► P: +34 985 26 04 73
► F: +34 985 26 09 05
► info@hicasa.com
► www.hicasa.com

HICASA specialises in the storage, transformation, distribution and commercialisation of railway materials, rails and railway accessories of all types in accordance with both European (UNE EN), as well as American (ASTM) Standards, not to mention others such as AREMA, etc.

HICASA belongs to a private group of companies, GEVIR, which is made up of four enterprises in Spain, and is special in the sense that it combines its role of distributor with that of manufacturer, given that it possesses its own specialist light rail factory, a fact which endows it with a unique market profile.

We can boast of a roofed surface area at our installations of over 13,000 m², where we dispose of modern cutting and drilling machines that enable us to transform iron and steel and to supply orders of any format and measurement, in accordance with the specifications requested by our clients. We export over 50% of our products abroad.



ICON SISTEMAS DE INFORMACIÓN Y DATOS

► Avd. Santiago Amón, 3-52-
34005 (Palencia)
► P: +34 979 70 29 06
► F: +34 979 70 20 21
► ehornos@iconmm.com
► adelrio@iconmm.com
► www.iconmm.com
► www.denevads.com

Software development company specialized in passenger information systems, digital signage and advertising schedules, covering all areas of transport, either rail/metro, airports, bus or port. ICON Multimedia also has a significant presence in the world of commerce/retail, menuboards, and the banking sector, with worldwide reference clients with more than 40.000 points deployed around the world.

It stands out for the wide degree of customization of your product to suit the needs or requirements of any client or that may be contained in a statement of technical conditions.



IDOM

► Zarandoa 23
48015 Bilbao (VIZCAYA)
► P: +34 944 79 76 00
► F: +34 944 75 93 64
► cortega@idom.com
► oscar.rico@idom.com
► www.idom.es

IDOM is one of the European leading companies in the field of professional services in engineering, architecture and consultancy. It is an independent company established in 1957 and it has participated in over 30.000 projects in five continents. In 20 countries with 39 offices throughout regions (America: Argentina, Brazil, Canada, Chile, Colombia, USA, Mexico, Perú), Asia (India), Africa (Argelia, Libia, Morocco), Middle East (Saudi Arabia, UAE), Europe (Belgium, Slovenia, Spain, Poland, Portugal, United Kingdom). More than 3.000 staff possesses the expertise and experience to cover all the phases of a railway project (high speed, conventional, freight, metro, light rail, tramway, stations, depot and workshops), from conception to commissioning and beyond. IDOM will accompany the client by providing the correct technical assistance required for the decision-making process: technical specifications for design, alternatives studies, demand and traffic studies, financial and socioeconomical analysis, basic and detailed design, operational and maintenance plans, works supervision, testing and commissioning.



IKUSI

► Paseo Miramón, 170
20014 San Sebastián
(GIPUZKOA)
► P: +34 943 44 88 00
► F: +34 943 44 88 20
► movilidad@ikusi.com
► www.ikusi.com

Ikusi offers integral solutions for exploiting the diverse means of urban public transport (Bus/BRT/Tramway/Light Rail/Metro/Suburban), as well as in intermodal transport hubs. One proposal, backed up with a track record reaching back more than 20 years in the sector, has the main goal of improving passenger experience, guaranteeing safety, increasing revenue from secondary sources independent from the main activity, and streamlining operational efficiency.



IK4 RESEARCH ALLIANCE

► Pol. Azitain 3K, 2ºG
20600 Eibar
(GIPUZKOA)
► P: +34 94 382 03 50
► otegi@ik4.es
► www.ik4.es

IK4 Research Alliance is a private and independent alliance of R&D centres, a benchmark in the European R&D context. It comprises 9 organisations in the Basque Country: AZTERLAN, CEIT, CIDETEC, GAIKER, IDEKO, IKERLAN, LORTEK, TEKNIKER and VICOMTECH.

The IK4 Research Alliance sets out to generate, capture and transfer scientific and technological knowledge mainly to the business framework.

This way it contributes towards improving the competitiveness of companies and the progress of society. Nowadays it gathers a staff of 1275 and an income of 102M€ in 2014.



IMPLASER 99, S.L.L.

► Pol. Ind. Borao Norte, Nave 5A
50172 Alfajarín (ZARAGOZA)
► P: +34 902 18 20 22
► F: +34 902 18 20 22
► international@implaser.com
► www.implaser.com

Implaser is a Spanish company focused in developing innovative security signs for railway projects. Innovation and quality are our mainstays, as we were the first SME being certified in R+D+I in Spain. Implaser has all the range of products certified by AENOR with photoluminescent values of 150, 300, 580 and 720 mcd/m².

We are also specialized in the manufacturing of informative, security and accessibility stickers for coaches, to be used both indoor and outdoor. Hard work and great concern for innovation has allowed us to develop new products, such as photoluminescent systems combined with electroluminescent and guiding systems by LEDs.



INDRA

► Avda. de Bruselas, 35
28108 Alcobendas (MADRID)
► P: +34 91 627 38 77
► F: +34 91 626 88 68
► enavarro@indra.es
► www.indra.es

Indra is a world leader and pioneer in the supply of technological platforms for railway operations management, control and supervision, having specific solutions already tested on high speed and conventional lines and metropolitan operations. Indra is also a leader in ticketing systems for transport operators and has facilities and projects all over the world. Furthermore, Indra develops high-precision safety and signalling systems. At this moment in time, Indra's solutions are completely unique because of their high level of integration and adaptation to the current and future necessities of the

railway environment whatever may be the most state of the art technological and operative options. Indra has managed to open a competitive market for the first time based on technological and economical competitiveness.



INECO

► Paseo de la Habana, 138
28036 Madrid (MADRID)
► P: +34 91 452 12 00
► eva.pulido@ineco.com
► www.ineco.com
► www.ineco.com

Global leader in transport engineering and consultancy, it has contributed to the development of transport infrastructures for over 45 years in more than 45 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 Ankara-Istanbul line in Turkey and the HS2 project in the United Kingdom.



INGETEAM POWER TECHNOLOGY, S.A.

► Edificio 702.
Parque Tecnológico de Bizkaia
48160 Derio (BIZKAIA)
► T: +34 94 655 90 00
► F: +34 94 403 98 37
► traction@ingetteam.com
► www.ingetteam.com

Ingeteam is an expert leader in the development of electrotechnical and power electronics systems providing involving energy exchanges at large. Our capacities and the experience on the railways sector allow us to offer technological solutions that significantly

contribute to reach our customers strategic objectives, leading to maximize operational efficiency. We strive towards offering in-house/ state-of-the-art developments for:
- Rolling Stock: Traction Systems and TCMS
- Infrastructure: Energy Recovery Systems.



INTERNACIONAL HISPACOLD, S.A

► Avda. Hacienda San Antonio, 1
Pol. Ind. El Pino
41016 Sevilla (SEVILLA)
► P: +34 954 677 480
► F: +34 954 999 728
► hispacold@hispacold.es
► www.hispacold.es

Hispacold is a World leader company for climate systems specialized in comfort for people with more than 30 years' experience. Hispacold designs and manufactures HVAC solutions for all rail vehicles: trams, metros, EMUs, DMUs, LRVs... with proven and reliable technology solutions. In Hispacold each activity is based on a solid quality culture and on a real commitment with the environment. Quality certifications ISO 9001, ISO 14001, OSHAS 18001 are only the smallest part of this working way. Hispacold is a company of Irizar Group SC, which employees more than 3.000 people in the five continents and has a global turnover of more than 550 Million €. This gives Hispacold the benefits from a multinational organization while maintaining an individual company spirit. Hispacold's presence in the five continents guarantees the best technical assistance at any place of the world.



INSERAIL, S.L.

► Alberto Alcocer, 46 3ªA
28016 Madrid (MADRID)
► P: +34 91 302 95 40
► jcanedo@inserail.es
► www.inserail.es

This is an engineering and consulting firm founded in 1994 and focused on the railway,

energy and building sectors, developing its activity in the different stages of planning, design, construction and exploitation of investments.



JEZ SISTEMAS FERROVIARIOS, S.L.

► Arantzar, s/n
01400 Llodio (ARABA)
► P: +34 94 672 12 00
► F: +34 94 672 00 92
► infor@jez.es
► www.jez.es

JEZ Sistemas Ferroviarios, S.L. is committed to designing, manufacturing, supplying and maintenance of all types of manganese steel switches and railway track systems, in addition to moulded cast steel parts for the general industry. Our Technical Department (Department of 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 or spare tongues. At JEZ Sistemas Ferroviarios, S.L. we fit our developments to meet clients needs.



KELOX, S.A.

► Isla de Jamaica, 8
28034 Madrid
(MADRID)
► P: +34 91 334 15 90
► F: +34 91 358 05 64
► marketing@kelox.es
► www.kelox.es

Kelox launched its railway activity in 1977, manufacturing catering equipment for dining cars on longdistance lines. The experience and knowledge acquired over the years have become Kelox specialist in the design and full supply of galleys and catering equipment for high-speed, shuttle and regional trains. Our style of

design is characterised by harmony; it is beautiful, ergonomic and functional, always according to the customer specifications.



UNIVERSITY OF CANTABRIA - LADICIM (LABORATORY OF THE DIVISION OF MATERIALS SCIENCE AND ENGINEERING)

► Avda. de los Castros, 44
39005 Santander (SANTANDER)
► P: +34 942 20 18 28
► Fax: +34 942 20 18 18
► ladicim@unican.es / casadoja@unican.es
► https://ladicim.es/

The mechanical laboratory LADICIM - UC transfers to society the knowledge available in the University, through continuous advisory services and agreements with companies and institutions for the development of R&D+i, and captures the areas in which the knowledge must be further enhanced, to then offer a better service.



LA FARGA LACAMBRA, S.A.U.

► Ctra. C-17z - Km. 73,5 08508
Les Masies de Voltregà
(BARCELONA)
► P: +34 93 850 41 00
► F: +34 93 859 55 30
► gustau.castellana@lafarga.es
jordi.vilaro@lafarga.es
► www.lafarga.es

La Farga Lacambra is a model company in the railway sector, with more than 200 years' experience in the copper industry. A solid international presence and continuous innovation in the search for new alloys have enabled it to produce high-service materials. La Farga Lacambra provides global solutions for copper materials and its alloys such as CuMg, CuSn or CuAg,

integrating the whole productive process and ensuring the maximum technical qualities. These products satisfy the needs of the market for all kind of lines and speeds around the world.



LAMAIGNERE CARGO

► Edif. Servicios Generales. Centro de Carga Aérea Madrid-Barajas
Ofi. 608 28042
Madrid (MADRID)
► T: +34 91 312 01 22
► Fax: +34 91 312 01 66
► fherrero@lamaignere.com
► www.lamaignere.com

Spanish company with a presence through its network of collaborators and with its own offices in different markets, dedicated to international air and sea transport services, assessment and customs management



LANDER SIMULATION & TRAINING SOLUTIONS, S.A.

► Portuetxe, 23ª Local B3
20018 San Sebastián
(VIZCAYA)
► P: +34 943 21 74 91
► Fax: +34 943 21 74 91
► aohlsson@landersimulation.com
► www.landersimulation.com

Lander Simulation & Training Solutions, S.A., is a Company specialising in the design, development and implantation of state-of-the-art commercial simulation devices aimed at training professional drivers of all types of railway rolling stock (underground, tramways, regional, long distance and high-speed rail networks). It boasts a powerful sales teams that has developed a direct sales technique to potential clients both in Spain and abroad.



LIMMAT M&M S.L.

► Cuellar, 11 -1º
40003 Segovia
(SEGOVIA)
► P: +34 943 101 863
► info@limmat-group.com
► www.limmat-group.com

Limmat Group boasts extensive experience in the rail infrastructures sector, supporting the processes and projects of its clients through comprehensive solutions aimed at engineering, consulting and technological and innovative products that maximise efficiency in their engineering and consulting operations: Limmat Group is a specialist in management and consultancy and engineering activities of all types of PPP projects, with maximum specialisation in railway infrastructures.



LUZNOR

► Paduleta, 47 01015 Vitoria
(ARABA)
► P: 945 200 961
► F: 945 200 971
► iarbeloa@luznor.com
► www.luznor.com

Luznor Company is specialized in the design, manufacture and commercialization of professional torches (for railway industry), emergency lighting (for industry and architecture) and other Electronic devices. Luznor offers you (in its factory in Vitoria) highly qualified technicians, a high standard of quality, an effective system development, manufacture and testing, and above all, a philosophy of commitment to our customers allowing us to offer innovative products equipped with advanced technology and recognized prestige.



MB SISTEMAS, S. COOP.

► Pol. Ind. Igeltzera - C/ Igeltzera, 8
48610 Urduliz
(BIZKAIA)
► P: + 34 94 403 06 26
► F: + 34 94 403 06 27
► amacias@mbsistemas.es
► www.mbsistemas.es

MB SISTEMAS is part of MONDRAGON CORPORATION. We develop turnkey "World Class" engineering projects, implementing automation solutions into the Assembly and welding phases of manufacture process for car body structures of railroad passenger cars. We give "ad hoc" solutions for the customer's needs; having implanted successfully our facilities around the world. As engineering we develop both, robotic installations and special machines for any assembly process.



METALOCAUCHO, S.L.

► Poligono Erratzu, 253
20130 Urnieta
(GIPUZKOA)
► P: +34 943 33 37 55
► F: +34 943 33 37 51
► info@metalocauch.com
► www.metalocauch.com

MTC specialises in the design and manufacture of anti-vibration and suspension solutions for Rolling stock. The Company was established in 1982 and currently has three manufacturing sites, located in Spain (HQ), China and India. In 2009 the company was awarded IRIS Certification. MTC, being among the leading companies in its sector, supplies to the main Rolling stock Constructors worldwide, including Alstom, Bombardier, CAF, CSR, CNR, Hyundai Rotem, Siemens, Talgo, Vossloh). We also collaborate with Operators for the supply of spare components for their overhaul projects. Our main products are rubber-metal

primary and secondary suspensions, focusing on primary springs (conical or chevron type), guiding bushes, guiding links, secondary air springs and emergency springs, traction rods, elastic bushings, buffers, layer springs as well as a diverse range of associated rubber-metal solutions.



MGN TRANSFORMACIONES DEL CAUCHO, S.A.

► C/ Candelaria, 9 - Pol. Ind.
Camino del Calvario
28864 Ajalvir (MADRID)
► P: +34 91 887 40 35
► F: +34 91 884 45 84
► enp@mgncaucho.com
► www.mgncaucho.com

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.



NEWTEK SOLIDOS S.L

► Pol. Abendaño.
Urdaneta bidea, 3B.
Zarautz - (GIPUZKOA)
► P: +34 943 835942
► F: +34 943 894441
► comercial@newteksolidos.com
► www.newteksolidos.com

NEWTEK SOLIDOS, S.L. manufactures sand filling systems for the railway equipment industry, sand feeders, storage silos, pneumatic transport, dust return systems, sand loading equipment and facilities maintenance.


NEM. NUEVAS ESTRATEGIAS DE MANTENIMIENTO, S.L.

► Paseo Mikeletegi, nº 54 - 1ª planta
20009 Donostia (GIPUZKOA)
► P: +34 943 30 93 28
► F: +34 943 30 93 26
► info@nemsolutions.com
► www.nemsolutions.com

At NEM Solutions we offer total control of business operations and maintenances for the railway industry. Our products and services project the assets' future from data generated daily. The objective is to give our client the possibility to control his/her own business and to avoid surprises. Thanks to our expert knowledge we provide wheel life management, productivity improvement and O&M cost reduction.


P4Q ELECTRONICS, S.L.

► Ctra. Bilbao-Balmaseda, Km. 9
48810 Alonsotegi (BIZKAIA)
► P: +34 94 498 20 28
► ialberdi@p4q.com
► www.p4q.com

At P4Q we are involved in the complete development of electronic devices and lean production services. We are structured as an integral supplier of electronics solutions, focused in flexibility and quick development. We design under customer specs and approval.

Being a partner of our customers giving global support attending local production demands. Is the basis of our strategy. We have facilities in Albuquerque (NM), USA as well as in Spain.


PARRÓS OBRAS, S.L.

► Ctra. Virgen del Monte, 1
13260 Bolaños de Calatrava (CIUDAD REAL)
► P: +34 926 88 47 05
► F: +34 926 88 47 06
► rocio@parros.es
► www.parros.es

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


PRETENSADOS DEL NORTE S.L.

► Miravalles, 4 (Zona Industrial de Betoño) 01013
Vitoria (ALAVA)
► P: +34 945 258 431
► F: +34 945 261 400
► pretenorte@pretenorte.com
► www.pretenorte.com

PRETENSADOS DEL NORTE produces the best prestressed wire for railway sleepers in the world. More than 30 years' experience, PRETENORTE only uses the best raw materials and we can supply any need required by the client.

We have supplied prestressed steel for several projects around the world and our material is considered the one with the best quality in prestressed WIRE world. We have the best and most modern machinery and a highly qualified team of experts and engineers. We also produce prestressed steel used in precast concrete parts and structures.


PATENTES TALGO, S.L.

► C/ Paseo del Tren Talgo, 2
28290 Madrid (MADRID)
► P: +34 91 631 38 00
► F: +34 91 631 38 93
► marketing@talgo.com
► www.talgo.com

Talgo, leading High Speed rolling stock manufacturer in Spain, has over 70 years of experience manufacturing very high speed, high speed, intercity and regional trains, tilting passenger coaches and locomotives.

The company is also a pioneer in providing complete maintenance solutions to railway operators worldwide, and is specialized in the design and manufacture of maintenance equipment for any type of rail vehicles.


PRECON; PREFABRICACIONES Y CONTRATAS, S.A.U.

► C/ Espronceda, 38, local 3
28003 Madrid (MADRID)
► P: +34 91 343 03 48
► F: +34 91 359 12 46
► fsanchez@precon.cemolins.es
► ferroviario@precon.cemolins.es
► www.cemolins.es

PRECON is the Spanish leader in design and supply of precast concrete products for railway tracks, either ballasted and ballastless tracks.

PRECON has supplied solutions based on monoblock, twinblock, block, slabs and sleepers for switches and crossings. Either for high speed, conventional lines, heavy haul, subways and tramways. PRECON from its two Spanish factories has supplied more than 15 millions twinblock sleepers, 5 millions monoblock sleepers, 500,000 ml sleepers for switches and crossings and currently manufacture most of the slab track systems in use in Spain.


SEMI, S.A. (GRUPO ACS)

► Avda. de Manoteras, 6 2ª Planta
28050 Madrid (MADRID)
► P: +34 91 308 93 35
► F: +34 915 218 597
► ferrocarril@semi.es
► www.semi.es
► www.grupoacs.com

A society in international expansion. With the adaptability of a small business, the

infrastructure of a big company and the financial backing of a large group. SEMI is encompassed in the major companies of Industrial Services sector of the ACS group. Focused in the industrial field, SEMI build infrastructures for energy, transport, communication, environment and non-residential building. Activity in the railway area: Electrification and Traction Substations for AC and DC, Auxiliary Electrical Equipment, Engineering and Consulting, Maintenance of Catenary and Substations, Infrastructure for Railway Signaling and Communications.


SEGULA

► Oquendo 23, 1ª planta
28006 Madrid
► T: +34 917 991 112
► F: +34 917 991 113
► www.segula.es

SEGULA Technologies is an international engineering consultancy group specialised in cutting-edge innovation.

Since 2002, SEGULA Technologies is present in Spain. We are an engineering services company with more than 1.000 professionals working in Staffing, Consultancy, PLM and Fixed Price Projects. It is based in 12 locations in Spain: Madrid, Barcelona, Vitoria, Zaragoza, Bilbao, Pamplona, Vigo, Valladolid, Vigo, Valencia, Sevilla and Cartagena close to the main customers. In 2016, SEGULA Technologies turnover in Spain was more than 54 million Euros. More than 60% of our collaborators are university graduates. Our customers include leading companies in leading sectors: aeronautical, automotive, energy, industry, IT, rail, etc...


SENER INGENIERÍA Y SISTEMAS, S.A.

► Avda. Zugazarte, 56
48930 Getxo Las Arenas (Vizcaya) – España
► P: +34 94 481 75 00/+34 91 807 70 68
► F: +34 94 481 75 01/+34 91 807 87 32
► dep.infraestructurasytransporte@sener.es
► www.ingenieriaconstruccion.sener

Sener is one of the leading engineering and technology groups in Europe with over one billion euros of annual turnover, more than 5,000 professionals and a continuously growing international presence with offices in more than 15 countries.

In the field of railway engineering, Sener count 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 or ICE services.


SICE TECNOLOGÍA Y SISTEMAS

► C/ Sepúlveda, 6 -Pol. Ind.
Alcobendas 28108 Alcobendas (MADRID)
► P: +34 916232200
► F: +34 916232201
► sice@sice.com
► www.sice.com

SICE Tecnología y Sistemas, (SICE TyS) is a multinational group of Companies, technology and systems integrators operating in the fields of traffic and transport, environment and energy, telecommunications and all types of industrial processes.

SICE TyS's transport activities are focused on meeting the needs of users, operators and transport operation concessionaires in the transport sector.

As a systems integrators and systems suppliers, they offer unique technological solutions tailored to all kind of installations. Design of the Centralized management of all services that complement any form of public or private transport and integrates different solutions and systems:

- Security&Safety Systems for Metros and Railways
- Telecommunications Systems for Metros and Railways

- Signaling: (Interlocking, Level Crossing, CTC)
- Electric BRTs
- Ticketing
- Public transport prioritization
- Consulting Engineering (OFITECO): Railways lines, Tunnels, Load test (railways bridges).


SIEMENS RAIL AUTOMATION S.A.U.

► Ronda de Europa, 5
28760 Tres Cantos. (MADRID)
► P: +34 91 514 80 00
► www.siemens.es/railautomation

Siemens Rail Automation is the resulting Company after the acquisition of the Invensys Rail Dimetronic group by Siemens. The new division offers integrated mobility solutions through the most advanced technologies for railway signalling and train control.

Our main purpose is the supply of "turn-key" projects, including all the phases of design, development, supply, manufacturing, installing, testing, commissioning and maintenance of railway signalling systems and automatic train control systems for either mass transit applications as main line and high speed lines.

The solutions and systems of Siemens Rail Automation allow railways and metropolitan networks to improve the safety of their railway application; increase the capacity of the lines; reduce operating costs; optimize maintenance works; obtain a better usage of its rolling stock, having at the same time lower energy consumptions rates and to decrease energy consumption.


STADLER RAIL VALENCIA S.A.U.

► Pol. Ind. del Mediterráneo
C/ Mitjera, 6 – 46550 Albuixech (VALENCIA)
► P: +34 96 141 50 00
► F: +34 96 141 50 02
► info@stadlerrail.es
► www.stadlerrail.com

The new Spanish División of Stadler has a long history as rail vehicles provider. Stadler Rail Group completed the purchase from the Vossloh Group of its Spanish business unit of manufacture of locomotives and light rail vehicles at the end of 2015.

This acquisition falls within the long term growth strategy of the Stadler and reinforces its position as one of the leading manufacturers of railway vehicles with new products and the access to new markets.

Technology and quality are the key points of the entire range of products developed and produced in the Valencia plant. Closely linked with the industrial heritage of railways and with the benefit of more than a century of experience, Stadler Rail Valencia designs and manufactures state-of-the-art locomotives as well as passenger trains and provides a comprehensive range of services such as the maintenance of the vehicles, spare parts logistics, technical support or training.



Talleres Alegría, s.a.

TALLERES ALEGRÍA, S.A.

► C/ Peña Santa, 7 - P.I. Silvota
33192 Llanera (ASTURIAS)

► P: +34 985 26 32 95

► F: +34 985 26 60 1

► talegria@talegria.com

► www.talegria.com

Talleres Alegría with more than 100 years at the service of railway's networks, offers to its customers a wide range of fixed track equipment with the best quality and service conditions. Following its own technical design or its customer's, Talleres Alegría manufactures among other turnouts for High Speed Lines, conventional Lines, subway and Tramway lines, as well as End Forged Switch Points and Track Vehicles.

Being aware of the relevance of comfort within the railway sector, Talleres Alegría has collaborated with leading companies developing and applying technical solutions for mitigating noise and vibrations during the crossing over the turnouts.



TECNALIA (FUNDACIÓN TECNALIA RESEARCH AND INNOVATION)

► **Albert Einstein, 28 Parque Álava**
01510 Miñano Álava
(VITORIA)

► P: +34 664 359 613

► Fax: +34 901 706 009

► Hugo.martinezdelahidalga@tecnalia.com

► www.tecnalia.com

CITEF was created in 1998 as part of the F212 (Foundation for the Promotion of Industrial Innovation) for the purposes of development, innovation, experimentation, study and training in the railway knowledge area. This is a non-profit organisation that pursues general interest aims within any relevant rail transport technology sector.



TECTATOM

► **Avda. Montes de Oca, 1 San**
Sebastián de los Reyes
28703 Madrid
(MADRID)

► P: +34 91 659 8600

► F: +34 91 659 8677

► correo@tecnatom.es

► www.tecnatom.es

Tecnatom has more than 50 years of experience in the application of Non Destructive Testing (NDT) to the inspection of components. It also offers its high technological level in the development and application of inspection systems and techniques to the railway market, where security and quality control are increasing required. Tecnatom can provide its depth knowledge on materials currently used or tested in the railway sector (metals or new materials carbon-fiber based), taken advantage of its activities in the nuclear and aerospace sectors.

The main fields where it is carrying out activities in the railway sector are:

- Inspection services for infrastructures and rolling stock
- Development of inspection techniques and procedures
- Development of inspection equipment and systems (ultrasonics, eddy currents) for rail transport components (track, axles, bogies, wheels)
- Training of operators on Non-Destructive Testing (NDT) techniques
- Development of training simulators for train drivers.



TECNIVIAL

TECNIVIAL

► **C/ Livorno nº59**

CP 19004 Marchamalo
(GUADALAJARA)

► P: +34 949 32 50 00

► F: +34 949 25 20 80

► export@tecnivial.es

► www.tecnivial.es

Created in 1973, Tecnivial is the Spanish reference in traffic safety. It contributes giving solutions regarding Airport, Railways, and Road Signaling and marking.

The challenge for a permanent evolution, technological innovation, and customer's satisfaction are our identity signs. In Tecnivial we specialize in all types of fixed signalling for roads, both conventional and high speed lines; in this last section are one of the companies approved by the Railway Infrastructure Administrator (ADIF).

We have extensive experience in railway stations signalling, carefully following the specifications of the corporate identity manuals.

We develop comprehensive and customised signage projects, from project design to final installation and maintenance service.

Tecnivial has always been committed to the I+D+i, which has allowed it to be a reference in the fixed railway signaling, high-speed and conventional network, while being present in the most relevant projects at the national level; this is the case of the Madrid-Figueras or Olmedo-Orense sections, and internationally, Ave Medina-La Meca.



TEKNORAIL SYSTEMS, S.A.

► **Paseo de la Castellana, 91**
28046 Madrid
(MADRID)

► P: + 34 91 515 60 00

► F: + 34 91 564 72 86

► info@teknorail.com

► www.teknorail.com

Teknorail Systems, S.A. is a company belonging to the EUROFINSA Group, whose activity focuses on the development of railway interior projects, aimed both for the refurbishment of existing vehicles and also for new rolling stock, with a scope of supply that ranges from the design and engineering to the industrialization and material supply, including the technical assistance to the car commissioning. Teknorail's main goal is to provide its customers with high-quality solutions for railway interiors by means of innovation, global project management, modular supply and flexible solutions.



TELICE

► **Pol. Ind. Onzonilla, 2ª fase**
24391 Ribaseca
(LEÓN)

► P: +34 987 22 10 04

► F: +34 987 26 44 07

► telice@telice.es

► www.telice.es

Telice is a Spanish company with 39 years of experience in several fields of technology installation, especially for the railway sector. Our activities cover design, installation and maintenance for Railway Electrification Systems, Railways Safety and Signalling, Optical Fiber, Industrial Automation and Electrical Installations. Our extensive experience has made Telice a preferred partner for carrying out work and providing services for important railroad administrations and major construction and technology companies in the railroad industry.



TELTRONIC, S.A.U.

► **F-Oeste, 12 P.I. Malpica**

► **50016 Zaragoza (ZARAGOZA)**

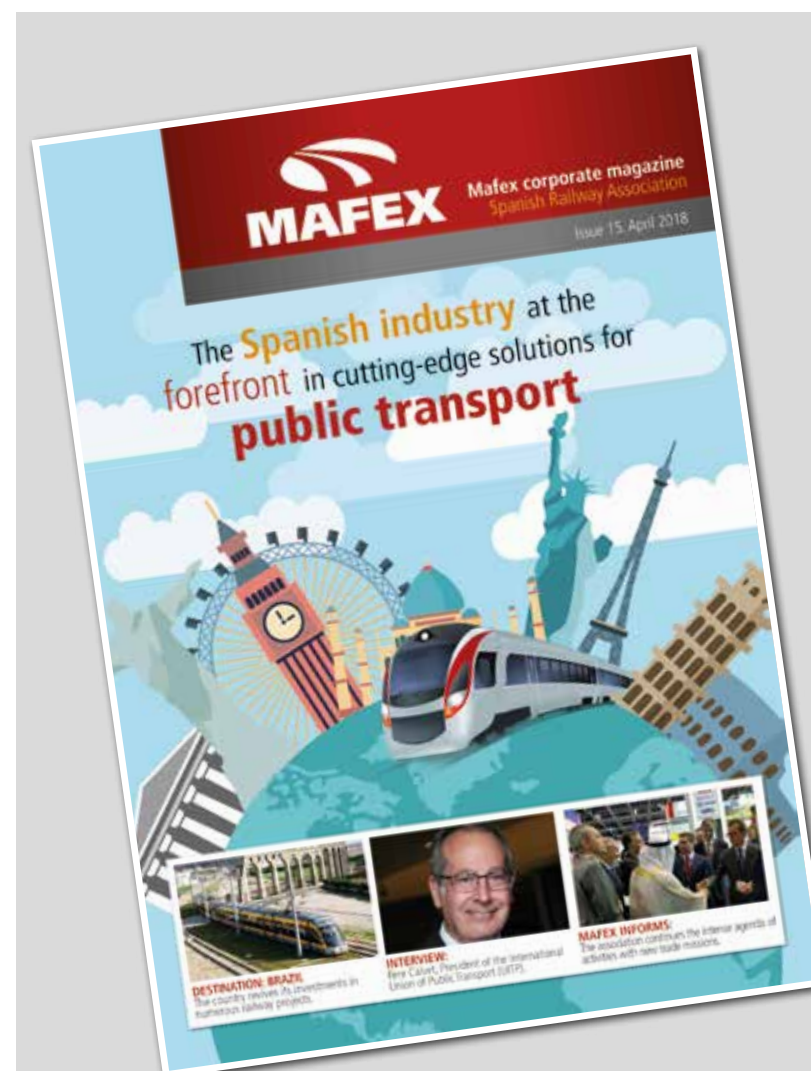
► P: +34 976 46 56 56

► Fax: +34 976 46 57 20

► fsanjuan@teltronic.es

► www.teltronic.es

Company belonging to Hytera Communications Corporation Limited, that designs and manufactures equipment and radio communications systems for Critical Mission, including communications infrastructures based on TETRA and LTE technology, vehicular and portable terminals, Control Centres and Emergency Despatch Stations, along with video-surveillance solutions. Furthermore, it is endowed with wide-ranging experience in the customisation of its products in line with the most demanding requirements of our clients, as can be clearly seen in our on-board TETRA equipment for conventional and underground railway systems.



Corporative Magazine **Mafex**

ONLINE VERSION
FREE

Print version
ask for rates

6.000 readers!

Contact telephone number:

+34 944 70 65 04.

Suscription:

comunicacion@mafex.es

<http://magazine.mafex.es>



THALES

THALES ESPAÑA GRP, S.A.U.

► Serrano Galvache, 56 Edificio Álamo
4º, Planta Sur.

28033 Madrid (MADRID)

► P: +34 91 273 72 00

► F: +34 91 273 78 67

► jose.villalpando@thalesgroup.com

► www.thalesgroup.com

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

getinsa-euroestudios



TPF GETINSA-EUROESTUDIOS,

► C/ Ramón de Aguinaga, 8

28028 Madrid (MADRID)

► P +34 91 456 09 82

► F: +34 91 456 09 83

► internacional@getinsa.es

► www.getinsa.es

With more than 50 years of experience, TPF GETINSA EUROESTUDIOS has grown into a leading business group in Spain and an international benchmark in the engineering sector of transportation infrastructures and the environment. The projects and studies required to develop public works and linear infrastructures are achieved thanks to our human and material resources. We are experts on the comprehensive management of infrastructure in all its phases, starting from the preliminary design up to the operation and maintenance, including all the intermediary steps as profitability analysis, studies, projects, works control and supervision, as well as financial management. These activities are developed both in Spain and abroad. Our international delegations have been established in different

countries and our experience extends over 40 countries in Europe, Asia, America, Middle East and Africa. We are currently working in international projects in 30 countries.

At present, the TPF Getinsa-Euroestudios employs more than 1200 professionals, two thirds of whom are university graduates.



TYPESA

► C/ Gomera, 9. 28703

San Sebastián de los Reyes (MADRID)

► P: +34 91 722 73 00

► F: +34 91 651 75 88

► madrid@typsa.es

► www.typsa.com

Typsa Group is one of the most important European consulting groups and leader in the fields of civil engineering, architecture and the environment. Since its creation, in 1966, Typsa Group's ever-increasing activities, having focused both on preliminary assessment and on design, as well as supervision and/or management of construction projects in Europe, the Americas, Africa and the Middle East. Typsa is one of the most experienced Spanish consulting firms in the field of railways and metro systems. We have been involved in more than 4,700 km of High Speed lines (HSL), 2,600 km of conventional lines, 390 km of conventional metro and 450 km of tram and light-rail transits.



VALDEPINTO, S.L.

► Calle Águilas, 9 - Nave 11

28320 Valdepinto (MADRID)

► P: +34 91 691 42 68

► F: +34 91 691 57 03

► lauraparra@valdepinto.net

► www.valdepinto.com

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.



VICOMTECH (FUNDACIÓN CENTRO DE TECNOLOGÍAS DE INTERACCIÓN VISUAL Y COMUNICACIONES)

► Paseo Mikeletegui, 57

20009 San Sebastián (VIZCAYA)

► P: +34 943 30 92 30

► Fax: +34 943 30 93 93

► mtlinaza@vicomtech.org

► www.vicomtech.org

Vicomtech is an applied research centre, founded in 2001 and located in the San Sebastián Technology Park, which develops technological solutions in the fields of Computer Vision, Data Analytics, Computer Graphics, Advanced Interaction, and Language Technologies. The results of their research projects are applied to various sectors such as automotive, rail, intelligent transport systems, industry and advanced manufacturing and energy, amongst others. All of its activities are regulated with the R&D+I management system, such as the continuous improvement of results and its measurement, the optimisation of technological innovation processes, as well as the transfer and generation of knowledge, thus ensuring that it uses methodologies of the very highest quality.

ZFoam

ZFOAM

► P.I. Alfajarín, Parcela 10

50172 Alfajarín (ZARAGOZA)

► T: +34 976 79 06 40

► Fax: +34 976 10 05 97

► zfoam@zfoam.com

► www.zfoam.com

The company provides complete solutions tailored to the needs of its customers with accurate technical support. They have equipment that covers all the specialist processes of transformation of plastic foams, along with low and high temperature insulation. They have vertically integrated the semi-transformation and final transformation processes, so that a complete service is offered from the raw material to the final product, including the choice of the most suitable materials and the design process.



TWO SYSTEMS IN ONE TRAIN

CITYLINK is a modular, barrier-free and low-floor light rail vehicles family specially designed to provide a safe and high comfortable ride connecting the city and its surroundings without transshipments. CITYLINK platform covers tramway applications and full train regional operations at 100 km/h and it can be easily adapted to fit your network requirements and mobility demands avoiding extra infrastructure investments.


www.stadlerail.com

STADLER



COMPREHENSIVE
RAIL SOLUTIONS

ROLLING STOCK
SIGNALLING
SERVICES
EQUIPMENT & COMPONENTS
TRANSPORT SYSTEMS



A green and white CAF Metrolink Granada tram is shown on a track, with a cityscape in the background. The tram has the number 301 and the text 'METROPOLITANO GRANADA' on its side. The background is divided into several geometric sections, each labeled with a rail solution category.

WHEELSETS, GEARBOXES & COUPLERS

SIGNALLING

ROLLING STOCK

TRANSPORT SYSTEMS

REPAIRS & MAINTENANCE

ELECTROMECHANICAL SYSTEMS

TRACTION AND COMMUNICATION SYSTEMS

CIVIL WORKS

RAILWAY SIMULATORS

www.caf.net

Meet us at:
Bilbao Exhibition Centre
Stand 10
18-19 April 2018

WORLD
**METRO
& LIGHT RAIL**
CONGRESS 2018