MAFEX

Mafex corporate magazine
Spanish Railway Association

Issue 21. November 2019

AUSTRALIA AND NEW ZEALAND

The railway, at the heart of transport infrastructure investments

MAFEX REPORTS

The King grants a Royal Audience to MAFEX on the occasion of its 15th Anniversary.

INNOVATION

The passenger experience, the fulcrum of the industry's advances in R&D.

RAILLIVE!

New edition of Rail Live! from 31 Mach to 2 April, 2020 in Madrid.

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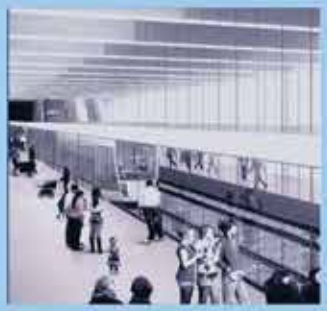

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THE KING GAVE A ROYAL AUDIENCE WITH THE SPANISH RAILWAY ASSOCIATION (MAFEX) ON THE OCCASION OF ITS 15TH ANNIVERSARY
The monarch was informed of the evolution of the association throughout the fifteen years of its career path and the key role of the railway in the future of mobility.

CONFERENCE ON THE "IMPACT OF THE DEREGULATION OF PASSENGER TRANSPORT IN THE RAILWAY INDUSTRY"
The event, organised by Mafex together with IE University, brought together senior officials and representatives of the sector to discuss the next open to competition of the transport market for passengers.

FOWARED: RAIL LIVE! 2020
On the 31st March - 2nd April 2020 in Madrid the global rail industry will gather for three days of conference and an exhibition.

CONFERENCE ON ADVANCED TECHNOLOGIES IN THE RAILWAY SECTOR
The workshop organised by Mafex and Ik4-Tekniker has featured the colloboration of the Spanish Railway Technological Platform (PTFE), Adif and Renfe along with associated companies that shared its cases studies.

TMB CHALLENGES EVENT
Orgased by Mafex and TMB-Transports Metropolitans de Barcelona to promote collaboration in R&D in the railway field.

MAFEX PREPARES AN INTENSE FOREIGN PROMOTION PLAN FOR 2020
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Dear Friends,

As you will be well aware, on September 16th, we celebrated out 15th Anniversary. A long haul in which the Spanish Railways Association (MAFEX) has become the main representative of a highly cutting-edge industry with major presence abroad and renowned prestige the world over owing to its high technological capacity, specialisation and know-how.

For this reason, His Majesty King Felipe VI granted us royal audience on September 27th in which he met representatives of the companies that form the Association's Steering Committee, led by our President, Víctor Ruiz Piñeiro, and in which we were given the opportunity to inform him of the progress made over these fifteen years of its career path; from the outset until its consolidation in the railway framework on a national and international scale. The encounter also served to pass on to his Highness the challenges and concerns that the Spanish railway sector faces, both on a national and international scale, and in which the railway, thanks to its advantages in terms of sustainability, capacity and safety, amongst others, must embark upon a pivotal role in future transport and sustainable mobility.

In the same section, there are also more detailed news items on events such as the "Workshop on the repercussion of the de-regulation of the passenger transport network in the railway industry" which MAFEX organised alongside IE University and in which representatives of the Spanish railway sector came together to analyse the main challenges and opportunities they face from December 2020 onwards, when the transport market for passengers will be opened up to competition.

Also worthwhile highlighting are two seminars carried out from within the Innovation Division of the Association in the field or R&D that boasted the collaboration in the same of TMB - Transports Metropolitans de Barcelona in the "TMB Challenges Seminar" y la "Workshop on technological advances in the railway sector", the latter undertaken alongside IK4-Tekniker and which featured the backing of the Spanish Railway Technological Platform (PTFE), as well as the participation of Adif and Renfe. As you will know, from within the Association backing is being given to all those initiatives in this strategic field, understanding them as being key to the competitive improvement of sectorial companies and considering innovation to be an essential pillar to achieve the necessary evolution of the railway sector and its industry.

In this issue you will also be informed of the Trade Delegation organised to the Czech Republic in the month of September, the Foreign Promotion Plan 2020 that is already underway and the incorporation of three new members to MAFEX, to whom I would like to take the opportunity to give them our warmest welcome: SGS Tecnos, Technology & Security Developments and WSP Spain.

With regard to the section entitled "Destination", an article is included on the transport plans in place in Australia and New Zeeland; two markets in which investments will be made in the overhaul of the railway network in the coming years, and which opportunities for collaboration open up for the Spanish railway industry. An example of this interest in the grouped participation of 8 companies under the auspice of MAFEX in the AusRail Plus Trade Fair that will be held in Sydney. from the 3rd to 5th of December.

A matter of major interest that you will find in the "In Depth" section is an analysis of the different financing models for transport projects, and their evolution experienced in recent years. The public private partnerships gather momentum with the aim of providing efficient and viable public transport network.

To conclude, as with every issue, in the section entitled "Our Partners", you can consult as many as 16 news items and tenders awarded in recent months to Spanish firms, and in the section "Innovation" you will find seven interesting articles on technological innovations developed recently by MAFEX partners.

Approaching the year, I would also like to take advantage of the occasion to wish you a Merry Christmas and many successes for 2020.

MANAGEMENT: MAFEX.
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The **King gave a royal audience** with the Spanish Railway Association (Mafex) on the occasion of its 15th anniversary

HIS MAJESTY THE KING WELCOMED ON SEPTEMBER 26TH, THE COMPANIES THAT COMPRISE THE ASSOCIATION'S MANAGEMENT COMMITTEE, HEADED BY THE PRESIDENT OF THE SAME, MR VICTOR RUIZ PIÑEIRO.

King Felipe VI received, on September 26th, at the Zarzuela Palace, the Spanish Railway Association (Mafex), whose Steering Committee composed of representatives of the companies Amurrio Ferrocarril y Equipos, ArcelorMittal, Bombardier Spain, Caf, Idom, Indra, Ingeteam, La Farga, Metalocaucho, Talgo, Sener, Sice, Tecnivial, Thales España and Typsa, who attended under the auspice of the company's President, Víctor Ruiz Piñeiro and accompanied by the Secretary Jaime Hernani and the Managing Director Pedro Fortea.

Víctor Ruiz Piñeiro indicated that "it is an honour to be received by his Majesty on a date of such special significance for us as is the celebration of the 15th anniversary as the reference association of the sector on a national level, while being one of the most relevant on the international stage."

During the meeting, from within MAFEX the monarch was informed of the evolution of the association throughout the fifteen years of its career path, its beginnings, evolution and consolidation in the national and international railway panorama in order to reach the 89 current partners who represent more than 80% of the foreign turnover of the Spanish railway sector.

The monarch was informed of the evolution of the association throughout the fifteen years of its career path.

Image of the Spanish railway sector being received by King Felipe VI..

The audience served to transfer to the King the challenges and concerns facing the Spanish railway business sector both nationally and internationally. MAFEX officials explained how the railroad, due to its advantages in terms of sustainability, capacity and safety, amongst others, must play a key role in the future of mobility of people and freight in Spain. Similarly, he was confident that the railroad is at the top of the priorities of the Spanish Administration when it comes to structuring national transport and sustainable mobility policies of the future, so that, our country, can be an example at the time to help achieve the environmental aims set forth by the European Union and those assumed by the international community. To achieve all of the foregoing, MAFEX insisted on the need for a commitment and state consensus in Spain to define a long-term rail infrastructure and rolling stock investment plan, based on a global transport strategy and stable, and preventing this road map from being modified either by economic cycles, or by political changes.

During the reception, MAFEX's president thanked the monarch for the confidence always shown towards the association, and in general towards the Spanish railway sector, through the various engagements in which he has offered his presence throughout this period.

During the reception, MAFEX's president thanked the monarch for the confidence always shown towards the association.

MAFEX informs the King that the railways, due to their advantages in terms of sustainability, capacity and safety, must play a key role in the future of mobility of people and freight in Spain.

The King showed his interest in the progress of MAFEX and the railway sector.

The conference on the de-regulation of the railway sector brought together numerous representatives of the industry.

The rail industry primes itself for the immediate deregulation of **passenger transport**

THE REPRESENTATIVES OF THE SPANISH RAILWAY INDUSTRY MET TO ANALYSE THE UPCOMING OPENING OF THE PASSENGER TRANSPORT MARKET, AS WELL AS THE MAIN CHALLENGES AND OPPORTUNITIES UNVEILED AT THE CONFERENCE ON THE "IMPACT OF THE DEREGULATION OF PASSENGER TRANSPORT IN THE RAILWAY INDUSTRY" HELD ON OCTOBER 8TH.

The event, organised by the Spanish Railway Association (MAFEX) together with IE University, brought together senior officials and representatives of the sector to discuss the changes that will occur from December 2020, when the market is open to competition.

The session was presented by the Chairman IE Centre for Transport Economics & Infrastructure Management, Julio Gómez-Pomar; and the president of Mafex, Víctor Ruiz, where they highlighted "the opportunity of liberalisation for society, citizens, operators and of course for industry". For the latter, deregulation will mean a more demanding market for products and services, more innovative and advanced, and that will make it possible for companies that participate in the process to benefit from the repositioning at the international level of our sector."

At the opening of the conference, the Secretary of State for Infrastructure, Transport and Housing, Pedro Saura, highlighted "the major challenge of the change towards a new business model". Saura recalled that "we are facing a great state reform, essential for the Spanish economy, which will increase productivity, bring society together and advance key issues such as the environment, innovation and competitiveness." According to Saura, the keys for its implementation to be a success are based on aspects such as the correct design of the liberalisation model, the elimination of any barrier, as well as the permanent evaluation by the Government of the efficiency and equity of its development. Regarding the main repercussions on the sector, he stressed that "an increase in traffic and a greater number of trains can mean an investment of 1,500 million euros for the industry, a boost to the railway 4.0, new opportunities in the maintenance sector of rolling stock and the opening to the international market ".

In turn, the President of Adif, Isabel Pardo de Vera, stressed the role that the administrator plays in a "state project, key from an economic point of view" and the commitment that

all social, political, public agents also have and private to promote a means of transport that will improve people's lives.

Pardo underlined that the objective of Adif is to respond successfully to the challenges that must be faced to make this process a reality and ensure efficient management of the network in view of traffic growth forecasts and the use of railway infrastructures. In this regard, he recalled that in a multi-operator scenario "from within Adif, we are focused on overcoming all the difficulties that may exist in its development."

Other aspects in which he emphasised are the administrator's plans to improve the use of the stations, provide an innovative concept of service and attention to the traveler, implement a fully interoperable system and move forward in terms of energy efficiency and adaptation to the new digital environment.

Round tables: European experience and impact

The experts also had the opportunity to share experiences and viewpoints during two round tables in which national and international speakers voiced their opinions.

During the first one, devoted to the "Impact of liberalisation on railway operators", CEO & President VY (Norwegian State Railways) Norway, Geir Isaksen; and the General Director of Development and Strategy of Renfe, Manel Villalante i Llauradó. In his speech, Villalante said that liberalisation opens a new paradigm for mobility. The company, which will place the spotlight on users in the coming years, has designed the "Strategic Plan 2019-2023" as a roadmap for liberalisation with digital, cultural transformation and strategic alliances as key points; in addition to its commitment to internationalisation as an integral operator.

In the second round table, entitled "Impact on the rail liberalisation industry in the EU", the second Vice President of MAFEX, María Concepción Ortega Ortíz, featured alongside; Director Spekter (Employers' Association) Norway, Sverre Høven; and RailForum Rail Association Board member Hans Koers. In this block, it was shown how in Europe this process is carried out very differently in each country, the efforts involved in the change in terms of cost and efficiency, improvement of services and business restructuring to offer an attractive service to passengers and increase the train quota as a means of transport.

Bussiness Network

Regarding the role of the business network, María Concepción Ortega outlined the opportunity offered by liberalisation to promote the railroad and value the investments that have been made in recent years, as well as the significant know-how and technological advances offered by Spanish companies.

Ortega said that "the industry is prepared to respond to the needs of different actors such as Renfe, Adif or the new operators" to help them achieve their aims in terms of energy efficiency, sustainability, innovation or service excellence. Although, she added that it is necessary to design a stable investments programme in infrastructure and with sufficient resources in R&D to continue to spearhead world transport.

The Secretary of State for Infrastructure, Transport and Housing, Pedro Saura, and the president of Mafex, Víctor Ruiz.

New edition of **Rail Live! Madrid**

Above, principal pannel of Rail Live! 2019.

THE RAILWAY IS THE SOLUTION TO MASS SUSTAINABLE TRANSPORT THAT IS BACKED BY GOVERNMENTS ALL OVER THE WORLD. DEBATE FORUMS SUCH AS RAIL LIVE! ARE KEY TO FINDING OUT MORE ABOUT ITS SIGNIFICANT ROLE.

As the importance of positioning rail as the key transport mode of the future becomes a priority in cities and nations around the world with sustainability and population growth in mind, the developments required in rail are vast. As is visible around the world, rail is the sustainable mass transit solution which governments are backing. Recent announcements such as Modi's continued large-scale investment in India's transport infrastructure, the UK's latest £45 billion investment in developments at Network Rail's Control Period 6 and the decision of Texas Central (with the strategic help of the Spanish operator Renfe) to privately fund a high speed rail service between Houston and Dallas are just some examples of the global momentum backing rail.

Organisations all around the world are working to understand how rail operations and development projects can be optimised to better serve users, have a lower cost for owners and investors and have the capacity and accessibility to provide a backbone to future mobility. Some of the wider factors driving investment include the fourth railway package being implemented by the EU fundamental which incentivises major changes throughout the industry via a set of tools including the key pillar of liberalisation. Providing smart and healthy cities, fit for tomorrow's economy is also driving investment in rail as a convenient and, most importantly, sustainable transport mode. Some of the key challenges that rail needs to tackle in order to be truly ready to support sustainable and accessible travel include smart mobility, optimising capacity and developments of urban rail networks as well as using digital technology to provide smart infrastructure. While technology plays a vital role in these developments, new ways of thinking also need to become established.

As the Spanish rail market liberalises in line with the rest of the EU and landmark projects are launched around the world including in Japan, China, India, USA, Australia and more, Rail Live! brings the leaders of world's largest railway players together in Madrid to discuss these areas of development, to share the

31st March - 2nd April 2020

latest technological achievements and discuss what the impact on the European and worldwide rail sector will be.
The host partners of the show are MAFEX. Now celebrating their 15th year, MAFEX brings a wealth of experience representing the best in the Spanish railway sector across the world. As an axis of innovation and internationalisation, MAFEX are fantastically placed to help Rail Live drive the future of the sector in Spain and around the world.

Internationalisation and digitalisation: Two key areas of focus at Rail Live!

Internationalisation is a big focus for Renfe, using their expertise and knowledge to develop world-leading projects including Saudi Arabian Railways and Texas Central. With a number of landmark railway projects around the world, the knowledge and expertise of the Spanish rail market are in high demand. Both SAR and Texas Central will be travelling to Madrid for Rail Live! to share updates on the projects, along with a number of other important global developments including Rail Baltica, NRCTC in India, HS2 and California High Speed Rail Association. As the international opportunities for Renfe and the Spanish rail market continue to develop, the focus on these important projects will update the industry on the technologies, challenges and developments from a global perspective.

In addition to this, digitisation is naturally a priority for Renfe, who are focused clearly on one area which is set to majorly disrupt how rail fits into the wider transport landscape, Mobility as a Service. Having recently launched their 'Renfe as a Service' platform, Renfe are choosing to be an active player in the smart mobility ecosystem in Spain and internationally. The opportunity for high speed and long-distance rail to act as a backbone of a future society which no longer depends on privately owned cars and supports a wider ecosystem of a multi-modal shared and public transport is revolutionary. Renfe will be joining us to share more about the development of 'RaaS' and how Renfe envisages the development of smart mobility to unfold over the next few years. The evolution in this area marks an important cornerstone of the future of digitisation and will be in focus within the Mobility 4.0 Sessions at Rail Live! where international operators will discuss the role of rail in the development of smart mobility.

> The development of smart and cities boosts railway investments as a sustainable means of transport.

Global leaders on the agenda

The Rail Live! keynote sessions welcome global leaders to share the strategies that decision makers in large public and private operators are looking to implement to improve passenger and freight services. Keynote speakers joining us to share updates on their projects include Dr. Jacob Kam, CEO of Mass Transit Railway MTR (Hong Kong), who leads arguably the best urban rail network in the world, achieving 99% punctuality and high standards of service using state of the art technology and world leading operational management. Vinay Kumar Singh, Managing Director of the National Capital Region Transport Corporation (NCRTC) project, India's flagship 300 M€ rail development connecting Delhi to regional centres with high speed commuter rail will also be participating in the keynotes. Vinay will give updates on this project, sharing their vision and how his team are overcoming the many challenges in building a high-capacity commuter rail in such a densely populated region. Corey Hannett, Director-General, Major Transport Infrastructure Authority of Victoria (MTIA), who oversees the huge £8-billion (9.340M€) capital investment portfolio in the State of Victoria will also be joining the line-up. With a vast portfolio of projects, Corey will share the developments of rail in the state of Victoria and how it is developing in this region.

The keynote speakers will not only update the industry on their own developments but also look towards trends impacting every project and rail operator at a global level, from financing models, sustainability, digital innovation and topics such as urbanisation, which are putting strain on the capacity of many rail networks globally.
The technologies that are key to revolutionising the rail industry and implementing the larger strategies mentioned above are complex and challenging. With this in mind, Rail Live! covers 13 themes and technologies, all key to achieving the overarching vision that global thought leaders envision.

Opportunities in digital technology

Fundamental to the development of railways fit for the future is the digitisation of railway operations. Technologies including AI, IoT, big data, cloud computing, and virtual reality are all offering up new opportunities for efficiencies across areas as broad as training, maintenance and network planning.

Digital innovation is challenging in this safety conscious and traditional industry, so Rail Live! Will bring together thought leaders to share their experiences of driving innovation throughout their organisations and ultimately making operations more reliable and cheaper. Another major challenge is the interoperability of rail networks, looking at how digital technology is impacting the development of international railways. Standardisation is a key challenge across the industry and a number of discussions will centre around this.

Some of the standout speakers who will be focused on digitisation include Tae Ho Kim, CEO of Seoul Metro focused on the development of a smart and connected metro. Rolf Härdi, Chief Technology Innovation Officer, Deutsche Bahn – Deutsche Bahn is one of the world's leading railway operators, with some of the most technically advanced operations globally. Rolf will be joining us to discuss some of the key areas of opportunity that technology presents. Rolf also has a focus on open data and how this can be managed to support international development in rail. Nalinaksh Vyas, Head of Technical Mission, Indian Railways – The Technical Mission at Indian Railways are tasked with revolutionising operations across this vast contingent with the use of sensors, data management, AI and IoT to develop a platform which will impact every corner of this network. Gerald Schinagl, Head of Digital Innovation, OBB will be joining us to discuss a number of the different projects he is leading the way on, from various use cases of smart glasses to the latest developments in condition-based maintenance.

The latest developments in sustainability

As rail is the most efficient form of mass transport, the global focus on sustainability is offering a new lease of life for the rail industry. as governments and cities are focusing on the development of rail in answer to various environmental challenges and commitments, the rail industry continues to focus on a number of developments which can make Rail yet more sustainable. Discussing everything from hydrail, electrification and traction power, the Sustainability & Power stream continues to be a core focus at Rail Live!

Some of the speakers already confirmed to join us include Matthias Tuchschmid, Head of Energy Efficiency & Renewable Energy Programme, Swiss Federal Railways (SBB) who will be sharing the work he is leading around overall energy reduction at SBB and the economic incentives attached. Margrethe Sagevik, Head

of Sustainability, Norwegian State Railways (Vy) who leads VY's sustainability strategy in Norway will be sharing the various challenges of implementing these practices throughout the supply chain and engaging effectively in carbon offsetting efforts.

Bart Van Der Spiegel, Energy Advisor, Infrabel is a leader in the development of efficient energy practices in Belgium, focusing on a number of projects including driver optimisation and upgrading legacy power

The railways will take centre stage at Rail Live! in Madrid.

systems. Finally, Gabriel Castanares, Energy Efficiency Advisor, Renfe will be discussing the opportunities to save unused energy and the challenges of engaging with infrastructure managers.

Intelligent Infrastructure as the key to the future.

Core to the development of rail is the implementation of technology and new strategies across infrastructure and its related assets. As new technologies offer unprecedented levels of monitoring, assessment and operational optimisation, the development of these networks is fundamental as capacity requirements increase and networks around the world are relying on aging infrastructure.

Kim Sang Gyun, CEO, Korean Railway Network will be speaking at Rail Live! and sharing the development of the infrastructure on the Korean railway network, one of the most sophisticated globally. Sharing the technologies which have proven key to improving operations Kim Sang Gyun will take a deep dive into the creation of an intelligent infrastructure network in Korea. Martin Frobisher, Group Engineering Director, Network Rail, managing some key developments across the UK, will share how condition-based maintenance is being developed and the technical challenges the Thameslink and TransPennine upgrades have caused. Carel Jonckheere, Smart Railway Director, Infrabel will share the 2040 strategy at Infrabel, touching on areas including mixed reality, 5G and the role of smart clothing in creating an infrastructure network fit for the future.

Main developments in Urban Rail

Metro and Light Rail networks have always been a focus at Rail Live! and these streams will continue to focus on the many developments taking place on these networks, examining everything from the role of data, the impact of intelligent infrastructure and automation.

Some of the world's leading networks are already confirmed to join us, including Khalid Alhogail, CEO, Saudi Public Transport Company (SAPTCO) who will share the development of this flagship project in Riyadh, which will revolutionise mobility in this road dependant city. Roman Lapytov, Deputy CEO – Strategy, Moscow Metro will give an update on the digital transformation at Moscow Metro and the importance of ultra-precise asset inspection in keeping up to date with the best metro networks in the world. BC Yen, President, Metro Taipei will be joining us to discuss how data streams are revolutionising operations in Taipei and the role of automated on-board inspection in developing state of the art maintenance systems.

Stations

As the hubs for passengers travelling on rail, stations are a core part of the railway ecosystem and impact the seamless journey all operators envision for their customers. Dealing with challenges from station design to operational efficiencies, the focus on Stations at Rail Live! is a core part of the discussion at the show.

Some of the speakers joining us include Philipp Lombriser, Senior Business Analyst, Swiss Federal Railways (SBB) discussing how SBB are focused on creating stations which are digital hubs for the network, Mohammed Chahid, Head of Asset Development, Office National des Chemins de Fer (ONCF) who will be discussing how they are managing the lifecycles of their stations and creating the stations of the future. Sanjeev Kumar Lohia, Managing Director and CEO, Indian Railway Stations Development Corporation will be joining us to share the landmark redevelopment of Bangalore Station, a complex and challenging project.

New focus on freight

A new addition this year, the new focus on freight will bring together the leaders of this industry who are using technologies, new business models and partnerships to bring rail freight to the front line of rail operations. Looking at everything from operational automation, to real time management of cargo, the projects being discussed will be industry leading.

Technology is key for the railway.

From 31st March to 2nd April, 2020, the worldwide railway industry will meet in Madrid during Rail Live!

Speakers confirmed to join the freight summit include Bertrand Minary, Chief Innovation and Digital Officer, SNCF Fret who will be discussing the automation of their processes and the impact this has on optimising operations. Anja Maria Sonntag, Chief Innovation Officer, SBB Cargo is leading the projects developing automatic coupling and will be bringing new insights from Switzerland on this topic to the discussions at the show. Michail Stahlhut, Managing Director, Hupac Intermodal will be discussing the role of open data and the digitisation of the full freight industry to reap real rewards. Finally, Gino Pfister, CEO, Ecco Rail will be joining us to share his vision of the future of freight and understanding how important inter-modality and customer experience is for the rail freight sector to ever compete effectively.

Cybersecurity

As digitisation is a core focus in much of the programme at Rail Live!, cybersecurity cannot be ignored. The serious challenges of keeping railway systems secure, as more and more data and operational actions are transferred to digital should not be underestimated. The Cybersecurity Summit will bring together the leaders at the forefront of this challenge to discuss the varied ways in which rail can ensure security for the networks, employees and passengers.

Some of the leading minds within Cyber Security sector are confirmed to join us, including: Geir Arild Engh-Hellesvik, CISO of Norwegian State Railways (Vy), Christian Schlehuber, Team Leader Cyber Security OT at DB Netz, Lies Alderliste-de Wit, CISO at Nederlandse Spoorwegen (NS).

Rail Live! as an event

On the 31st March - 2nd April 2020 in Madrid the global rail industry will gather for three days of conference and an exhibition. The whole rail industry will be represented at the event, with leaders and visionaries speaking across 13 content areas, suppliers and partners attending and exhibiting at the show and the end users and buyers of this technology within the industry will attend the exhibition.

The industry leading discussions which will take place within the conference is the centrepiece of Rail Live!, encouraging real debate, updating the industry on the latest technologies and innovations and enabling international executives to discuss shared challenges and opportunities.Rail Live! is well aware of the importance of networking, with a multitude of opportunities available, from a fantastic reception on the 1st April, to extended breaks and an app within which 1-2-1 meetings can be arranged.
As we will be in Madrid, where some of the best rail technologies are on our doorstep, we will be partnering with Renfe, Adif and Metro de Madrid to provide a range of site visits around the conference sessions.

In addition to the conference, a number of activities will be taking place. The exhibition will welcome over 300 companies to share their latest technologies and projects and also incorporate a start-up village, featuring 150 start ups who have disruptive ideas and technology for the rail industry. Two seminar theatres will cover the latest technologies being implemented in the Spanish rail market and the VR/AR demo Zone is one not to miss.

RAIL LIVE!

Tuesday 31st March - Thursday 2nd April 2020 | Madrid, Spain

Rail Live! brings the global leaders of the railway industry together to discuss how new technologies are shaping the future of rail. Covering all the key areas of development in rail including intelligent infrastructure, freight, automation, sustainability, cyber security, smart mobility and stations. Speakers include world leading CEOs and visionary thinkers from networks and projects around the world.

GLOBAL RAIL LEADERS SPEAKING

KIM SANG-GYUN
CEO
Korea Rail Network Authority

COREY HANNETT
Director-General
Major Transport Infrastructure Authority of Victoria

JACOB KAM
CEO
MTR Corp

ROLF HARDI
Chief Technology and Innovation Officer
Deutsche Bahn

ELISABETH WERNER
Director Land Transport, DG MOVE
European Commission

MARK THURSTON
CEO
HS2

S K LOHIA
CEO
Indian Railways Station Development Corporation

VINAY KUMAR SINGH
CEO
NCRTC -Delhi

LENA ERIXON
Director-General
Trafikverket

ANDREW HAINES
CEO
Network Rail

MIROSŁAW ANDRZEJ ANTONOWICZ
Member of the Executive Board
PKP

BASHAR AL MALIK
CEO
SAR

TAEHO KIM
CEO
Seoul Metro

PATRICK JEANTET
CEO
SNCF Réseau

BERNARD CATHELAIN
Deputy CEO
Société de Grand Paris

LIES ALDERLIESTE-DE WIT
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31st March - 2nd April 2020
Madrid, Spain

Conference on **advanced technologies** in the railway sector

THE WORKSHOP ORGANISED ON THE 14TH OF NOVEMBER BY IK4-TEKNIKER AND THE SPANISH RAILWAY ASSOCIATION, MAFEX, HAS FEATURED THE COLLOBORATION OF THE SPANISH RAILWAY TECHNOLOGICAL PLATFORM (PTFE), ADIF AND RENFE ALONG WITH COMPANIES OF THE STATURE OF CAF, BOMBARDIER, INGETEAM AND SDEA ENGINEERING SOLUTIONS.

During the event, innovation was addressed in the railway sector through the sharing of state-of-the-art technologies in materials engineering, advanced manufacturing, automation and industrial robotics, electronics and predictive maintenance, which offer new opportunities to the railway sector.

The workshop was inaugurated by the Managing General of IK4-Tekniker, Alex Bengoa. Later on, Pedro Fortea, Managing Director of the Spanish Railway Association explained how cooperation is "a key element in innovation and competitive improvement". After this first part, a tour of the facilities of the Technology Centre was carried out with all attendees such as Tribology Laboratory, PVD and Solgel Coatings Laboratory, Electronic Laboratory, Industrial and Collaborative Robotics [DEMOS], Industrial Maintenance [DEMOS] and Advanced Manufacturing.

To end the day, the companies Bombardier, CAF, Ingeteam and SDEA Engineering Solutions had the opportunity to unveil their technological developments and applications in the railway sector within the scope of the event.

After the presentation of each of them, it was the turn of Adif, Renfe and the Spanish Railway Technology Platform (PTFE) where they were able to expose their technological strategies in R&D through their needs and challenges and the vision of R&D+i on a national and European level.

TMB challenges **event** to promote collaboration in R&D in the railway field

Gerardo Lertxundi, CEO of TMB during his speech at the conference.

THE MANAGING DIRECTOR OF TMB, TRANSPORTS METROPOLITANS DE BARCELONA, GERARDO LERTXUNDI, ALONGSIDE HIS COUNTERPART AT MAFEX (SPANISH RAILWAY ASSOCIATION) PEDRO FORTEA, UNVEILED ON NOVEMBER 6TH THE OPENIG OF THE CHALLENGES EVENT JOINTLY ORGANISED BY BOTH BODIES.

Its main aim was to publicise the activity that Transports Metropolitans de Barcelona (TMB) carries out in the fields of internationalisation and innovation. As far as the latter is concerned, different technological challenges were presented in the areas of maintenance, sustainability, Big Data and train digitisation. On the other hand, the participating companies also had the opportunity to present the technological solutions to the previously identified challenges, generating a forum in which innovation is considered as a key element for the competitive improvement of the companies.

The combination of these challenges on one side and the vision of the initiatives underway on the other, resulted in the identification of a unique set of opportunities for the sector, thus responding to the different shared challenges.

This sector's commitment to R&D+i was reflected in the participation of representatives of 30 companies. The Association is supporting all those initiatives in this strategic area, understanding it as a key factor in the competitive improvement of companies in the sector and considering innovation as an essential pillar to achieve the necessary evolution of the railway sector and its industry.


Pedro Fortea, General Director of MAFEX during his presentation.

MAFEX prepares an **Intense Foreign Promotion Plan** for 2020

The Spanish Railway Association (MAFEX) has developed an intense schedule of activities for the year 2020, with the aim of continuing with the work of support and international promotion to companies in the sector, as well as boosting its presence in the new transport projects planned in forthcoming years

To achieve this, an activity plan has been designed in which different actions are combined as participations grouped in fairs, business delegations and inverse missions. A complete agenda that especially highlights the third edition of the trade fair named - Rail Live ! Congress - from March 31 to April 2 in Madrid, which is co-organised in tandem with Terrapinn and which places the Spanish railway sector in a sectorial showcase of great relevance and the coordination of the eleventh Spanish grouped participation of the InnoTrans fair, the world's largest exhibition in the sector will undertake in Berlin in the month of September.

For MAFEX, attendance in both events is also a unique opportunity to analyse the priority factors in which the association works for the global future of the railroad. Amongst these, aspects such as sustainability, R&D, the digital ecosystem, and interoperability come to the fore.

Furthermore, strategic trade delegations to Azerbaijan, Canada, Scotland, the United States, Welsh, Georgia, Israel and Uzbekistan have been scheduled. It will also be present at the main fairs and congresses of the sector such as the Middle East Rail fair in Dubai, the Exporail Congress in Cancun that in 2020 celebrates its 19th edition and the Urban Transport Seminar in India.

To conclude, it is also worthwhile highlighting the carrying out of a reverse mission on public transport and two seminars.

MAIN EXTERNAL PROMOTION ACTIVITIES IN 2020

ACTIVITY	DATES
	27-30 JANUARY
EXPORAIL XIX - CANCÚN CONGRESS (MEXICO)	11-13 FEBRUARY
MIDDLE EAST RAIL FAIR - DUBAI (UAE) AND STUDY MISSION TO JORDAN	25-26 FEBRUARY
TRADE DELEGATION TO ISRAEL	9 - 12 MARCH
RAIL LIVE - MADRID (SPAIN)	MARCH 31 - APRIL 02
REVERSE MISSION ON PUBLIC TRANSPORTATION - MADRID (SPAIN)	MARCH 30 - APRIL 03
TRADE DELEGATION TO THE USA	MAY
RAILWAY AND URBAN TRANSPORT SEMINAR - INDIA	MAY
INNOTRANS WORLD CONGRESS FAIR - BERLIN (GERMANY)	22 - 25 SEPTEMBER
TRADE DELEGATION TO SCOTLAND - WALES	5 - 9 OCTOBER
TRADE DELEGATION TO CANADA	19 - 23 OCTOBER
TRADE DELEGATION TO UZBEKISTAN - AZERBAIJAN - GEORGIA	26-29 OCTOBER

New **Mafex** partners

The Spanish Railway Association continues to grow with the recent incorporation of three new partners. MAFEX adds with these memberships a total of 89 companies that represent all the sub-sectors of a solid industry and that forges its path around the world.

SGS TECNOS

SGS Tecnos is an inspection, verification, analysis and certification company. Its services can be divided into 4 categories: Inspection, Testing, Certification and Verification.

TECHNOLOGY & SECURITY DEVELOPMENTS

With more than 30 years' experience in the design, development, manufacture and maintenance of special vehicles. It offers solutions adapted to bodies, companies and other security fields.

WSP SPAIN

WSP- Spain is one of the leading civil engineering consultants in Spain. They provide engineering solutions in different sectors such as transport, building, environment or industry, among others.

The Spanish railway industry travels to the **Czech Republic** in search of new projects

The delegation organised by the Spanish Railway Association (MAFEX) in collaboration with the Commercial and Economic Office of the Czech Republic, aimed to meet the needs of transport infrastructure in the country and seek out avenues of cooperation towards its development.

On the one hand, the country's major investment in interurban transport, as can be seen in Metro Prague, and on the other, the European Investment Bank (EIB) has approved a credit line of 447 million euros to finance part of the railway overhaul plan underway in the country. Of this amount, the first phase of funds have already been delivered, amounting to 116 million euros.
During the event, some of the meetings that were held were with the Ambassador of Spain, Angel Losada, the municipal transport company Prague Dopravni Podnik Prahy (DPP), the Prague Tram Infrastructure Administration, the Railway Infrastructure Administration in charge of the entire network of infrastructure as well as the management of the plans for the High Speed Sprava Zeleznicni Dopravni Cesty (SZDC), the state railways ČESKÉ DRÁHY (ČD), and ŠKODA Transportation.


Image of the Business Delegation to the Czech Republic.

THE SPANISH RAILWAY ASSOCIATION (MAFEX) ORGANISED A TRADE DELEGATION TO THE CZECH REPUBLIC ON SEPTEMBER 25TH AND 26TH. SPANISH INDUSTRY WISHES TO PARTICIPATE IN THE MODERNISATION PLAN OF THE COUNTRY'S RAILWAY NETWORK. IT IS A STRATEGIC NODE FOR THE EUROPEAN CONNECTIONS THAT HAVE THE EU FINANCIAL BACKING.

MAFEX

MAFEX Spanish Railway Association 2020

FIND OUT MORE ABOUT ALL ACTIVITIES AND SERVICES WE HAVE PREPARED FOR 2020 REGARDING INTERNATIONALISATION AND COMPETITIVENESS AND INNOVATION

mafex@mafex.es

42 new trains for Barcelona Metro

ALSTOM SPAIN

Alstom has signed a contract with Barcelona Metro operator TMB (Transports Metropolitans de Barcelona) to supply 42 Metropolis trains to replace those currently running on lines 1 and 3 of the network. The contract, valued at over €260 million, includes the design, manufacturing and commissioning of the trains. The five-car trains will be manufactured in Alstom's Barcelona site.

The new trains for Barcelona will benefit from the experience and reliability of Alstom's Metropolis range, incorporating innovative technological solutions and meeting top requirements in terms of sustainability, Comfort, connectivity and accessibility. Faithful to the aesthetic line of TMB, they also incorporate new visual elements that identify the City, such as the doors graphics, that make a nod to the town planning (Cerdá Plan).

Aquafrisch selected by EU Gateway Business Avenue

AQUAFRISCH

Aquafrisch has been selected under the EU-JAPAN Economic Partnership Agreement (EPA) to participate in the EU Gateway Business Avenues programme, which is part of the mission to promote European railway equipment in Japan.

Aquafrisch will join 40 companies from different nations of the European Union. France, Germany, Poland, Czech Republic and Italy will be some of the countries present at the "RAILWAY TECHNOLOGIES AND SERVICES" meeting that will take place in Tokyo from 27 to 29 November. EU Gateway B.A is a program created and financed by the EU, with the purpose of helping European companies to make themselves known in the Asian market. After an exhaustive selection process at European level, the selected companies were called for a first contact between the organization and the participants.

Aquafrisch participated together with the rest of the selected companies in the presentation meeting of the project that took place last September 20 in Brussels, where experts in the field exposed the advantages of participating in this event, in which they will be able to know better the Japanese railway sector and thus to offer their products and services to potential customers of the Japanese market.

Ardanuy Ingeniería will be part of developing two new lines for the Bangalore Metro

ARDANUY INGENIERÍA

The Consortium made up of Ardanuy Ingeniería and Ardanuy India Pvt. Ltd. will be part of implementing two new lines for the Bangalore Metro: the Airport Line and the ORR Line.

Bangalore Metro Rail Corporation has awarded the Consortium with the design contract for the lines' power supply, third rail traction to 750Vcc and Scada System designs in order to expand this transportation network.

Both lines will have a total length of 53.68 kilometers, will serve around one million passengers by 2040 and will have 30 stations between them. The project will cost an estimated 750 million euros for the ORR line and around 1.325 million euros for the Airport Connection line.

The metro network expansion works will be divided into two phases. Phase II A corresponds to the ORR Line

and will run along 17 kilometers with 13 stations. Phase II B will connect the metro line to the airport with a section length of 36.68 kilometers and 17 stations.

India: A Market of the Future for Spanish Engineering

For Ardanuy Ingeniería, this contract consolidates the Company's order book in India. India is a country in which the Consulting Firm is already well established thanks to its subsidiary Ardanuy India Pvt and is currently participating in numerous projects for both railway as well as urban transport.

Apart from carrying out different activities for both the East and West Freight Corridors (DFCC), other important projects that the Company is involved in are the Chikjajur-Bellary line (between Hyderabad and Bangalore) and the Virbhadra - New Rishikesh line (Rishikesh). The Consulting Firm also collaborates in different design engineering works for the metros of Kochi, Mumbai and Delhi.

Azvi will assembly Rail. One's slab track system in the Arna-Fløen tunnel in Bergen, Norway

AZVI

Azvi and the German company Rail.One have signed a joint agreement to assemble the first ballastless track in the Nordic country. Rail.One's Rheda 2000® slab track system will be installed along the 6.9km single-track Arna-Fløen tunnel in Bergen.

The project was launched by Bane Nor to increase capacity on the Arna-Bergen line, and was awarded to Azvi by the Nordic railway infrastructure manager.Both Azvi and Rail.One are committed to joint development in the Nordic region by offering and delivering the latest innovations in slab track systems for both high-speed and high-performance railway lines.

Bombardier and University Carlos III launch the Railway Engineering Master's Degree program sixth edition

BOMBARDIER SPAIN

Bombardier Transportation and Carlos III University of Madrid continue their collaboration to identify and educate rail industry talent on the sixth edition of the Railway Engineering Master's Degree program that the codirect in Madrid.

The sixteen students will be provided with comprehensive and multidisciplinary training in all the areas of railway engineering. From the design and computing of rolling stock material to propulsion, signaling, security systems or maintenance.

The course curriculum comprises both theoretical and practical training that gives students the opportunity to work with the latest tools and solutions used in the industry. The course also enables students to complete internships with leading companies in the industry, including Bombardier Transportation. The course will take place at the University Carlos III campus in Leganés, Madrid.

All the students that started the master being unemployed had found a job in the railway industry, and approximately 60% of them, work directly or indirectly, for Bombardier.

SNCF awards caf the supply of 28 regional trains

CAF

SNCF has selected CAF as the manufacturer of its new Intercités train fleet. The project covers the supply of 28 regional trains to operate on the Paris - Clermont-Ferrand and Paris - Limoges - Toulouse lines and it includes options for up to 75 additional trains. Designed to reach a maximum speed of 200 km/h, the new units will offer a high level of comfort and equipment thanks to their ergonomic seats, autonomous access for people with reduced mobility and WIFI, plugs and USB ports inside the train. This new project will also involve a strong investment by CAF in its Bagnères-de-Bigorre factory in southern France, as well as a significant growth in its number of employees in France. The units are expected to enter commercial operation as of 2023.

Icon Multimedia strenghs its solutions in all FGV facilites

ICON MULTIMEDIA

Ferrocarrils de la Generalitat Valenciana (FGV) progresses in the digital transformation relying on Icon Multimedia, a company from Palencia. The solution implemented receives the metro, tram and railway schedules from the Passenger Information System of both Valencia and Alicante. This intermodal information consolidator allows a centralised data administration. This way, FGV moves forward the Open Data as part of their global and successful Smart City strategy.

IDOM is participating in the Central Railway project of Uruguay

IDOM

IDOM is participating in the design of the Montevideo - Paso de los Toros Central Railway Line project in Uruguay. This will be the largest infrastructure project in the history of the country, as 8 million tons of products will be transported from the North and Center of the country to the Port of Montevideo. The involvement of IDOM is this project reinforces the firm's activity in the rail market at a global level, adding yet another project to the many developed by the firm worldwide.

This expansion and enhancement project covers a section of some 270 km, seeking to improve the infrastructure with new interchange stations, super and substructures, a clearance gauge to allow for future electrification…

In this context, IDOM as the coordinator of the design of the construction project, is carrying out the detailed engineering work included in the scope of work that includes the stage of preliminary design stage and the design of the executive project. The project is being developed using a BIM approach.

For the next 18 years, the Grupo Vía Central consortium, composed of Sacyr (40%), Saceem (27%), NGE (27%) and Berkes (6%), is responsible for the design, construction, financing, rehabilitation and maintenance of the Montevideo - Paso de los Toros Central Railway Line.

Ikusi renews Iris quality certification

IKUSI

Ikusi has renewed until July 2022 the Iris certification for the activities of design, development and integration of surveillance systems by camera, video and electronic rear-view mirror, passenger information systems and communication systems. In Spain, only two other companies are certified in these three scopes. This certification guarantees the maximum quality and safety of the systems and projects that Ikusi develops for the railway sector.

The work previously carried out by the Ikusi team has become evident with the obtaining in the first instance of this demanding certification, essential to work with the main clients of the railway sector.

Ikusi has been present in this market since 1994, and continues to participate actively in the evolution that the railway industry is undergoing in order to respond to the growing needs for efficiency and sustainability of transport.

From its integration and engineering perspective, Ikusi provides the railway industry with projects based on information and communications technologies that facilitate greater connectivity and open up new possibilities for transmitting and receiving data in the new scenario of digitalization, in which this industry is also immersed.

Ikusi aplica herramientas edge computing, big data, data analitics, machine learning y realidad aumentada para la digitalización de actividades ferroviarias que permiten optimizar y transformar el negocio de los clientes, al mismo tiempo que aportan seguridad y confort a los pasajeros.

Indra obtains IRIS certification, which confirms the highest standards or quality and safety for its railway products

INDRA

Indra has received the certificate IRIS (International Railway Industry Standard), under the standard ISO/TS 22163: 2017, for quality management systems for application in the railway sector.

This certification recognizes Indra's commitment to continuous improvement and confirms that the company's railway products and services comply with the highest standards of quality, reliability and safety in the sector. Having this accreditation, created by the UNIFE initiative, improves the competitiveness of Indra's Transport market, as it contributes to increase its efficiency and profitability and reinforces its position as leader of the sector.

It also opens new opportunities for presenting offers, as this certification is increasingly valued and requested by customers.

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BOMBARDIER

EIB finances Ingeteam's RDI strategy with EUR 70m loan under Juncker Plan

INGETEAM

The European Investment Bank (EIB) will finance Ingeteam's innovative activities by providing a EUR 70m Innovation Loan under the Investment Plan for Europe. The goal of the agreement signed today in Bilbao is to support Ingeteam's research, development and innovation (RDI) programme focused on developing new solutions to meet the needs of the energy transition. The project, signed today in Bilbao, is backed by the Juncker Plan's European Fund for Strategic Investments (EFSI).

The investments will be implemented from this year up until 2022 at the company's plants in the Basque Country, Navarra and Albacete. Ingeteam will benefit from the favourable conditions of EIB financing in terms of both long maturity periods and interest rates thanks to the Investment Plan for Europe, or Juncker Plan, which enables this EIB to offer increased support for investments fostering innovation, economic growth and jobs. This project will help secure the jobs of the company's almost 4,000 employees.

SENER wins a new contract for the dynamic supervision of Adif Alta Velocidad projects

SENER

SENER has been awarded a new contract for the dynamic preliminary engineering and detailed design supervision of Adif Alta Velocidad (AV) projects. Of all the companies that participated in this tender, SENER deserved the highest technical score rating.

The contract, for a total amount of 2.7 M€, will take place over 30 months, and SENER, within its scope, will be responsible for supervising high-speed rail projects in Spain that are submitted by third-party companies to Adif AV during this period.

The work SENER has carried out in the previous similar contract for the dynamic supervision of Adif AV projects has seen it involved in projects design relating to the Palencia-Aguilar de Campoo and Murcia-Almería high-speed lines, the high-speed railway's integration in Vitoria city and the enlargement and refurbishment of the Chamartín station in Madrid.

Siemens Mobility to set up Singapore's Downtown Line signalling simulation center

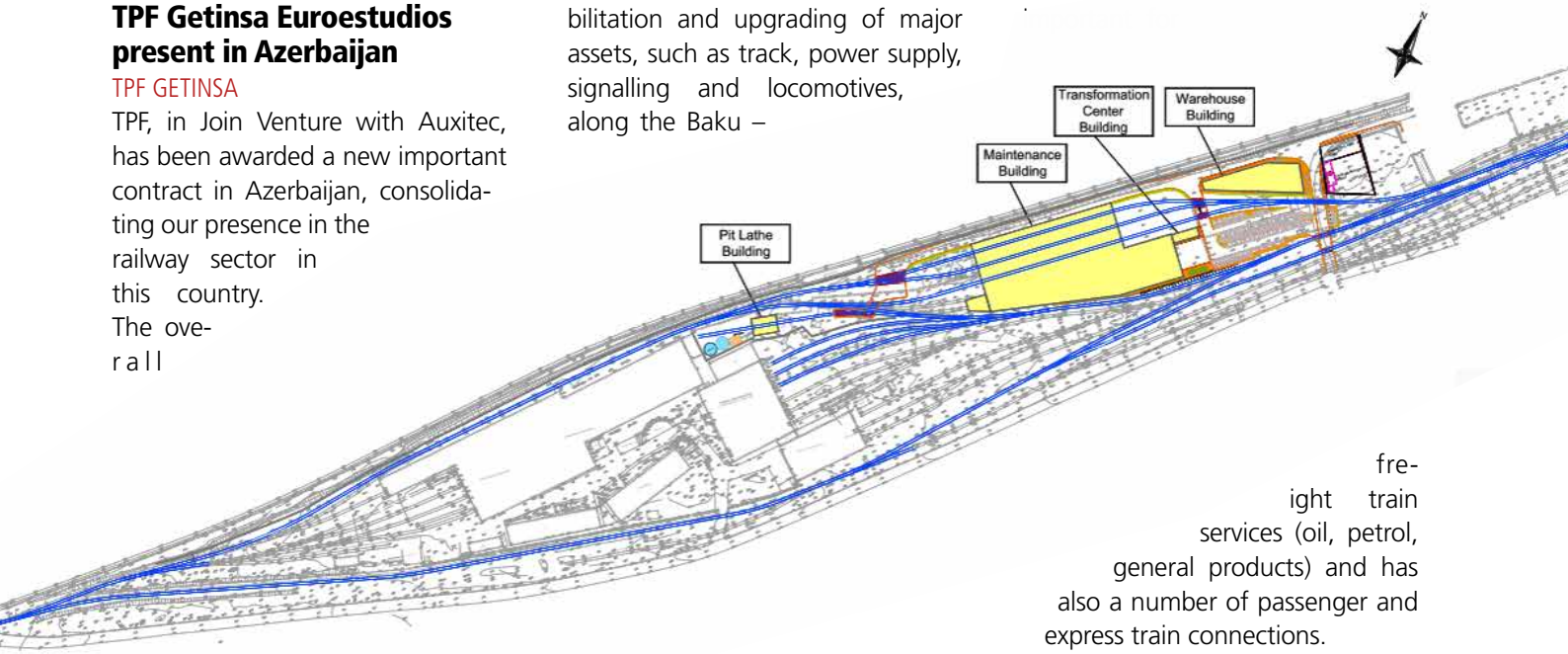
SIEMENS

Siemens Mobility has been awarded a contract by the Singapore Land Transport Authority (LTA) to design and establish a simulation center for the Downtown Line's (DTL) signalling system. The center will enable in-depth and faster technical analysis surrounding signalling-related incidents, enhance testing of new signalling features and system functionalities before deployment as well as increase capabilities for training LTA and the operator's technical staff. DTL currently uses Siemens Mobility's signalling system and automatic train operations. The test center will be established in two stages and completed by end-2020. The first will include ATS simulation environment and the second will include the full test environment: CBTC, interlocking, communications and trackside elements.

TPF Getinsa Euroestudios present in Azerbaijan

TPF GETINSA

TPF, in Join Venture with Auxitec, has been awarded a new important contract in Azerbaijan, consolidating our presence in the railway sector in this country. The overall objective is the improvement of the railway infrastructure through rehabilitation and upgrading of major assets, such as track, power supply, signalling and locomotives, along the Baku – Böyük-Kesik corridor.



This corridor is the main railway line in Azerbaijan and runs East-West, connecting Baku and the Caspian Sea with Georgia. It is very freight train services (oil, petrol, general products) and has also a number of passenger and express train connections.

The contract, with an initial duration of 30 months, includes 4 sections with a total length of 502 km (equivalent to 1,435.4 km of single track).

New markets for Stadler locomotives

STADLER

In 2019, Stadler has strengthened its new Co'Co locomotives family with several orders in Europe that raise the number of locomotives sold from this family to 74. The EURODUAL locomotive has started commercial operations in France and will soon do so in Germany and Scandinavia.

But the success of this locomotive also reaches other markets. The private freight operator Körfez Ulastirma has acquired seven hybrid locomotives, EURODUAL type, to be used in rail freight transport services in Turkey. It is the first contract of Stadler in this country.

In addition, Stadler has won its first contract in the Pacific region: 34 diesel-electric locomotives for the Taiwan Railways Administration (TRA). The locomotives will be used for passenger and freight traffic on the narrow gauge network – 1,067 mm – in Taiwan and they are specially designed for the tropical and subtropical climate in this country, which can reach a humidity level of up to 100% and extreme temperatures of up to 45° C.

On the other hand, the new Co'Co' metre-gauge locomotives SALi of Empresa Ferroviaria Andina (FCA) arrived in Bolivia in September and they are currently performing tests on the Bolivian network.

Teltronic's TETRA solution, certified to support ETCS

TELTRONIC

Kazakhstan Temir Zholy (KTZ), Kazakhstan rail operator company, has certified the successful integration of Teltronic's TETRA solution with the ETCS provided by Bombardier Signaling company, responsible for the signalling application at Zhetygen – Altynkol line.

After the successful laboratory integration developed in Gothenburg, the system was deployed on a railway line of 300 Km length where different densities of the locomotive traffic were applied on the signalling system.

The tests in the field demonstrated and it is recognized by KTZ, that the complete system solution, Integrated by TETRA NEBULA infrastructure and EN50155/EN45545 on board equipment, works stably on the whole back and forth track, allowing the correct operation of the signalling system, with both regular and high traffic.

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STADLER

SANDRA RUEDA
Port and Rail Mode Manager of the Structuring Vice-presidency of the National Infrastructure Agency (ANI) of Colombia

"Colombia works towards the revival of its railway corridors"

Mafex Magazine: Colombia has embarked upon several plans to boost the railroad as a means of transportation. What is the role of ANI and what are its aims in this action programme?
Sandra Rueda: Currently, the country has 3,300 kilometres of railway track. Of this network, 51% is managed by of the ANI, amongst which two corridors are run as a tender concession and two corridors under early operation conditions, named La Dorada-Chiriguaná railway corridor that has influence in the municipalities of Santander, Antioquia, Cesar and Caldas, and the corridor between Bogota and Belencito which runs through the departments of Cundinamarca y Boyacá both are under state-run contracts.

It is precisely on these two corridors in which works are being performed at the present time on the reactivation of early operations, and their public restructuring is expected to embark upon the refurbishment process, while in the medium-term delivering as part of a concession their operation and maintenance.

Mafex Magazine:How have you planned the implementation of these projects?
Sandra Rueda: The revival of the railway mode in the country is one of the priorities in transport infrastructure. Rehabilitated railways and in conditions of operation are fundamental in the mission of reviving multimodalism.
Work is underway on several projects. For this reason, we have defined diverse criteria for their prioritisation in order to identify the projects to be dealt with, with the idea that it is the State that makes the public investments in infrastructure and can obtain the concession of operation and maintenance in the future.
The corridor that has been deemed of highest priority in the outset is Dorada-Chiriguaná. We already have a consultant who commenced studies in June and along these lines, the aim is to move forward with the structuring to have the tender ending by 2020.

Mafex Magazine: What are your plans for passenger transport?
Sandra Rueda: From the regions, a boost has been given to commuter railway projects for passengers.

The first of these, the Regiotram, which is a tender that was issued in the second half of 2019. It is a system that will connect Bogotá with municipalities that comprise the Sabana de Occidente region, namely Funza, Mosquera, Madrid and Facatativá.
The tender, for a period of 26 years has a value of 3.43 million dollars, includes aspects such as financing, studies, designs, social and environmental management, implementation of construction works and the ANI workshop, adaptation and deviation repair, network interventions, operation, maintenance, partial reversal and infrastructure reversal.

The project will operate as a suburban train in suburban and rural areas and as a tram in urban areas on a route of approximately 40 kilometres.

Mafex Magazine: What will be the next step in order of priority?
Sandra Rueda: The next step, in terms of passenger transport will be the structuring of the Bogotá-Zipaquirá corridor, for which the structuring process was published in the month of the November 2019. The idea is to seek an alternative sustainable mobility for citizens. In the first stage, its analysis will be performed for the financial and social benefits that the project can bring, together with the viability of the investment.

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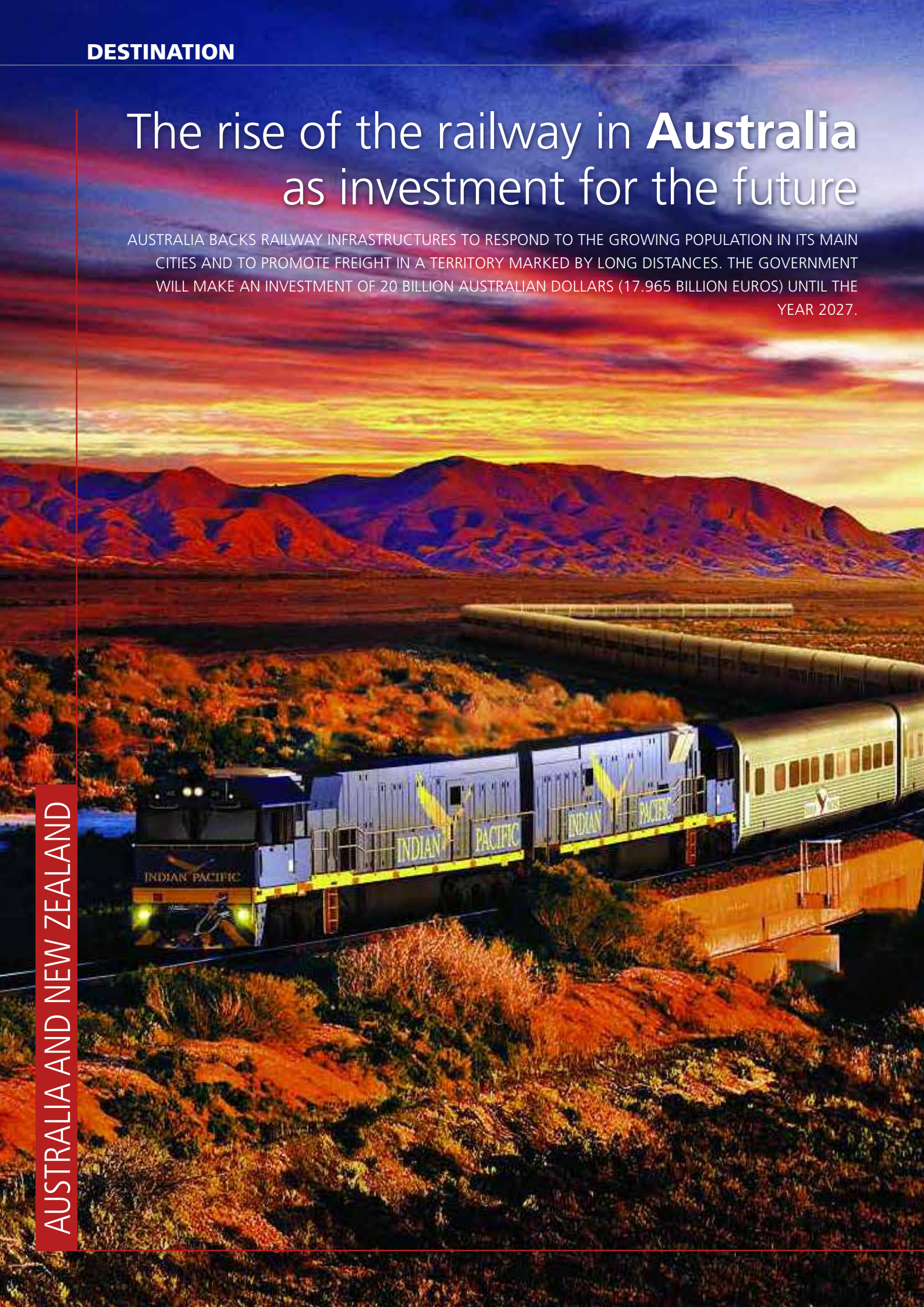
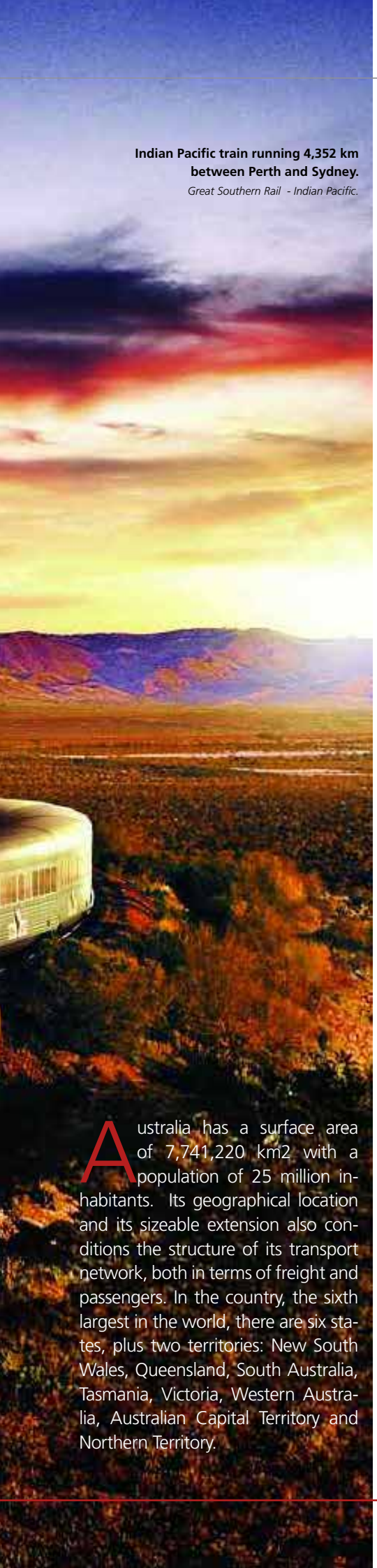
The rise of the railway in **Australia** as investment for the future

AUSTRALIA BACKS RAILWAY INFRASTRUCTURES TO RESPOND TO THE GROWING POPULATION IN ITS MAIN CITIES AND TO PROMOTE FREIGHT IN A TERRITORY MARKED BY LONG DISTANCES. THE GOVERNMENT WILL MAKE AN INVESTMENT OF 20 BILLION AUSTRALIAN DOLLARS (17.965 BILLION EUROS) UNTIL THE YEAR 2027.





Indian Pacific train running 4,352 km between Perth and Sydney.
Great Southern Rail - Indian Pacific.

Australia has a surface area of 7,741,220 km2 with a population of 25 million inhabitants. Its geographical location and its sizeable extension also conditions the structure of its transport network, both in terms of freight and passengers. In the country, the sixth largest in the world, there are six states, plus two territories: New South Wales, Queensland, South Australia, Tasmania, Victoria, Western Australia, Australian Capital Territory and Northern Territory.

The railway will have a very specific weighting in Australia in the coming years in order to improve mobility options in the country.

The majority of the population is concentrated in the capital Canberra and the cities of Sydney, Melbourne, Brisbane and Perth. Considered one of the 15 largest economies in the world,it also stands out in the international rankings as one of the most attractive countries for businesses. The increase in population, which will rise from about 25 million to 31.4 million by 2034, and the search for competitive solutions compared to air and road travel have led the authorities to focus on a sustainable solution for the future. Furthermore, each territory has planned its own programmes to boost transport. In all of them the implementation of infrastructure investment programmes have the railway in centre stage. It is an ideal context for companies that want to contribute their products and services to the development of these initiatives.

The railway sector

The Australian rail network boasts 33,355 kilometres of track, plus another 4,000 kilometres that are devoted to the transport of sugarcane in the state of Queensland. 10% of these lines (3,369 kilometres) are electrified and are located in the metropolitan areas of Sydney, Melbourne (1500 V DC), Brisbane and Perth (25 kV AC). The rest of the system runs on diesel.

The main connections are especially concentrated on the east coast and southeast on the Brisbane-Sydney-Melbourne axis.

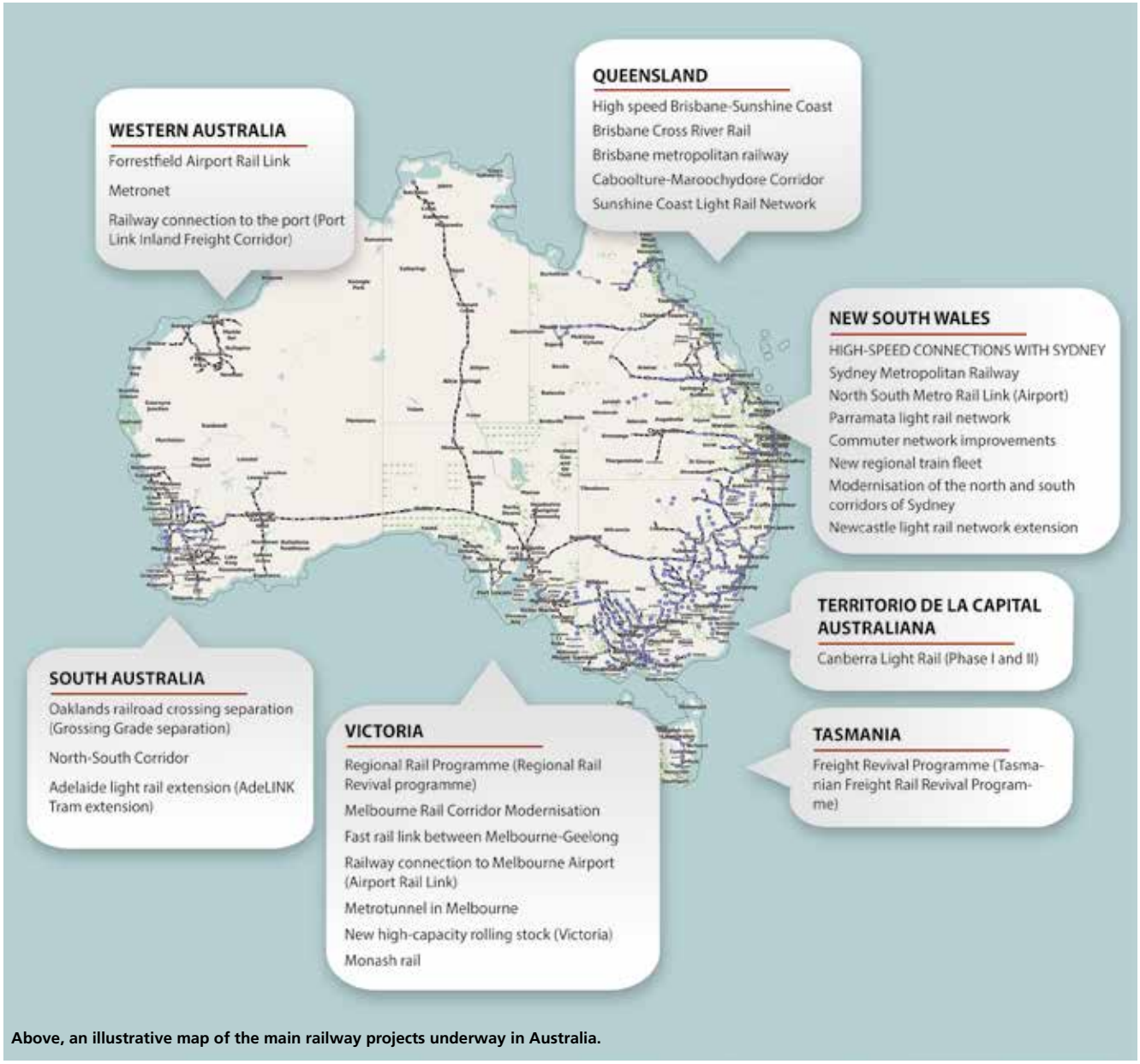
As for its technical characteristics, it should be noted that the network has three types of widths. The international standard (1,435 mm) is the most implanted, with 17,247 kilometres and is used on interstate routes, as well as in certain mining areas such as Pilbara (Western Australia). Alongside this, all states have some branches with these characteristics, except Tasmania

There are 12,522 kilometres of narrow track (1,067 mm), found in the states of Queensland, Tasmania and in the metropolitan area of Perth for the transport of goods such as sugar cane. The least commonly found is the wide track (1,600 mm) with 3,247 kilometres spread throughout in the states of New South Wales, Victoria and South Australia.

The main connections are especially concentrated on the east coast and southeast on the Brisbane-Sydney-Melbourne axis.

Main stakeholders

The federal government and that of the different states own most of the rail infrastructure (Transport for NSW, VicTrack, Queensland Rail Limited, Public Transport Authority of Western Australia).



Above, an illustrative map of the main railway projects underway in Australia.

Also, they are entrusted with the maintenance of the networks and the plans for expansion and modernisation of the lines.

The management element belongs to several private companies. In passenger transport, operators vary depending on the territory. In New South Wales the companies are

Sydney Trains, NSW Trains (intercity); in Victoria, Metro Trains Melbourne (suburban rail network), V / Line (interstate lines) and Yarra Trams (Melbourne trams). In Queensland there are Citytrain (city network), Traveltrain (intercity connections) and GoldLiQ (tram). On the other hand, Western Australia operates TransPerth and TransWa. They are joined in South Australia: Adelaine Metro and Glenelg Tram. Long-distance journeys provide Great Southern Railway, NSW TrainLink and Queensland Rail.

As for the transport of freight, the market is highly concentrated.

65% of the network is in the hands of two companies: Aurizon and Asciano.

There are also other companies such as SCT Logistics, GWA, Qube Logistics, Pacific National, BHP Billiton, Rio Tinto, Karara and Tasrail, among others.

Investments

Australia has modern transport networks, but the increase in population, especially in large urban centres and the momentum intended to be given to freight traffic, has led the authorities to prioritise modernisation and network expansion projects. The

Through the "National Rail Plan" 8.949 billion euros will be invested over a period of 10 years.

government will make an investment of 20 billion dollars (17.965 billion euros) until the year 2027.

On the one hand, the "National Rail Plan" (National Rail Programme) is underway, endowed with 10,000 million Australian dollars (8,949 million euros) to be invested over a period of 10 years.

The goal is to improve rail connections in the surrounding cities and regional centres. On the other, for mega projects such as the "Inland Rail" they have a budget of 8.4 billion Australian dollars (7,545 million euros).

The opportunities to participate in this major boost to the railways are historical. Together with the federal programme over the next ten years, a portfolio of projects is planned that encompasses the numerous initiatives of the different states that include new infrastructure, improvements to existing networks and fleet renewal.

AUSTRALIA: NATIONAL RAILWAY PROGRAMME

PROJECT	INVESTMENT M€ (unless stated)
Western Sydney Rail" (St. Marys-Bringelly)	3.132
Connection to Melbourne Airport	2.237 +2.287 of the programme investment in infrastructure:
Fastest trains between Geelong and Melbourne	1.789
New stages of the METRONET project (Perth, Western Australia)	984
Construction of the Monash Rail in Melbourne (Victoria)	425
Overhaul of the Beerburrum-Nambour line (Queensland)	349
Track duplication and electrification of the Frankston-Baxter line in Melbourne	201
Completion of stratification on the Gawler line (Adelaide)	196.8
Gold Coast 100 light rail stage 3A Rail connections in the Victoria region	447.4
Tullamarine Rail Link	26.8
INLAND RAIL	
Inland Rail	7.545

Source: Australian Government National Rail Programme

Solely in the Budget for 2019-2020, the Government has earmarked 3.5 billion Australian dollars (3.132 billion euros) to the South Sydney North South rail link and another 2 billion Australian dollars (1.789 billion euros) for the fast rail between Geelong and Melbourne.

Freight train in service in the Australian network.

AUSTRALIA AND NEW ZEALAND

Rail freight competes for higher market shares

THE RAILWAY IS THE MAIN MEDIA TRANSPORT OF FREIGHT IN AUSTRALIA. THE NEW PROJECTS, AS INLAND RAIL, WHICH HAS A BUDGET OF 8.4 BILLION AUSTRALIAN DOLLARS (7.545 BM) WILL PROMOTE THEIR DEVELOPMENT IN FORTHCOMING YEARS. FURTHERMORE, OTHER RELEVANT WORKS ARE CARRIED OUT, SUCH AS THE MURRAY BASIN LINE.

The railways are highly competitive for bulk transport, in mining and agricultural sectors, over long distance routes in Australia. The mining sector represents 69% of the total, since most of the coal is transported by this means. In addition, 19% is dedicated to intermodal transport and 12% to primary products.

The implementation of large projects such as "Inland Rail" will contribute to the growth of bulk services in the coming years. Congestion of roadway infrastructure will also contribute to greater demand for train routes. To boost its development, there are plans such as the new Moorebank Precinct terminal in New South Wales.

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INLAND RAIL MELBOURNE (VICTORIA) -BRISBANE (QUEENSLAND)

Inland Rail is a 1,700 kilometre rail freight line that directly connects Melbourne (Victoria) and Brisbane (Queensland), without going through the Sydney network.

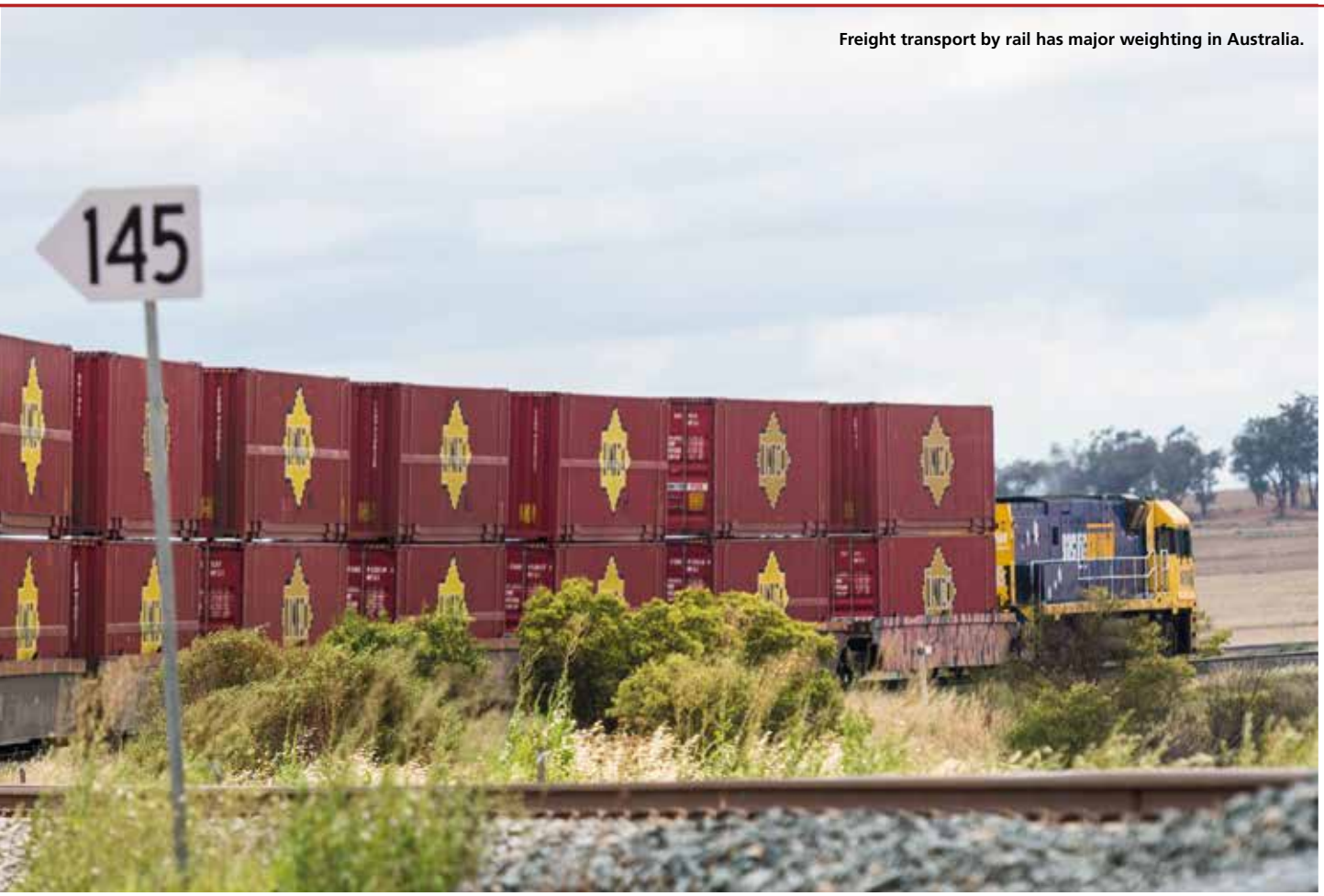
The project, which ends in 2030, is described as "priority" and the Government has allocated to its development an entry of 8.4 billion Australian dollars (7.545 billion euros). The aim is to provide a service to compete with the roadways, with the option of carrying out this journey in 24 hours efficiently, safely and more economically.

The branch includes improvements to 1,200 km of existing tracks and the construction of a further 500 kilometres through regional Victoria, New South Wales and Queensland. Furthermore, access will be made to the ports of Melbourne, Port Kembla, Sydney, Newcastle, Brisbane, Adelaide and Perth. Trains can reach travelling speeds of 115 kilometres per hour and it will be possible to carry out double loads, thus obtaining a clear advantage over transport by lorries. The current coastal route can be shortened by about ten hours, with a connection of agricultural and mining areas to the transport network.

PORT RAIL SHUTTLE (MELBOURNE, VICTORIA)

The main cargo centres in the north and west of Melbourne will be connected to the city's port. This network, which includes the facilities of the Austrak company, the Somerton centre and SCT Logistics Altona, will allow more than 70,000 containers to be transported by rail and be more competitive than via road. The federal government will allocate 38 million AUS$ (34.1 million euros) to this project, along with another 20 million dollars (M) that the Victorian government will contribute.

Below, a train from the company SCT Logistics Altona.



Freight transport by rail has major weighting in Australia.

MURRAY BASIN LINE (VICTORIA)

With this project, with a budget of 440 million dollars (395 million euros), significant improvements are made to the freight rail network of North Western Victoria. In this area is the Murray Basin region, with a large bulk production and export of agricultural and mineral products. The company entrusted with the works is the firm V / Line. One of the most significant tasks is to enable wide track access to the port of Portland. The works have been divided into five stages, four of them already completed. The latter includes improvement work on the Warrenheip line to Maryborough.

MOOREBANK LOGISTICS PARK

The Moorebank logistics park has been considered one of the most significant infrastructure projects in the country. The Government has committed to investing 370 million dollars (332 million euros) for its development and aims to improve the current connectivity of freight transport. To achieve this, a 243-hectare terminal will be built that will become the largest logistics centre in Australia. Once operational, it will boast the capacity to transport up to 1.05 million TEUs per year in export and import activities and another 0.5 million in interstate connections.

This large infrastructure will have a rail connection with the Southern Freight Line (SSFL).

Infografía de la terminal intermodal de Moorebank.

TASMANIA GOODS REVIVAL PROGRAMME

This Programme, with a budget of 119.6 million Australian dollars (107 million euros), includes the installation of 290 kilometres of track and the insertion of 225,740 sleepers, along with additional work on the Melba line.

The third phase is currently being developed, which consists of the overhaul of the port of Burnie with the construction of a new ship loader to replace the existing one and allow bulk products to be transferred onto container ships for domestic and foreign export.

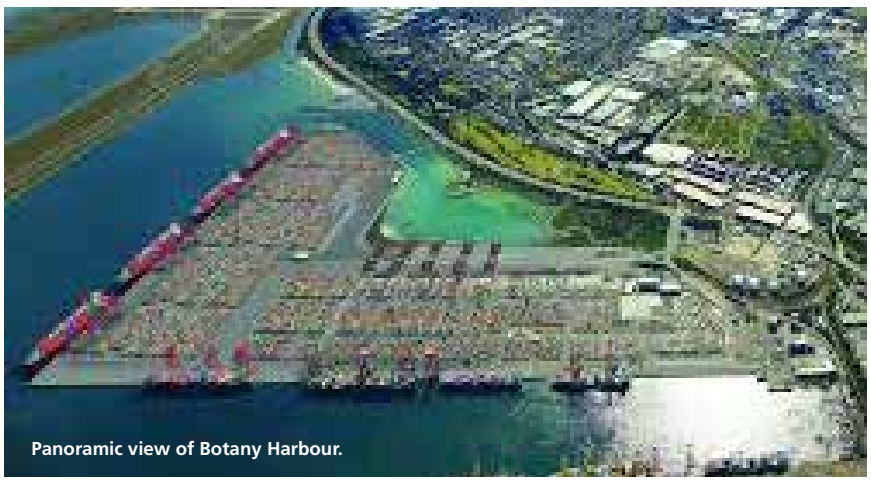
CABRAMATTA RAILWAY CONNECTION (SYDNEY, NEW SOUTH WALES)

The Australian Government will allocate 400 million dollars (359 million euros) to two railway projects in New South Wales. Along with the duplication of the track at Botany Port, the construction of a new road between the outlying areas of Cabramatta and Sydney Warwick Farm has been announced.

This will allow freight trains travelling in any direction to cross over and provide additional rail freight capacity.

PUERTO BOTANY (TRACK DUPLICATION)

Botany will become Australia's largest container port in terms of volume in the next 30 years. For this reason, it is necessary to provide improved railway connections. At the moment the line between these facilities and Cooks River has a single track section that will be duplicated, alongside the building of a new access and carrying out the associated signaling work.



Panoramic view of Botany Harbour.

The project is expected to permit greater load movement from the current average of approximately 20 trains per day (per direction) to around 45 trains per day (per direction) by 2030.

These works are part of the "New South Wales Freight and Ports Plan" (NSW Freight and Ports Plan 2018-2023) and have a regional budget of 400 million Australian dollars (359 million euros). This year also ends stage three, which consisted of the improvement of the South Sydney Freight Line that goes from these facilities to MacArthur.

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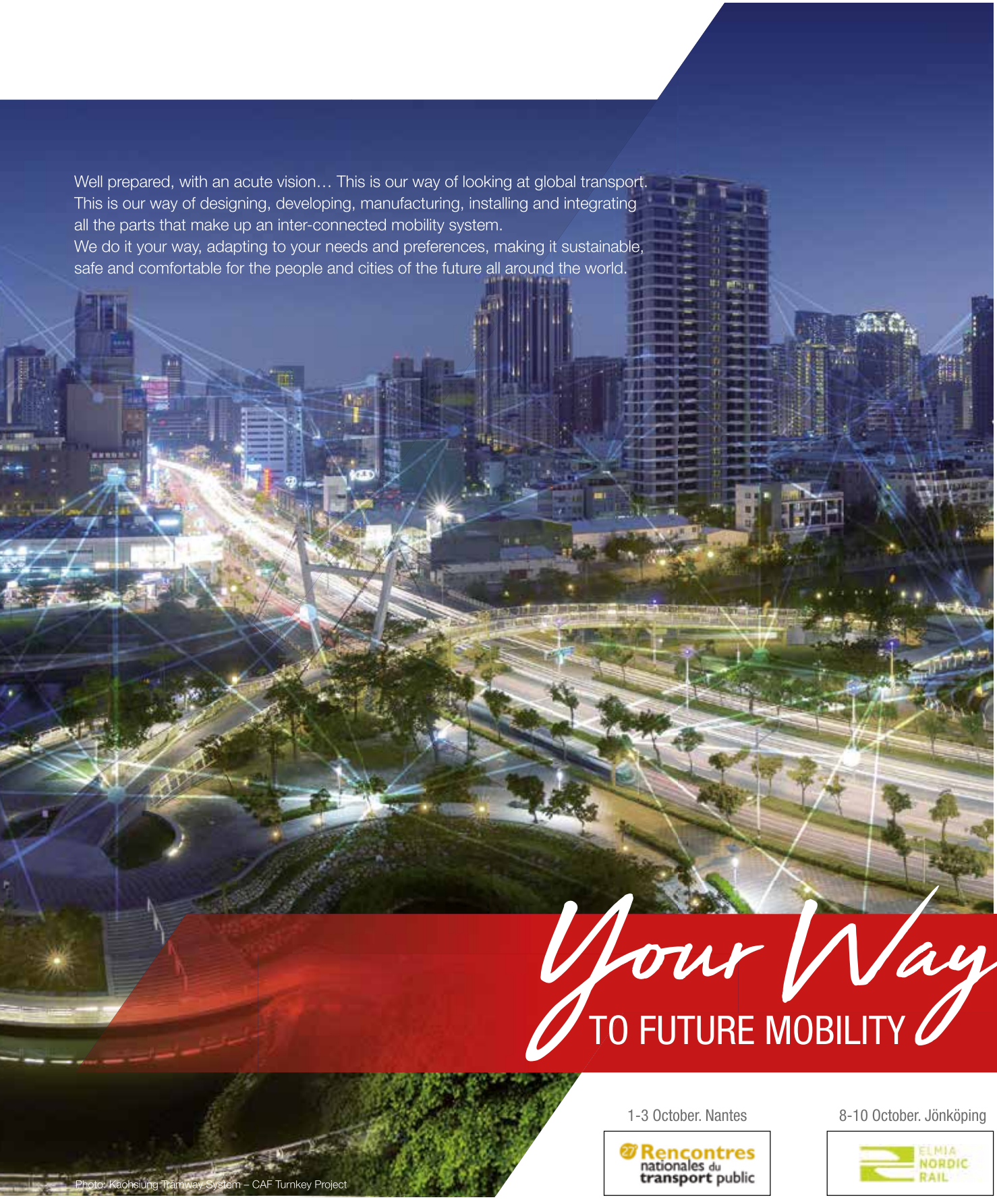

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THE STATE OF NEW SOUTH WALES EMBARKS ON 88 RAILWAY PROJECTS IN WHICH METROPOLITAN RAIL, TRAMWAYS AND COMMUTER RAIL PROGRAMMES TAKE CENTRE STAGE. ALL OF THEM ARE PART OF THE LARGEST STATE INFRASTRUCTURE PROGRAMME.

New South Wales has the largest transport infrastructure programme underway in its history, endowed with 55.6 billion Australian dollars of investment (34.234 billion euros). Within this plan, which is part of the "Four-year capital programme 2019-2023", there are more than 3,500 projects for road and rail, among which the commitment to the train (metropolitan, tramway, commuter networks) stands out.

HIGH SPEED CONNECTIONS WITH SYDNEY

The current Government of New South Wales has announced plans to build four high-speed state-of-the-art rail routes. Still in the initial study phase, the goal is to connect Sydney with the fastest growing urban centres in the region, with a direct route to Canberra in the territory of the Australian Capital.

The current plan includes links with a distance of less than 300 kilometres from Sydney to Canberra, Goulburn, Central Coast, Newcastle, Lithgow and Bathurst, the heart of Parkes (part of the Inland Rail project), Wollongong and Nowra. The proposal would see the journey time between Sydney and Canberra reduced from four hours to just one.

In a first stage, with the existing refurbishment works on the line, the trains could reach speeds of 200 kilometres per hour. In the longer term, with construction of new networks, this speed could reach 250km / h, and in some sections as much as 350km / h Which would reduce travel times by up to 75%.

The city of Sydney, where high-speed connections are planned.

IMPROVEMENT IN THE NORTH AND SOUTH CORRIDORS OF SYDNEY

The city of Sydney needs more and better rail connections, hence transport authorities have planned several extension works in the long-term.

On the one hand, the "South West Rail Link" corridor will be extended from the station at Leppington to North Bringelly in order to also connect with the Northbound

Southbound line (North South Rail Line).

On the other, in this last branch a passenger link will be created between the lines of Main West near St. Marys and Main South, near MacArthur.

SYDNEY METROPOLITAN RAILWAY

The Sydney metropolitan rail network is a megaproject considered as the largest transport undertaking in Australia in the public sector. With a budget of 12 billion Australian dollars (7.474 billion euros) it will feature 31 stations and more than 66 kilometres of track. According to the planned calendar, it will be completely finalised in 2024. The development of the works has been divided into several phases.

The first stage (Sydney Metro Northwest) is a 36-kilometre underground rail network.

Future Sydney metropolitan rail stop on the Westwead line.

This section was inaugurated in May 2019 and its works have included the construction of eight new metro stations, and five improved stations. The second phase (Metro City and Southwest) is a stretch that will be 30 kilometres long and will link Chatswood Station with downtown Sydney.

Seven new stations will be included in this branch: Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street, Central Station and Waterloo. Furthermore, rehabilitation works of the Bankstown line will be carried out to convert it into a section of the metropolitan railway line. This second stage has been allotted a budget of 11.5 billion ASU$ (7.08 billion euros).

Already in 2016, the Government of the state of New South Wales announced a third phase: Sydney Metro West to which 6.4 billion Australian dollars (3.986 Bn billion euros) have been allocated. This route will link the urban centres of Sydney and Parramata to the west. Works are expected to begin in 2020.

METROPOLITAN RAIL CONNECTION TO THE AIRPORT (NORTH SOUTH METRO RAIL LINK)

The metropolitan railway will reach the future Western Sydney International Airport in 2026, the forecast date for its opening. To this end, the "North South Metro Rail Link" project has been launched, which is funded by the Australian Government with 3.5 billion Australian dollars (2.155 billion euros). Furthermore, the New South Wales executive will allocate 2 billion Australian dollars (1.231 billion euros) over the next four years to its development. The network will connect to the T1 (Western Line) line. Fully automated driverless trains will be available for operation, as is in place in the rest of the Sydney underground network.

Image of the future Western Sydney International Airport.

PARRAMATA LIGHT RAIL NETWORK

The first phase of this network, scheduled for 2023, will feature 12 kilometres of track and 16 stations. The route will link the central business district and the intermodal station of Parramatta with areas of cultural interest, university campuses and social housing zones. Specifically, it will extend to the peripheral area of West mead, on the west side, to the new Bankwest Stadium, the Powerhouse cultural venue, the Riverside Theatre, as well as the residential area in Telopea, the Rosehill Gardens racecourse and three university campuses Western Sydney University.

In a second phase of nine kilometres, the light rail network will connect with the section of phase I and the city of Parramatta with Ermington, Melrose Park, Wentworth Point and Sydney Olympic Park.

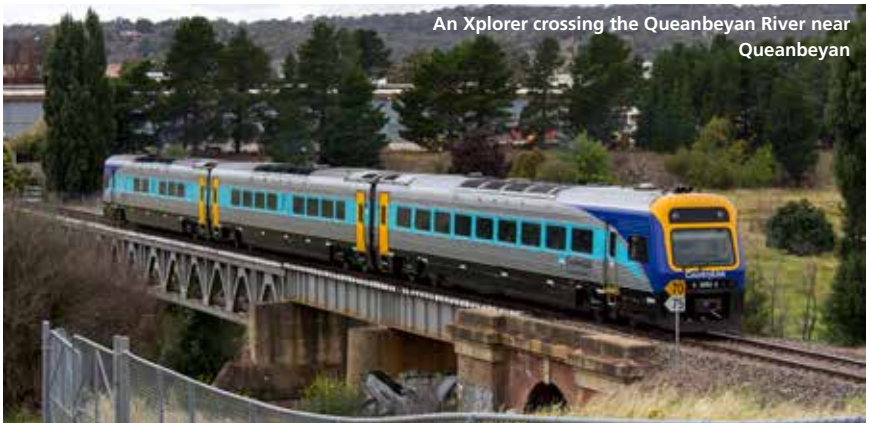
It is estimated that in 2026, some 28,000 people will travel daily in this new means of transport. CAF, which is part of the Great River City Rail Light awardee consortium, formed by CAF Rail Australia and Transdev Australasia have been entrusted with the start-up of this service.

Recreation of the Parramata light rail network.

IMPROVEMENTS IN THE COMMUTER NETWORK

The Transport for New South Wales (TfNSW) authority also wishes to boost Sydney 's commuter lines. To achieve this, the improvement and overhaul of 815 km of network will be carried out, where new digital signaling and rail traffic management systems will be installed. Tasks to be carried out by the Ineco company.

These changes will increase by more than 60% the number of trains that access the central district of Sydney and the circulation capacity in areas such as Western Sydney and South West Sydney by up to 100,000 people per hour. The actions planned within the programme include the updating of the signaling network to ETCS level 2 and the implementation of the ATO (Automatic Train Operation) system.



An Xplorer crossing the Queanbeyan River near Queanbeyan

STATION REFURBISHMENTS

One of the railway works included in the New South Wales infrastructure programme is the modernisation of the railway stations. These include the works at Yagoona, Wollstonecraft Dapto, Clarendon, Bellambi, Wauchope, Taree Station, Queanbeyan, Parkes, Narrabri, Waitara, Thornleigh Stanmore, St.Peters, Petersham, Normanhurst, Erskineville, and East Hills.

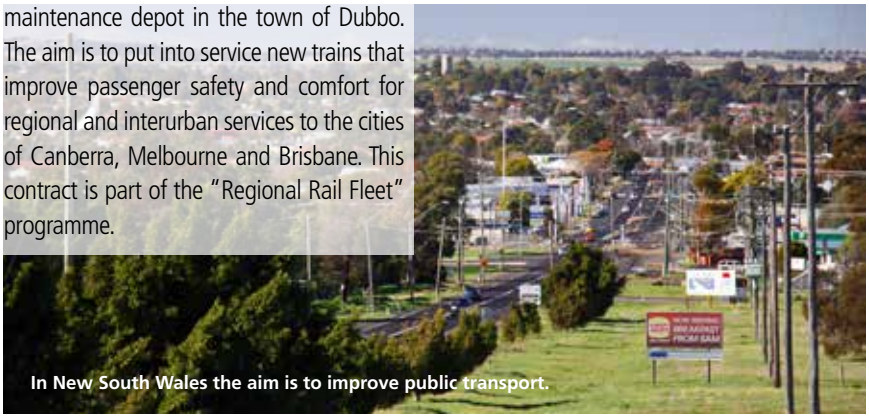
Part of the works carried out belongs to the "Transport Access Programme", which seeks to improve the accessibility of the facilities. The budget for 2019-2020 has been increased up to 300 million Australian dollars (184.6 million euros) to provide funds to continue with these improvements.

In the picture, the Taree railway station.

REGIONAL TRAIN FLEET

The Government of New South Wales has signed a contract this year to design, build, finance and maintain the new regional railway fleet for the amount of 1.26 billion Australian dollars (775 million euros).

The Momentum Trains Pty Ltd. consortium, in which CAF holds a stake, will be entrusted with the supply and maintenance for a period of 15 years of the new regional train fleet. This agreement includes 29 regional diesel-electric units, two simulators, and the construction and equipment of a new maintenance depot in the town of Dubbo. The aim is to put into service new trains that improve passenger safety and comfort for regional and interurban services to the cities of Canberra, Melbourne and Brisbane. This contract is part of the "Regional Rail Fleet" programme.



In New South Wales the aim is to improve public transport.

NEWCASTLE LIGHT RAIL NETWORK EXTENSION

The Government of New South Wales has published a new 40-year transportation plan seen for the metropolitan area of Newcastle, the sixth most populous city in Australia. The "Greater Newcastle Future Transport Plan" is intended to double the public transport quota in 2056, which represents only 3.2% of trips during the week, and 1% on weekends.

Amongst the most significant initiatives are the expansion of the light rail network. This network, in commercial operation since February 2019, features six stations and runs CAF rolling stock. Several options are now being studied for its extension from the exchanger to Broadmeadow Station, Hunter Stadium or Mayfield.

Newcastle also backs the light rail network.

Above, a general overview of the city of Brisbane.

AUSTRALIA AND NEW ZEALAND

Queensland backs rail infrastructure

IN THE STATE OF QUEENSLAND, SOME OF THE COUNTRY PRIORITY RAILWAY PROJECTS ARE UNDER DEVELOPMENT, SUCH AS THE CROSS RIVER RAIL, WITH AN INVESTMENT OF 5.4 BILLION AUSTRALIAN DOLLARS (3.322 BN), OR THE HIGH-SPEED CONNECTION "NORTH COAST CONNECT."

The Queensland Transport and Roads Investment Programme (QTRIP) 2019–20 to 2022–23 "ensures the continuity of regional transport projects. Railway infrastructures enjoy a prominent role, as many works have state support and are a top priority such as new regional connections, the Cross River project or the Brisbane metropolitan line.

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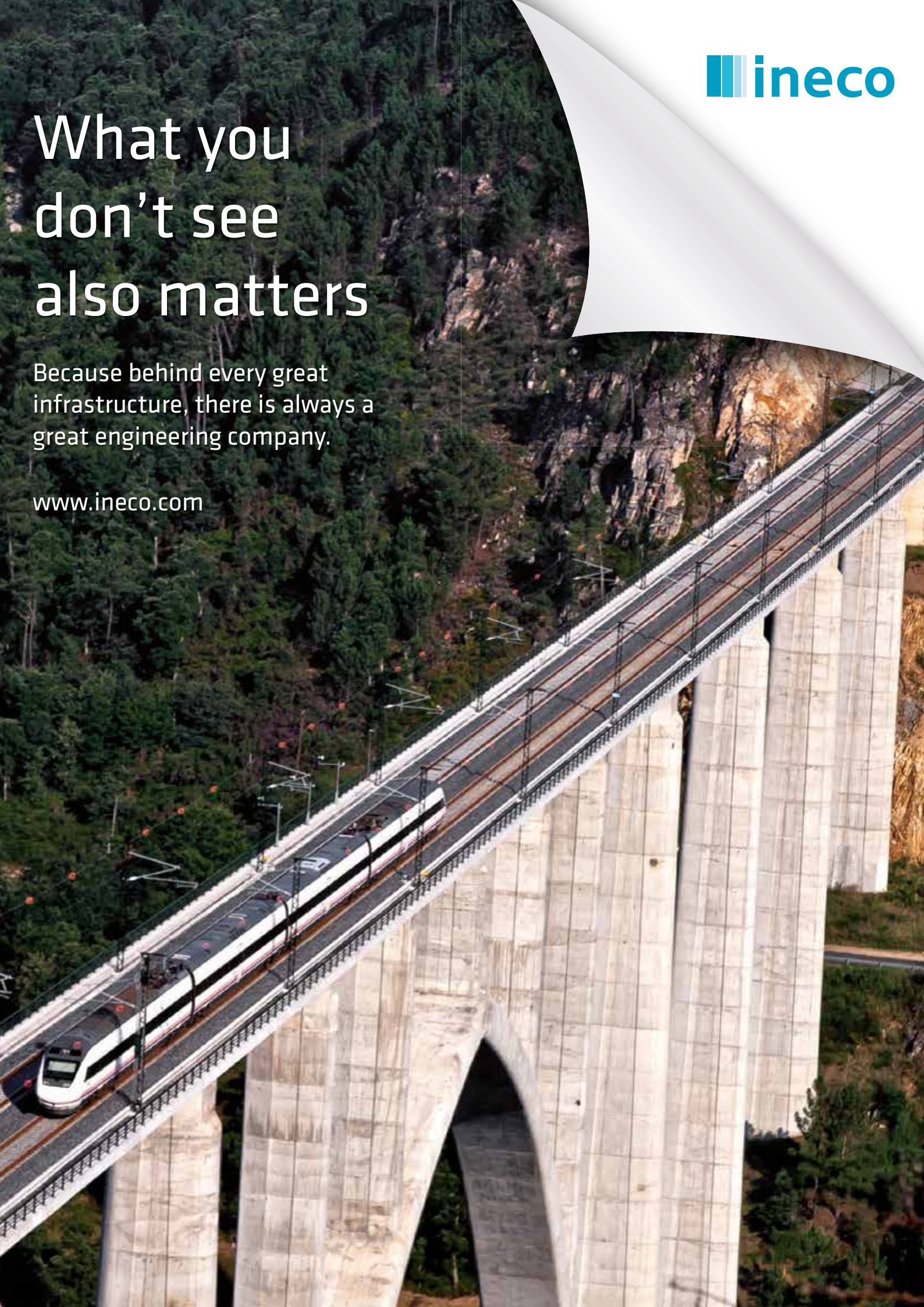


BRISBANE-SUNSHINE COAST HIGH-SPEED LINE

One of the lines that are being considered in the region is the high-speed rail connection entitled "Brisbane-Sunshine Coast-Moreton Bay." his project, entitled "North Coast Connect" would reduce travelling time, with a 200-kilometre journey, taking less than an hour. The action plan includes the improvement of the current layout between Brisbane and Beerburrum, the installation of new lines between Beerburrum and Nambour and the construction of a 40-kilometer road between Beerwah and Maroochyodre. For these works, the Queensland Government has allocated a fund of 160.8 million Australian dollars (98.3 million euros), while the federal executive will contribute 390 million Australian dollars (239 million euros). The ultimate goal is for the high-speed rail line to be operational over a period of five years.

High speed in Brisbane may be a reality in the near future

BRISBANE CROSS RIVER RAIL NETWORK

Cross River Rail is one of the most relevant infrastructure projects in the country with an investment of 5.4 billion Australian dollars (3.322 billion euros). The works to unlock the urban core, expand the network's potential and provide more and better services to citizens, began in September. It is a 10.2 kilometre route from Dutton Park to Bowen Hills, which includes 5.9 kilometres of tunnel that will cross the Brisbane River. The route will include four new underground stations at Boggo Road, Woolloongabba, Albert Street and Roma Street and another eight overland at: Rocklea, Moorooka, Yeerongpilly, Yeronga, Fairfield, Dutton Park and Exhibition.

According to the planned works' schedule, it will be completed in 2024 and will serve to decongest traffic in the city center, increasing services and connecting the network with other systems. Amongst the companies selected to execute the project are three firms of CIMIC Group, an Australian subsidiary of Spain's ACS.

Below, the infographics of the Cross River project stations.

Brisbane metropolitan line.

BRISBANE METROPOLITAN RAILWAY

The city of Brisbane will have a large combined network of 21 kilometres of bus lane and two new metro lines with 18 stations. The works corresponding to the first phase will be carried out until 2022, the year in which it will enter into operation.

The project has an estimated cost of 944 million Australian dollars (580 million euros) and will be operationally ready in 2022. There will be interchanges that will connect to the "Cross River" rail network at Boggo Road station and Roma Street station.

CABOOLTURE-MAROOCHYDORE CORRIDOR

The Queensland authorities have conducted a study to propose a new passenger rail service. It is a fork of the north coast line in Beerwah that would extend through Caloundra to Maroochydore. This network would strengthen the transport of Sunshine Coast and will link the urban core of its coastal area with Brisbane.

A photograph of the city of Maroochydore.

ACCESSIBLE STATIONS AND SMART TICKETING

Queensland also works to improve the services provided to users. For this reason, it is committed to new technologies and to make its facilities wholly accessible.
On the one hand, the central station of Brisbane will have smart ticketing systems (Smart Ticketing system), a project for which 371 million Australian dollars (231 million euros) have been allocated. The aim is to digitise the payment method so that the user can pay through their Smartphone / smartwatch easily.

On the other hand, the transport authorities have approved an item of 250 million Australian dollars (153 million euros) for improvement works at stations for passengers with reduced mobility.

SUNSHINE COAST LIGHT RAIL NETWORK

In Sunshine Coast there are plans for a light rail network.

Sunshine Coast City Council has developed a plan to put in place an
integrated public transport system with which to serve the growing population of the area. In July 2019, it unveiled to the Government of Queensland a study where several proposals are analysed and in which two light rail lines were suggested. It would be a 20 kilometre track between Maroochydore and Caloundra, through Mooloolaba and Kawana and the idea for this to be completed in 2025.

Western, South Australia and Territories: The train gathers momentum

THE STATES OF WESTERN AND SOUTH AUSTRALIA, AS WELL AS THE TERRITORY OF THE AUSTRALIAN CAPITAL ALSO OPTS FOR THE TRAIN AS A MEANS OF TRANSPORT. PROOF OF THE FOREGOING ARE THE PROJECTS IN PROGRESS, SUCH AS METRONET, CONNECTIONS TO THE FORRESTFIELD AIRPORT OR THE EXTENSION OF THE CANBERRA TRAM.

Public transport services are a priority in states such as Western and South Australia, as well as in the Australian Capital Territory. All of them aim to respond to the expected increase in population and new mobility needs.

Western Australia

FORRESFIELD AIRPORT RAIL LINK

The "Forrestfield-Airport Link" connection is a project jointly financed by the federal government and that of the state of Western Australia. For its development there is a budget of 1.86 billion Australian dollars (1.145 billion euros). The layout will take advantage of the existing Midland line to extend the service to the peripheral areas of eastern Perth. The works, which will be completed in 2021, include three new stations at Redcliffe, Airport Central and Forrestfield.

In April 2016, the Salini Impregilo NRW (SI-NRW) consortium was awarded a contract of 1.176 billion AUS$ (796 million euros) for the design, construction and 10 years of line maintenance.

Metronet is another of Australia's major rail projects.

METRONET

One of the most significant public transport works in the state is Metronet.

The project aims to reduce traffic congestion on roads by expanding the Perth network.

In its first stage, 78 new kilometres of track and 18 stations will be built. Amongst the tasks involved includes the completion of the railway branch to Forrestfield airport and the extension of the lines from Joondalup to Yanchep, Midland to Bellevue and Armadale Line to Byford. Furthermore, the Thornlie and Cockburn stations will be connected, a new 21 kilometre line (Morley-Ellenbrook) will be enabled and new stations such as Karnup will be built at the Mandurah branch.

On the other hand, in order to provide this network with modern and higher capacity trains, the Railcar Programme is underway, which has a budget of 1.6 billion Australian dollars (984 million euros) for the acquisition of 246 new trains This programme seeks to replace the old models of the series and the diesel units that operate between Perth and Enrique Bunbury. Alstom Transport Australia will be responsible for the supply of the new C series, which will enter service from the year 2022.

South Australia

ADELAIDE LIGHT RAIL EXTENSION (ADELINK TRAM EXTENSION)

In September 2017, the government of South Australia allocated 80 million dollars (49.2 million euros) to the first phase of AdeLink, a project to connect the north with the south of the city, which included the acquisition of three additional trams. The City Council added 5 million to hasten proceedings.

This year, the state executive has announced the intention to continue with the plans to expand the network. It is one of the infrastructure priorities.

For its part, the tender also includes it within the long-term strategy called "20-year city transport strategy".

Five lines are raised that reach the peripheral areas.

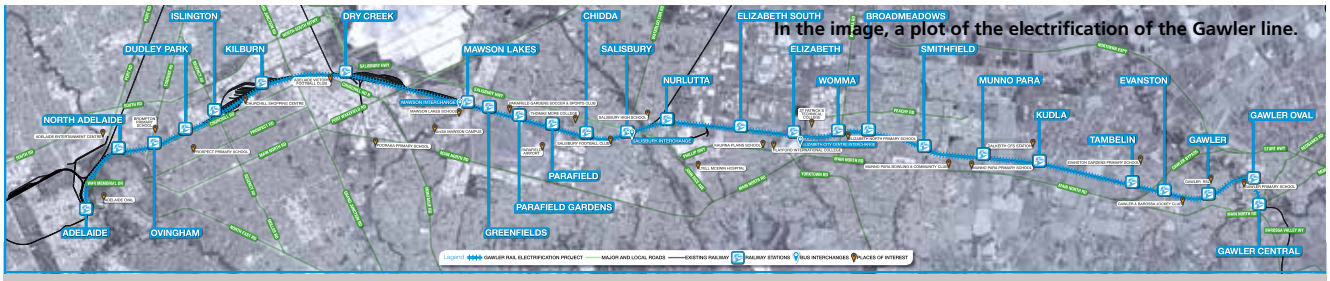
FLINDERS LINK (ADELAIDE)

The extension of the Tonsley railway line to the Flinders Medical Centre is one of the works underway in the city of Adelaide.

This project has been endowed with a budget of 125 million Australian dollars (76 million euros). The route will create new connections with the health and education facilities of the city.

The project includes the construction of a new station in Flinders and the elimination of the one in Tonsley.

Adelaide will expand its rail network to new areas of the city.



In the image, a plot of the electrification of the Gawler line.

GAWLER LINE ELECTRIFICATION

The electrification and modernisation of the rail line between Adelaide and Gawler will improve the service on this network while increasing its capacity. The works have been adjudicated the amount of 615 million Australian dollars (383 million euros).

The completion of the project is forecast for 2021.

Australian Capital Territory

Panoramic of the city Canberra.

CANBERRA LIGHT RAIL (PHASE I AND II)

The forthcoming extension of the light rail network from Canberra to Woden, by 1.7 kilometres, is planned for the year 2024. This section will have three new stops in City West, City South and Commonwealth Park. With this extension, which will have four additional units, the network will serve 3,000 more passengers per day during its first year of operation.

Victoria

increases the capacity of its public transport with new projects

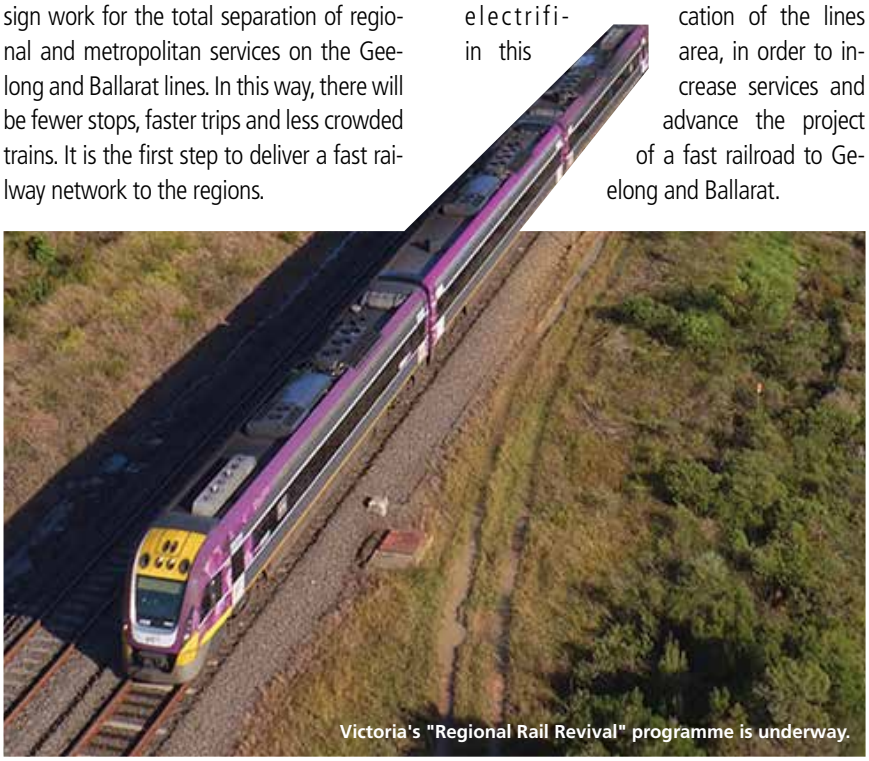
REGIONAL RAILWAY PROGRAMME (REGIONAL RAIL REVIVAL PROGRAMME)

The "Regional Rail Revival" programme, endowed with a budget of 1,750 million Australian dollars (1.076 billion euros), will modernise all regional passenger train lines in Victoria. It is a joint initiative of the federal and state governments.

The works include improvement of stations and signaling systems in several lines Rail Projects Victoria (RPV) is responsible for the planning and implementation of the programme that includes the rehabilitation of the Ballarat lines, which have an allocation of 557 million Australian dollars (342 million euros); Bendigo and Echuca, with 91 million Australian dollars (98.3 million euros) and Geelong, with another 160 million AUS$ (98.3 million euros).

There are also funds for improvements in the Gippsland network, 530 million AUS$ (325 million euros); the northeast corridor, to which 275 million Australians (169 euros) will be designated; Shepparton and Warrnambool. Tasks on the latter two are assigned 356 and 114 million AUS$ respectively (218 and 70.1 million euros). Alongside the foregoing, the Victorian budget 2019/2020 has set aside 100 million Australian dollars (€61.4 million euros) for planning and design work for the total separation of regional and metropolitan services on the Geelong and Ballarat lines. In this way, there will be fewer stops, faster trips and less crowded trains. It is the first step to deliver a fast railway network to the regions.

In turn, the "Western Rail Plan" designed for the western part of the State is underway. One of the works included is the electrification of the lines in this area, in order to increase services and advance the project of a fast railroad to Geelong and Ballarat.



Victoria's "Regional Rail Revival" programme is underway.

VICTORIA HAS A WIDE PORTFOLIO OF RAILWAY PROJECTS UNDERWAY. THE AIM HERE IS TO INCREASE THE CAPACITY OF PUBLIC TRANSPORTATION AND IMPROVE REGIONAL CONNECTIONS.

Above, an image of the well-known Metrotunnel project.

MODERNISATION OF THE MELBOURNE RAILWAY CORRIDOR

In the picture, a snapshot of the city of Melbourne

The Victoria Government wants to boost rail connections between Melbourne and its outskirt areas. The modernisation of these layouts will improve the system's power supply and signalling, as well as duplicating several lines in Cranbourne, an urban area 43 kilometres southeast of the city's central business district.

Several works will be carried out this year on the network that goes from Melbourne to Cranbourne and Pakenham. This programme also includes the elimination of 17 level crossings between Caulfield and Dandenong to avoid traffic congestion and develop a new rail corridor between Sunbury and Cranbourne and Pakenham, as well as the setting up of new rail tracks and larger platforms.

Once all the works are completed, the network will allow for large capacity trains to run from Cranbourne and Pakenham to Sunbury, passing through the central business district through the Metrotunnel. These works, together with the project known as Metrotunnel will allow to transform Melbourne's busiest rail lines. Furthermore, they will improve security and the efficiency of transport services that, from now on, will be increased its capacity by around 235,000 passengers a week on said route and at peak times. Part of the multi-million dollar budget allocated will also be used for the undertaking of detailed design works with a view to putting into operation new high-capacity metropolitan railway trains in Sunbury.

MELBOURNE-GEELONG FAST RAIL

The 2019-2020 budget of the Federal Government has set aside 2 billion Australian dollars (1.229 billion euros) for a fast rail line between Melbourne and Geelong. Once operational, it will reduce the journey's distance from 60 to just 32 kilometres. It would also be the first of its kind in Australia, traveling at faster speeds than any train line in the nation at an average of 160 km / h.

The purpose of the initiative is to improve traffic between both cities, which accumulates more than 54,000 vehicles a day between its main access points: the West Gate Bridge and the Princess Freeway.

The investment will be used entirely for the construction and improvement of roads and the signalling system. The Department of Infrastructure of the Government of Australia has estimated that the total cost of the project will reach 4 billion Australian dollars (2.459 billion euros), of which 2 billion will be financed by the Government of Victoria. This operation also includes 40 million dollars for the preparation of five feasibility studies to analyse the development of a fast train network in the main cities of the country.

Among them, the Brisbane-Gold Coast, Melbourne-Albury-Wodonga, Melbourne-Traralgon, Sydneyollongong and Sydney-Parkes routes are considered. This project has promoted the creation of the National Fast Rail Agency, which will work with governments, communities and private sector agents to determine priorities and financing solutions.

One of the goals of the Australian Government is to create faster connections between cities.

METROTUNNEL (MELBOURNE)

Victoria authorities intend to increase public transport capacity in the city of Melbourne. Valued at 11 billion Australian dollars (6.765 billion euros), this project includes the construction of two twin nine kilometre tunnels between the northwest and southeast of the city. From the South Kensington and South Yarra train station, crossing the financial district. Five new underground stations will be built: Arden, Parkville, CBD North, CBD South and Domain. The construction of both tunnels will end in 2026, according to the planned works' schedule.

MELBOURNE AIRPORT RAIL LINK

The construction of the Airport Rail Link will link Melbourne Airport with the metropolitan and regional rail network through the Sunshine area, 12 kilometres from the city, and will involve the expenditure of 5 billion Australian dollars (3.074 billion euros).

The feasibility study will be completed in 2020. It will include an economic analysis of the project, as well as technical aspects such as the possible stations of the route. The works will begin in 2022 and will take nine years to complete.

Metrotunnel will expand transport capacity in Melbourne.

MONASH RAIL

In the city of Monash, 20 kilometres southwest of Melbourne, a study has been launched to build a railway line that links both urban centres.

The project, which has a federal government item of 475 million Australian dollars (292 million euros), includes a first phase of study and feasibility, as well as the planning and works necessary for its development. In a second stage the possibility of extending this network to Rowville is raised.

HIGH CAPACITY ROLLING MATERIAL (VICTORIA)

Victoria's state executive, through Metro Trains Melbourne, has acquired 65 high-capacity metropolitan rail vehicles. Initially, they will circulate on the Cranbourne and Pakenham lines, and later arrive at Sunbury once the Metrotunnel is opened. The new high capacity signaling will allow for more trains to travel more frequently at intervals of only two or three minutes. This is a fleet of multi-unit electric trains (EMUs) that will enter service in mid-2020.

This rolling stock will eventually be used in Metro Rail Tunnel when commercial operations begins in 2025.

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New Zealand seeks improved mobility through further infrastructure investment

THE NEW ZEALAND GOVERNMENT HAS APPROVED A HISTORICAL INVESTMENT PLAN WITH WHICH IT WANTS THE RAILWAY TO FORM THE BACKBONE OF A SUSTAINABLE TRANSPORTATION NETWORK FOR THE 21ST CENTURY.

New Zealand, with an area of 267,707 km^2, is an archipelago formed by two large islands, one in the North and the South, along with other 700 of smaller size.

Divided into 16 regions, its main cities are Auckland, Christchurch, Hamilton, Dunedin, Tauranga, Whangarei and Palmerston North. The population increase, currently has

In the image, a freight train of the Kiwi Rail company.

NEW ZEALAND: CURRENT RAILWAY BUDGET

	INVESTMENT ITEM (M€)
Track and other infrastructure improvements	190.2
Funds from the PGF (Provincial Growth Fund) for regional railways	172
Rolling Stock Rehabilitation	215.5
Replacement of and land assets with railway capacity	20
Additional allocation for Auckland City Rail Link	307

Source: Ministry of Transportation of the Government of New Zealand.

New Zealand will invest in improving the country's rail infrastructure on routes running northbound to southbound.

4,885,300 inhabitants, especially in urban areas, has led the Government to rethink mobility solutions to respond to the growing increase in passengers in a sustainable and competitive manner.
In order to replace road traffic, investments will be used in the next ten years to boost the railroad as a solution, both for goods and passengers.

The railway sector

The national railway system, exclusive property of the State, consists of a 1,067 mm wide network in the North and South Islands.
The services are mostly for freight rail, especially in bulk and for import and export. The only two cities with urban networks are Auckland and Wellington. In addition, there are some tourist lines, though of minor importance.
KiwiRail Holdings Limited operates throughout the network through several
branches On the one hand, KiwiRail Freight manages freight traffic. On the other, KiwiRail Interislander is in charge of passenger and cargo services in the Cook Strait.
In turn, KiwiRail Passenger is responsible for urban stretches in Wellington and also for long-distance panoramic trips in Coastal Pacific, TranzAlpine, Northern Explorer and Capital Connection services.
The maintenance and improvement of the network and rolling stock is entrusted to KiwiRail Infrastructure

NEW ZEALAND: MAIN RAILWAY PERFORMANCES

PROJECT	INVESTMENT IN €
Repairs to the Wairoa-Napier line	2.8M
Additional funds for the Wairoa-Napier network	690,000
Whanganui Railroad Modernisation (Freight)	1.7M
Kawerau / Murupara	143,794
New Plymouth-Eastgate	14,804
South Port	143,804
North Auckland	1.2 M
Viability study Hokitika to Westport	287,103
TranzAlpine and Coastal Pacific tourist rail improvements	45.9M
Design of a multimodal hub in Palmerston North	23 M
Feasibility study of the restoration of the Gisborne -Wairoa line	74,471
Viability of the Tairawhiti tourist line (Steve Breen-Jacque White-Adam Hughes)	74,471
Improvements in the maintenance of the national network (KiwiRail Working Capital)	28.7 M
Study of the North Auckland line	287,125

Source: Ministry of Transportation of the Government of New Zealand.

In the 2019 budget, an entry of 599 million was approved as the first step of planned rail investments in the next 10 years.

and Engineering. At present, this renowned company boasts a network of 4,000 kilometres and a rail fleet of 198 locomotives, 4,585 freight wagons and three ferries.

Investments

In the 2019 budget, an allocation of 1.042 billion New Zealand dollars (599 million euros) was approved as the first step of planned rail investments in the next 10 years. This amount includes 331 million New Zealand dollars (190.2 million euros) for improvements in roads and other infrastructure until the year 2021; 375 million New Zealand dollars (215.5 million euros) for new rolling stock , as well as another 300 million New Zealand dollars (172 million euros) for works in different regions.

Also, an entry of 534 million New Zealand dollars (307 million euros) has been earmarked to continue with the urban project "City Rail Link" in the city of Auckland.

More modern networks for **freight transport**

Freight transport by rail in New Zealand is in good health. The network has four main lines, several secondary and minor connections in almost all regions.
Around 19 million net tons are transported annually by rail, 95% is export and import traffic with connections to ports. Due to the important relevance it has in national transport, the Government has included in the 2019 budget items to introduce improvements in the network, since the volume of movement of products and raw materials has continued to rise in recent years.

FREIGHT TRAFFIC BY RAIL CONTINUES TO GROW IN NEW ZEALAND. DUE TO THE SIGNIFICANT WEIGHTING IT HOLDS IN THE COUNTRY, IN THE NEXT YEARS IMPROVEMENTS WILL CONTINUE TO BOLSTER INFRASTRUCTURE THROUGHOUT THE NETWORK.

One of the units of the Kiwi Rail company.

"PALMERSTON NORTH FREIGHT HUB" FREIGHT CENTRE

One of the main initiatives is the launch of a freight rail centre near Palmerston North, the Manawatu-Wanganui region. This project, called "Palmerston North freight hub" endowed with an investment of 40 million New Zealand dollars (22.9 million euros) from the Government Provincial Growth Fund. In this way we want to respond to the potential growth of rail traffic in this area, since these volumes are expected to increase by 60% over the next 20 years.

MODERNISATION OF THE WHANGANUI RAILWAY (FREIGHT)

The improvement of the Whanganui-Castlecliff railway line will receive a three million New Zealand dollar (1.7 million euros) allocation. With this project, 6,250 lorries will be removed from the roadways and 563 tons of carbon dioxide will no longer be emitted.
This area is an enclave of special importance for the freight exports of the country.

NAPIER LINE TO WAIROA

KiwiRail will reopen the Napier to Wairoa railway line in order to reduce the traffic of trucks transporting timber in the region. The reconstruction of this branch is necessary after the severe damage suffered by storms in 2012.
The relaunch of this route is bolstered by revenue from the Provincial Growth Fund. After its reopening, it is expected that by 2032/2034 the figure of 44 million tons transported by rail will be reached.

Public transport advances in Aukland and Wellington

THE CITIES OF WELLINGTON AND AUCKLAND EXPAND THE RAILWAY TRANSPORTATION NETWORKS TO OFFER MORE AND BETTER CONNECTIONS. FURTHERMORE, THE NEARBY SERVICES WILL BE REINFORCED, FOR WHICH IT IS ALSO POSED ACQUISITION OF NEW ROLLING STOCK.

Rail passenger transport is concentrated in the cities of Auckland and Wellington: Both have projects underway to strengthen their services. Also, in terms of passengers, transport authorities seek financing to expand the fleet of trains for suburban networks.

AUCKLAND: CITY RAIL LINK

Auckland will strengthen its transport network with the new "City Rail Link" (CRL) connection that will end in 2024. In the project, which has a budget of 4.4 billion New Zealand dollars (2,533 million euros) a new 3.5 kilometre dual-track tunnel will be built. The tour will be through the city centre, between Britomart transport facilities and Mount Eden station. Precisely, the latter will be redesigned, will house four platforms and will be the exchange node with the new lines and branches of the Western network (Wetern Line). Additionally, two new stops, Aotea and Karangahape will be built.

WELLINGTON METROPOLITAN RAILWAY

The Wellington metropolitan rail network has a modernisation project underway to offer more and better services to users. Traffic in rush hour has grown by 17% over the last three years, so it is necessary to increase capacity, frequency and ensure modern and more efficient transport. The scheduled works will be carried out on the Hutt Valley, Wairarapa and Melling lines. In addition, the track between Trentham and Upper Hutt (Hutt Valley) will be doubled.

ROLLING STOCK FOR REGIONAL SERVICES

The Greater Wellington Regional Council plans to acquire a fleet of rolling stock in the face of increasing capacity requirements. The aim is to improve the rail network of the region. Amongst the lines that would have these new trains are those of Wairarapa, the Hutt Valley and Kapiti. Trains operating long distances between Wellington and Masterton and Wellington and Palmerston North require rearrangements to respond to an increase in user numbers.

To achieve this, the purchase of 15 new multiple units is proposed. The supply of this additional rolling stock, scheduled for 2025, requires an investment of 415 million New Zealand dollars (237.2M).

SOME MAFEX MEMBERS WITH PROJECTS IN AUSTRALIA AND NEW ZEALAND

ALSTOM

In 2015, the New South Wales Transportation Authority awarded to the Altrac consortium , of which Alstom is part Alstom, a contract for the new 12-kilometer Sydney tram line. All last generation Citadis X0'5 trams running on this line have been manufactured at Alstom's factory in Santa Perpètua, Barcelona. The signaling and security systems have been developed by the Alstom regional Center located in Madrid. This project has transformed Sydney and provide a step change in the city's public transport capability and reliability while protecting the aesthetic appeal of the Central Business District".

ARCELORMITTAL

ArcelorMittal was the sole steel supplier for the first phase of Sydney Metro project, Australia's largest public transport infrastructure project, recently inaugurated; as well as other projects around the country.

ArcelorMittal was chosen for the Sydney Metro project as it is a worldwide reference, able to offer rails that combine excellent reliability and the highest quality, without forgetting other requirements such as safety, durability, cost efficiency, service and environmental-friendliness

SOME MAFEX MEMBERS WITH

ARDANUY INGENIERIA

Ardanuy Ingeniería is present in Australia where it has participated in various Railway Projects. The Consultancy Company has carried out the Operational and Maintenance Assistance during the tender stage of different metro and tram networks for Pacific Partnerships PTY Ltd. The Company was also awarded the Technical Assistance contract to prepare the WestConnex tender, more specifically, for the tunnel section of this roadway.

Oceania's market is a key part of Ardanuy's Internationalization Plan and adds to the company's other projects carried out in more than 60 countries in 5 continents. Currently, sales turnover outside of Spain is more than 80%.

CAF

CAF has become one of the main railway suppliers in the Oceania region. The company has different tram projects in cities such as Sydney, Canberra, Newcastle and soon Parramatta. For this project, CAF will supply thirteen Urbos units, as well as the line systems and their integration, which include the traction system, substations, signaling system, and control and communications center for the project. The scope of the project also covers the construction of maintenance facilities.

Furthermore, CAF has supplied commuter trains for Auckland Transport in New Zealand. The Company has recently been awarded the regional train project for Transport for New South Wales in Australia.

PROJECTS IN AUSTRALIA AND NEW ZEALAND

CAF SIGNALLING

CAF Signaling embarks on projects in New Zealand. The company takes over projects such as the equipping of 72 electrical units (EMUs) with its on-board system "AURIGA OBS BL 2 ERTMS / ETCS + ATO" for the Auckland Transport operator network. With the first one, AURIGA OBS ERTMS will carry out the safe monitoring of the train movement with high availability and its fail-safe operation. For its part, with AURIGA ATO, predictable train driving will be carried out that adheres to the planned timetables, thus maximising energy savings and improving passenger comfort. This contract bolsters the company's presence in a market, such is that of Oceania, where transport authorities aim to boost the railways in forthcoming years.

INDRA

Indra is working to modernize the railway network video surveillance system in Sydney. The company is equipping two control centers with the most advanced software for the operation and control of the video surveillance system for a network of over 150 commuter stations. Additionally, Indra complemented the communications network to which 11,000 new IP cameras were connected. The solution includes all of the advantages of IP technology and allows for viewing each camera's images in real time from any computer, tablet or cellphone connected to the network, increasing security in stations to benefit over one million daily users of commuter trains.

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SOME MAFEX MEMBERS WITH

IDOM

IDOM, a leading engineering, architecture and consulting multinational, continues to strengthen its position in the international arena. Drawing on its extensive experience developing transportation system projects around the world, IDOM has now entered the rail market in Australia and New Zealand, collaborating with local partners.

Amongst others, IDOM has been participating, together with AURECON, in the Melbourne tram expansion project that connects Caulfield station with the Stud Park shopping center in Rowville. In this project, IDOM reviewed and advised on the implementation of best practices in the design of the Light Rail Transit (LRT) corridors, a total of 19 km, 17 stops and 30 rolling stock vehicles. In addition, IDOM was a finalist in the tender process for the Auckland light rail project: City Center to Māngere Light Rail Project for the New Zealand Transport Authority.

IDOM has also been working in other fields in Australia, such as the first Australian Waste-to-Energy (WtE) plant in Kwinana.

CETEST

In recent years CETEST has played an active role in Australia and New Zealand´s market. Regarding Australia, CETEST is carrying out the homologation campaign for CAF´s Newcastle Tram, Sydney Tram and Canberra Tram. In this case, in addition to noise tests, dynamic behaviour, EMC and comfort assessments, the monitorisation of the ride quality during operation is also being performed. Other projects in Australia includes ALSTOM´s Sydney Metro, where current collection tests and stationary tests in India by means of CETEST´s portable platforms have been carried out. As for New Zealand, Auckland EMU´s complete homologation campaign and its current extension is CETEST´s main contribution.

EMC test for Canberra tram.

PROJECTS IN AUSTRALIA AND NEW ZEALAND

INECO

Ineco participates in the modernisation of the commuter rail network of Sydney, Australia, operated by Sydney Trains. With the role of Systems Integrator, the company is responsible for assisting the authority Transport for New South Wales (TfNSW) to define, integrate and implement the new railway systems for the network, together with Network Rail Consulting, Acmena and The Go-Ahead Group. This role is critical to enable the network to increase its capacity significantly and allow it to absorb future demand.

This program consists of three lines of action: the upgrading of the entire signalling network to ETCS level 2; the implementation of an ATO (Automatic Train Operation) system to assist drivers; and the installation of a railway traffic management system to improve the efficiency of incidents and service throughout the entire electrified network in New South Wales. At a first step, the project is focussed on the modernisation of two railway lines closed to the city.

SICE

Since 2005 (Eastlink project in Melbourne), SICE is a reference in Oceania in ITS for tunnel projects.

SICE has participated in 7 major projects in Australia, 2 in New Zealand and 4 more that are in execution.

In Sydney, WestConnex is the largest urban tunnel (33 km) in Australia, connecting the West and Southwest regions. After M4 East (1B), WestConnex New M5 (2), M4-M5 Link (3A) and Rozelle Interchange (3B) will follow. In Melbourne, SICE works in the Westgate tunnel, the largest project in the state of Victoria, to solve the traffic problems of the West Gate Bridge that will open to traffic in 2022.

In New Zealand, SICE delivered Waterview, the most complex tunnel project in the country's history.

SOME MAFEX MEMBERS WITH

SIEMENS

Siemens Mobility is carrying out the Goonyella project for Aurizon customer. This is a project carried out by the groups of Spain, Australia and Germany. The scope of this includes the design and supply of a ETCS Level 2 (Centralized system and track elements, as well as on-board equipment) for the coal transport line with an extension of 800 kilometers in Central Queensland (Australia) , whose system is one of the four main central Queensland Coal Network (CQCN) operated by Aurizon.

The implementation period is 48 months and is expected to be completed by June 2022.

Implementing this ETCS Level 2 technology will increase operational efficiency and competitiveness, while improving security by adopting cutting-edge technology solutions globally. This is the first ETCS system implemented by Aurizon, which will replace the current signaling system.

TELTRONIC

Teltronic is responsible for the TETRA communications system of the Central Business District and South East Rail, a new line that extends its route over 12 kilometers and has 19 stations. The deployment comprises TETRA NEBULA infrastructure, with a Switching Control Node and base stations (MBS) to provide coverage for the entire line, and 60 RTP-300 on-board radios. The equipment is installed with a specific configuration, 1 rack-2 cabins, and the system is integrated with Intelligent Transportation Systems (ITS) and with the PA and intercom systems.

Metro North West Line, Sydney

Teltronic provided the TETRA communications system to the first Sydney metro line. The system consists of the TETRA NEBULA infrastructure, with Site Base Stations (SBS), mobile and portable terminals and 66 on-board radios RTP-603, in addition to the control center solution, CeCoTRANS with 7 operators. The network is integrated with Automatic Train Supervision (ATS), Train Control and Management System (TCMS) and Public Address and intercom systems. It also allows the transmission of text messages transmission to vehicle panels and pre-recorded messages through PA.

PROJECTS IN AUSTRALIA AND NEW ZEALAND

THALES

Thales has been the technology manager from his competence center in Spain for the implementation of the communications, voice, security and passenger information systems of the Northwest Metro in Sydney; in addition to data access networks, security camera systems and passenger information monitors of the Australian network.

The line has 13 metro stations and a length of 36 km, in addition to 1,400 mobile, fixed and thermal cameras that have been integrated by Thales into the Thales Video System operating platform (TVS).

TYPSA

ATC consortium comprising Advisian (Australia), TYPSA and CERTIFER (France), was recently awarded the role of Independent Certifier for the greenfield components of the Sydney Metro, Australia's most ambitious public transport project. These services include 6 greenfield stations at Martin Place, Victoria Cross, Crows Nest, Barangaroo, Pitt Street and Waterloo, along with the Line-Wide (LW) rail systems contract, and the Operations, Trains and Systems contract (OTS2).

The ATC consortium is providing local and international expertise, understanding, best practice, and deep technical and commercial insight to work for the best outcome of the Sydney Metro project and the end-user. The team began to provide the services during the first quarter of 2019. TYPSA brings its wide expertise in Metro stations and infrastructure, such as Barcelona, Madrid, Stockholm, Riyadh, Doha and Singapore.

Financing models: New options for railway projects

RAILWAY PROJECTS FORGE THEIR PATH THROUGHOUT THE WORLD WITH NEW FINANCING AND MANAGEMENT MODELS. THEREIN, PRIVATE PUBLIC PARTNERSHIPS GATHER MOMENTUM WITH THE AIM OF TAKING FORWARD PUBLIC TRANSPORTATION NETWORKS WHILST MAKING THESE EFFICIENT AND FEASIBLE.

The railway is bolstered in countries around the world thanks to its numerous economic and environmental advantages. Data published indicate that investments in this type of infrastructure will continue to rise until 2021, according to the study on "World Rail Market" that Roland Berger has drafted for UNIFE (European Railway Industry Association). The progress of these types of projects has

also undergone a change in financing models. With the aim of making them viable, administrations are increasingly seeking the collaboration of the private sector to carry out socially and economically profitable transport systems. Evolution over time of how transport networks come into being has gone from the completely public contribution to shared and even wholly private models.
This experience has resulted in various models in the construction, management and maintenance of infrastructure and commercial operation, with a diverse public-private combination.

The choice of the legal-financial scheme that best fits each railway project depends on elements as diverse as the technical complexity and / or implementation, the financial endeavours that the administration is willing to carry out, or the risks that each of them is willing to assume the parties involved, amongst other factors.

In all cases, what is sought is that there is a balance in the cost / benefit equation and that a railway project

The Spanish railway industry has launched numerous collaborative projects with the public sector worldwide.

featuring a positive socio-economic impact can be put into place.

Benefits

The new financing formulae that have been established over time, beyond 100% public funds, present a series of advantages for transport administrations. If the private partner is particularly versed in the design, implementation, operation and maintenance of railway systems, it increases the efficiency of strategic projects with regard to delivery terms and implementation costs, based, among other aspects, on their market criteria in the assessment and correct allocation of the necessary resources.

Furthermore, this allows for the implementation of new mobility plans without having to derive the expenses associated with public budgets, thus freeing up its resources.

PPPs

The public-private partnership or PPSs in transport seeks, through a contract between two sectors, public and private, to undertake a railway project.
The best-known legal-financial schemes are concessions and turnkey projects.

Public-private partnerships in the transport sector are based throughout the world.

The PPP framework in a broad sense, and concessions more specifically, represents a formula used in Spain for a long time. It has gone from public funds (of European origin) to having several concessions in urban transport. Although, in high-speed, medium distances and commuter rail networks, State management of projects continues to be a feature in most cases.

The concessional framework has allowed the development of railway infrastructure of great complexity in record time (project, expropriations, works, service start-up) even with advanced deliveries on the scheduled deadlines.

Examples in Spain

This model first came into use in the nineties, on the line of the Arganda del Rey Metro in the Community of Madrid. Later it was applied in the tramways of Barcelona. Other flagship examples are the Metropolitan Railways of Malaga, Sanchinarro, Seville or the tramways of Parla, Alicante, Murcia, Tenerife and Saragossa, along with the extension of the Madrid Metropolitan Railway between Vicálvaro-Arganda and Line 8 to the airport.

Similarly worthy of special mention are the commuter rail stretches between Móstoles-Navalcarnero, yet it was in 2010 with the Extraordinary Infrastructure Plan (PEI) when there was a turning point in the model used so far over long distances and opened the gateway to PPP formulae.

An example of this was the approach to track assembly and installation and maintenance contracts for the Madrid-Galicia High Speed Line; comprehensive construction and maintenance of the installations on the Albacete-Alicante section of the HSL Madrid-Castile La Mancha- Valencian Community-Region of Murcia; the high-speed North-Northwest Corridor track assembly (Olmedo-Pedralba Section); the Antequera ring or the intermodal logistics centre at Aranjuez.

The consolidation of this financing model in Spain is due to the fact that there is a good regulatory framework due to the need not to compute a series of metropolitan rail and urban tramway projects in de fi cit. And faced with the lack of access to direct financing in the markets.

TURNKEY PROJECTS

The "turnkey" scheme (EPC) is a modality in which the corresponding administration or transport body recruits another company to undertake all the work associated with a project in exchange for a closed price. This process encompasses the entire construction, which can range from conceptual engineering,

both basic and detailed, the drafting of the project until the final testing processes on the installation and infrastructure commissioning. The company assumes the commitment to grant a project fully equipped and in perfect working order. This contracting mechanism, where the design and construction of the works is a single joint process provides several benefits. On the one hand, a streamlined and effective development of the project is achieved, alongside a reduction of risks and disagreements that can generate unforeseen costs and lengthen handover terms, as well as great savings in terms time and resources, through the concentrating of all processes in a single company. Furthermore, for the consortium entrusted with the project there are lower risks than in the concession as they assume operating obligations, although support can be provided in the implementation of the rail system.

PPPs

PPPs are formulae for private sector participation in the development of a public service that can be carried out in many different ways, with the most widespread being construction and operational tenders or concessions.

In these cases, the private partner plays part of the role that the administration previously carried out. On the one hand, it can take over the commissioning and / or provide the subsequent service and maintenance assuming part of the financial, technical or operational risks.

This term is the one used in Spain. In Europe it is known as PPP (Public-Private Partnership) and in Latin America as APP (Public Private Alliance). PPPs help boost innovation, best practices and optimal value for money within the project. Their instrumentation allows to promote and manage new infrastructure developments.

From the perspective of the planner and contracting body, it is a complex process in which numerous aspects have to be detailed for the most suitable management of the decision-making and contracting processes.

In the cycle of definition of the contract and its tender, a PPP unit is often enabled for pre-analysis work to study socio-economic viability, the reasoned forecast of its implementation and drafting of the mandatory reports.

This task is especially important when the project is based on budget payments (partial, regular or total) to the private party, since future resources will be consumed.

It is for this reason it is necessary to define the "affordability" of these charges, through proper long-term financial planning. The financial contribution is usually provided by from Financial Institutions (Banks, Investment Funds, etc.), concessionary companies or the administration itself. That said, those who ultimately pay the cost are citizens through taxes, the passengers, through the use of the service, either in the form of full payment or co-payment or the direct beneficiaries of an investment.

In Europe, the driving force behind the promotion of PPPs has been the European Commission in order to alleviate the limitations of the Member States to finance the necessary implementation of infrastructure, equipment and services.

In this way, the absorption of the Funds that the European Union provides for the development of the member countries is facilitated, without losing sight of the limits imposed in relation to its public deficits.

TENDERS / CONCESSIONS

Concessions are increasingly common in public transport. It is the well-known BOT (Build, Operate, Transfer) model that is increasingly applied, since it is the least complex figure from an administrative point of view and the easiest to manage (as a form of contracting).

The main stakeholders involved in this type of initiatives are, on the one hand, the Public Administration, and, on the other, the concessionary companies, also known as Project Vehicle Enterprises (SVP) or Specific Purpose Enterprises (SPE) alongside the promoters. Also included are the funders who provide resources from outside the company. In this case, the company or consortium assumes all responsibility, steering and management of the project, from construction to concession.

This scheme fosters competition in mass transport, where they are usually large volume contracts. The high requirements of technical knowledge and managers to the awardees also require having well-prepared and trained administrations to start the entire process.

However, this figure is the least institutionalised and the most difficult to control on the part of the Administration. Still, by including certain clauses in the contract, proper functioning can be monitored.

DEVELOPMENT COOPERATION AGENCIES

A figure that also has certain clout in this field is that of the Development Cooperation Agencies.

Currently, there are a large number of railway projects around the world that have been successfully carried out thanks to the financing of these companies. Such is the case of Japan (JICA), in Panama, Vietnam and the Philippines or the French AFD (Agence Française de Développement) in Colombia (Ayacucho Tram) and Ecuador (Cuenca Tram). The aim is to grant credits to accompany public policies that promote sustainable mobility.

Public-private partnerships in the transport sector are based throughout the world..

The international market chooses **Spanish experience** in PPP projects

THE SPANISH RAILWAY INDUSTRY HAS A PRESENCE IN NUMEROUS RAILWAY PUBLIC-PRIVATE MODEL PROJECTS. AN INCREASINGLY MORE ACTIVE ROLE THANKS TO ITS KNOW-HOW, CAPACITY AND COMPETITIVENESS IN CONCESSION MANAGEMENT AND TURNKEY PROJECTS.

The international market for infrastructure projects under the PPP modality is increasingly active. The need for administrations to start up new networks in tandem with industry has grown exponentially in recent years.

In this collaborative process, Spanish companies and their subsidiaries continue to display their capacity and competitiveness. Thanks to the worldwide experience accumulated in the management of projects of high technical complexity, both concessions and turnkey, they have a solid base to adapt to the requirements and particularities of each client.

This industry not only covers the phases of engineering, construction and supply of systems and rolling stock, but is also entrusted their running.

The opening to competition, as a result of privatisation, concession, liberalisation or deregulation, opens up major business opportunities in the near future. A backdrop in which Spanish groups show their strength with the trust placed in them by numerous entities and transport administrations around the world.

In terms of concessions, the examples to date are multiple. In South America, in the Lima Metropolitan Railway (Peru), the design, construction, running and maintenance are being carried out under the PPP regime for Line 2 between Ate and Callao and the branch on Line 4. Spanish companies are also present in the Colombian Atlantic rail network, and in the most significant railway concession in all of America; the Mexican Suburban Railway, which involves the construction, operation and maintenance of the suburban network for a term of thirty years.

Another country that relies on Spanish industry in this area is Brazil, with turnkey projects such as the ma-

nufacture of 40 units of seven modules and the implementation of the Cuiabá tram signalling system.
They are joined by public-private collaboration in Riel Metropolitan Railway, in Guatemala City or the fast train from San José, in Costa Rica.

In North America, Spanish experience also comes to the fore in different public-private partnerships. In the United States, the concession of the automated train of the Los Angeles International Airport, with a 25-year operational tender, is proof of the foregoing. In Canada, the design and works under concession of the Ottawa Light Rail Network (Confederation Line), amongst others, have been carried out.

In Asia, a significant turnkey project is the Kaohsiung light rail (rolling stock, signalling, electrification, ticketing and integration of all subsys-

PPP projects continue to grow throughout the world and the experience of the industry is sought.

tems), the extension of the Manila Metro L1 (LRT-1 Cavite Extension) or the Almaty Metropolitan Railway, in Kazakhstan.

In Oceania, Spanish companies have been awarded the contract for rail and mining services in Australia to increase the size of the RailConnect fleet in New South Wales or the supply of a turnkey maintenance workshop railway in the Pilbara region. Also noteworthy is the contract for the design, construction, financing, operation and maintenance until 2030 of the Sydney light rail network.
In Europe, many standout projects have also been undertaken. In Britain, the Wales & Borders rail network contract and the development of the South Wales Metropolitan Railway has a Spanish stake in the winning consortium, with the commercial running of this included until 2033.
To this system is added the operation and maintenance of the Dockland Light Railway in London and the metropolitan area of Manchester (Metrolink). Furthermore, Spanish industry is involved in the construction one of the sections of the Follo Line that will link Oslo with Ski. This is the largest of the four EPC contracts for the project, design and construction of the longest railway tunnels in Scandinavia.

SOME MAFEX MEMBERS

ALSTOM

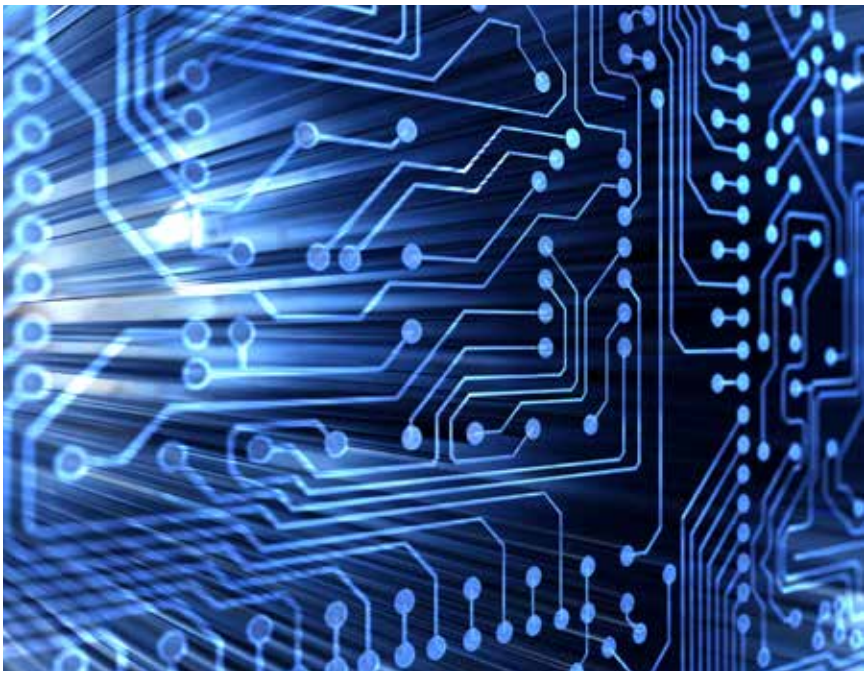
The Spanish Railway Infrastructure Administrator (Adif) awarded to a consortium led by Alstom a contract to build and maintain, for a period of 20 years, the signaling and telecommunications systems for the high speed line Albacete-Alicante.

This is the first contract to supply HS equipment awarded by Adif in a PPP (Public Private Partnership) scheme. In operation since 2014, this was also the first time in Spain, ERTMS Level 2 have been installed without the back up of Level 1 equipment.

CAF SIGNALLING

CAF Signaling boasts its own in-house capacity and engineering to undertake "turnkey" railway signalling projects and is acknowledged as such by different railway administrations in Spain and in other countries throughout Europe, America, Africa, the Middle East and Asia.

Amongst the numerous examples in public-private partnership models, under the concession and turnkey regime, its participation in relevant projects such as the Mexico-Toluca intercity train, SCT (MEXICO), the first turnkey tram system in Latin America, the one in Cuiabá or the light rail in the city of Kaohsiung, in Taiwan are worthy of special mention



WITH PPP PROJECTS

CAF

CAF Group set up CAF Investment Projects (CAF IP) as a spearhead for developing and managing Concessions and PPP Projects worldwide. Through these business models CAF Group is involved not only in EPC and O&M business, but also in the financial services. Within this year, jointly with its consortium partners for each project, CAF Group has reached the financial close of Regional Rail Project in Australia and Liege Tram in Belgium. These projects, joined to the previous references in Spain, Mexico and Brazil position CAF Group as a leader in privately funded comprehensive mobility systems.

CAF IP is currently assessing different opportunities worldwide, with a potential net worth equity investment over 500 Million Euros.

IDOM

Railway transport infrastructures, and especially those related with Urban Transport, have currently a worldwide expansion, constituting the public and private sector association, through the PPP, a key factor in the financing and development of them.

IDOM actively participates, internationally, by providing technical, legal and financial advisory services in the definition, structuring, development and management of this type of initiatives.

Thus, IDOM has assisted the Guatemala City with the MetroRiel project and, currently, among others, the City of Almaty (Kazakhstan) with their LRT, and the one in San José de Costa Rica with the current Rapid Train project.

MetroRiel of Guatemala.

"Zaragoza, **intelligent mobility** "

CTAZ (Transport Consortium of Zaragoza Area) and Alstom in Spain are developing a pilot innovation project, based on Alstom's multimodal solution Mastria, to improve metropolitan bus network management. The ultimate objective is to resolve incidents more quickly in a real time basis and help to improve route planning. The results of the project will be presented at the Smart City Expo World Congress, held in Barcelona from November 19 to 21.

Based on the innovative Mastria technology for urban mobility smart management, the objective of this project undertaken by Alstom and CTAZ is to improve bus service efficiency using Big Data and machine learning tools.

ALSTOM WILL DEVELOP AN INNOVATION PROJECT FOR IMPROVING ZARAGOZA'S METROPOLITAN BUS NETWORK MANAGEMENT.

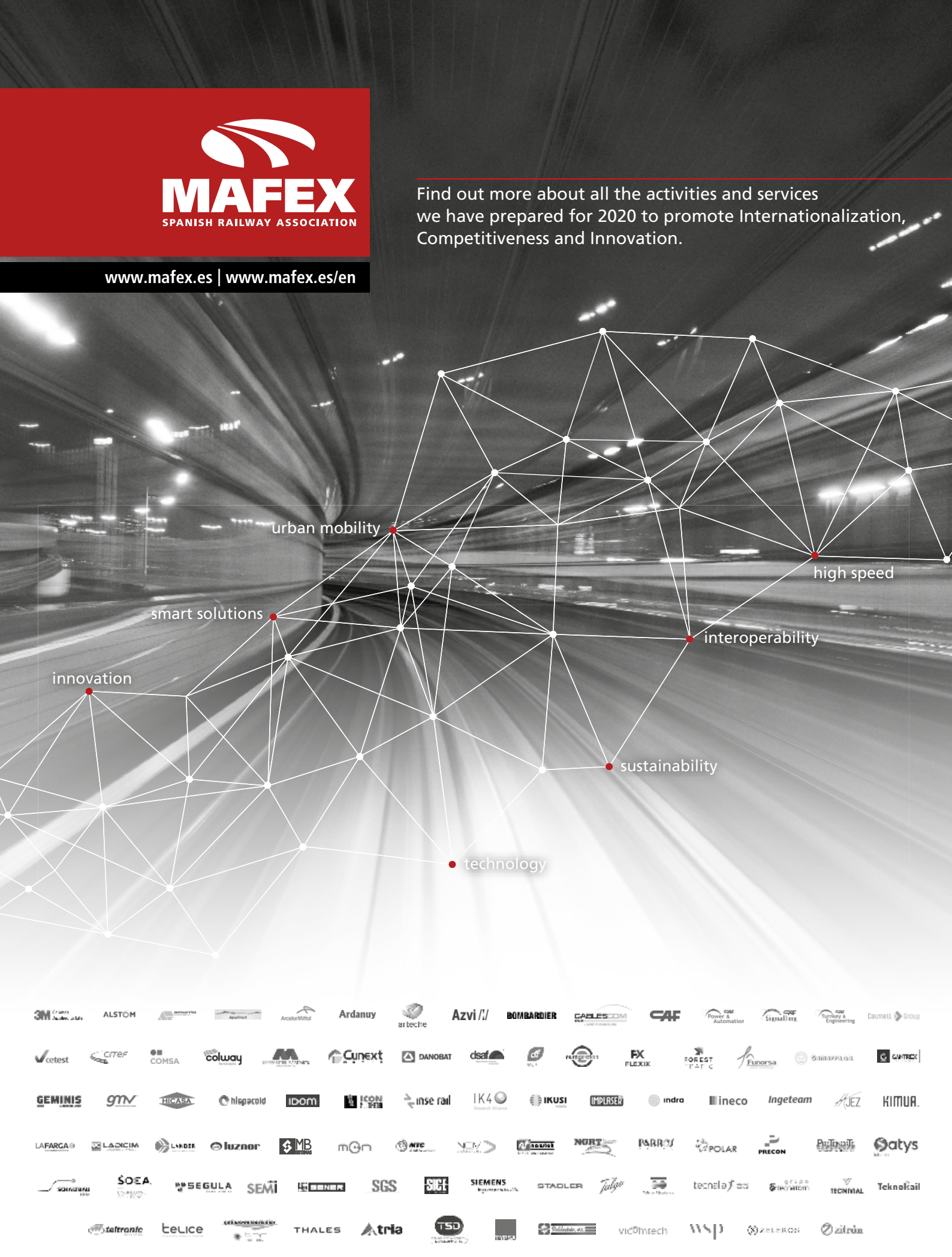
Alstom and CTAZ teams will analyse the bus network schedule and GPS data, including delays, positions, incidents, etc. Thanks to the use of algorithms and smart data analysis (historical and real-time), the analysis will establish a model of automatic incident detection in the bus network of the Zaragoza metropolitan area.

The fleet of buses coordinated by CTAZ on which the innovation project will be based includes 6 different operators and covers 30 municipalities, with a total of 25 lines. The organization of this complex network, which annually transports over 5 million passengers, represents a real challenge, as the different operators have diverse internal management mechanisms. The prototype resulting from this joint research aims to coordinate in real time all the network information and improve incident resolution efficiency thereby, offering an improved service for passengers.

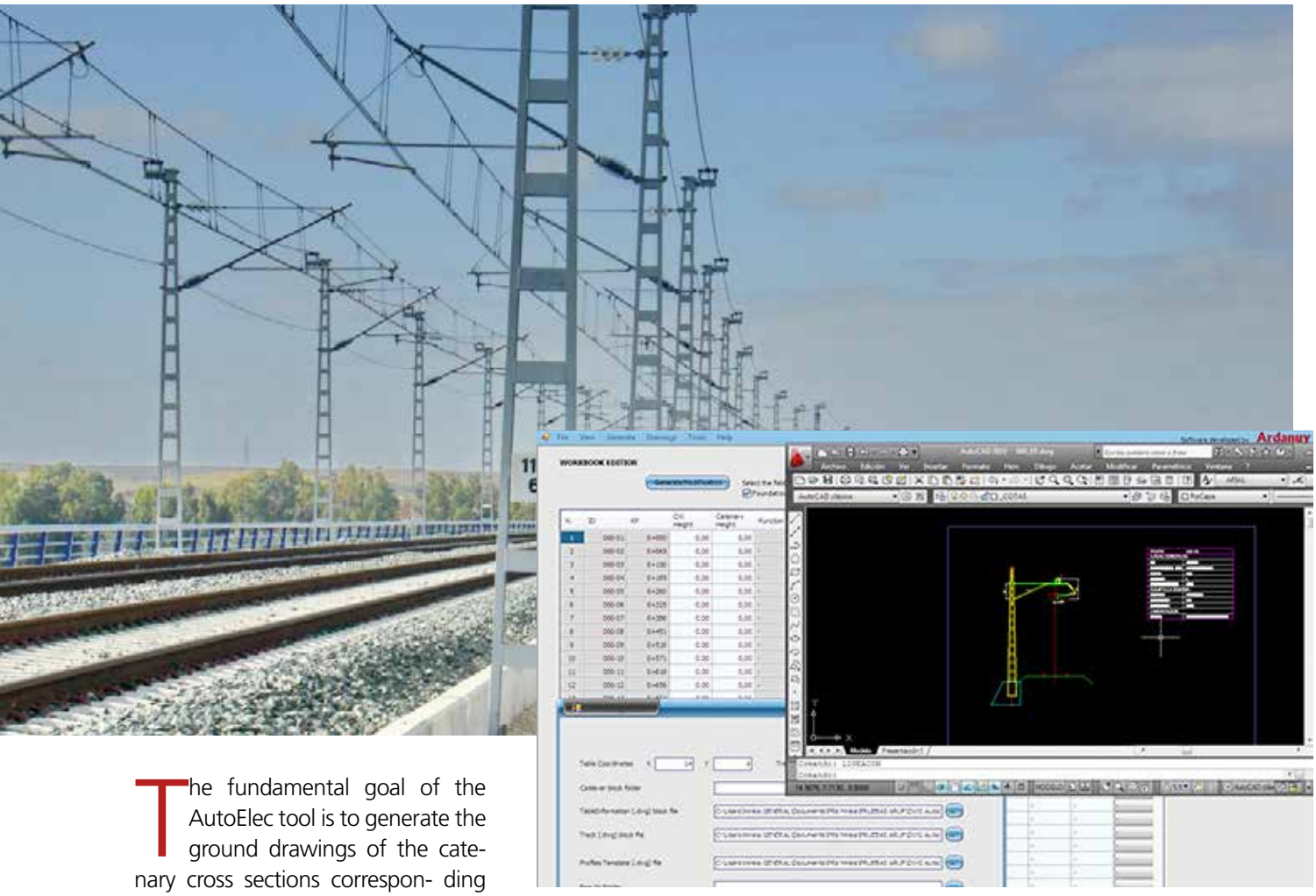
MAFEX
SPANISH RAILWAY ASSOCIATION

www.mafex.es | www.mafex.es/en

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



AutoElec: Program for calculation and generation of railway electrification line drawings



ARDANUY INGENIERÍA HAS DEVELOPED A PROGRAM FOR CALCULATION AND GENERATION OF RAILWAY ELECTRIFICATION LINE DRAWINGS CALLED AUTOELEC.

The fundamental goal of the AutoElec tool is to generate the ground drawings of the catenary cross sections correspon- ding to the alignment of a railway line. These drawings are ge- nerated on the basis of:

-The Work Book, which is a file where the coordinates, pos tion, type and offset in each pole.

-Alignment Drawings.

This tool has been developed to facilitate the execution of overhead contact line projects for railways and metros. Its use by engineers and draughtspeople from Ardanuy Ingeniería, S.A. has significantly incrased the efficiency and improved the quality of life of the projects.

AutoElec modules

Catenary design is a sequential process and so an effort has been made so that the tool graphically represents the results obtained without any need for reaching the last design phase. This provides a double advantage:

y In the first place the preparation of drawings in the interme- diate phases of the design process the results provided by the program can be verified, thus facilitating the revision of the completed design.

y In the second place it allows for employment of the appli- cation with no need for all of the functionalities to be used.

For this purpose the AutoElec software tool has been develo- ped modularly.The main modules are:

1. Preparation of the CatenaryWork Book
2. Generation of the Catenary ground drawings
3. Generation of the Catenary cross section drawings

Conclusions :

The R&D of Ardanuy Ingeniería, S.A.has provided its employees with a powerful work tool with the aim of facilitating catenary projects. Through independent modules a flexible, reliable and easy to use program has been created which allows the company to process the orders put in by its clients with the foremost effi- ciency and satisfaction.

Optimización de los **sistemas CBTC** de las líneas 1 y 6 del metro de Madrid

BOMBARDIER TRANSPORTATION WILL COOPERATE WITH METRO DE MADRID TO IMPROVE THE TRANSIT AND DECREASE THE WAITING TIME IN LINES 1 AND 6 OF THE UNDERGROUND.

Bombardier Transportation will cooperate with Metro de Madrid to improve the transit and decrease the waiting time in lines 1 and 6 of the underground. The vehicles that drive around those lines have, since 2011, Bombardier´s CBTC control systems (Communications Based Train Control).

The improvements will focus on the optimization of the CBTC systems, that allow a high degree of automatization in the operation, a raise of the security measures, and to increase the performance and frequency of the trains, reducing the time interval between them.

In order to achieve this project, the tasks will start with the analysis of data compiled since the implementation of the system, which will allow running preliminary simulations in which base the new software, necessary to modify the lines transit. Once they achieve the security requirements, they will proceed to install the new versions of the map in the RATC (Region Automatic Train Control) line equipment, and in the VATC (Vehicle Automatic Train Control) of the vehicles (2000 series on Line 1 and 5000 and 8000 series on Line 6). Bombardier will also monitor the behavior of the new version of the software.

The Center of Excellence in San Sebastián de los Reyes will be in charge of the operation. Specialized in railway signaling and control systems, they develope high-end solutions on a global scale.

The professionals of this center had participated in ambitious projects, such as the international supply of the edgy control system Bombardier CITYFLO 650, that operate in lines 1 and 6 of Madrid´s Metro, São Paulo´s Metro Line 5 or Istambul´s Metro Line M5.

New advances in **railway signalling**

CAF SIGNALING IS PART OF THE PIONEERING RESEARCH PROJECTS IN THE FIELD OF RAILWAY SIGNALLING ON A NATIONAL AND INTERNATIONAL SPHERE. THE THREE MOST RECENT INITIATIVES ARE: TOOLTRAIN, SIGMA 2 AND CBTC-2020.

CAF Signaling participates in the main R&D projects focused on national and European railway signalling.

Amongst the most recent ventures, there are three railway research initiatives that are ongoing. The first one, TOOLTRAIN, focuses on advanced tools for the characterisation and sizing of high-performance rail lines. Funded by the Ministry of Science, Innovation and Universities, and with the support of the ERDF (European Regional Development Fund), this initiative will run until 2020.

Secondly, the company is part of "SIGMA2 Signalling Migration for Automation 2" where it provides its know-how to achieve new advances in signalling. This programme, promoted by the Basque Government within the HAZITEK 2018 programme and with financing from the ERDF fund, will also end in 2020.

These are joined by their outstanding research role in the project "CBTC-2020 New interoperable CBTC system for the urban transport networks of the future". In this case, the managing firm is the Centre for Industrial Technological Development (CDTI) and this action, which ends in 2021, and is included in the CIEN Strategic Programme.

CAF Signaling: More than 12 research programmes since its inception

Together with the ongoing projects, CAF Signaling has been involved in, to date, more than 12 R&D programmes fostered by national and European administrations. Amongst the most noteworthy are those related to new developments of the ERTMS system.

Last generation **ticketing systems**

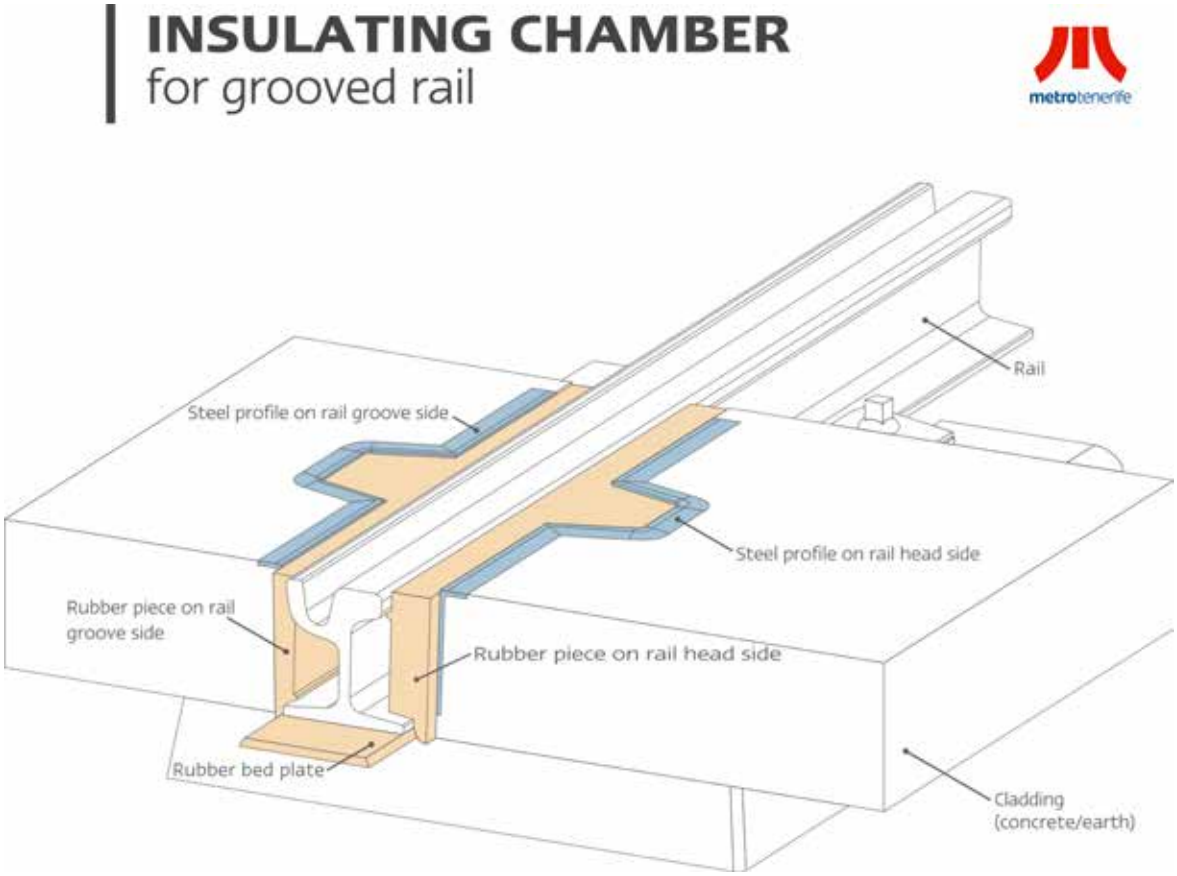
IDOM, in recent years, is aware as consortiums, operators, suppliers and ticketing consultants are receiving information impacts from a multitude of new technologies promising to be the definitive solution to all the possible limitations of current AFC systems and allowing us to offer new seamless travel experiences to our commuters.

IDOM POSSES THE KNOW-HOW TO ASSIST ON MASTER PLANNING, DESIGN AND UPGRADING, TESTING, SUPPORT FOR THE IMPLEMENTATION AND OPERATION OF THE MOST ADVANCED TICKETING SYSTEMS.

Travel card emulations inside mobile SIMs, open loop systems, physical or virtual EMV financial cards, bluetooth beacons, static or dynamic QR codes, NFC for top-up or validation are examples of this wide range of technology that can confuse us. Oyster in London or EZ-Link in Singapore become unreachable icons of ticketing R&D producing a permanent sensation of never being technologically up to date.

At IDOM we have been providing manufacturer independent ticketing engineering and consultancy services for over 3 decades, while working with many of these providers on almost all of our customers' projects. In this time, we have been able to learn that there is no single and perfect model valid for all metropolises. It is just the opposite, each system is and must be the fruit of its history (technological precedents or security schemes, fare policies). The stability of transport, the volume of infrastructures as well as their long technological investment life cycles make continuous adaptation to change more complex. Nor should we forget the types and proportion of users and their socioeconomic profile, since not everyone is prepared or has a financial card, a smartphone or a state-of-the-art NFC wearable. Therefore a master plan that defines the architecture, roadmaps and appropriate proportions of each of these complex ingredients is one of the great keys in our AFC sector. IDOM posses the know-how to assist on master planning, design and upgrading, testing, support for the implementation and operation of the most advanced ticketing systems that include next-generation cards such as NXP Mifare DESFire EV1/EV2, SAM modules and HSM devices, open-loop systems, anti-fraud control with AES symmetric and asymmetric cryptography, advanced clearing houses, on-line services in the cloud, MaaS and the latest innovative projects as NFC top-up or validation under patent for Android and even iOS operating systems (mobile devices payment)
Cairo, Lima, Bogota, Bilbao, Dublin Metros, transport authorities of Ireland, Bahrain, Dubai, Bizkaia, European Governments, Jordan, Peru, Basque Government and a long list of IDOM customers, to whom we are deeply grateful.

Insulating chamber to facilitate and reduce costs of **track maintenance**



METROTENERIFE HAS DEVELOPED AND PATENTED, FOR URBAN RAILWAY TRACKS WITH EMBEDDED RAIL, AN INNOVATIVE INSULATING CHAMBER FOR THE RAIL

Urban railway tracks require electrical and acoustic insulation of the rail to reduce their effects on the urban environment due to the abundance of buildings nearby, pedestrians, piping, etc. This insulation is carried out by means of recycled rubber elements that envelop the rail both on the lower part and on the sides. When certain maintenance or replacement works on the rail are required it is necessary to remove the above-mentioned insulating element, which makes it obligatory to carry out demolition work on the track coating because it often contains stiff materials (concrete, tiles, asphalt…).

Metrotenerife has developed and patented, for urban railway tracks with embedded rail, an insulating chamber for the rail which fulfils the above-mentioned requirements of insulation.

Furthermore, thanks to its careful geometry, can be easily installed and extracted without any need to remove the coating from the track, and it also simplifies the subsequent reinstallation. In this way, it is possible to reduce time, cost and effort involved in rail maintenance and replacement works, without losing the benefits and robustness of the system. The detachable insulating chamber can be installed on the track with stiff coatings and also on green tracks (grass) as well as on crossroads, for which an additional element has been developed which makes it possible to protect the insulating chamber from the effects of traffic. This detachable insulating chamber has been tested on site under the least favourable conditions, giving highly satisfactory results.

Consolidation of INGEBER in 2019

DURING 2019, INGETEAM HAS DEVELOPED ACTIVITIES TO CONSOLIDATE SEVERAL ENERGY RECOVERY PROJECTS BUT ALSO HAS INVESTED ON R&D BEARING IN MIND THE COMPETITIVENESS OF INGEBER

The energy recovery based on INGEBER is a proved solution to improve energy efficiency and to reduce costs, therefore the market liberalization and the search of optimizing energy consumption reminds an opportunity for market development. We have worked on a compact solution, that eases the integration process to answer market needs. At the same time, a programme to improve useful life of components has been implemented. At the same time, during 2019 different projects have been developed. A system has been installed in U2 of Wien Metro, after having recorded a yearly recovery of approx. 1.4 Mio kWh on the first system.

We have also installed 2 new INGEBER in Metro de Barcelona, so that at the end of the year the city will have 3 systems of 1.7 MW. Finally, we are working on first 2 MW system for the railways system SFM in Mallorca.

New generation of TETRA+LTE infrastructure: **eNEBULA**

TELTRONIC HAS PRESENTED THE NEW GENERATION OF ENEBULA INFRASTRUCTURE. THE COMPANY CONTINUES DEVELOPING AND EVOLVING ITS TETRA SYSTEM TO ADAPT IT TO THE NEW NEEDS AND DEMANDS OF USERS.

Teltronic has presented the new generation of eNEBULA infrastructure, a solution that has proven its robustness and reliability in hundreds of deployments all over the world, with specific functionalities for transport sector. The company continues developing and evolving its TETRA system to adapt it to the new needs and demands of users.

To do so, eNEBULA incorporates LTE broadband capabilities fully integrated with TETRA. This integration is carried out at all levels: infrastructure hardware and the Network Management System, control centre solution for both radio accesses, and even the terminals. Thus, through a single solution that preserves the investments made by customers in TETRA, it is possible to evolve towards new broadband services.

In addition, within this evolution process, other elements have also been incorporated into the eNEBULA portfolio, such as the extensive catalogue of cybersecurity licenses and services specifically designed to protect critical infrastructures. Likewise, the company transfers all its experience in secure communication systems to the scope of the IoT, allowing users to access a huge ecosystem of applications which make it possible to optimize and improve the efficiency of its daily operations.

The solution also includes the MCBS, a new outdoor base station with multi-carrier capabilities, whose benefits will mean a significant reduction in costs, in key aspects such as the optimization in the design of networks, energy savings, or in the simplification of installation and maintenance tasks.

ENGINEERING, CONSULTANCY AND CERTIFICATION

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

- Albatros, S.A.U.
- Ardanuy Ingeniería, S.A.
- Caf Signalling, S.L.
- Caf Turnkey & Engineering, S.L.
- Calmell, S.A.
- Citef (Fundación para el fomento de la innovación industrial)
- Dsaf-Dinamicas De Seguridad, S.L.
- Duro Felguera Rail, S.A.U.
- Eurogestión
- Grupo Eurogestión Ingeniería de Telecomunicaciones, S.L.
- Idom-Engineering, Consulting, Artchitecture
- Ikusi SLU
- Indra Sistemas, S.A.
- Ineco-Ingeniería y Economía del Transporte, S.A.
- Inserail
- Luznor Desarrollos Electrónicos, S.L.
- Segula Technologies España, S.A.U.
- Sener Ingeniería y Sistemas, S.A.
- SGS Group Spain
- Sigma Rail
- Teknorail - Grupo Eurofinsa
- Tecnivial S.A
- Tectronic
- Thales España Grp, S.A.U.
- TPF Getinsa Euroestudios, S.L.
- Trigo Group
- Typsa - Técnica Y Proyectos, S.A.
- Vicomtech
- WSP Spain-Apia S.A.

Systems, environmental, financial management and IT consulting

- Aquafrisch, S.L.
- Ardanuy Ingeniería, S.A.
- Citef (Fundación para el fomento de la innovación industrial)
- Eurogestión
- Fundación Gaiker
- Grupo Eurogestión Ingeniería de Telecomunicaciones, S.L.
- Idom-Engineering, Consulting, Artchitecture
- Ik4 Research Alliance
- Ineco-Ingeniería y Economía del Transporte, S.A.
- Segula Technologies España, S.A.U.
- Sener Ingeniería y Sistemas, S.A.
- SGS Group Spain
- Teknorail - Grupo Eurofinsa
- TPF Getinsa Euroestudios, S.L
- Vicomtech
- WSP Spain-Apia S.A.

Technical Specifications Drafting and supervision of rolling stock manufacturing

- Albatros, S.A.U.
- Ardanuy Ingeniería, S.A.
- Caf Turnkey & Engineering, S.L.
- Eurogestión
- Hispacold S.A.
- Idom-Engineering, Consulting, Artchitecture
- Ineco-Ingeniería y Economía del Transporte, S.A.
- Polar
- Segula Technologies España, S.A.U.
- Sener Ingeniería y Sistemas, S.A.
- SGS Group Spain
- Teknorail - Grupo Eurofinsa
- Trigo Group
- WSP Spain-Apia S.A.

Work supervision

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

Product and process certifications

- Ardanuy Ingeniería, S.A.
- Cetest, S.L.
- Citef (Fundación para el fomento de la innovación industrial)
- Dsaf-Dinamicas De Seguridad, S.L.
- Eurogestión
- Fundación Gaiker
- Grupo Eurogestión Ingeniería de Telecomunicaciones, S.L.
- Idom-Engineering, Consulting, Artchitecture
- Ineco-Ingeniería y Economía del Transporte, S.A.
- Polar
- Sener Ingeniería y Sistemas, S.A.
- SGS Group Spain
- Trigo Group
- Teknorail Group
- WSP Spain-Apia S.A.

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

- Ardanuy Ingeniería, S.A.
- Caf Turnkey & Engineering, S.L.
- Citef (Fundación para el fomento de la innovación industrial)
- Duro Felguera Rail, S.A.U.
- Eurogestión
- Gantrex Spain
- Idom-Engineering, Consulting, Artchitecture
- Ineco-Ingeniería y Economía del Transporte, S.A.
- Segula Technologies España, S.A.U.
- SGS Group Spain
- Teknorail Group
- Tpf Getinsa Euroestudios, S.L
- Typsa - Técnica y Proyectos, S.A.
- WSP Spain-Apia S.A.

Training and simulations tools

- Grupo Eurogestión Ingeniería de Telecomunicaciones, S.L.
- Ik4 Research Alliance
- Segula Technologies España, S.A.U.
- Lander
- WSP Spain-Apia S.A.

INFRASTRUCTURE AND SUPERSTRUCTURE

Civil works (platforms,stations, depots)

- Azvi S.A
- Caf Turnkey & Engineering, S.L.
- Comsa Corporacion
- Funor, S.A.
- Inserail, S.L.
- Luznor Desarrollos Electrónicos, S.L.
- Parrós Obras, S.L.
- Sener Ingeniería y Sistemas, S.A.

Electrification

- Alstom Transporte, S.A.
- Azvi S.A
- Caf Turnkey & Engineering, S.L.
- Comsa Corporacion
- Cunext
- Ingeteam Power Technology, S.A.
- Inserail, S.L.
- La Farga Yourcoppersolutions, S.A.
- Semi- Sociedad Española de Montajes Industriales, S.A.
- Telice, S.A.
- Tria Ingeniería, S.A.
- Valdepinto, S.L.

Infrastructure and superstructure equipment and components

- Alstom Transporte, S.A.
- Amurrio Ferrocarril y Equipos, S.A.
- Arcelormittal España, S.A.
- Arteche (Electrotécnica Arteche Smart Grid, S.L.)
- Azvi S.A.
- Cables de Comunicaciones Zaragoza, S.L.
- Caf Turnkey & Engineering, S.L.
- Comsa Corporacion
- Cunext
- Dsaf-Dinamicas De Seguridad, S.L.
- Duro Felguera Rail S.A.U.
- Flexix, S.A.
- Funor, S.A.
- Hicasa-Hierros y Carbones, S.A.
- Ik4 Research Alliance
- Ikusi SLU
- Inserail, S.L.
- Jez Sistemas Ferroviarios, S.L.
- Ladicim
- Mb Sistemas, S.Coop.
- Next Generation Technologies

MEMBERS DIRECTORY

- Precon - Prefabricaciones y Contratas, S.A.U.
- Pretensados del Norte, S.L.
- Semi -Sociedad Española de Montajes Industriales, S.A.
- Talleres Alegría, S.A.
- Talleres Zitrón
- Tecnivial S.A
- Telice, S.A.

Track assembly

- Alstom Transporte, S.A.
- Amurrio Ferrocarril y Equipos, S.A.
- Azvi S.A.
- Caf Turnkey & Engineering, S.L.
- Comsa Corporacion
- Gantrex Spain, S.A.
- Inserail, S.L.
- Pretensados del Norte, S.L.
- Talleres Alegría, S.A.
- Tria Ingenieria, S.A.

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

Traffic control and signalling (safety)

- Albatros, S.A.U.
- Alstom Transporte, S.A.
- Bombardier España
- Cables de Comunicaciones Zaragoza, S.L.
- Caf Signalling, S.L.
- Caf Turnkey & Engineering, S.L.
- Grupo Eurogestión Ingeniería de Telecomunicaciones, S.L.
- Ik4 Research Alliance
- Ikusi SLU
- Implaser 99, S.L.L.
- Indra Sistemas, S.A.
- Inserail, S.L.
- Jez Sistemas Ferroviarios, S.L.
- Luznor Desarrollos Electrónicos, S.L.
- Revenga Ingenieros S.A:
- Segula Technologies España, S.A.U.
- Semi- Sociedad Española de Montajes Industriales, S.A.
- Sice Tecnología y Sistemas
- Siemens Rail Automation, S.A.U.
- Teknorail - Grupo Eurofinsa
- Tecnivial S.A
- Tectronic, S.A.
- Telice, S.A.
- Thales España Grp, S.A.U.

Protection (security) and infrastructure monitoring

- Albatros, S.A.U.
- Alstom Transporte, S.A.
- Azvi S.A
- Bombardier European Holdings, S.L.U.
- Caf Turnkey & Engineering, S.L.
- Comsa Corporacion
- Dsaf-Dinamicas De Seguridad, S.L.
- Grupo Eurogestión Ingeniería de Telecomunicaciones, S.L.
- Ik4 Research Alliance
- Indra Sistemas, S.A.
- Inserail, S.L.
- Segula Technologies España, S.A.U.
- Semi- Sociedad Española de Montajes Industriales, S.A.
- Siemens Rail Automation, S.A.U.
- Telice, S.A.
- Thales España Grp, S.A.U.
- Vicomtech

Systems and equipment for collection, ticketing and access control

- Caf Turnkey & Engineering, S.L.
- Calmell, S.A.
- Comsa Corporacion
- Ecocomputer S.L.
- Gmv Sistemas, S.A.U.
- Ikusi SLU
- Indra Sistemas, S.A.
- Inserail, S.L.
- Revenga Ingenieros S.A:
- Semi- Sociedad Española de Montajes Industriales, S.A.
- Sener Ingeniería y Sistemas, S.A.
- Sice Tecnología y Sistemas
- Siemens Rail Automation, S.A.U.
- Telice, S.A.
- Vicomtech

Communications

- Albatros, S.A.U.
- Azvi S.A.
- Cables de Comunicaciones Zaragoza, S.L.
- Caf Turnkey & Engineering, S.L.
- Comsa Corporación
- Eurogestión
- Gmv Sistemas, S.A.U.
- Grupo Eurogestión Ingeniería de Telecomunicaciones, S.L.
- Ik4 Research Alliance
- Ikusi SLU
- Indra Sistemas, S.A.
- Inserail, S.L.
- Revenga Ingenieros S.A:
- Semi- Sociedad Española de Montajes Industriales, S.A.
- Sener Ingeniería y Sistemas, S.A.
- Sice Tecnología y Sistemas
- Siemens Rail Automation, S.A.U.
- Tectronic, S.A.U.
- Telice, S.A.
- Thales España Grp, S.A.U.
- Vicomtech

Passenger information and on-board entertainment systems

- Albatros, S.A.U.
- Alstom Transporte, S.A.
- Bombardier España
- Turnkey & Engineering, S.L.
- Gmv Sistemas, S.A.U.
- Grupo Eurogestión Ingeniería de Telecomunicaciones, S.L.
- Icon Multimedia, S.L.
- Indra Sistemas, S.A.
- Inserail, S.L.
- Ikusi SLU
- Revenga Ingenieros S.A.
- Sice Tecnología y Sistemas, S.A.
- Siemens Rail Automation, S.A.U.
- Tecnivial S.A.
- Telice, S.A.
- Vicomtech

ROLLING STOCK MANUFACTURERS

High Speed trains (over than 250km/H)

- Alstom Transporte, S.A.
- Bombardier España
- Caf-Construcciones y Auxiliar de Ferrocarriles, S.A.
- Patentes Talgo, S.L.
- Siemens Rail Automation, S.A.U.
- Zeleros

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

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

Urban and suburban trains

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

Freight wagons and Locomotives

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

Vehicles for infrastructure maintenance

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

MANUFACTURERS OF VEHICLE COMPONENTS, AUXILIARY EQUIPMENT AND SYSTEMS

Traction and propulsion components

- Alstom Transporte, S.A.
- Arteche (Electrotécnica Arteche Smart Grid, S.L.)
- Bombardier España
- Caf Power & Automation, S.L.U.
- Flexix, S.A.
- Ik4 Research Alliance
- Ingeteam Power Technology, S.A.
- Mgn Transformaciones del Caucho, S.A.
- Siemens Rail Automation, S.A.U.
- Zeleros

Control, auxiliary and diagnostic systems

- Albatros, S.A.U.
- Alstom Transporte, S.A.
- Arteche (Electrotécnica Arteche Smart Grid, S.L.)
- Bombardier España
- Caf Power & Automation, S.L.U.
- Gmv Sistemas, S.A.U.
- Hispacold S.A
- Ik4 Research Alliance
- Indra Sistemas, S.A.
- Ingeteam Power Technology, S.A.
- Kimua Group
- Nem Solutions
- Sigma Rail
- Stadler Rail Valencia, S.A.U.
- Zeleros

Assembly equipment

- Arteche (Electrotécnica Arteche Smart Grid, S.L.)
- Danobat, S. COOP.
- Funor, S.A.

Mechanical components

- Alstom Transporte, S.A.
- Bombardier España
- Caf-Construcciones y Auxiliar de Ferrocarriles, S.A.
- Flexix, S.A.
- Funor, S.A.
- Gamarra, S.A.
- Hispacold S.A.
- Ik4 Research Alliance
- Metalocaucho, S.L.
- Mgn Transformaciones del Caucho, S.A.
- Polar
- Stadler Rail Valencia, S.A.U.
- Talleres Alegría, S.A.
- Zeleros

Interiors

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

Safety

- Albatros, S.A.U.
- Alstom Transporte, S.A.
- Arteche (Electrotécnica Arteche Smart Grid, S.L.)
- Bombardier España
- Dsaf - Dinamicas de Seguridad, S.L.
- Fundación Gaiker
- Indra Sistemas, S.A.
- Luznor Desarrollos Electrónicos, S.L.
- Sigma Rail

MAINTENANCE: EQUIPMENT, MAINTENANCE SERVICES AND REFURBISHMENT

Infrastructure and superstructure maintenance

- Alstom Transporte, S.A.
- Amurrio Ferrocarril y Equipos, S.A.
- Azvi S.A
- Caf Turnkey & Engineering, S.L.
- Comsa Corporacion
- Duro Felguera Rail, S.A.U.
- Gantrex Spain
- Inserail, S.L.
- Ladicim
- Semi- Sociedad Española de Montajes Industriales, S.A.
- Sigma Rail
- Tria Ingeniería, S.A.

Rolling Stock maintenance

- Alstom Transporte, S.A.
- Arteche (Electrotécnica Arteche Smart Grid, S.L.)
- Azvi S.A
- Bombardier España
- Caf - Construcciones y Auxiliar de Ferrocarriles, S.A.
- Caf Turnkey & Engineering, S.L.
- Comsa Corporacion
- Goratu Lathes
- Grupo Trigo
- Hispacold S.A.
- Nem Solutions
- Next Generation Technologies
- Patentes Talgo, S.L.
- Siemens Rail Automation, S.A.U.
- Stadler Rail Valencia, S.A.U.
- Talleres Alegría, S.A.
- Talleres Zitrón
- Technology & Security Developments

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

- Albatros, S.A.U.
- Alstom Transporte, S.A.
- Arteche (Electrotécnica Arteche Smart Grid, S.L.)
- Azvi S.A.
- Bombardier España
- Caf Signalling, S.L.
- Caf Turnkey & Engineering, S.L.
- Dsaf-Dinamicas de Seguridad, S.L.
- Gmv Sistemas, S.A.U.
- Ikusi SLU
- Indra Sistemas, S.A.
- Inserail, S.L.
- Jez Sistemas Ferroviarios, S.L.
- Luznor Desarrollos Electrónicos, S.L.
- Next Generation Technologies
- Patentes Talgo, S.L.
- Semi- Sociedad Española de Montajes Industriales, S.A.
- Sice Tecnología y Sistemas, S.A.
- Siemens Rail Automation, S.A.U.
- Sigma Rail
- Telice S.A.

Maintenance of systems, equipment and vehicles components

- Albatros, S.A.U.
- Alstom Transporte, S.A.
- Arteche (Electrotécnica Arteche Smart Grid, S.L.)
- Bombardier España
- Caf-Construcciones y Auxiliar de Ferrocarriles, S.A.
- Caf Power & Automation, S.L.U.
- Caf Turnkey & Engineering, S.L.
- Gmv Sistemas, S.A.U.
- Goratu Lathes
- Grupo Trigo
- Hispacold S.A.
- Indra Sistemas, S.A.
- Ingeteam Power Technology, S.A.
- Kimua Group
- Mgn Transformaciones del Caucho, S.A.
- Nem Solutions
- Patentes Talgo, S.L.
- Satys Interiors Railway Spain SA
- Sice Tecnología y Sistemas
- Stadler Rail Valencia, S.A.U.
- Technology & Security Developments

Supply of maintenance equipment

- Albatros, S.A.U.
- Alstom Transporte, S.A.
- Aquafrisch, S.L.
- Bombardier España
- Danobat, S. COOP.
- Kimua Group
- Nem Solutions
- Newtek Solidos S.L.
- Next Generation Technologies
- Patentes Talgo, S.L.
- Polar
- Tecnivial S.A.
- Sigma Rail

ALBATROS, S.L.U.

Technology company specialized in the design and manufacture equipment for trains, metros and trams. Divisions: Power Electronics (static power converters and battery chargers) and On-Board Systems (PACIS, control systems and other embedded systems). Leader in providing auxiliary components for trains and is among the leading world companies in such competitive markets like Europe, USA and Latin America. Headquarters located in Spain and factories in USA and Brazil. SEPSA products stand for high quality, high reliability and a long design life. The QM system is certified in accordance with IRIS, ISO 9001, CMMI3 and its eco-management system in accordance with ISO 14001.

Albatros, 7 Pol.Ind. Pinto Estación 28320 Pinto (MADRID)
+34 91 495 70 00
sepsacomercial@sepsa.es
www.sepsa.es

ALSTOM ESPAÑA

As a promoter of sustainable mobility, Alstom offers a complete range of solutions (from high-speed trains to metros, tramways and e-buses), passenger solutions, customized services (maintenance, modernization), infrastructure, signalling and digital mobility solutions. The company recorded sales of €7,3 billion in the 2017/18 fiscal year. Alstom is present in over 60 countries and employs 34,500 people. In Spain Alstom employs around 2,000 people on 18 sites, including a rolling stock manufacturing site and 4 innovation centres where it runs R&D programmes for rolling stock and railway signalling, safety, security, digital mobility and services.

Martinez Villergas, 49 - Edificio V - 28027 (MADRID)
+34 91 334 58 00
+34 91 334 58 01
www.alstom.com

AMURRIO FERROCARRIL Y EQUIPOS, S.A.

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

Maskuribai, 10 01470 Amurrio (ÁLAVA)
+34 945 891 600
+34 945 892 480
comercial@amufer.es
www.amufer.es

AQUAFRISCH, S.L.

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

Ignacio Zuloaga, 10 28522 Rivas Vaciamadrid (MADRID)
+34 91 380 03 33
jmartin@aquafrisch.com
www.aquafrisch.com

ARCELORMITTAL

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

ArcelorMittal Asturias. Edif. de Energías, 2 pl. 33691 Gijón (ASTURIAS)
+34 985 187 750
rails.specialsections@arcelormittal.com
https://rails.arcelormittal.com/

ARDANUY INGENIERÍA, S.A.

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

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

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

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

ARTECHE

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

Derio Bidea, 28 48100 Mungia (VIZCAYA)
+34 946 011 200
+34 946 155 628
marketing@arteche.com
www.arteche.com

ASOCIACIÓN IK4 RESEARCH ALLIANCE

IK4 is a private and independent alliance of R&D centres, a benchmark in the European R&D context. It comprises 6 organisations in the Basque Country: AZTERLAN, CEIT, IDEKO, IKERLAN, LORTEK and TEKNIKER.
The IK4 Research Alliance sets out to generate, capture and transfer scientific and technological knowledge in order to contribute towards improving the competitiveness of companies and the progress of society.

Polígono Azitain 3k, 2G 20600 Eibar (GUIPÚZCOA)
+34 943 820 350
jmerdozain@ik4.es
www.ik4.es

AZVI

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

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

BOMBARDIER TRANSPORTATION

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

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

CABLES DE COMUNICACIONES ZARAGOZA, S.L.

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

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

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

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

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

CAF POWER & AUTOMATION

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

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

CAF SIGNALLING, S.L

CAF Signalling, the technological subsidiary of the CAF Group, designs and provides Integral Signalling Solutions, both in Spain and abroad. The company has its own advanced technology products, both for onboard and wayside applications that make up the core of its integral solutions. As a result of a significant and growing effort in R&D&I, particularly in the area of critical safety systems, CAF Signalling promotes continuous innovation and customer focus.

CAF Signalling, boats the Company's own in house engineering and expertise to take on "turn-key" railway signalling projects.

Avda. de la Industria, 51 28108 Alcobendas (MADRID)
+34 91 789 27 50
+34 91 661 37 51
cafsignalling@cafsignalling.com
www.cafsignalling.com

CAF TURNEY & ENGINEERING

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.

Parque Científico y Tecnológico de Bizkaia, Laida Bidea, Ed. 205. 48170 Zamudio (VIZCAYA)
+34 946 819 550
+34 94 623 29 29
comercial@cafte.com
www.cafte.com

CALMELL, S.A.

The Calmell Group is the leader in access control and identification, through its companies Calmell S.A., Affix S.L., Idoneum S.A., which are respectively engaged in producing the supports (tickets, cards,…), developing specific software and hardware, personalization and security.

In the public transport sector it works for integrators and operators supplying any kind of support for ticketing and reader/writer systems.

With a strong international presence through its network of representatives and distributors, the Calmell Group is able to satisfy your needs on a global level.

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

CETEST, S.L. Centro de Ensayos y Análisis

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

Their customers include passenger, freight and special track maintenance vehicle manufacturers, component suppliers, as well as Notified Bodies, engineering firms and authorities.

Lazkaibar, s/n Edif. CETEST 20200 Beasain (GUIPÚZCOA)
+34 943 028 690
emartinez@cetestgroup.com
www.cetestgroup.com

CITEF

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

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

José Gutierrez Abascal, 2, 28006 (MADRID)
+34 91 336 32 12
citef@etsii.upm.es
www.citef.es

COLWAY FERROVIARIA, S.L.

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

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

COMPOSITES MARTIARTU

In COMPOSITES MARTIARTU we are specialists in the design and manufacture of parts in SMC (Sheet Molding Compound).
With more than 25 years of experience and thousands of parts manufactured for various sectors: transport, automotive, construction, power, electrical, telecommunications, naval, etc.
We have several presses up to 1250 TN, complemented with our machining center, painted robotic PIMC and water jet cutting.
Certificates, since 2008, in ISO 9001 and ISO 14001.

Pol. Ind. Martiartu, Calle 2 Pab 1. 48480. Arrigorriaga (VIZCAYA)
+34 946 711 701
+34 946 711 701
afg@martiartu.net /info@martiartu.net
www.compositesmartiartu.net

COMSA

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

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

CUNEXT COPPER INDUSTRIES

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

Av. de la Fábrica, s/n 14005 (CÓRDOBA)
+34 957 499 300
josep_anfruns@cunext.com
www.cunext.com

DANOBAT S.COOP.

Specialised Machine Tools and production systems for railway industry offering technologically advanced solutions and services, including among others engineering, consultancy, which are fully adapted to clients' needs.
DANOBAT focuses its activity in the supply of turnkey solutions for the manufacturing and maintenance of railways rolling stock, incorporating own leading technology products, together with those manufactured by specialised companies.

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

DINÁMICAS DE SEGURIDAD, S.L.

DSAF is a entrepreneurial society focused on the safety of the movement of people at risk.
Committed to the new technologies applied to the design of signaling systems, prevention and emergency in safety, DSAF promotes the development of products that guarantee the highest grade of security according to the standards of type approval current in generalized risk societies such as global ones.
The activity of DSAF focuses on these two major sectors: road / rail tunnels and wind towers.

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info@dsaf.es
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DURO FELGUERA RAIL, S.A.

DF Rail is a company specialized in the design and manufacture of turnout systems for metro, conventional, heavy haul and even high speed lines up to 350 kph.. DF Rail has its own designs and patents thanks to an intense effort in research and development, and its technologically advanced facilities,with more that 56,000 m^2 for the desing, manufacturing and assembling of turnout systems as well as machining and flash-butt welding of Mn steel crossings, machining of switches and stock rails. Besides, it designs and manufactures locking systems, fastening systems, wear devices, insulated glued joints and transition rails. Our products are installed in more that 21 countries.

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EUROGESTIÓN

Consulting company focused on the transport market and renewable energies. With a high degree of specialisation in the railway sector, they develop tailor-made applications that allow the automation of data processing to build an information system that provides value to its customers. They also have a set of computer support tools that help them carry out their management.

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FLEXIX, S.A.

FLEXIX, develops, manufactures worldwide since 1950 INJECTION and EXTRUSION RUBBER PARTS, rubber-metal, rubber-plastic, special elastomers and assemblies. We are part of the KÄCHELE-FLEXIX Group, with 2 plants in Germany, 1 in Spain and a warehouse in USA. For the RAILWAY SECTOR we produce mainly for infrastructures, absorption of vibrations under track, tie pads for sleepers, different range of stiffness (14-152 kN/mm). We provide development in geometries (FEM), materials, (conductivity, non-harmful gases...)
TYPE OF PARTS: Pads, Ducts, bellows, tubes, silent-blocks, joints, bumpers, axles, links, valves, bearings.
MIXTURES: NR, SBR, EPDM, CR, H/NBR, ECO, AEM, ACM, Silicone, FPM.

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FOREST TRAFIC S.L.

Manufacturer of panels for floors / ceilings / doors / sectorial / furniture
We assist our customers throughout each project: from the material consultancy to the development of the pre-equipped kits and its delivery in JIS process all over the world. We develop panels with different cores: fire proof plywood (HL3 for UNE EN 45545), composites, technical foams, honeycombs, cork-rubber compounds, etc. We can as well increase the physio-mechanical features with aluminum, inox, HPL or polyester coatings.
We guarantee ALL of our panels against delamination using individual ultrasonic testings in the whole area of the panel.

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FUNORSA

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

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GAIKER CENTRO TECNOLÓGICOs

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

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GAMARRA, S.A.

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

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GANTREX SPAIN, S.A.

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

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GEMINIS LATHES, S.A.

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

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GLOBAL QUALITY ENGINEERING SER. UNA COMPAÑÍA DE TRIGO GROUP

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

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GMV SISTEMAS S.A.U.

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

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HIERROS Y CARBONES , S.A.

Since 1997 Hicasa is specialised in transformation, tailored cut, storage and distribution of railway tracks materials, all kinds of rails and railways accessories with a permanent stock of more than 3.500 MT.
In 2006 we have incorporated to our Group of companies a factory specialised in manufacturing light rails from 7 kg/m to 48 kg/m, manufacture according European and American Standard, Australian or South African together with other types of Standard (AREMA).
Our own experience allows us the optimal management of the supply chain, exporting to more than 30 countries all over the world.

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ICON MULTIMEDIA, S.L.

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

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

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IDOM CONSULTING, ENGINEERING AND ARCHITECTURE S.A.U

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

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IKUSI, S.L.

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

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IMPLASER 99 SLL

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

We are also specialized in the manufacturing of security, informative and accessibility decals for installation inside and outside the railway coaches.

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INDRA

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

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INECO

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

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INGENIERIA Y TECNICAS DEL TRANSPORTE TRIA, S.A.

In 2005 Tria Group was set and has been closely linked to railway infrastructure sector being from then on the most profitable division within the group.

Tria has an extensive technological know-how that allows us to cover a wide range of activities in the sector and has a highly experienced and qualified team of professionals in every department: track superstructure, catenary, substations, facilities, consultancy and R&D.

In 2010 Tria started his way to internationalization setting branches around Europe, SouthAmerica and Australia without stopping using innovation as a key to success.

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INGETEAM POWER TECHNOLOGY, S.A.

Ingeteam is an international group specializing in power and control electronics (inverters, frequency converters, controllers and protections) and electrical engineering and automation projects. The company operates in 22 countries, with 3,900 employees. R&D is at the backbone of its business activities.

In railways, the traction converters INGETRAC are based on an smart integration of proved Proved Modules, comprising all necessary elements to be fully operational, on each required application.

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INSE RAIL S.L.

Inse Rail is an engineering firm that is highly specialized in the railway industry and specifically its installations and systems.

Founded in 1994, it is dedicated to engineering, consulting and project management in the railway, industrial, energy and building construction industries, carrying out its activities in the different stages of planning, design, construction and operation of investments.

Inse Rail participates in the international development of the High Speed Rail and metropolitan transportation, with a strong specialization in electrification, signaling, security and communication systems, and other railway transport installations.

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INTERNACIONAL HISPACOLD, S. A.

Hispacold, a World leader Company for climate systems with more than 40 years' experience is specialized in passangers comfort.

Hispacold designs and manufactures HVAC solutions for all rail vehicles: trams, metros, EMUs, DMUs, LRVs… with proven and reliable technology solutions.

Hispacold is certified in the most recognized International quality management, environment and safety standards: ISO 9001, ISO 14001, OSHAS 18001, EN 15805-2 and the prestigious IRIS ISO/TS 22163.

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JEZ SISTEMAS FERROVIARIOS, S.L.

JEZ is committed to the designing, manufacturing, supplying and maintenance of all types of manganese steel switches and railway track systems for railways and tramways, in addition to moulded cast steel parts for the general industry.

Our Technical Department (Department R&D) ensures we have the capability of designing and producing points and crossings (turnouts, crossovers, scissor crossovers and diamond crossings) or parts for them, such as hard steel manganese crossings, spare tongues… as well as the generation of patents.

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

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KIMUA ENGINEERING, S.L.

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

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LA FARGA YOUR-COPPERSOLUTIONS, S.A.

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

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

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LADICIM - UNIVERSIDAD DE CANTABRIA

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

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LANDER SIMULATION & TRAINING SOLUTIONS

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

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

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

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LUZNOR DESARROLLOS ELECTRONICOS, S.L.

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

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MB SISTEMAS S.COOP.

Automated Solutions for the Train Carbody Manufacturing.

With an extensive experience in joining technologies, we implement automated solutions in the train carbody manufacturing industry.

We are a benchmark in this field and our solutions certainly result in cost and time savings, whilst also offering an extremely high appearance and dimensions quality level.

From the simultaneous engineering to the implementation of the solution, our terms are particularly appealing in a world where the limit date for obtaining the first cars is crucial.

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METALOCAUCHO, S.L. (MTC)

MTC, being part of Wabtec Corporation, designs and manufacture rubber-metal components for suspension and vibration control systems used on railway, automotive and industrial applications.

With headquarters in Spain, MTC has 4 production facilities in 1) Spain, 2) China, 3) India and 4) USA, which offers to customers the possibility to localize production in any of these countries.

Thanks to a wide commercial presence in any country of the world, MTC gives local support to develop projects for both OE and Aftermarket bussinness.

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

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MGN TRANSFORMACIONES DEL CAUCHO, S.A.

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

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

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

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NEWTEK SOLIDOS, S.L.

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

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NEXT GENERATION RAIL TECHNOLOGIES, S.L. (NGRT)

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

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

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PARRÓS OBRAS, S.L.

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

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PATENTES TALGO, S.L.U.

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

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POLAR DEVELOPMENTS

POLAR experience in structural design with composites based on carbon fibre and epoxy resin

POLAR extracts technologies from specialized sectors and transfers them to sectors that can benefit from its advantages. Aeronautics, Space, Shipbuilding.

POLAR is currently developing various R & D projects with public and private funding in order to test new materials and typologies.

POLAR verifies the results obtained through the construction of prototypes and specific test campaigns.

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

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

It has supplied monoblock, twinblock, block slabs and sleeper for switches and crossings, Either for high speed, conventional lines, haul, subways and tramways.

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PRETENSADOS DEL NORTE, S.L.

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

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REVENGA SMART SOLUTIONS

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

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SATYS INTERIORS RAILWAY SPAIN

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

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

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

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

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SEGULA TECHNOLOGIES

SEGULA Technologies is an engineering group with a global presence, helping boost competitiveness within all of the major industrial sectors: automotive, aerospace, energy, rail, naval and defense, pharmaceutical and oil & gas.

Present in 30 countries and with 140 offices worldwide, the Group fosters a close relationship with its customers thanks to the expertise of its 12,000 employees. A leading engineering specialist placing innovation at the heart of its strategy, Segula Technologies conducts large-scale projects, ranging from studies to industrialisation and production.

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SOCIEDAD ESPAÑOLA DE MONTAJES INDUSTRIALES, S.A.

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

*New SS/EE traction in Parets del Vallés at the p.k. 20/285 of Barcelona-French border line.

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

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SENER INGENIERÍA Y SISTEMAS, S.A.

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

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SDEA SOLUTIONS, S.L.

SDEA Solutions is a technical consulting firm specialized in providing engineering and design solutions for the railway sector, Energy and Transport mainly.

We have a team of highly qualified engineers working in 3 main areas, Rail Sector Designs and BIM projects for linear works; Advanced Calculation and Simulation (FEA/FEM and CFD Calculations); Process Engineering and Thermo-mechanical designs.

With our participation we hope to provide new knowledge using tools that the sector is demanding, especially in the development of BIM methodology with international presence and bidding for the R+D development.

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SGS GROUP SPAIN

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

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

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

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

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SIEMENS MOBILITY, SLU

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

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SIGMA-RAIL, S.L.

SigmaRail is an innovative company offering new cognitive computer vision solutions for the rail industry. Applying state-of-the art deep learning techniques SigmaRail offers a wide range of services from infrastructure inspection, ETCS geographical data, BIM modelling, rolling stock yard sorting or predictive infrastructure maintenance. We address the requirement of modelling a given environment and automate its data processing. This way we can help infrastructure managers, rail operations, suppliers, installers and maintainers of most rail projects around the world to be more efficient. SigmaRail has completed projects in Spain, UK, Morocco, Saudi Arabia, Mexico, Singapore and Australia.

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STADLER RAIL VALENCIA, S.A.U.

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

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TALLERES ALEGRÍA, S.A.

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

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TECNIVIAL,S.A.

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

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TECHNOLOGY & SECURITY DEVELOPMENTS

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

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TEKNORAIL SYSTEMS, S.A.

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.

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TELICE, S.A

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

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TELTRONIC

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

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THALES ESPAÑA GRP S.A.U.

Thales is a World leader in Mission Critical Solutions for Land Transportation. Thales Spain, with more tha 60 years of experience, has been pioneer and leader in the thecnological development of the Spanish railways, beein one of the main suppliers of safety and telecommunication systems for the Spanish Railways Administrations and present in countries as Turkey, Mexico, Algeria, Malaysia and Morocco.
Its activity goes from the development, manufacturing installation, commissioning to the maintenance of equipments and systems for railway signalling, train control, Telecommunication, Supervision ticketing and critical infrastructures security.

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TPF GETINSA EUROESTUDIOS, S.L.

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TYPSA

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

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VALDEPINTO, S.L.

Valdepinto, S.L. was established in 1986 and focuses its activities in the Railway sector.
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- 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.

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VICOMTECH

Vicomtech is an applied research centre specialising in Artificial Intelligence, working on technological solutions based on Computer Vision, Data Analytics, Computer Graphics, Advanced Media Technologies and Language Technologies. It aims at meeting the innovation requirements of the local companies and institutions to face new economic and social challenges, and improving their competitiveness in a global market. The transfer mechanism for this research is the creation of R+D+i projects geared to companies' needs. Furthermore, the centre works intensively on cooperation projects, through cooperative technology development promotion schemes at local, national and international level.

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WSP SPAIN

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

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ZELEROS

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

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ZITRON, S.A.

ZITRON is a world-wide leading company in designing, manufacturing, commissioning and maintenance complete ventilation systems for metro and tunnels. ZITRON has the world's biggest aerodynamic test bench, certified by AMCA, for testing fans at full load and 100 % speed. ZITRON's extensive reference list includes more than 500 metro and tunnel projects. The latest and more significant ones are Crossrail in London and Doha Metro. Experience and know-how, providing innovative and tailor-made solutions, are our most appreciated values. The global growing market of ZITRON´s fans, along with the high level of satisfaction of the Clients is the best mark of its equipment and services quality.

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3M ESPAÑA,S.L.

3M is a global innovation company based on science, dedicated to the development of products that improve the daily lives of people. 3M Science is present in homes, offices, hospitals, dentists' offices, telephones, computers, vehicles. You will find it on roads, trains and airplanes; It also helps you transport energy and stay connected.

In the case of the rail segment, 3M technologies can help maximize the efficiency of manufacturing and maintenance of rolling stock and infrastructure, while reducing costs and improving performance and sustainability.All this, also guaranteeing the safety of the workers.

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At the forefront of Rails Solutions

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

ArcelorMittal's main trending topics for railway:

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

New ArcelorMittal rails calculation tool
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