

15 MAFEX Anniversary years

representing the
SPANISH RAILWAY INDUSTRY



SPECIAL

Special feature on the Mafex 7th International Railway Convention.



INNOVATION

Mafex will spearhead the European Project entitled H2020 RailActivation.



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ANNUAL PARTNERS' MEETING:
MAFEX EXPANDS THE NUMBER OF
ASSOCIATES AND BOLSTERS ITS
ACTIVITIES FOR 2019

The Association informed the Annual Partners' Meeting of the progress made in the previous year, the incorporation of new companies and the evolution of activities for the 2019-2020 timeframe.

MAFEX UNVEILS THE
RAILACTIVATION PROJECT

The RailActivation project was unveiled at the Kick-Off Meeting of the European Commission.

MAFEX PARTICIPATES IN THE
ENTREPRENEURIAL ENCOUNTER

With the Minister of Infrastructure Development of the United Arab Emirates, Abdullah Belhaif Alnuami held in the office of CEOE.

AGREEMENT BETWEEN BCIE AND
MAFEX

To promote and support internationalisation in the Spanish railway sector.

MAFEX ATTENDS THE UNIFE GENERAL
ASSEMBLY IN DUBLIN

Held in Dublin from the 14th to 16th of June and Association was in attendance to support the body's activities.

MAFEX ATTENDS ALAMYS' TECHNICAL
COMMITTEES

Held in Porto, from June 30th until July 4th.

NEW WORKSHOP ON FEMALE VOICE
IN MOBILITY

Mafex supports this initiative on visibility of women in the mobility sphere.

NEW MAFEX PARTNERS

Mafex continues to grow in terms of partner numbers with the incorporation of two new companies: SDEA Solutions and Composites Martiartu.

MAFEX 15TH ANNIVERSARY

Mafex reaches 15 years of intense activity as a benchmark association for an innovative, cutting-edge industry with an increasingly marked presence throughout the world.

BALANCE APPRAISAL OF THE 7TH
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Once again, the industry welcomed this biennial event in a very positive manner which brought together delegates from 30 countries and more than 120 senior official from Spanish companies and bodies.

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15 years of promotion, representation and defence of the Spanish railway industry



Dear friends,

MAFEX turns 15. This 15th anniversary will be celebrated in a very special manner, as it symbolises a wide-ranging history filled with challenges and major accomplishments. Sixteen companies embarked upon, on September 16, 2004, their pathway to boosting internationalisation. Fifteen years later, MAFEX, comprising 86 partners, is the flagship association of the Spanish railway sector. Its consolidated position is endorsed through intense activities involving representation and defence of the railway sector, thanks, especially, to the trust that you have always placed in us. Our aim is to continue to offer a high-quality service contributing added value to the activities undertaken by associate companies and to work further towards accomplishing an industry at the cutting-edge in terms of international innovation, whilst also being highly competitive, being thus able to support it in new challenges, such as digital transformation and the changes to the global market.

In this issue, we will unveil other topics of interest, namely the appraisal of the 15th General Meeting, progress made over the last year, as well as the incorporation of new partners and the evolution of activities for the 2019-2020 timeframe.

Furthermore, a report is included on developments at the 7th International Railway Convention, which this year featured Malaga as its location between June 3 to 5. This professional platform has as its aim the analysis of projects and investments planned in the nations that back the railway as a means of transport, and to learn first-hand about the different technological solutions developed in our industry to see how best to respond to current needs.

Once again, it was very well received and managed to bring together delegates from 30 countries and more than 120 senior officials from Spanish companies and bodies, therein holding more than 550 meetings.

With regard to the regular sections that comprise the issue, the section "Our Partners" displays the current situation of 23 firms, who unveil their latest innovations, as well as the adjudications of tenders for national and international projects.

Furthermore, the section entitled "Destination" contains a broad report devoted to Scandinavian countries. Sweden, Denmark and Norway progress towards a cutting-edge railway, with major investment plans, both in terms of infrastructure, as well as the digitisation of their services. In the section "In Depth" the project "Wales and Borders" is tackled in detail. Wales and its coastal region will undergo a major boost in the coming years that will result in more and improved railway connections. In these pages, you will be able to learn more about the overhaul of the entire network and its plans for the future.

In the section entitled "Innovation" in this issue, the unveiling of the RailActivation project contained within the Horizon 2020 programme is particularly noteworthy, recently awarded to a consortium spearheaded by MAFEX. Likewise, seven MAFEX companies display their most recent progress in the sphere of R&D."

We hope that this special issue is of interest to you and provides you with a complete overview of the current situation affecting the sector, as well as allowing you to learn first-hand the present state-of-play in the railway industry and the contribution made by Spanish firms to its development the world over. Thank you once again for trusting in us.

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Mafex holds its annual General Meeting

Mafex, the Spanish Railway Association held its annual General Meeting on June 27, 2019, at which a large group of partner companies gathered. In addition to the opening ceremony featuring the Secretary General of CEOE, José Alberto González Ruiz and organisations such as Adif, Renfe, the State Secretary for Commerce, Icxex, España Exportaciones e Inversiones, Foundation of the Spanish Railways (FFE), Spanish Railway Technology Platform (PTFE), Metro Madrid, Transportes Metropolitanos de Barcelona (TMB) and MetroTenerife took part in the public session held afterwards.

During the session, a review of the tasks undertaken in its different working groups and committees over the last year was presented, also taking stock of the diverse activities organised and coordinated by MAFEX. In the field of international promotion, the success of the second edition of the RailLive fair and congress was singled out, which with the contribution of MAFEX, was a major success within the framework of the events that, internationally, have been held so far this year within the sector on a worldwide scale. The event has irrefutably become a national reference platform in rail transport enjoying broad support from the sec-

THE SPANISH RAILWAY ASSOCIATION INFORMS OF ITS ANNUAL MEETING OF PARTNERS, HELD IN THE SPANISH CONFEDERATION OF BUSINESS ORGANISATIONS (CEOE) IN MADRID, REPORTING ON PROGRESS MADE IN THE LAST YEAR, AS WELL AS THE INCORPORATION OF NEW PARTNERS AND THE EVOLUTION OF ACTIVITIES IN THE 2019-2020 TIMEFRAME.



From left right Pedro Fortea, general director of MAFEX, Alberto González, general secretary of CEOE, Víctor Ruiz, president of MAFEX and Jaime Hernani, secretary of MAFEX.

tor. Likewise, the 7th International Railway Convention organised by MAFEX in collaboration with Icxex España Exportaciones e Inversiones, and held in Malaga in the month of June, brought together more than 150 experts from companies and institutions from more than 30 countries from the five continents and in which there were also 22 technical sessions dealing with the most relevant current topics such as smart and digital mobility, predictive and efficient maintenance, security or multimodality.

Elsewhere, the actions that will take place during the second half of the year were unveiled, including several business delegations and the tech-

nological delegation to Japan that MAFEX will spearhead together with CDTI and that will take place within the framework of the MASS TRANS INNOVATION JAPAN Event. Therein, the opportunity will be given to understand the local ecosystem of the country that supports innovation, receive real-time feedback on projects / prototypes / business plans, as well as exploring and meeting potential partners.

18 New Incorporations

It is noteworthy that within the framework of the annual General Meeting, companies that joined MAFEX since the General Meeting of the previous year were presented. These companies are: Cunext, Eurogestión, Forest Traffic, Grupo Trigo, Kimua, Mechanized Martiartu, Lander, Next Generation Rail Technology, Polar, Revenga, SDEA, Sigma Rail, Tria, Zeleros, Zitron and 3M Spain, all companies with headquarters or implementation in Spain that boast an important export component in railway materials. The association currently has 86 members, whose rail turnover in 2018 amounted to more than 5 billion euros, of which 80% resulted from foreign markets, and who employ more than 24,000 people.

Mafex unveils the RailActivation project

On June 26th, MAFEX submitted the project entitled RailActivation in the Kick-Off Meeting held by the European Commission. The project named RAILACTIVATION is framed within the H2020 invitation to bid, as part of the working programme for innovation in Small and Medium Sized Companies. The project, coordinated by MAFEX, in collaboration with TECNALIA, DITECFER, BTS and QUINN has as its main aim the creation and spearheading of an



entrepreneurial and organisational scheme for the adoption of innovation-based strategies in the SME workplace, using the open innovation approach.

Two other financed projects were also submitted during the meeting, alongside RailActivation, with the aim of seeking out synergies between the different initiatives unveiled.

Mafex participates in the business meeting with the infrastructure development minister of the United Arab Emirates, Abdullah Belhaif Alnuami in CEOE

On the occasion of his visit to the offices, the Minister of Infrastructure Development of the United Arab Emirates (UAE), Abdullah Belhaif Alnuami, presented the business and investment opportunities of the existing infrastructure sector in this country,

during a business meeting held on July 12 at the headquarters of the Spanish Confederation of Business Organisations (CEOE).

The Secretary of State for Commerce, Xiana Méndez; the President of CEOE, Antonio Garamendi, and the

Managing Director of the Chamber of Commerce of Spain, Inmaculada Riera took part in the event. The new UAE ambassador to Spain, Majid Al-Suwaidi, Víctor Ruiz, president of MAFEX together with Julián Nuñez, president of Seopan also took part, offering a presentation of the infrastructure and railway sector in Spain for the benefit of the institutional delegation and the more than 100 most important Spanish companies related to the infrastructure sector.

Abdullah Belhaif Alnuami, praised the organisation of these bilateral meetings that allowed him to learn first-hand about the ongoing projects and enhance technological and industrial cooperation between the two countries.



Agreement between the Central American Bank for Economic Integration and MAFEX to promote and support the internationalisation of the Spanish railway sector

On May 21, a meeting was held in Madrid between representatives of the Central American Bank for Economic Integration (BCIE), with its Executive President, Dante Mossi and MAFEX, led by its President, Víctor Ruiz, accompanied by BCIE representatives as well as members of the MAFEX steering committee, where a collaboration agreement was signed between the two bodies regarding cooperation and support in railway-based matters. In this way, the assessment, exchange and transfer of knowledge of the Spanish railway sector will be facilitated and promoted, thereby sharing extensive knowledge of the



Victor Ruiz, president of MAFEX and Dante Mossi, executive president of BCIE

Spanish railway industry due to its being a global benchmark, in order to collaborate in the Rail Infrastructure plans of the Central America region.

Within the infrastructure development plans, the Central American region aims, through the Central American Bank for Economic Integration, to boost the development of Central American countries through efficient rail transport. The purpose of the agreement is to establish general lines of collaboration between the Association and the Bank to promote and support the internationalisation of the Spanish railway sector, as well as to support and encourage collaboration in innovation and competitive improvement between the companies associated with MAFEX, the association itself and both bodies.

Mafex attends the UNIFE General Assembly in Dublin

MAFEX attended the UNIFE General Assembly, which this time was held in Dublin from June 12 to 14. The Dublin Declaration was signed at this year's Assembly to raise awareness amongst national and EU decision makers about the crucial importance of the railway industry for sustainable development on a worldwide level. That is why the EU and its Member States were urged to act in three areas: Implementation of the Technical Pillar of the Fourth Railway Package, for the promotion of the best Quality-Price ratio in public procurement and to ensure access to the global market. On the other hand, the extension of the Shift2Rail Programme for research and Innovation within the framework of Horizon Europe was requested and to finalise an EU initiative dedicated to improving the skills in the railway industry.

As on previous occasions, on the first day the different Committees and working groups were organised. Then, the assembly itself was held,

THE GENERAL ASSEMBLY OF THE ASSOCIATION OF THE EUROPEAN RAILWAY INDUSTRY (UNIFE), WAS HELD IN DUBLIN FROM 12 TO 14 JUNE. MAFEX, AS A UNIFE PARTNER, WAS PRESENT TO SUPPORT THE WORK AND ACTIVITIES OF THIS BODY.



where the different actions and milestones accomplished last year were unveiled. The second day was reserved for the organisation of forums, featuring high-level speakers such as Shane Ross, Minister of Tourism, Transport and Sports of Ireland, as well as Henrik Hololei, General Di-

rector of Mobility and Transport (DG MOVE) of the European Commission, alongside round tables. It should be noted that in this edition, Philippe Citroën, General Director of UNIFE, asked the European Commission to establish a European Digitisation Platform in the railway sector.

New MAFEX partners: SDEA Solutions y Composites Martiartu



SDEA Solutions

This is a technical consulting company specialising in providing engineering and design solutions for the railway sector, mainly in the fields of Energy and transport. It boasts a team of highly qualified engineers working in 3 main areas; Railway sector designs and projects in BIM for linear works; Advanced calculation and Simulation (FEA / FEM and CFD calculations); Process engineering and Thermo-mechanical designs.

MAFEX expands the number of partners with the incorporation of 2 new companies, thus totalling now 86 members.



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Mafex attends the Technical Committees of the Latin American Association of Metropolitan and Underground Railways



The city of Porto, Portugal, hosted the headquarters of the 24th edition of the Technical Committees of the Latin American Association of Metropolitan and Underground Railways (ALAMYS) from June 30 to July 4, whose general theme revolved around Asset Management: An effective process to maintain quality in terms of services. MAFEX had the opportunity to attend the opening ceremony followed by the launch of the ALAMYS Project Management Guide and the presentation of current and future

projects of the Porto and Lisbon Metropolitan Railways. Furthermore, a technical conference was also developed with the *Challenges panel to establish efficient asset management system in metros.*



New workshop on FeMale Voice in Mobility



On June 12, MAFEX participated in Madrid in a new workshop arranged by FeMale Voice in Mobility, an initiative that supports the Association and aims to promote the role of women in mobility. In addition, there was the presence of Ester Morales, Head of Business Development in Piperlab.

This new workshop is added to the previous one held in April and featured the collaboration of Ewa Widlak, consultant on gender and communication diversity, founder of Widlak Strategies.

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Director-General
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Dear Partners and Friends,

Since 2006, I have had the honour of chairing Mafex, an association that was ahead of its time and was able to meet the internationalisation needs of Spanish companies. I would like to highlight the fact that our association, which currently boasts 86 companies, accounts for 75% of our country's rail exports.

We have on-hand powerful tools: the active participation of our partners, the steering committee, the communication committee, the internationalisation committee, the innovation committee and the Hyperloop observatory. Likewise, the acknowledgment of our regional, national and international administrations to which we thank for all their support during these year.

With verve and enthusiasm, our shared project came into being 15 years ago.

Without overlooking the strategic axis of internationalisation, many other wishes have also been included, thus adding and improving on approaches and focus, so that what we have today has been

accomplished: The Spanish Railway Association. Each step has been a victory on our path, thanks to the efforts of everyone involved.

Of course, our ambition and drive does not stop here, we are developing major scale new projects, always thinking about what are our partners and companies may need: greater representation, more scope of influence, thus becoming a breeding ground for ideas and development, contributing to our sector and Spanish companies spearheading in industrial and research terms on a worldwide level.

Mafex has been able to position itself at the fore as a benchmark for national and international administrations, thanks to its good endeavours, collaboration and continuing exchange of knowledge and information.

I am sure that within another 15 years, on our 30th birthday, we shall once again look back and see equally spectacular progress like that achieved in our first 15 years.

I wish you all my very best, especially MAFEX's workers, without whom none of this adventure would have been possible.

15th Anniversary: An association focused on boosting and bonding of the railway sector

The Spanish 15th Anniversary: An association focused on boosting and bonding of the railway sector Railway Association (MAFEX) celebrates its 15th Anniversary. It was in the summer of 2004 when Fundigex-Spanish Association of Foundry Exporters, an association belonging to Grupo AGEX, a federation to which MAFEX belongs, promoted the creation of an association of exporters in which to group the interests in terms of promotion foreign and internationalisation of companies in the rail sector. In its start-up, the backing and cooperation of ICEX, España Exportación e Inversiones was also vital.

The companies that formed that first committee were: AceraliaGrupo Arcelor, EA Technology Global Amurrio Ferrocarriles y Equipos, Felguera Melt, Fundiciones Garbi,

MAFEX ENJOYS 15 YEARS OF INTENSIVE ACTIVITY AS A REFERENCE ASSOCIATION FOR AN INNOVATIVE AND CUTTING-EDGE INDUSTRY WITH INCREASING PRESENCE WORLDWIDE.

Getinsa, Guivisa, Hicasa, Ineco-Tifsa, ITK Ingeniería, Jez Sistemas Ferroviarios, KLK Electro Materiales, La Farga Lacambra, Metalocauchos, Redalsa and Talleres Alegría. Furthermore, there was the unwavering support of RENFE who was also present at that first constituent assembly.

The Path to Internationalisation These sixteen companies embarked upon, on September 16, 2014, their path to boost the internationalisation of the Spanish railway sector. An arduous journey in which MAFEX has become, today, the main representative of a leading industry, with

major external presence and a reputation acknowledged worldwide for its high technological capacity, specialisation and know-how. MAFEX, which was created under a scenario of large railway investments in Spain, has shifted in 15 years from that small number of founding partners to 86 members, a figure that serves to verify the success of that initiative to foster movement into foreign markets.

MAFEX today Currently, the association has 86 members, with its companies moving from a turnover of 181 million in 2004, to more than 5 billion euros

in 2018. Furthermore, they represent 75 of the Spanish railway exports and are present in more than 90 countries where they have developed more than 1,000 transport projects. MAFEX's mission is to serve all of partners and the Spanish railway sector by helping their companies in their internationalisation processes and defending their general interests to achieve, in cooperation, the highest possible level of competitiveness of the same. The high level of qualification, experience in special projects and the in-house knowledge has led to this industry becoming the chosen partner in the plans for overhaul and expansion of transport networks of the five continents. The association includes small, medium-sized and large companies from all activity rail segments, as well as technological and university centres. MAFEX has managed to unify a thriving industry, responding to the needs and demands of the associated companies. Hence, together with the launch into foreign markets, specialist services have been incorporated into fields of special relevance such as competitiveness and innovation to face new challenges such as digital transformation.

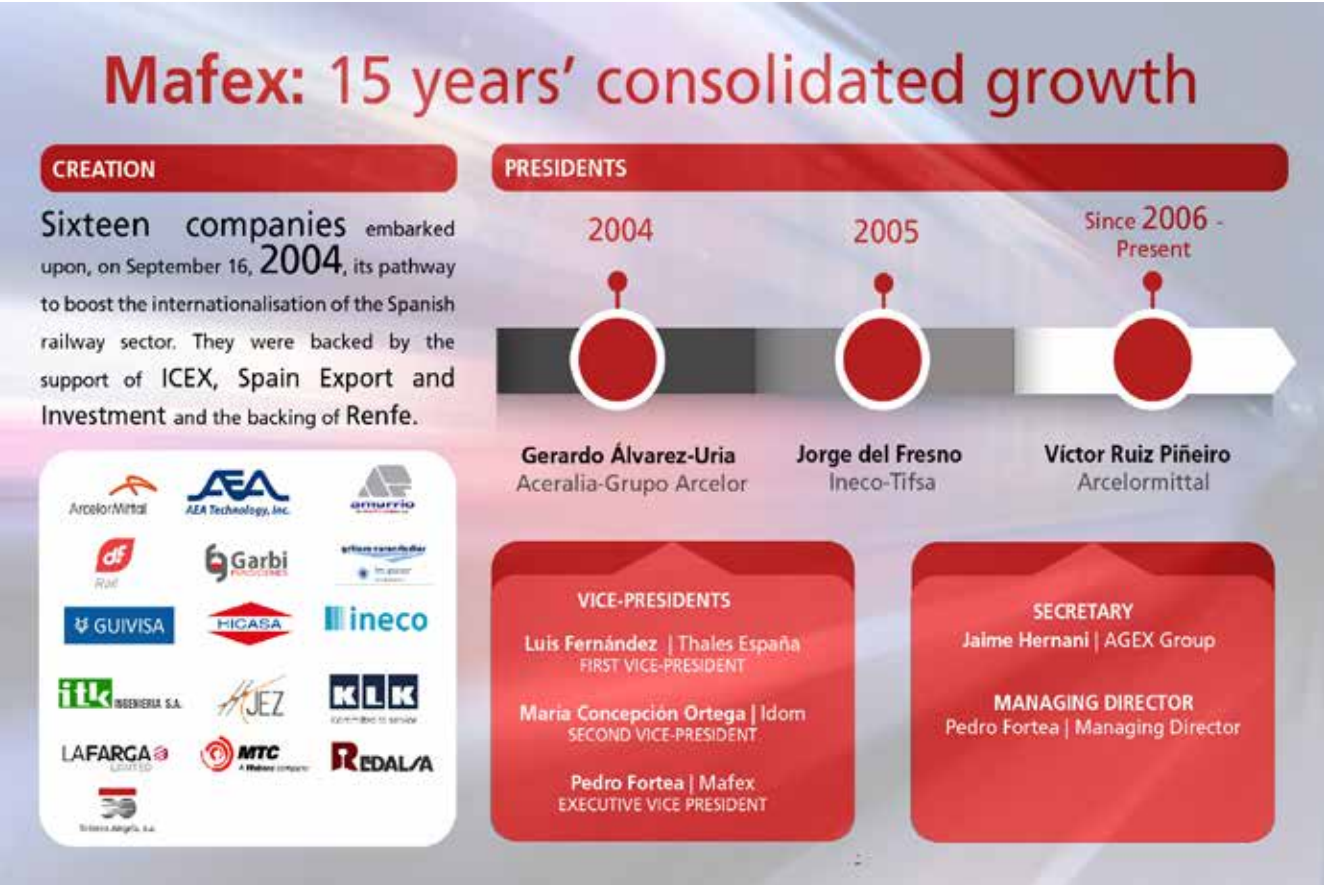
A track record of achievements Over these 15 years, highly positive results have been achieved. The association represents and promotes abroad an activity sector with a strong technological component.

MAFEX has facilitated access to 85 countries to the Spanish railway industry with the organisation of more than 190 foreign promotion actions in which more than a thousand companies have participated, also arranging visits to Spain for more than 175 company delegations, administrations and organisations all over the world. The association has also launched numerous initiatives such as the preparation of the 7th International Railway Convention, in collabo-

ration with ICEX Spain Export and Investment, which this year has celebrated its seventh year in Malaga edición. It also co-organises the Rail Live! Trade Fair, alongside Terrapinn, a congress fair that moved its headquarters from London. This professional platform once again places the Spanish railway sector in a sectorial showcase of great relevance.

Activity areas The association's activity has similarly increased over the years and has gained weight in strategic areas. MAFEX provides a service according to the new needs of the members. These tasks are developed around four main axes: internationalisation, competitiveness and innovation,

institutional relations and strategic positioning and marketing and communication. In the field of **internationalisation**, actions focus on three sections. The first one called "Market intelligence and foreign promotion," The aim is to foster collaboration among MAFEX members and contribute to the identification of new business opportunities, thus bolstering the positioning of the sector. To this end, an intense Annual Activity Plan is drawn up that encompasses the organisation of direct commercial delegations, inverse missions, participations grouped in the main railway fairs worldwide, as well as the creation and implementation of in-house services. From the



second section devoted to Commercial Policy, it focuses on the special follow-up of current issues and impact on the industry in order to create new solid business opportunities and overcome trade barriers, where it is very necessary to closely observe the instruments of defence, also ensure effective protection of the sector's interests and thus avoid bad practices.

To this are added the work of **institutional relations** and **strategic positioning**. To boost the defence of the interests of the Spanish railway sector from MAFEX, it participates in various business and institutional forums such as UNIFE (Association of the Rail Industry European) or CEOE (Spanish Confederation of Business Organisations). Furthermore, there is the official recognition of the Secretary of State for Foreign Trade of the Ministry of Industry, Commerce and Tourism as a collaborating association of the Ministry in internationalisation matters, or by the Basque Government and SPRI as a railway cluster. Likewise, collaborations are maintained with the Ministry of Public Works, Renfe, Adif, the Foundation of the Spanish Railways, the Spanish Railway Technology Platform, ICEX or CDTI, amongst others. On the international stage, cooperates with UITP (International Public Transport Union) and with Alamys (the Latin American Association of Meters and Undergrounds).

Another of MAFEX's key areas focuses on **"competitiveness and innovation"**.

The association acts as a facilitator of activities to achieve more competitive, innovative and technologically advanced companies.

Therefore, it is committed to a formula and cooperation between companies. In this way, progress is made on issues of special relevance such as the work groups that aim to enhance the competitive improvement of the partners, mainly in terms of sustainability, multimodal



logistics, Smart Mobility, eco-design, Industry 4.0, Predictive Maintenance and Security.

Collaboration between academia and the industrial sector is promoted, making a continuous approach to universities and technology centres, as well as to start-ups with technology that can be applicable in the sector. As well as technological surveillance with the identification of strategic projects fostering the participation of partner companies in R&D projects collaboratively.

Finally, in terms of **marketing and communication**, strategies are established to disseminate the capabilities of the partners and the Spanish railway sector. For this reason, different channels and tools such as MAFEX magazine have been designed, which has become a link of international dissemination with a sizeable following in the sector, reaching more than 6,000 subscribers and with online and print edition. Alongside this, presence in social networks, the corporate website or different is worthy of special mention, thematic newsletters and special interest pieces.

Additionally, different sector reports are published annually, based on statistical data, positioning notes and topics of special interest.

Defence of the railways

The role of general defence of the railways is another of the main aims. The association works on the pro-

motion of this medium for its clear advantages in terms of sustainability, capacity and safety, amongst other aspects.

For this reason, from within MAFEX, it is insisted that only by promoting the railway sector as a backbone of national transport and sustainable mobility policies, the environmental aims set out by the European Union and widely assumed by the international community can be achieved.

With this in mind, the association stresses that, in order to continue promoting it, strong support from the Public Administrations is required and requests a commitment and political consensus from the State to define an investment plan, in the long-term, based on a global and stable transportation strategy. This road map should not be modified by economic cycles or by political changes; nor should it affect projects and tenders already underway.

A future filled with challenges and opportunities

MAFEX's pathway advances with highly defined aims. Over the forthcoming years, work will continue on an intense annual activity plan in order to promote worldwide a driving sector of the economy and technological symbol, defending thus its interests and helping in the new innovation scenarios arising, along with the challenges of digital transformation. 🚂



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The importance of Mafex

The association receives congratulatory messages for its 15 year career path



► **Isaías Táboas Suárez**
President of Renfe

"From within Renfe, we firmly believe in the importance of having the existence and experience of an association such as MAFEX, which defends and supports the external activity of the Spanish railway industry.

Throughout these 15 years, MAFEX has demonstrated great efficiency representing the sector worldwide, having been able to adapt to the evolution that the industry itself has experienced, contributing to undertake significant improvements for the Spanish railway sector, both in Spain and abroad.

For Renfe, which has one of its fundamental strategic pillars in internationalisation, collaboration with MAFEX and Spanish companies abroad is an excellent formula for exporting knowledge of a leading railway industry in the world."



► **Philippe Citroën**
General Director of UNIFE

"From within UNIFE we congratulate Mafex on its 15th anniversary and wish to highlight its commitment to the development and promotion of European railway equipment and standards at international and European level.

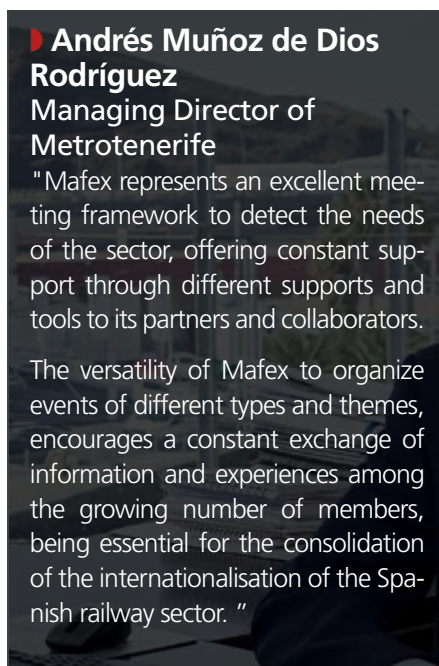
Mafex has become in these years a fundamental member of UNIFE, actively collaborating in the international promotion and the increase of the competitiveness of the suppliers of railway solutions."



► **José Carlos Domínguez Curiel**
Managing Director of the Railways Foundation

"Mafex is synonymous with success and its three five-year periods of experience, not coincidentally, coincide with the greater development and projection of the Spanish railway sector in its history, which places our companies and Spain in a position of undoubted international leadership.

I wish to stress in these lines an essential value in any project and that from the Railways Foundation we observe in Mafex: the professional and human quality of the team that comprise it, a basic and fundamental element in any successful experience. Congratulations Mafex."



► **Andrés Muñoz de Dios Rodríguez**
Managing Director of Metrotenerife

"Mafex represents an excellent meeting framework to detect the needs of the sector, offering constant support through different supports and tools to its partners and collaborators.

The versatility of Mafex to organize events of different types and themes, encourages a constant exchange of information and experiences among the growing number of members, being essential for the consolidation of the internationalisation of the Spanish railway sector."



► **Antonio Garamendi Lecanda**
President of CEOE

"First of all, I congratulate Mafex for its 15th anniversary at a time when the railway sector in Spain is becoming increasingly significant. It contributes to the improvement of the country's economic competitiveness and supports the development of the activity in sectors such as industry, commerce and tourism, among others. In this sense, it marks one of the flagship references in infrastructure in Spain.

Furthermore, Spanish railway companies boast extensive international experience, along with the field of innovation too. This makes the Spanish railway industry a benchmark worldwide. Spanish companies forming the sector participate intensely in the major infrastructure works that are being carried out in many countries of the world, contributing their great skills, experience and mastery of new technologies.

We are facing one of the sectors whose companies have best managed how to evolve into a global business model. This is down to, mainly, continuous innovation. And Mafex must be proud of all these achievements."

in the railway sector



► **Isabel Pardo de Vera Posada**
President of ADIF

"The investment effort of Spain in recent years, has resulted not only in the improvement of our infrastructure but also in the development of a powerful Spanish railway sector, which successfully participates in projects on five continents.

We would like to take advantage of Mafex's 15th Anniversary to congratulate the Association and its member companies for the relevant successes accomplished during this time and we encourage them to continue promoting the internationalisation of the sector, an aim in which they will continue to enjoy ADIF's support."

► **Eduardo De Montmollin**
President of Alamys

"Currently, ALAMYS has a cooperation agreement with Mafex that strongly bolsters relations between the metropolitan railway world of Latin America and Spain.

We have witnessed the strident efforts by Mafex to position itself in the different international markets of our area, and therefore we are proud to be associated to the proliferation of greater and improved rail transport projects in our region. Congratulations Mafex, on your 15th anniversary!"





Bilateral meetings.

Positive appraisal of the 7th MAFEX International Railway Convention

Malaga was the chosen location of MAFEX's "7th International Railway Convention". A professional meeting on a global scale that has become a flagship event in the Spanish railway sector. Once again, the industry has welcomed this biennial initiative that has brought together delegates from 30 countries and more than 120 senior officials from Spanish companies and organisations.

The opening ceremony featured the president of MAFEX, Víctor Ruiz; and the Secretary General of Infrastructure of the Ministry of Public Works, Julián López Milla; the Secretary General of Infrastructure,

ONCE AGAIN, THE INDUSTRY HAS WELCOMED THIS INITIATIVE HELD ON A BIENNIAL BASIS IN A HIGHLY POSITIVE MANNER THAT BROUGHT TOGETHER DELEGATES FROM 30 COUNTRIES AND MORE THAN 120 SENIOR POSTS IN COMPANIES AND ORGANISATIONS FROM ALL OVER SPAIN.

Mobility and Land Management of Andalusian Regional Government, Andrés Gutiérrez and the Managing Director of ICEX, Javier Serra.

After welcoming all participants, Ruiz highlighted the high degree of internationalisation of the sector and its effect on society, the economy and employment. Although, he did point out that to be able to overcome these challenges "we must be equipped with the tools that allow

us to put together stable and long-lasting investment plans that are not affected by political changes or economic cycles. All of the foregoing, with a clear backing for innovation and promoting internationalisation under conditions of equality and reciprocity when competing abroad."

On behalf of the Ministry of Public Works the Secretary General of Infrastructure, Julián López Milla, valued during the opening session the

vast experience and development of the Spanish railway network, particularly in terms of high-speed rail, and expressed full institutional support to the national railway industry, highlighting its knowledge, competitiveness and innovation.

Furthermore, the Secretary General explained the Ministry's commitment to mobility, understood as a right, with an approach based on safe, connected and efficient mobility, and that places the citizen at the centre of all decision-making processes. Finally, he highlighted the important role of companies and institutions in the sector in the face

The convention represented an opportunity to take the pulse of the sector and open new business opportunities abroad.



Opening ceremony 7th International Railway Convention.



Technical visit Malaga - María Zambrano train station.

of aspects such as the new safety culture and the upcoming deregulation of national passenger services in the European context, and stressed that the railroad is experiencing a historic moment driving it towards the improvement of competitiveness, in which professionals in the sector perform fundamental tasks.

During his speech, the Secretary General of Infrastructure, Mobility and Land Management of the Regional Government of Andalusia, Andrés Gutiérrez, indicated that sustainable mobility is one of the main priorities of the new Transport and Mobility Infrastructure Plan (PITMA) 2021-2027. In this programme, he explained, the railway is set to play a starring role. Among the key projects are the impulse to the metropolitan railway networks of Granada, Malaga and Seville, as well as the start-up of trams such as Alcalá de Guadaira, Jaén and Bahía de Cádiz. Cádiz. This is coupled with coordination with

other institutions to continue advancing in the field of high speed and freight transport.

In turn, the Director General of ICEX España Exportación e Inversiones, Javier Serra, placed the spotlight on the high technological capacity of Spanish companies, which stand at the fore as world leaders in railway matters. From this body, he added, highly diverse actions are carried out to identify projects and business opportunities, as well as to support companies in the international market.ior. Amongst these initiatives are seminars, trade missions, presence in trade fairs, market studies etc. He also stressed the importance of "the close collaboration"

that exists with MAFEX to help the sector in its international presence.

A wide-ranging outreach programme of technical seminars and congress sessions

As on previous occasions, the convention represented an opportunity to take the pulse of the sector and open new business opportunities abroad. All of the foregoing, in a format of technological knowledge with an extensive programme of technical seminars held by some of the participating Spanish railway companies and congress sessions carried out by international delegates. Amongst the Spanish companies that gave a presentation at the technical seminars during the days

of the convention, ArcelorMittal, CAF, Ceit-Ik4, Indra Sistemas, Ingenium Power Technology, Inse Rail, Jez Sitemas

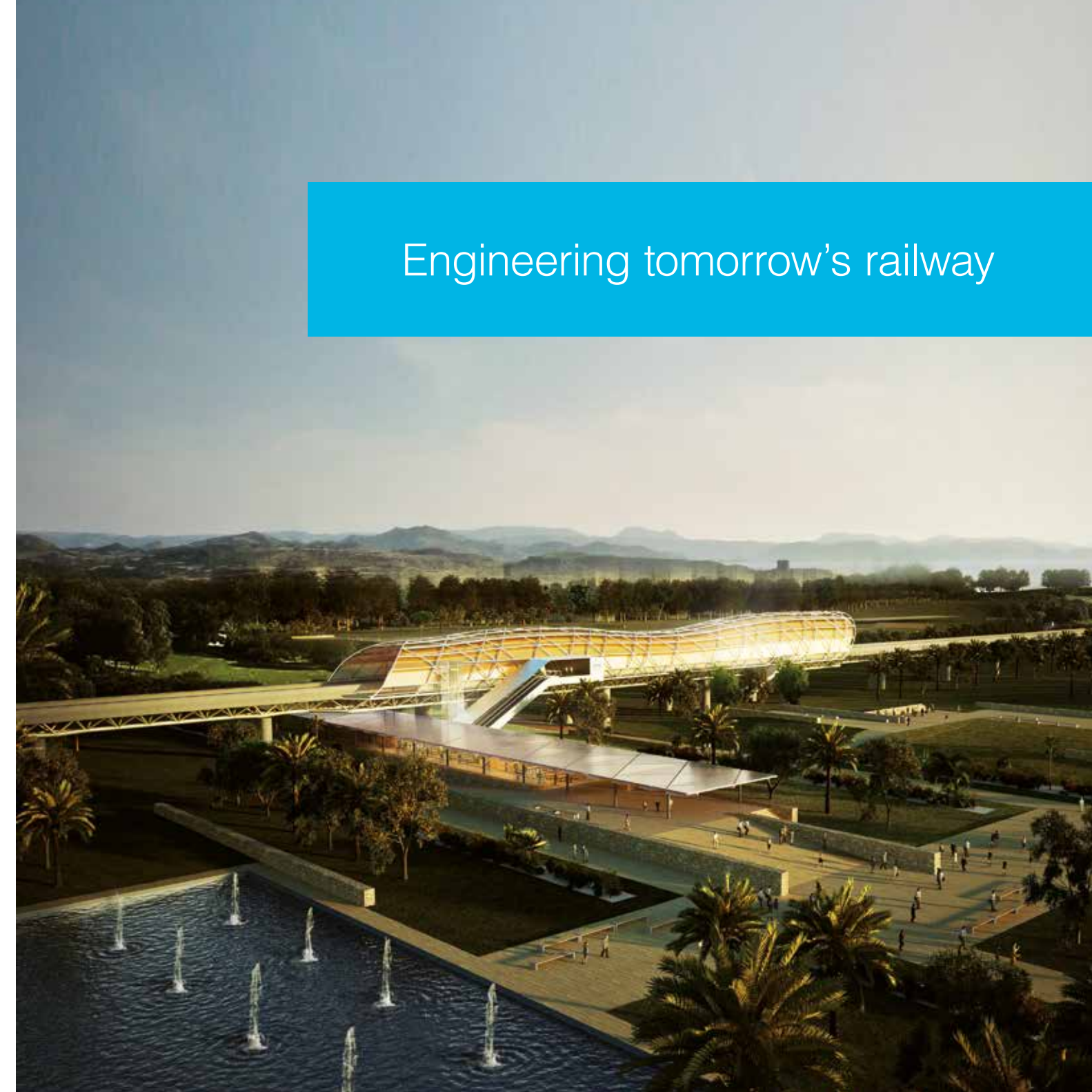
Railways, La Farga YourCooper-Solution, Nem Solutions, Ogi Axle, Talgo Patents and Telice. All of them provided a good sample of the technological advances developed by the industry associated with MAFEX, as well as its extensive international implementation as a benchmark in R&D in large-scale and complex railway projects.

Elsewhere, amongst the international organisations able to present the status of their projects during the congress sessions, were: Banedanmark (Denmark), Go Ahead (United Kingdom), HS2 (United Kingdom), New Transit Department Seoul Metro (Korea South), Transportation Master Plan Team "JTMT" (Israel) and West Midlands Metro (United Kingdom).

Bilateral meetings

In parallel, during the days of the event, more than 550 individual

During the event, more than 550 individual meetings were held between the 50 foreign guests and the 120 representatives of the 40 Spanish companies and organisations.



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meetings were held between the 50 foreign guests and the 120 representatives of the 40 participating Spanish companies and organisations, with the aim of bolstering commercial ties and exploring opportunities for cooperation. The working programme also included a technical visit to Malaga Metro and a trip by AVE to Cordoba, with a tour beforehand of the Malaga María Zambrano AVE station. In addition, after the three days of conferences in Malaga, international participants had the opportunity to move around different cities and view first-hand more centres and

facilities of the main railway companies in the sector.

Extensive institutional support

The seventh edition of the event was bolstered by the collaboration of numerous institutions and agencies, to which the organisation was thankful for the unwavering support offered. Amongst them, Icx España Exportación e Inversiones, Ministry of Public Works, ADIF, RENFE, Andalusian Regional Government, Metro de Malaga and Eurif. The companies sponsoring the event also deserve special mention: CAF and Zitron.

The seventh edition of the event was widely supported by numerous institutions and organisations.



Technical Visit to the Malaga Metropolitan Railway.



In the image, a moment of the technical sessions.

PARTICIPATING INTERNATIONAL ORGANIZATIONS		
COUNTRY	COMPANY	POSITION
ARGENTINA	Supercemento	Construction Manager - Railway Division
AUSTRALIA	Downer Edi	General Manager Engineering TLS
BRAZIL	Metro Rio	Maintenance Director
BULGARY	NRIC-National railway infrastructure company	Head of Project Preparation Department
CHINA	CRRC Qingdao Sifang	Deputy Chief Engineer
CHINA	CRRC Qingdao Sifang	Principal Designer
CHINA	CRRC Qingdao Sifang	International Relations
COLOMBIA	ANI - Agencia Nacional de Infraestructuras	Port and Railway Transport Manager
CZECH REPUBLIC	Czech Railways	Director of the Department of Rolling Stock
CZECH REPUBLIC	Czech Railways	Manager - Traction Rolling Stock Maintenance Department
DENMARK	Banedanmark	Programme Director
EGYPT	GIECO - Gharably Integrated Eng. Co.	Business Development Associate
EGYPT	GIECO - Gharably Integrated Eng. Co.	Chairman
EQUATOR	Ministerio de Transportes	Director - Railway Transport
GREECE	Attiko Metro	General Director
ISRAEL	JTMT - Jerusalem Transportation Master Plan Team	CEO
ISRAEL	JTMT - Jerusalem Transportation Master Plan Team	Financial Adviser
JAPAN	Nippon Sharyo	Supervising General Manager - Purchasing Department - Rolling Stock Division
JORDAN	Ministry of Transport	QAIA Project Management Unit (PMU)
LITHUANIA	JSC Lithuanian Railways	Deputy CEO - Director of Railway Infrastructure Directorate
PERU	CONCAR	Logistic Coordinator
PERU	Ministerio de Transportes	Vice Minister
OLAND	NEWAG	Technical Manager
PORTUGAL	Metropolitano de Lisboa	Maintenance Director
ROMANIA	Softronic	IWE/EWE Engeneer- Head of Welding Department
SAUDI ARABIA	GCC SG	Director of Transport Dept.
SENEGAL	ANCF	Technical Manager
SERBIA	PUC Belgrade metro and train	Execective Director for Transport
SERBIA	PUC Belgrade metro and train	General manager
SERBIA	PUC Belgrade metro and train	Executive Director for infrastructure
SINGAPUR	LTA - Land Transportation Authority	Senior Group Director Rail
SINGAPUR	LTA - Land Transportation Authority	Project Manager (Systems, Infrastructure and Operations)
SOUTH KOREA	Hyundai Rotem Company	General Manager of Rail Procurement Team 2 (Overseas)
SOUTH KOREA	Seoul Metro	Team Manager / New Transit Department
SOUTH KOREA	KORAIL	Deputy General Manager - Contract Cooperation Dept.
SOUTH KOREA	KORAIL	Director - Contract Cooperation Dept.
SOUTH KOREA	KORAIL	Direct Puurchasing - Contract Cooperation Dept.
SOUTH KOREA	KORAIL	Manager - International Cooperation Dept.
SOUTH KOREA	Woojin Industrial Systems Co.	Overseas Sales Division II
TAIWAN	Tainan Rapid Transit Office of Tainan City Government	General Director
THAILAND	SRT - State Railway of Thailand	Superintending Engineer
THE PHILIPPINES	PNR - Philippines National Railways	Chief Planning Officer
TURKEY	Tulomsas	Head of R&D Department
TURKEY	TCDD	Locomotive Maintenance Workshop Manager
UNITED KINGDOM	HS2	Supply Chain Manager, Rolling Stock
UNITED KINGDOM	West Midlands Metro	Metro Programme Director
UNITED KINGDOM	Go Ahead Group	Head of Fleet
USA	Hyundai Rotem USA Corporation	Managing Director / Director of Procurement, Projects & Business Development
UZBEKISTAN	Uzbekistan Railways	Logistic a Public Purchasing Department
UZBEKISTAN	Uzbekistan Railways	Economic Analysis Department

How would you assess the



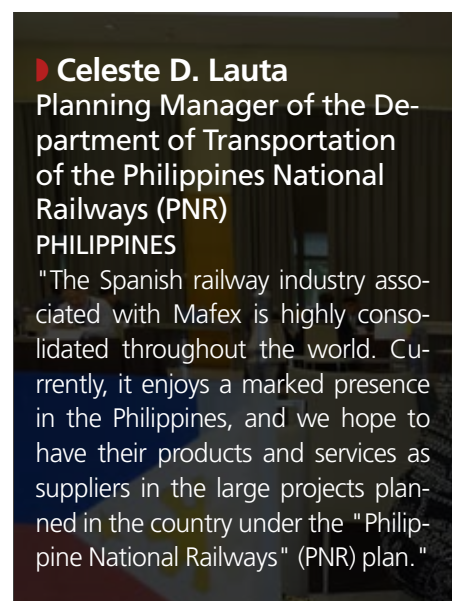
► **Carlos Estremadoyro Mory**
Peruvian Deputy Transport Minister
PERU

"The Spanish railway industry is very consolidated, not solely in the sphere of infrastructures, but also in aspects involving technology and management, as can be clearly seen in Peru. This progress is somewhat significant in its ability to develop new projects, as what is sought in these cases is comprehensive accompaniment between aspects. In addition, there is a special bond thanks to the affinity we have with Spain, along with the language, which facilitates collaboration with the industry, as well as with MAFEX's partners, which has proven itself to be cutting-edge."



► **Abeer M. Abdelwahab Khanfar**
QAIA Project Management Unit (PMU) of the Ministry of Transport
JORDAN

"Spain has a highly advanced railway industry with widespread experience and cutting-edge solutions. We hope to be able to turn to its companies in the major construction project involving the freight transport network that we have planned in Jordan."



► **Celeste D. Laut**
Planning Manager of the Department of Transportation of the Philippines National Railways (PNR)
PHILIPPINES

"The Spanish railway industry associated with Mafex is highly consolidated throughout the world. Currently, it enjoys a marked presence in the Philippines, and we hope to have their products and services as suppliers in the large projects planned in the country under the "Philippine National Railways" (PNR) plan."



► **Jesús Lugmaña**
Head of Railway Transport at the Ministry of Transport and Public Works
ECUADOR

"Spanish history in railway transport for us is a model to follow and implement in Ecuador. The services provided are highly efficient, both for passenger, as well as freight rail. The companies associated with MAFEX stand out for their specialisation. They perform wholesale accompaniment tasks ranging from the design, construction and operational stages. They have wide-ranging experience that has spread internationally and ability to adapt to the specific requirements of each country, alongside the needs of each project."



Spanish railway industry?



► **Sandra Rueda**
Railways and Port Manager of the Deputy Presidency of Structuring at the National Infrastructure Agency (ANI)
COLOMBIA

"The Spanish railway sector is very sturdy. We know it well as it has already been involved in wide-ranging experience in the development of certain transport projects in Colombia. It has forged a noteworthy path in our country and boasts competitive companies who are well aware of our needs, as well as the technical conditions demanded. MAFEX's partners can offer very good conditions in terms of products and services."



► **Jan Erik Scheider-Tilli**
Programme Director of Banedanmark
DENMARK

"I am suitably impressed by the major strides the Spanish railway industry has made since the eighties. The high-speed network that it has developed its industry is a major infrastructure with remarkable benefits for passengers. It is also relevant from an environmental viewpoint, since it contributes to a more sustainable transport model. With regard to its business network, I have had very positive experiences working with the Spanish sector associated with Mafex. Together with ADIF, we have collaborated with Spanish engineering on large projects in Denmark with highly satisfactory results."



► **Baba Diankha**
Technical Director of the Agence Nationale des Chemins de Fer (ANCF)
SENEGAL

"I had the opportunity to attend the Mafex International Railway Convention and discover a deep-rooted industry with solid experience. In Senegal, Spanish companies are already operating, and we hope that this collaboration will continue in forthcoming years."



► **Sim Wee Meng**
Senior Group Director of Rail Land Transportation Authority
SINGAPORE

"I think Mafex's Spanish railway companies have improved greatly in recent years and have earned well-deserved international recognition around the world. For example, in terms of signalling systems, in Singapore we have been working with them for a long time and I make constant trips to Spain to continue our joint projects. I also think that Spanish engineers are excellent professionals, highly qualified and operating to the very highest standards."





Alstom and Fundación ONCE will work together to improve accessibility in transport

ALSTOM SPAIN
Alstom and Fundación ONCE have signed a collaboration agreement to improve universal accessibility in transport and achieve full inclusion of people with disabilities.

Alstom and Fundación ONCE commit to promote accessibility in design projects and create solutions “that improve usability and comfort for people with disabilities or for the senior population in transport”. For this reason, Alstom will promote universal accessibility in all its products and services. Alstom will also participate in R&D projects that aim

to provide added value for people with disabilities or with special needs. Likewise, Fundación ONCE and Alstom shall promote Smart Mobility, aligned with the Smart City concept, which places people at the centre of the ‘smart’ developments in order to provide solutions adapting to their needs.

Ardanuy Ingenieria, selected for the Safety Works’ Technical Assistance Contract in La Sagrera and Sant Andreu

ARDANUY INGENIERIA
Ardanuy Ingenieria, in Consortium with GPO Ingenieria y Arquitectura, has been awarded the Technical Assistance Contract for the Railway Safety and Communications Facilities’ Works belonging to the Conventional Network Lines in the towns of La Sagrera and Sant Andreu. The 2.3 million euro contract also consists of the provisional high-speed parking area tracks in Sant Andreu. Works will include both the provisional and final stages. The works carried out will involve the Railway Signalling and Communica-



tions Facilities for the future intermodal station in La Sagrera as well as the parking area of the Sant Andreu Comtal High-Speed Line. The new station located in La Sagrera will provide service to the High-Speed Line

Madrid-Zaragoza Barcelona-French Border and two conventional lines: Barcelona – Mataró and Barcelona – Granollers. These conventional lines will be relocated to the interior of the station.

Bombardier Spain update Lima Metro signalling system

BOMBARDIER SPAIN
Bombardier successfully updated their system CITYFLO350 in Line 1 of the Lima Metro, allowing them to raise their daily traffic from 320.000 to 500.000 commuters. The Rail Control Solutions team (RCS), located in the Center of Excellence of San Sebastian de Los Reyes (Madrid, Spain), lead the project engineering the product and managing the supply chain. The implantation of the project, that last 24 months, included the development of optimized and adapted software that meets the operator needs, the installation of new rail circuits, switches, signals, beacons, etc; the supply of signalization equipment for 20 metro trains and training at management



and maintenance for the workers. The San Sebastian de Los Reyes center is the main provider for Bombardier’s business in Latin Ame-

rica, and they have also developed systems for Madrid’s, Barcelona’s, Bilbao’s or Seville’s Metros, among other projects in Spain.



CAF wins driverless trains contract in London

CAF
CAF has been awarded the contract to design, manufacture and supply a fleet of 43 trains for the Docklands Light Railway (DLR) by Transport for London (TfL). The units will be composed of 5 cars

and they will provide a number of significant improvements for passengers. This includes the latest audio and visual real-time travel information, air conditioning, mobile device charging points, multi-use areas - which can accommodate pushchairs, bicycles and luggage - and dedicated wheelchair spaces.

It is estimated that the new trains will begin service with passengers in the year 2023. Thirty-three trains will replace DLR’s oldest rolling stock which is nearly thirty years old and 10 will increase frequency and capacity across the network.

CAF Signalling is awarded the construction of four new tracks and a new electronic interlocking system in Madrid

CAF SIGNALLING

Adif has awarded CAF Signalling, as part of a Joint Venture with Sacyr Neopol, the works for the construction of four new tracks, suitable for trains measuring 750 m, for the reception and issuance of trains, along with a new electronic interlocking system forming part of the south technical bundle of the freight railway terminal Madrid-Vicálvaro. The contract's value stands at 18,744,925.9 €.

The project's aim is the remodelling of one of the strategic points on the Spanish logistics map and the one which articulates the entire freight distribution network throughout the country, serving as a connection between Mediterranean and Atlantic corridors. The Madrid-Vicálvaro terminal offers the greatest potential, thanks to its location in the articulator node of both corridors. CAF Signalling will be entrusted with the installation of the QUASAR S3e electronic interlocking system, which is grounding for the company's signalling solutions. At the forefront in the application of standard EN-50126 and other derived regulations, the system has evolved toward the support for new functional aspects, such as the integration of LEU and compatibility with ETCS systems.



Instrumented Wheelsets in CETEST.

Important new contract award

CETEST

Recently CETEST has formalized two important contracts with the Indian company RDSO (Research Designs & Standards Organisation), research agency under the Ministry of Railways.

In the first case, CETEST will provide RDSO with its support and

know-how for the migration of the current Indian standards to European standards. To this end, several theoretical trainings have been established based on the current EN14363 standard. Likewise, RDSO will be provided with two instrumented wheelsets. Specific training will be provided for its use, which includes the execution of a testing campaign.

In the second case, CETEST will supply RDSO with a total of 10 instrumented wheelsets for 5 types of vehicles (two wagons, two e-locomotives and one passenger car). This collaboration reinforces the role of CETEST as one of the few suppliers of instrumented wheelsets in the world, with an average instrumentation and calibration of 30 instrumented wheelsets per year.

COMSA awarded with a new Project in Sweden

COMSA

The public transport administration of Sweden Trafikverket relies again on COMSA to execute the design and build project "Väg 261 Ekerövägen E1: Tappström-Lindötunneln". It includes the demolition of a 160-meter-long viaduct and its replacement with a new one of 120 meters. The new structure will have 4 spans of which one is a turning steel section, to allow the boat traffic on the Tappström.

In addition to the bridge, 2,3 km of the road between the municipalities of Ekerö and Lindö, in the southeast of Stockholm, will be upgraded. In detail, this includes the doubling from one to two lines in each direction, comprising also the relocation of an existing roundabout.

On Thursday, 27th of June, the official contract signature event took place in Stockholm between Trafikverket, COMSA and Yapi Merkezi.



In the center of the photograph, the representatives of Yapi Merkezi, COMSA and Trafikverket, Özge Anıoğlu, Pedro Miguel Rivero and Per Ling-Vannerus.

kezi. COMSA was represented by its Director of Development, Contracting and Estimate Pedro Miguel Rivero.

Cunext Copper industries introduces at railway sector

CUNEXT COPPER

Cunext Copper Industries is a company specialized in half-finished copper production and micro alloys as well as copper, bronze and aluminum cables. It locates production at headquarters of Cordoba and also subsidiaries on Vitoria and Brescia, and it has consolidated as one of the principal European producers of copper and aluminum.

In the way of constant innovation and continuous improvement, the business group has made a firm commitment for producing railway cables. Starting the activity on casting own raw materials and its micro alloys, it vertically integrates on the total production phases.

Cunext produces copper cables, bronze and high performance contact wire applied to different speeds from local transport and railway conventional lines to high



speed. Aluminum steel cables for high energy transmission capacity completes product range and turns Cunext into one of the unique European producers of copper and aluminum cables for railway application.

The experience demonstrated during more than 100 years of activity, the consolidation on export markets and the strong investment on most modern technology makes Cunext the ideal partner for railway overhead contact line installers.



Forest Traffic has integrated the splitting control system GRE-CON UPU 6000 into its Quality Management Process
FOREST TRAFIC
According to its Quality Plan (2017-2021), Forest Traffic has integrated

the splitting control system with ultrasound GRE-CON UPU 6000 into the production of every no honeycomb panel involved in Rolling Stock projects. This control is implemented to every panel and it is repeated after

the gluing of any coating (interior or exterior) included to improving the physio-mechanical specs of the panel. It guarantees the completeness of the gluing process in the board.

Patentes Talgo and Geminis Lathes sign a commercial partnership agreement
GEMINIS
TALGO and GEMINIS consolidate, extend and formalize their commercial collaboration with the signing of an agreement with the aim of completing the range of machinery required in railway maintenance workshops. The two companies develop and manufacture comple-

mentary products, in the case of TALGO, underfloor wheel lathes, and in the case of GEMINIS, surface lathes, which enables collaboration to offer complete solutions consisting of different machines for train maintenance workshops. In the words of Mr. Josu Unzueta, General Manager of GEMINIS, "both companies have a complementary product, which in no case is a competitor and which has the same end customer: the train maintenance workshops". From TALGO, its Maintenance Equipment Director, Mr. Jesús Aranda, points out "the magnificent relationship

maintained over the last few years between the two companies has led us to collaborate at specific times, and we understand that it is a good time to strengthen the existing relationship and increase commercial collaboration".



Icon Multimedia improves the EMT Madrid passenger information system EMT Madrid
ICON MULTIMEDIA
The use of technology for the passenger transport services in the Smart Cities is increasing and continuing expanding.

The commitment of ICON Multimedia with the Digital Signage has permitted the implementation of its Passenger Information System, DENEVA, to EMT bus fleet. The software includes a precise times prediction system that takes the feedback from the vehicles GPS positions. Thus, the presented infor-

mation at the displays is accurate and useful. By integrating DENEVA with the Open Data platform of EMT Madrid, ICON Multimedia incorporates a new audio, warnings and incidences system, launching personalised messages and able to adapt depending on the next stop, time or day.



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-  Security and Communication systems for metro and railway infrastructures
-  Automatic Fare Collection
-  Railway Signalling

Idom will design 344 km of Rail Baltica project

IDOM

Rail Baltica is the greenfield rail transport infrastructure project that will integrate the Baltic States (Lithuania, Latvia, Estonia), Poland, and indirectly Finland into the European rail network. For this challenge, IDOM has been awarded five out of the seven contracts to design Rail Baltica main line in Estonia, Lithuania and Latvia, thanks to the international experience that IDOM has acquired in the design of high-speed projects in Spain, as well as in Sweden, and Poland, among others. The Latvian section will be developed alongside the firm INECO. In all these contracts account for 344 km of high-speed railway, involve about 155 structures, including the 1.7 km bridge over the Neris River, making it the longest railway bridge in the Baltic States. This large infrastructure will also be suitable for freight traffic, with a design speed of 249 km/h for passenger traffic and 120 km/h for freight traffic. IDOM is already developing the value engineering, basic design and detailed design of the entire infrastructure and track superstructure. In addition, IDOM will carry out the design supervision of the project during the construction phase.



ght traffic. IDOM is already developing the value engineering, basic design and detailed design of the entire infrastructure and track su-

perstructure. In addition, IDOM will carry out the design supervision of the project during the construction phase.

Berta Barrero, president of the Industry Division of the UITP

INDRA

Berta Barrero, the transportation market director at Indra has received the backing of the majority of the industrial members of the UITP (International Association of Public Transport) for her appointment as President of the Industry Division and as its representative on the association's executive board, the governing body of the leading organization in the global transportation sector. Berta Barrero's incorporation into the governing bodies of the UITP strengthens Indra's partnership with the association and reinforces the company's position as one of the main players and experts in the mobility and transportation sector. It also contributes to the UITP's efforts to increase the presence of women



in the organization and their visibility in the world of transportation, a sector in which only 22% of European professionals are female. Indra joined the UITP in 2018 in order to contri-

bute its technological capabilities and experience within the sector and thus improve urban and interurban mobility while promoting sustainable mobility.



Ingeteam closes FY 2018 with a turnover of €637 million

INGETEAM

Ingeteam has achieved a turnover of €637 million: a 47% increase since 2016. 82% of the business is

abroad. The Group has created 865 new jobs and has invested €84 million in R&D. It has made investments of more than €30 million. This year we have delivered converters from a new

plant in India and have consolidated our business in USA and Brazil. Ingeteam expects to consolidate its growth by achieving sales of €730 million by 2021, including sales fourfold in Railways.

Kimua Group announces the opening of its new R&D Hub

KIMUA

While in the pursuit of a forward-looking goal of becoming an international reference centre in terms of heavy-loads handling, Kimua Group announces the opening of its new R&D Hub. Services like engineering and testing will be cen-

tralized in this new facility, as well as a new business unit destined to complete the current service portfolio: advanced training courses on heavy lift and lashing. In the R&D Hub located in the Basque Region, Northern Spain, Kimua Group will bring together engineering state-of-the-art design software and in-house-made testing developments covered under the

umbrella of Lamia 4.0, a completely modular and monitored 1,000 Ton test bench. The new R&D Hub will soon be the heart of Kimua Group, the place from which the organization will keep providing effective solutions and services for handling rolling stock inside a factory, improving logistics and enabling complicated maintenance operations.



GWEP: Light at the end of the tunnel

SDEA ENGINEERING SOLUTIONS

The design phase of the Great Western Electrification Project (GWEP) is coming to its end. After the government decision in 2017 of cancelling the section Cardiff-Swansea, the initial design of Cardiff station had to be re-designed.

SDEA Engineering Solutions has been providing the talent of its experts to this project since 2016 through their local collaborator Andromeda. Due to the complexity of the works, they were selected for the re-design of the station which has been delivered to contractor for installation in July.

SDEA has contributed to reduce the cost overruns by an adequate work's management in coordination with Network Rail.



Talent and innovation, our essence. La Farga presents its 11th Sustainability Report 2018

LA FARGA

2018 was a year of major transformations for La Farga. The group's various companies were brought under the umbrella of a single company, La Farga Yourcoppersolutions, S.A.

This change was accompanied by a new management organisation. In 2018 we also invested in the development and implementation of a new continuous casting line that has enabled us to increase our production capacity.

This year we have repeated the double presentation format of our report: a full report, which contains the results and activities carried out in 2018; and a shorter infographic-



TALENTO E INNOVACIÓN, NUESTRA ESENCIA

INFORME DE SOSTENIBILIDAD 2018
11.ª edición



based report that contains a summary of the most important data.

You can download the full report from our website: www.lafarga.es.



Siemens has been awarded two contracts by Adif

SIEMENS

Siemens Mobility has been awarded the contract by Adif for the drafting of the construction and execution project for the adaptation works of the security and telecommunications facilities at the Cariñena and Ferreruela stations for the circula-

tion of 750 meter freight trains.

The operations include the adaptation of the traffic management systems and other installations - field elements and wiring networks and pipelines - in both stations, the adaptation of the Centralized Traffic Control (CTC) to the new devices, and the laying of signaling and communications wiring. As well the

company was awarded the contract by Adif High Speed for the works of La Sagrera station in Barcelona including the security and communications facilities of the Barcelona-Granollers and Barcelona-Mataró sections with conventional width in the accesses and its passage through the new intermodal station.

TRIA Engineering, SDEA Solutions and EasyBIM join forces to develop projects under the BIM Methodology

TRIA INGENIERÍA

We are pleased to announce TRIA Engineering, SDEA Solutions and EasyBIM have recently unified the experience to work and develop projects under the BIM Methodology. Together we have set a team with proven experience in the infrastructures sector, and with a clear intend



to cover both industrial and infrastructure projects with BIM methodology.

The team named as "BIM Trinity Solutions" is determined to use BIM to the maximum of its capabilities to increase productivity, reduce the

use of materials and become a new standard for the rest of the industry. Together we will help the digital transformation within construction and infrastructure sector, working on private projects and public tenders.

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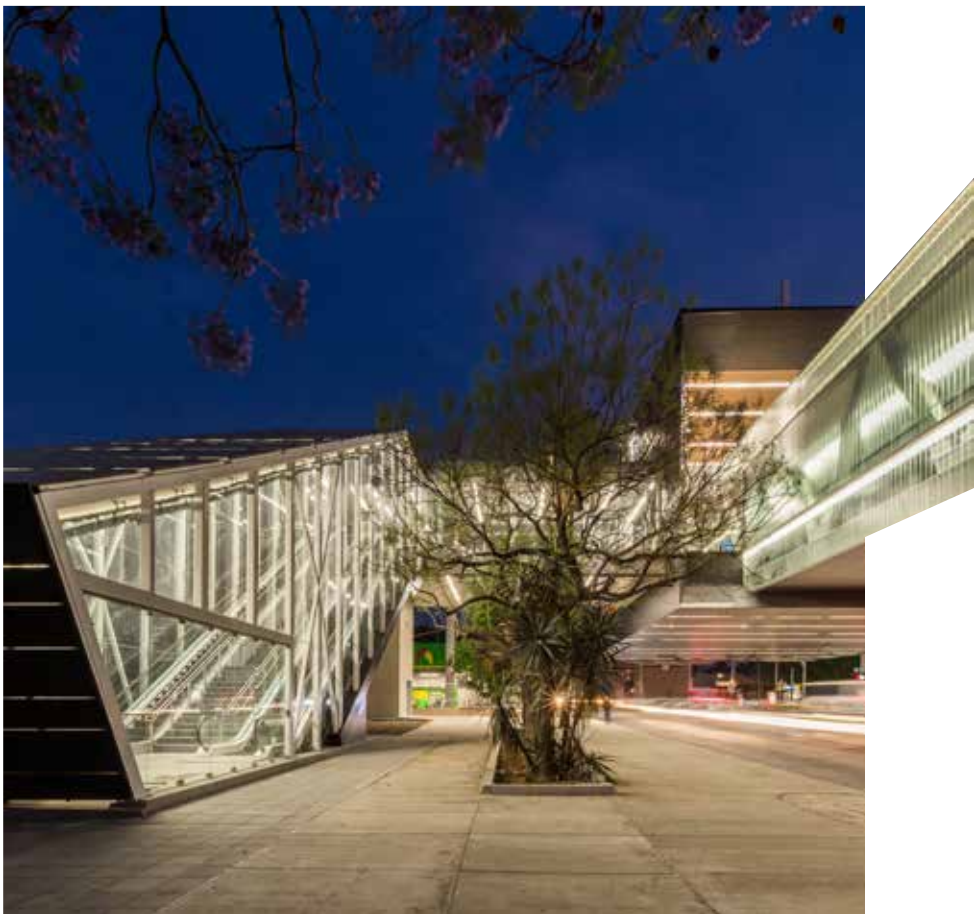
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MAFEX Revista corporativa de Mafex
Asociación Ferroviaria Española



SENER increases its EBITDA by 22.5%

SENER
The engineering group SENER presented its Annual Report with the results for 2018, which show an increase in EBITDA of 22.5%, a profit before taxes of 29.2 million euros —27.7% higher than in 2017— and an investment in R&D that remains above 20 million euros. In Infrastructure, work continued on line 3 of the Guadalajara metro and the Toluca-Mexico City intercity train, as well as on the High Speed Two London-Birmingham (United Kingdom) high-speed line and on the high-speed line between Los Angeles and San Francisco (USA). There were new contracts in Brazil, Canada, Panama, Australia, Colombia, GCC and the Andean region, with which SENER has seen the expansion of the business strengthened in different sectors (rail, water, ports, airports, and highways).



Stadler supplies further locomotives to European Loc Pool – for the first time in multi-system configuration

STADLER
Stadler and European Loc Pool (ELP) have signed a contract for the acquisition of ten Co'Co 'electric locomotives for the rail freight transport. It is the second order that is formalized under the framework agreement announced in May and whose scope

amounts to a total of 100 vehicles. The locomotives stand out for their power, up to 9 MW, and for their high tractive effort thanks to their six motorized axles. On many EU freight corridors, a single Co'Co' locomotive can replace two Bo'Bo' locomotives for the same train weight. This will substantially reduce the cost base for freight rail operators. The locomotives has been ordered in multi-system configuration for Germany, Austria,

Switzerland and Italy (15 kV + 25 kV AC and 1.5 kV + 3 kV DC). All of them have ETCS and radio remote control as standard features and if required, they can be equipped with one or two additional 900 kW diesel engines. Stadler, European benchmark in the segment of diesel-electric locomotives, breaks into the segment of electric locomotives in which it aspires to become a reference player in the medium term.



SigmaRail wins Deutsche Bahn mindbox Object Recognition Challenge

SIGMARAIL
Deutsche Bahn start-up hub, DB mindbox, has selected SigmaRail as the winner of its Object Recognition Challenge. Using state-of-the-art computer vision technologies, SigmaRail is capable of automatically identify rail assets from multimodal data bases, such as HD videos, images, 3D point clouds, etc. and triangulate its accurate position along the rail corridor. In the upcoming 100 days, DB mindbox and SigmaRail will co-create, develop and deploy a solution that meets the requirements in these fields of Europe's largest rail operator and infrastructure owner as well as the second largest transport company in the world.

High speed in Turkey

TPF GETINSA EUROESTUDIOS
TPF Getinsa Euroestudios, S.L. has been working on a major high-speed rail project in Turkey since March. A joint venture, in which TPF is a partner, was awarded the contract to supervise the construction of the Cerkezkoy - Kapikule section of the Halkali-Kapikule Railway Line project. This project has been launched by the Ministry of Transport and Infrastructure of Turkey, and is being financed by the European Union. It involves the construction of a double-track rail line section which is designed for both passenger and freight transport and a speed of 200km/h. Section 1 will extend from Cerkezkoy to Kapikule along a length of 152 km. Construction of 3 stations will also be undertaken on its route, between the station at



Kapikule and the Bulgarian Border. This supervision assignment will be carried out in accordance with FIDIC

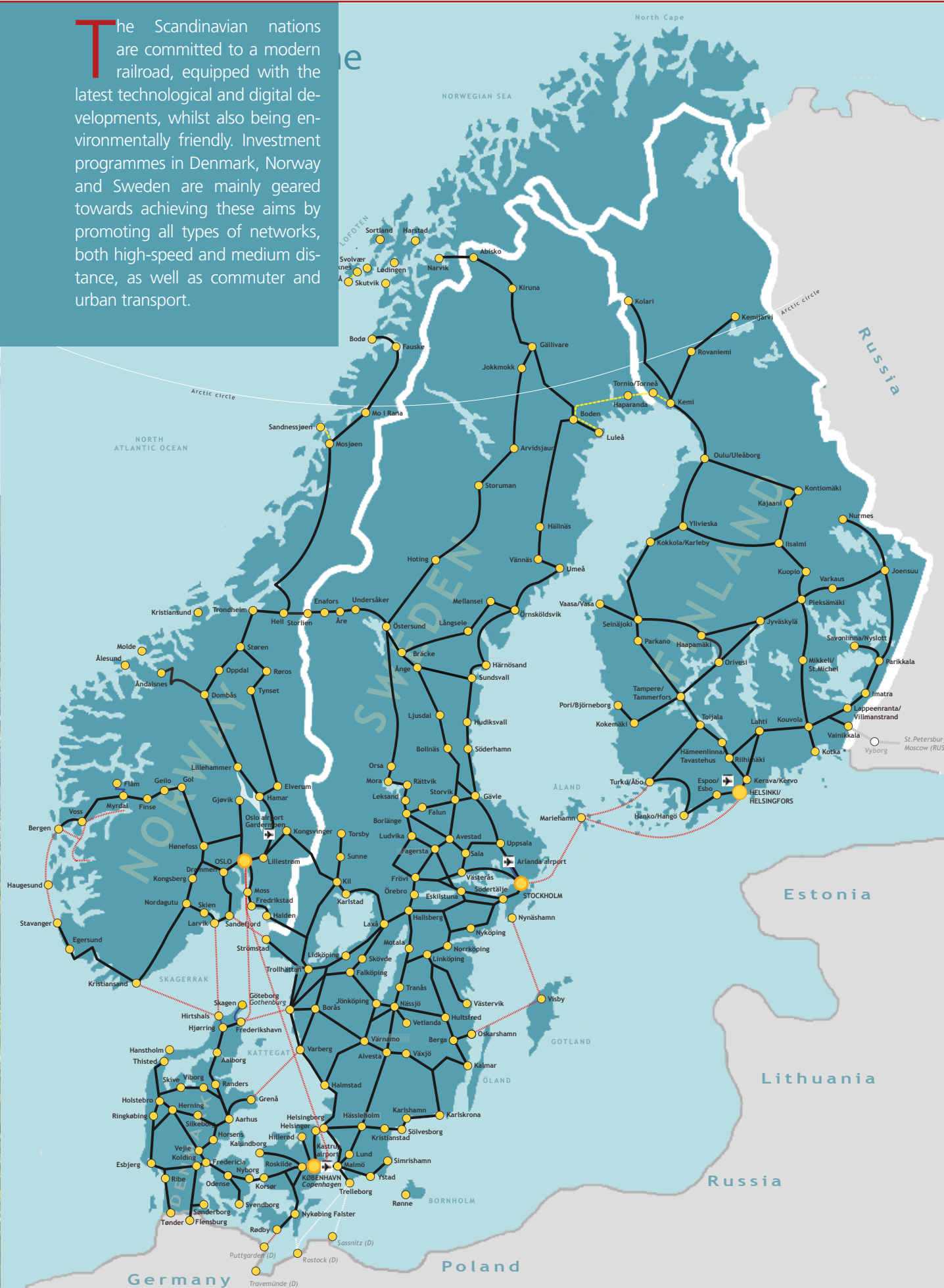
Conditions of Contracts for Construction and it is expected to be accomplished by 2023.

Scandinavian countries: Towards a state-of-the-art railway featuring a modern infrastructure

The Scandinavian nations are committed to a modern railroad, equipped with the latest technological and digital developments, whilst also being environmentally friendly. Investment programmes in Denmark, Norway and Sweden are mainly geared towards achieving these aims by promoting all types of networks, both high-speed and medium distance, as well as commuter and urban transport.



In Scandinavian countries they are committed to a modern, environmentally friendly railway.



The Sund bridge-tunnel connects the Danish capital, Copenhagen, and the Swedish city of Malmö.

Denmark, the path towards the future train

THE GOVERNMENT OF DENMARK WISHES TO GIVE A MODERNISING BOOST TO RAILWAY INFRASTRUCTURES THROUGH ELEVATED EXPENDITURE ON LARGE-SCALE PROJECTS. FOR EXAMPLE, ONCE THE ELECTRIFICATION PROGRAMME IS COMPLETED, THE COUNTRY WILL BECOME THE FIRST MEMBER STATE OF THE EU TO ADOPT ERTMS ON A NATIONAL SCALE.

Denmark, in northern Europe and located between the Baltic Sea and the North Sea, with a surface area of 42,920 km². It is amongst the smallest and least inhabited countries, with a population of 5,781,000 people (density of

135 inhabitants per km²). The use of public transport in the main cities has opted in recent years for the railway, which is especially relevant in Copenhagen, Aarhus and Odense. Regarding national connections, the ambitious electrification programme

carried out throughout the country is especially noteworthy.

Structure

Denmark's public rail network consists of 3,102 kilometres of rail track. Its lines are managed separately by

private railways. The entire network is 1,435 mm (standard width), with the exception of some narrow sections.

The Ministry of Transportation, Construction and Housing is entrusted with planning new investments and



modernisation programmes. It depends on the government agency Banedanmark, the National Railways Agency, which manages the maintenance, construction of new sections and the supervision of security systems. More than 196 million passengers and eight million tons of freight are transported annually. Furthermore,

there is a state-owned company, Femern Landanlaeg, for the modernisation of Danish railways associated with the Fehmarn Belt fixed link in northern Germany. For its part, DSB (Danske Statsbaner), a public railway operator, is responsible for rolling stock, as well as investment in the acquisition of new trains. The sector has operated in a fully de-

regulated manner since January 1, 2009 for the transport of freight and on the same date in 2000 for passenger rail services. Some of the operators that exist are public-private companies, such as Midtjyske Jernbaner, which is run by the central Jutland railways or DB Schenker, an international logistics operator. The rest of the companies that offer rail services are: Arriva Tog, BLDX A / S, CFL Cargo Danmark ApS, Contec Rail Aps, Lollandsbanen, Lyngby-Naerum Jernbane, Midtjyske Jernbaner, Nordjyske Jernbaner A / S, Railcare Danmark A / S, BD Schenker Rail Scandinavia A / S, Regiostong A / S, Scandic Rail Partners ApS, Varde -Norre Nebel Jernbane (Vestbanen).

Investments

The government of Denmark wishes to give a modernising boost to railway infrastructures through elevated expenditure on large-scale projects. To this end, a specific fund has been created with which the main projects (Real Fund) will be covered. Furthermore, there is support from the co-financing of European institutions to give priority to the railroad over other modes in the country.

DENMARK: MAIN RAILWAY PROJECTS

PROJECT	TYPE	INVESTMENT (€M)
Electrification programme	Electrification of 1362 kilometres of the main network.	1.245
Signage programme	Replacement of systems throughout the network with ERTMS Level 2 by 2021.	3,200
Copenhagen-Ringsted	High-speed	1,621
Ringsted-Fehmarn	17 kilometre underwater link	7,000
Aarhus light rail network	Several extensions like the L2 northbound.	-
Odense tramway	Construction of the dual-line network.	442 254

Source: Banedanmark (National Railway Agency of Denmark).

In Denmark, more than €13.7 Bn will be invested in the six main railway projects underway.



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ELECTRIFICATION PROGRAMME

Denmark has the largest European signaling project underway. The aim is the replacement of systems throughout the Banedanmark railway network with ERTMS Level 2 by 2021 and all signaling in the Copenhagen S-bane with CBTC. Once completed, the country will become the first Member State to adopt ERTMS on a nationwide scale. The programme has been allocated a budget of 3.2 billion euros. With these new changes, delays will be reduced by 80%, the speed and frequency of trains will increase. Alongside this, there will be a higher level of safety spread homogenously throughout the national network. Likewise, other advantages are that future maintenance will be more economical and the system will provide a basis for better centralised traffic control, energy optimisation and passenger information in time.



AARHUS LIGHT METROPOLITAN RAIL NETWORK

The light rail system in the city Aarhus (Aarhus Letbane) is run by the Midttrafik company. The first line opened in December 2017, though the network is still expanding. The service in the long distance section Odder a Lisbjergskolen opened on August 25, 2018. A third intercity line to Grenå opened on April 30, 2019. Plans are underway for more lines for the second stage of the project. Phase I contemplates an extension from the eastern port while phase 2 includes the construction of a branch from the central station to the Braband neighbourhood through the city centre. Furthermore, in a third period, the extension of Line 2 to the north will be carried out from Lisbjergskolen to Hinnerup.



HIGH-SPEED COPENHAGEN-RINGSTED LINE



This year, the first high-speed line that connects the cities of Copenhagen and Ringsted through a station in Køge North has been inaugurated. The line is equipped for operations with trains that travel

up to 250 km / h. While it is an initial first phase, DSB will start with existing conventional rail traffic on the route at higher speeds, thus introducing faster rolling stock in the future. Work on this line, ca-

lled Ringstedbanen (Ringsted), began in 2012 as part of the plan to improve rail connectivity between both urban centres. The general project is estimated to have cost €1.621Bn.

SIGNAL RENEWAL PROGRAMME

Denmark has the largest European signaling project underway. The aim is the replacement of systems throughout the Banedanmark railway network with ERTMS Level 2 by 2021 and all signaling in the Copenhagen S-bane with CBTC. Once completed, the country will become the first Member State to adopt ERTMS on a nationwide scale. The programme has been allocated a budget of 3.2 billion euros. With these new changes, delays will be reduced by 80%, the speed and frequency of trains will increase. In addition, there will be a greater level of safety spread homogenousy throughout the national network. Likewise, other advantages are that future maintenance will be more economical and the system will provide a basis for better centralised traffic control, energy optimisation and passenger information in real time.



RINGSTED-FEHMARN, THE RAILWAY CONNECTION WITH EUROPE



This project includes the construction of an additional track between Vordingborg and the southern part of Holeby, where the line connects to the Fehmarn Belt fixed link. The work consists of updating the infrastructure so that passenger trains can travel at 200 km / h, compared to the current 160 km / h (Ringsted-Vordingborg) and 120 km / h (Vordingborg-Rødby Havn). The branch will be electrified from Ringsted to Holeby, in line with the rest of the Danish rail network, and will have the

new ERTMS system, designed to ensure better punctuality and reliability. The European Investment Bank has approved a package of 200 million euros for this initiative. This project also includes the construction of an underwater tunnel of 17.6 kilometres, which will serve as a fixed link for rail and road traffic through the Femern Strait. According to the activity calendar, it is scheduled to be completed in 2028. The total approximate amount of construction of this link amounts to 7 billion euros. The

works of the project, which are located in the Corridor of the TEN-T Core Network of the Scandinavian Mediterranean, are expected to facilitate train scheduling in the section once the tunnel becomes operational. The four major packages for engineering and civil works are already awarded, and the next ones planned tenders are those related to electrical and mechanical installations, including systems and tools, the railway installation, as well as aspects of architecture and interior design.

ODENSE TRAMWAY

The city of Odense also backs sustainable mobility with a new tramway system. The

first phase is scheduled to open in 2020. The tram will depart from Tarup, in the



northwestern part, and will pass through the central train station, the University of Southern Denmark and the new hospital until it reaches its final destination in Hjallesø, in the southernmost part of the city. L1 will consist of 14.5 kilometres and will have 26 stations. The expected number of daily passengers is forecast as 34,000. The total budget is 3.3 billion Danish crowns (442 million euros). The tram is funded by the municipality of Odense, the Danish state and the region of southern Denmark. There is a second planned line of 7.5 kilometres, with a budget of 1.9 billion Danish crowns (254 million euros).

COPENHAGEN METROPOLITAN RAILWAY

The Copenhagen metropolitan railway is also benefitting from an expansion programme. Presently, works are underway on the extension of Cityringen, which once completed, will mean the entire system features a total length of 43 kilometres and more than 40 stations.

Cityringen Metro is a 15.5 kilometre underground circular line that is built on two branches, subway M3 and M4, connected to Kongens Nytorv and Frederiksberg stations. With an estimated cost of 21.300 billion Danish crowns (DKK) (2.836 billion euros), the project includes the construction of 17 stations.

The new line will be fully automated, driverless, and is expected to carry 240,000 passengers per day. This metro network will provide services to the main areas of Copenhagen, such as the Danish Parliament, the Central Station and the City Hall. It will also provide passengers with access to the regional train network, commuter trains at Copenhagen Central, Østerport and Nørrebro stations.



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Norway: the largest investment in its history in a modern and digital railway

NORWAY SEEKS A RAILWAY THAT RESPONDS TO NEW MOBILITY REQUIREMENTS WHILE BEING RESPECTFUL TO THE ENVIRONMENT. FOR THIS REASON, IT FOSTERS THE LARGEST TRANSPORT PROGRAMME IN ITS HISTORY WITH HIGH-SPEED PROJECTS, COMMUTER RAIL INITIATIVES, DUPLICATION AND ELECTRIFICATION OF LINES. FURTHERMORE, THE AIM IS TO INCORPORATE GREATEST ADVANCES, MEANING THIS WILL ENHANCE COLLABORATION IN TECHNOLOGICAL INNOVATION.

Norway is one of the most developed countries in the world. With 5,258,317 inhabitants and an area of 323,781 square metres, more than 80% of the population is concentrated into urban areas. The prosperous financial situation, with a thriving and highly stable economy, is notable in many sectors,

including transport, where infrastructure standards are particularly high. A level that wants to be given a boost in the coming years with the implementation of the advantages of new technological advancements. In the coming years, a substantial increase of inhabitants is expected, which will mean that there will be more than six million people in 2030, a figure that will increase to seven million in 2060. It is estimated that this growth will go hand in hand with a greater volume of passenger and freight transport that will continue until 2050. In this context, within all means of transport, the railway will take on a special role as the backbone of mobility.

Rail network

The current network has 4,208 kilometres of track, of which 2,459 are electrified at 15 kV 16.7 Hz AC; also it features 269 kilometres of double track and 69 for high speed rail. The train is a growing means of transport that, in the last year, transported 56,827 passengers

2,956 million kilometres of passengers and 24,783 tons of freight. The main long-distance branch leaves from Oslo westwards, along the south coast to Stavanger and over the mountains to Bergen; and north to Åndalsnes and via Trondheim to Bodø. The country also has four connection lines with Europe. Although there is only one high-speed line in commercial operation, the Gardermobanen line, which links the capital with Oslo's airport, Gardermoen, plans are in place to build more high-speed lines.

Sectorial Structure

The Norwegian Ministry of Transport and Communications has been com-

mission to handle the framework conditions necessary for the activities of the sector. Within this administration the Public Department of Rail Transport is framed. Alongside this, it has the Norwegian Railway Directorate, which is the government agency created in 2017 after the railway reform that was carried out in the country, and which has the strategic responsibility of the network. Its main mission is to create "efficient, safe and environmentally friendly railroad that benefits passengers and operators". The National Railway Infrastructure rests with Bane NOR, which is entrusted with the planning, development, operation and maintenance of the network, traffic management and development of railway properties. They are joined by the Norwegian Railway Authority, responsible for all safety issues.

Operators

In 2000, railway operations were deregulated. With this reform, freight and passenger services were privatised, but not the infrastructure. Therefore, Bane NOR is in charge of the planning, building and maintaining of the latter. At present there are several operators present in the Norwegian market and they offer competitive and efficient services, thanks to the three approved railway packages. Among them is the NSB Group,

The improvement of railway services is one of the top priorities in Norway.



which also works in Sweden and is one of the largest companies in the Nordic countries. In April of this year, it was renamed Vy Group; and Norske Tog, a Norwegian state company established for rental of rolling stock for passenger traffic operators. Other operators are: Cargo Net and Ofoten Line, of goods; the German

Hector Rail; the Swedish Tågakeriet; Sporveien T-banen AS, in charge of the Oslo Metro; LKAB Malmtrafik; Go-Ahead Nordic (Great Britain) and Flytoget AS, which serves on the Gardermoen high-speed line.

Investments

The "National Transport Plan for Norway 2018-2029" is currently

There are several operators present in the Norwegian market and offer competitive and efficient services.



Imagen de la estación noruega de Oslo Lufthavn.

NORWAY: MAIN RAILWAY PROJECTS

SECTION	TYPE	KM	BUDGET (M \$)	STATUS
Bergen: Kaigaten- Kronstad - Fyllingsdalen	Light rail network	10.8	725.5	Under construction
Oslo: Old Town -Sjo Mannskolen Tunnel	Light rail network	0.6	-	Planned
Tonsenhagen Tram Extension (Sinsenrysset - Bjerke)	Light rail network	3.7	-	Planned
Oslo Metro Line 6 (Majorsten Fornebusenter)	Underground railway	8.2	1.872 Bn	Planned for 2020
Vest foldbanen / Tonsberg - Skien	High-speed	72	4.680 Bn	Planned
Frederikstad - Halden	High-speed	39	-	Planned
Gardermoen - Hamar	High-speed	74	-	Planned
Hamar- Lillehammer	High-speed	54	-	Planned
Follo Line (Oslo Ski)	High-speed	64	2,925 Bn	Under construction
Sandbukta - Sastad	High-speed	10 kilometres in two directions	-	Planned for 2019
Drammen-Kobbernisdalen	High-speed	9	-	Planned for 2019
Bodo-Tromso	Mainline	500	Between 4 and 6M\$	Feasibility study
Map Kabao-Jira Junction	Mainline	15.8	-	Planned for 2019
Arna - Bergen	Mainline	4	-	Under construction
Tidsuoll Nord	Mainline	8.3	-	Under construction (since 2018)
Fauske - Tronso	Mainline	-	7.020 Bn\$	Preliminary Design

Source: Bane NOR SF

underway. In this programme, investments in the railway sector will involve an annual expenditure amount of 26.578 billion crowns (2.738 billion euros). For this year, Bane NOR, foresees several projects of major significance. In addition, throughout these years, the funds will be used for new large-scale projects. New initiatives will be launched, as well as the renewal of existing infrastructures. Furthermore, a major boost will be given to R&D and digitisation in order to prepare for the construction of railway systems that meet the needs of its growing population and reduce congestion and pollution on the roadways.

The main aims pursued are the reduction of the country's carbon footprint, as well as taking full advantage of the new technologies based on ITS (Intelligent Transport System) applied to mobility Regarding the way of carrying out the projects, the PPP (Public Private



The Nordland Line is a 729 kilometre railway network.

Partnership) mode is insisted in order to achieve an efficient undertaking of the works development. The Rail Development Plan specifies a series of priority initiatives for the coming years, including large inves-

tments for the InterCity network in Eastern Valleys, the electrification of the Trønder and Meråker lines, new routes between Bergen and Voss, as well as a Ringerike line, which will also shorten the connection with Bergen, among others. Apart from the budgets allocated in the Transport Plan, a new infrastructure fund of NOK 100 billion (EUR 10.326 billion) has been established, in order to promote the financing of these long-term projects.

The "Norwegian National Transportation Plan 2018-2029 with an average annual expenditure of €2.738 Bn is already underway.

DIGITISATION, AUTOMATION AND ERTMS

Within the modernisation plan of the railway network, Bane NOR has announced that it will also invest 20 billion NOK Norwegian crowns (2.063 billion euros) allocated to the digitisation and automation of the railway network and systems over the next 10 years. These improvement tasks include the implementation of the ERTMS / ECTS L2 system throughout the country with completion scheduled for 2034. Precisely, for the 2014-2023 horizon, a total of 6 billion Norwegian crowns (750 million euros) has been allocated to the implementation of this European system; Some works that will be synchronised with the Swedish ERTMS plan to ensure interoperability.



Hay planes para digitalizar la red ferroviaria en los próximos años.

INTERCITY NETWORK

Bane NOR plans to enable 270 kilometres of dual track and build 25 stations in the southeast of the country with an investment of 150 billion Norwegian kro-

nor (1.546 billion euros). The routes will run between Oslo-Lillehammer (Dovre line), Oslo-Halden (Østfold line), Oslo-Porsgrunn (Vestfold line) and Sandvika-

Hønefoss (Ringerike line). The new lines, which will be completed in 2036, will allow for speeds of up to 250 km / h. Of all of these, the Ringerike commuter network is one of the flagship projects. Its aim, to develop and increase the area of operation around the capital of Oslo, including Hønefoss and Ringerike in the InterCity rail network. Another highly significant effect is the substantial reduction in train travel time between the two largest cities in Norway, Bergen and Oslo, which is close to five hours. The works include large structures such as the construction of several bridges and tunnels. The main contract works are scheduled to start between 2021 and 2022.



Bergen station

BOOSTING METROPOLITAN AND LIGHT RAIL NETWORKS

Urban transport networks will also be bolstered in the coming years. There are light rail projects such as the extension of the network of the cities of Bergen-Kronstad-Fyllingsdalen) and Oslo (Old Town-Sjo Mannskolen Tunnel and Tonsenhagen Tram), as well as metropolitan rail projects in the capital, where Line 6 will be extended.



Urban transport will be bolstered in the coming years.

FOLLO LINE AND NEW HIGH-SPEED LINES



The largest high-speed project is called "Follo Line".

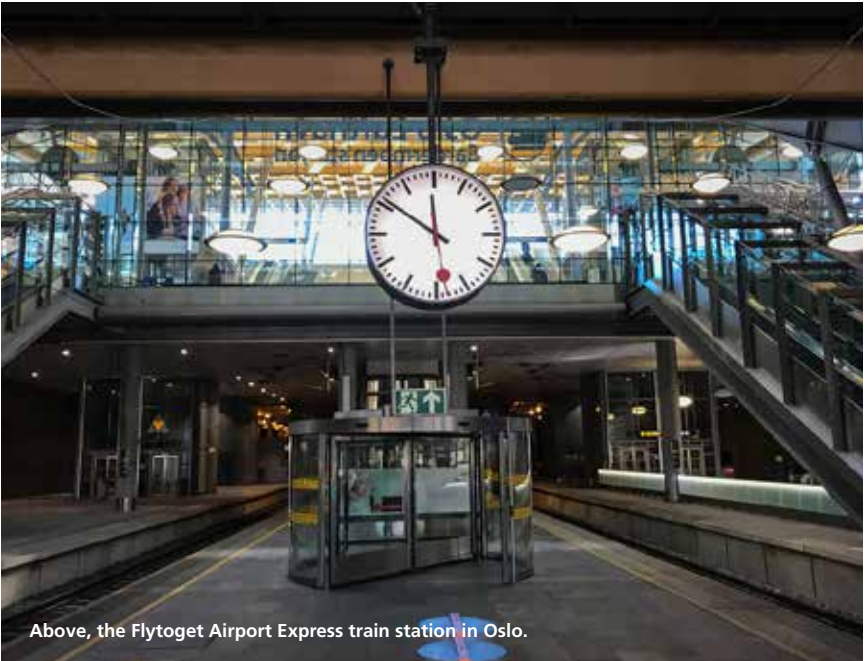
Among the main railway plans in Norway is the boost to high-speed lines. The largest project is known as the "Follo Line". This involves a 22.5 kilometre network that has been allotted investment of 2.609 billion euros and will link the cities of Oslo and Ski. The highlight is the construction of the two twin tunnels, entrusted to the firm Acciona, of 19.5 kilometres each one, which will become the longest in Scandinavia. Alongside this great infrastructure project, the largest in the country,



other networks are planned: Vest foldbanen / Tonsberg-Skien, with a budget of 4.104 billion euros; Frederikstad-Halden, Gardermoen-Hamar, Hamar-Lillehammer, Sandbukta-Sastad and Drammen-Kobbernikdalen.

R&D+I PLAN

With regard to transport plans, the R&D strategy is one of the cornerstones. To this end, a specific research plan has been designed with areas for development in matters of accessibility, security, climate and the environment. The initiatives will focus on areas such as electrification, railway technology, materials testing, etc. Likewise, one of the main Innovation programmes for the transport sector consists of 40 million NOK Norwegian crowns (4.124 billion euros) for collaborative projects to advance effective, safe and sustainable transport solutions. Funding is available under the Transportation 2025 programme for organisations into research, in cooperation with other stakeholders.



Above, the Flytoget Airport Express train station in Oslo.

In Sweden, the aim is to give a major boost to the railway as a means of transport in the forthcoming years.



Sweden renews its rail network with large-scale infrastructure investments

THE SWEDISH GOVERNMENT INTENDS TO RENOVATE ITS TRANSPORTATION MEANS THROUGH THE CURRENT NATIONAL INFRASTRUCTURE PLAN 2018-2029.

THE AIM IS TO BUILD NEW AND MORE MODERN, DIGITAL AND SUSTAINABLE NETWORKS, AND INCREASE ITS CAPACITY THROUGH THE IMPROVEMENT OF ITS OPERATIONS.

Sweden is the third largest country in terms of size of the European Union with 449,964 square kilometres and a length of 1574 kilometres, divided into 21 regions. With just over 10 million people, its population is highly concentrated in the south, especially in the three major cities: Stockholm, Gothenburg

and Malmö, where 51% of the total is accumulated. In addition, these three urban areas will continue to grow in the coming years, meaning that transport demand will also increase. The country's rail network, one of the most advanced in Europe, consists of 12,000 kilometres of track, of which 2,000 are double

track and 10,000 single track, 85% of them are electrified.

Structure

Sweden's transport manager, Trafikverket, is the main manager of 80% of the railway infrastructure. Currently, one of the main functions is to schedule the

construction and maintenance of the network. It is the largest public contracting authority in Sweden, bidding an average of 4 billion euros annually. On the other hand, the stations and the buildings are managed by the firm Jernhusen, which is Government-run. There is also a state-run passenger operator, SJ, as it com-



Tren de alta velocidad SJ3000 de SJ AB, en la estación central de Malmö, esperando para partir en Gotemburgo.

petes with other companies. The railway services it provides are mainly long-distance, and include overnight and high-speed train services, as well as regional rail services between the main cities of Sweden and the Scandinavian capitals. The company runs 1,200 departures serving different destinations from 284 stations. The main routes are covered with the high-speed X2000 train model that connects the capital with Malmö (in 4 hours) and with Gothenburg (in 3 hours). Regional services or within counties are operated by other companies and also by the subsidiary SJ Götalands-tåg, in the west of the country. The Swedish Transport Agency, is the body in charge of railway regulation with the aim of guaranteeing accessibility, and safety in rail transport, while Infranord, is the state provider of engineering and construction services, concentrates 60% of the Infrastructure maintenance work. In terms of infrastructure planning, regional administrations play a key

The Government has approved the National Infrastructure Plan 2018-2029, which will entail an investment of 66.328 billion euros.

role, such as Stockholm Läns Landsting, the regional administration of the Swedish capital, which is responsible for carrying out projects that affect the Stockholm region, including, for example, the management and extension of the Stockholm metropolitan railway. The Swedish railway market is fully deregulated. There are more than 20 goods operator licenses, following the deregulation of the state monopoly in 1996. Amongst them are Nobina Sverige AB, Grenland Rail, Transdev Sverige AB, Tågakeriet and Bergslagen AB, Tågfrakt AB, Svensk Tågkraft AB, Svenska Tågkompaniet AB, Real Rail Sweden AB, MTR Nordic AB, LKAB Malmtrafik AB, Keolis Sverige AB, Inlandsbanan AB, Hec-

tor Rail A, DB Cargo Scandinavia, Nordiska Tåg AB, DVVJ Stiftelsen Dal-Västra Värmlands Järnväg, CFäg Cargo, CargoNet AS, Skandinaviska Jernbanor AB, Baneservice Skandinavia AB, Arriva, A-Train AB and Captrain. Investments The railway is one of the most significant means of transport in the country and a sector to which a large number of investments are being allocated. The Government has approved the National Infrastructure Plan 2018-2029, which has an investment of 700 billion SEK Swedish kronor (66.328 billion euros). This plan is intended for the construction of new networks, as well as for the

SWEDEN: MAIN RAILWAY PROJECTS

PROJECT	TYPE	INVESTMENT (SEK / EUROS)	STATUS
Railway overhaul in the Borås area	Conventional rail network	-	Under construction Finishes in 2022
Hässleholm – Lund	High-speed Rail. Construction of 70 new kilometres of track.	-	Planned for 2027-2029
Vislanda-Ballingslöv track renovation	Conventional rail network	-	Under construction
North Bothnia Line	270 new kilometres of conventional rail network.	SEK 29 billion (2.749.Bn Euros).	Under construction
Hallsberg-Degerön track duplication	Duplication of track running 46 kilometres.	7 billion SEK (663.M€)	Several sections under construction
Ängelholm - Helsingborg track duplication		2.4 billion SEK (€227 M euros)	Construction from 2020 to 2023
Olskroken Project	Separation of the five-line traffic node.	2.4 billion SEK (€227 M)	Under construction
Getingmidjan Project	Railway section renovation in central Stockholm.	3.2 billion SEK (€303 million)	Under construction from 2017 to 2021
Gothenburg – Borås Project	High-speed Rail. Construction of 60 new kilometres of track.	-	Scheduled for 2025-2027
Lund – Arlöv,	Modernisation and expansion of two to four tracks.	-	Operationally ready in 2024.
"The East Link" Project	High-speed Rail. Construction of 160 kilometres, 200 bridges and 20 kilometres of tunnel.	54 billion SEK (€5.120 Bn)	In operation between 2033 and 2035
"The West Link" Project (Västlänken)	Regional Rail Network. Eight new kilometres Gothenburg	20 billion SEK (€1.896 Bn)	Estimated commercial in operation for 2026
Varberg tunnel	Construction of 7.5 kilometres of double track	3.99 billion (378.M€)	Under construction: 2019-2024.
Mälaren Line	Extension of two to four tracks by 20 kilometres (Tomtebodavägen-Kallhäll)	SEK 19.5 billion (€1.848 Bn)	Under construction

Fuente: Trafikverket.

restoration and modernisation of existing ones and focuses on aspects such as boosting digitisation, automation, smart transport and sustainability. A relevant focus is the reduction of greenhouse gas emissions by 2030 by 70% compared to the 2010 indicators. This programme allocates 125 billion SEK Swedish crowns (11.852 billion euros) for the operation and maintenance of the state railways and a further 333.5 billion SEK Swedish crowns (31.621 billion euros) for the development of the transport system. High-speed rail also features very prominently, in order to boost a more efficient railway network in the country between Stockholm, Gothenburg and Malmö. The Transportation Administration has planned three major projects: East Link, Gothenburg-Borås and Lund-Hässleholm.



High-speed train Stockholm-Oslo.

High-speed rail lines also feature very prominently, in order to boost a more efficient railway network in the country between Stockholm, Gothenburg and Malmö.

EAST LINK (HIGH-SPEED)

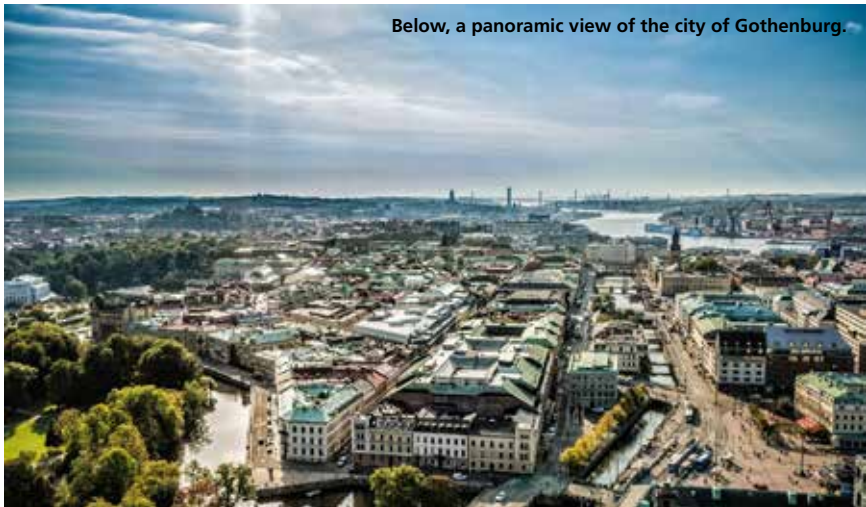


The East Link high-speed project has been defined as “the first step towards a new generation of railways in Sweden”.

The construction phase will end in 2021, with the goal that the first trains will be operational in 2033-2035. The works include the construction of 160 new kilometres, 200 bridges and 20 kilometres of tunnels. The line has a budget of 54 billion SEK Swedish kronor (€5.120 Bn).

HIGH-SPEED LINE BETWEEN GOTHENBURG-BORAS

Gothenburg and Borås, the two most important cities in the region, will have a high-speed link. This line is part of the railway's plans to link Stockholm, Gothenburg and Malmö. The branch will be double-track, running for 60 kilometres, and will allow a maximum speed of 250 kilometres per hour. This network will create a connection to the Gothenburg Landvetter airport. It is estimated that the construction phase will be between 2025 and 2027.



HÄSSLEHOLM-LUND HIGH-SPEED LINE



The new Hässleholm-Lund high-speed line will cross Skåne province and is the key to connecting southern Sweden with Stockholm.

The two-way branch will have 70 kilometres and trains will be able to run at a maximum speed of 320 km per hour. It is estimated that construction will begin between 2027 and 2029.

STOCKHOLM METROPOLITAN RAILWAY EXPANSION

Between 2016 and 2025 the Stockholm metropolitan rail network will be increased by approximately 19 kilometres with the construction of 4 new sections between Kungsträdgården and Nacka (7.7 kilometres), Sofia and Gullmars-



plan / Söderort (3.3 kilometres), Odenplan and Arenastaden (4.6 kilometres) and Akalla and Barkarby (3.4 kilometres). Alongside these actions, at least 9 new metro stations are planned. The beginning of the construction of the new sections is planned between 2016 and 2018 and the commissioning of the different lines between 2020 and 2025. It has been allocated a budget of: SEK 19.5 billion SEK (€1.835 Bn).

VARBERG TUNNEL

The extension of the railway network through Varberg, in the Province of Halland, is part of the transport plans for the west coast line between Gothenburg and Lund. In this project a section of 7.5 kilometres will be doubled and a tunnel of approximately 3.1 km in length will be built in the city centre (2.8 km of rock tunnel and 300 m of concrete tunnel).

A new station will also be enabled with a descent to the platforms. The works have a budget of 3.99 billion Swedish kronor (€378 M).

“THE WEST LINK” PROJECT

“The West Link” is one of the most significant transport infrastructure projects in Gothenburg. The project includes the construction of a railway tunnel in the central area of the city with three new underground stops in Haga, Korsvägen and the city's central station. The new works will connect commuter traffic with the rest of the traffic to the west. It is estimated that commercial operations may begin in 2026.

GETINGMIDJAN PROJECT



Between 2016 and 2025 the Stockholm metropolitan rail network will be increased by approximately 19 kilometres with the construction of 4 new sections between Kungsträdgården and Nacka (7.7 kilometres), Sofia and Gullmarsplan / Söderort (3.3 kilometres), Odenplan and Arenastaden (4.6 kilometres) and Akalla and Barkarby (3.4 kilometres). Alongside these actions, at least 9 new metro stations are planned. The beginning of the

construction of the new sections is planned between 2016 and 2018 and the commissioning of the different lines between 2020 and 2025. It has been allocated a budget of: SEK 19.5 billion SEK (€1.835 Bn).

NORTH BOTHNIA LINE

The North Bothnia connection is a new coastal railway line, between Umeå-Luleå, which aims to increase the capacity of passenger and freight transport. The project, which has a budget of 29 billion SEK (2.749.€M), includes the construction of 270 kilometres of rail track. With its implementation, freight traffic transportation costs will be reduced by 30 percent and passenger travel times between cities along the Norrland coast will be reduced by half. Studies are currently being carried out for the different subsections of the line.



DUPLICATION OF ROADS

Other projects underway within the modernisation plans of the Swedish network are aimed at duplicating the track on several routes. Amongst them are the works in Hallsberg-Degerön, 46

kilometres, and Ängelholm- Helsingborg. With these improvements, greater capacity for freight trains will be achieved, passenger traffic will be increased and safety will be improved.

OLSKROKEN PROJECT

Olskroken is one of the most important nodes of the railway system in Gothenburg and Western Sweden. At the moment five railway lines converge. In order to increase its accessibility, this initiative will separate the crossroads with which capacity will be increased to

handle rail traffic. Olskroken will connect to the new networks included in the West Link project. It is estimated that trains may run under these new conditions between 2023 and 2024. The project has an investment of 2.4 billion Swedish kronor (€227 M).



MÄLAREN LINE

The Mälaren Line will be extended between Tomtebodavägen and Kallhäll, northwest of Stockholm, from two to four tracks. The aim is to increase traffic capacity and train frequencies. The project also includes the construction of four new suburban stations in Kallhäll, Barkarby, Sundbyberg and Huvudsta.



GOTHENBURG PORT LINE

Currently this line runs in a single direction. In order to respond to the growth of freight traffic, the network is projected to double. The works have been divided into different sections: Pölsebo – Skandiahamnen, Erikssberg – Pölsebo and Kville bangård (Railway yard).



Mafex Magazine: Denmark is making strides in terms of railway matters with a clear backing for rail. How are the different initiatives performed?

Jan Schneider-Tilli: At the present time, there is an average investment level of approximately 1 billion euros annually for the overhaul of the railway network. These funds are set aside to increase capacity, modernisation and speed on the lines, to build new stations, as well as to implement programmes such as the one for electrification and the change of signalling systems.

Mafex Magazine: One of the major strides forward has been the first high-speed rail line in Denmark which came into operation in May 2019. How was this developed?

Jan Schneider-Tilli: The passenger line between Copenhagen -Ringsbølle is one of the most significant projects in terms of infrastructure in Denmark. The decision was made to build it in 2010 with a new layout and has been allocated 1,5 billion euros. It has a length of 60 kilometres on double track and features a modern and futuristic station. The line is designed to reach travelling speeds of up to 250 km/h. It is part

of the traffic corridor serving Scandinavia and connecting Germany. With this new network, improved services, with more departures, reduced delays and shorter travelling times will be offered.

Mafex Magazine: Amongst the standout projects that are currently underway, we have the signalling project which will entail major changes. What does this programme consist of and how is it evolving?

Jan Erik Schneider-Tilli: With this programme, the aim is to seek the replacement of the entire signalling on the Banedanmark rail network. On the one hand, the main and regional lines (Fjernbane) are being fitted with the standard European system known as the European Rail Traffic Management System (ERTMS) level 2 baseline 3. On the other, CBTC (Communication Based Train Control) technology is being implemented on the S-Bane network in Copenhagen. Banedanmark works intensely to deploy the new systems, although the adaptation of the Danish railway in a complex process. According to the current plans, implantation of ERTMS will continue until its completion in the year 2030. Amongst the ad-

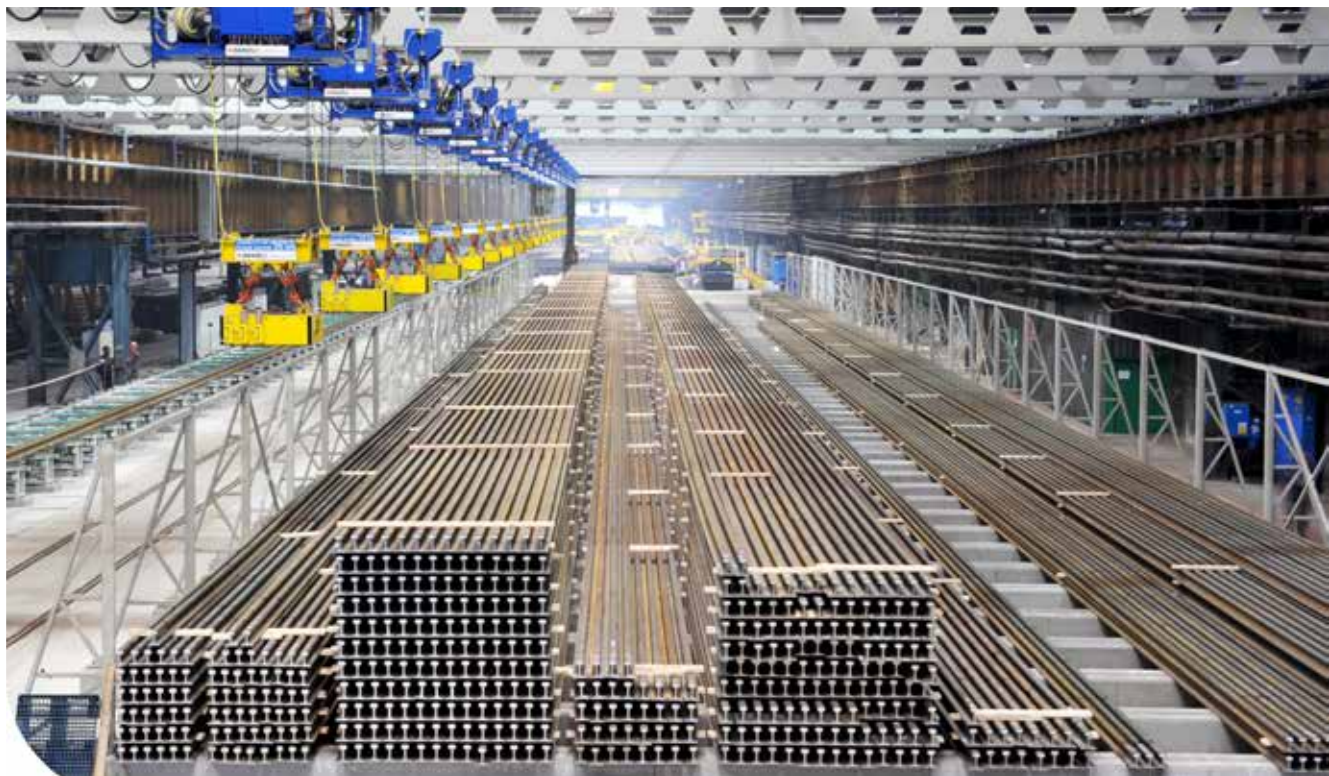
vantages of this modernisation, it is worth highlighting that fewer delays will be recorded, timekeeping will improve, and greater travelling speeds can be reached. In parallel, planning will be undertaken on the implantation of the Unmanned Train Operation (UTO) system on CBTC lines in Copenhagen.

Mafex Magazine: One of the main initiatives is the electrification programme.

Jan Schneider-Tilli: This is a large-scale project that encompasses the majority of the state-run Danish rail network. Through this project 1,362 kilometres will be electrified, with the majority being on double track. As of today, 1.756 kilometres of track have already been electrified, amongst which are included the main stretch between Øresund and Padborg through Storebælt and Lillebælt, as well as the connection between Tinglev-Sønderborg and København-Helsingør. Aside from this, the sections for København-Ringsted and Køge Nord-Næstved are also underway. During the coming years, work will begin on the networks for Ringsted-Holeby, Roskilde-Kalundborg, Fredericia-Aarhus, Aarhus-Aalborg, and presumably also Vejle-Struer and Aalborg-Frederikshavn.

SOME MAFEX MEMBERS WITH

PROJECTS IN SCANDINAVIAN COUNTRIES



ARCELORMITTAL

ArcelorMittal has supplied rails for Denmark’s first high-speed rail line, which was inaugurating in June 2019, connecting Scandinavia to the rest of Europe. The construction project comprises a

60-kilometre rail line between the cities of Copenhagen and Ringsted via Køge, allowing trains to travel at speeds of up to 250 km/h. ArcelorMittal has been producing high speed rails since 1990, with more than

1.500.000 tonnes, supplied, of this product. At present, it can supply individual bars up to 120 metres long with maximum reliability, geometrical precision, strict flatness and the highest quality on the market.

ARDANUY INGENIERÍA

Ardanuy Ingenieria is part of the largest Railway Project in Norway, the High-Speed “Follo” Line. The Consulting Firm was contracted by Dragados to carry out the Technical Assistance for the Review and Consulting of the Electromechanical Facilities found in the tunnel of this new Network. This is a large-scale project given that it includes constructing two twin tunnels each measuring 19.5 km long and with a diameter of 8.8 meters. The tunnels will connect the cities of Oslo and Ski. With the awarding of this contract, the Company once again continues to solidify its presence abroad. To date, Ardanuy has completed over 700 international projects.



CAF

CAF has several railway projects in the Scandinavian countries. On the one hand, the company has supplied its Urbos tram model for SL in Stockholm. In addition, CAF is the manufacturer of the units for the new tram network in the city of Lund. On the other hand, Sporveien, public operator of urban transport in Oslo, awarded CAF in 2018 the contract for the supply of 87 low-floor trams. It is one of the largest trams contracts obtained to date by CAF. Lastly, the company is supplying high-speed Oaris units for Flytoget in Norway.



CETEST

CETEST has significant experience in the execution of tests in Scandinavian territory. Among them, in Sweden, we should highlight the testing campaign on the Hermes prototype wagon, from Kiruna Wagon AB, as part of a European R&D project, also the special instrumentation

for the Bombardier’s C30 wheelset for Metro Stockholm, as well as the homologation campaign for the CAF’s Stockholm tram. In Norway, Flytoget Airport Express homologation campaign is currently being carried out, and the Oslo tramway homologation is planned, both for CAF. In

Denmark, dynamic behavior tests have been carried out this year in the Copenhagen metro for Hitachi Rail. And finally, in Finland, it is worth mentioning tests on a maintenance machine of Plasser for VR, and on a Matisa’s grinding machine, as well as the approval campaign of the Helsinki Metro of CAF.

SOME MAFEX MEMBERS WITH

PROJECTS IN SCANDINAVIAN COUNTRIES



IDOM
IDOM, an association of independent professionals working in the fields of Consulting, Engineering and Architecture, commenced activity in Scandinavia in 2013 on the Lund tramway, developing the concept, preliminary and tender documentation, including all disciplines. Since then, IDOM has picked up pace, and in 2018 establish a new office branch in Copenhagen (Denmark). In Sweden IDOM is currently working on the East Link high speed project, designing the 42 km section between the cities of Nyköping and Linköping for Trafikverket.

IDOM is additionally designing the Odense tramway and the Greater Copenhagen Light Rail (Hovedstadens Letbane, Line L and Line VBG Copenhagen), developing the detailed design and providing support during the construction phase, both in Denmark.

STADLER
Stadler has well proven experience in customizing rolling for the demanding climatic conditions in Scandinavia. The vehicles are manufactured to withstand the effects of the snow and ice and to operate at temperatures as low as -40° C. The first 8 EURO4000 locomotives manufactured in Valencia arrived to Norway in 2008 and at the beginning of 2020, 2 EURODUAL hybrid locomotives will arrive to the region. LRV from Stadler are running in Bergen (Norway) and soon they will also run in the Danish city of Odense. Stadler has supplied two types of rolling stock to Aarhus: conventional trams and hybrid tram-trains that can be operated also on the conventional heavy rail network.

FLIRT Nordic trains operate both in Sweden and in Norway. The Norwegian operator Vy has a fleet of 100 regional and long-distance trains that are also maintained by Stadler and the Swedish operator MTR Express has

6 trains. Currently, 33 double-decker trains KISS for the Swedish operator Transio and

22 EMU for the 891 mm gauge Roslagbanan suburban line are under construction.



TYPSA

The Stockholm Metro network is undergoing a major extension and the 'Extended Metro Administration' in 2014 entrusted DJV Sweco/Typsa with the design of the Southern and largest branch from the city centre southwards. The consultancy services contract includes for 11,5 km of new metro line and 7 stations, entirely built in rock tunnels with a maximum depth of 100m and a passage below the Baltic Sea. Sweco/Typsa's work commenced with Investigations and Conceptual Design for the complete section and now ongoing works are the Detailed Design and Tender Documents preparation for the different sections and stations. Contracts for preparatory works and 6 access tunnels have reached the market allowing for Construction start of the Blue



Southern branch in 2019. The tender of larger civil work contracts for main tunnels and stations will continue as per the Client's procurement plan.

nels and stations will continue as per the Client's procurement plan.



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Wales and Borders: The rebirth of rail services in Wales

THE WELSH RAILWAY IS ENAGED IN A NEW STAGE. SINCE 2018 AND FOR THE NEXT 15 YEARS A CONSORTIUM HEADED BY THE PRIVATE PUBLIC TRANSPORTATION OPERATOR KEOLIS AND THE SERVICE PROVIDER AMEY INFRASTRUCTURE SUPPORT ARE ENTRUSTED WITH ITS DEVELOPEMENT.

Transportation in Wales and its entire coastal area will experience great impetus over the next few years that will result in greater and better connections. This stage of transformation, planned with large investments, began on October 15, 2018, with the awarding by the Government of Wales of the railway services, over the next 15 years, to the consor-

tium formed by the private operator of public transport services, Keolis, and the infrastructure support service provider Amey.

Under the name of "Transport for Wales Rail Services", during this time, it will take over connections to all regions of Wales, as well as to communities along the border in England.

Transportation in Wales will undergo great momentum.

To complete the management of these routes, Keolis UK, which also manages Manchester Metrolink and Docklands Light Railway, plans to relocate its headquarters from London to Wales by 2019, and its global railway division from Paris to Wales by 2020.

Following the award of the contract by the Government of Wales, through the Ministry of Transportation, KeolisAmey, assumed the role of operator and Development Partner (ODP). It is a modality that combines network and infrastructure management.

Both parties have signed a collaboration agreement to cooperate in the improvement of the network, through investment in new infrastructure, the modernisation of the existing one, acquisition of new rolling stock for the total replacement of the current rail fleet, with modern trains and equipped with the state-of-the-art technology.

The Welsh Government wants rail connections to have been completely transformed and become a means of modern, fast transport with efficient routes within five years.

To this end, a massive investment programme has been launched with which the entire network will be revitalised. This plan includes the increase in services, the acquisition of new rolling stock, the implementation of innovative solutions and the overhaul of stations. These improvements are aimed at meeting the aims contained in the government document "Well-being of Future Generations (Wales) Act 2015".

From the Welsh Ministry of Economy they have announced that the global investment planned for this program is 5 billion pounds. One of the main actions, which will be allocated 823 million euros, will be the transforma-



tion of the lines to Treherbert, Aberdare, Merthyr Tydfil, Rhymney and Coryton. These funds will be used in the electrification works of 172 kilometres of roads and infrastructure improvements to increase the travel times and the frequency of the trains every hour.

Furthermore, 216 million euros will be invested in the improvement of stations and buildings and in the construction of at least five more. Additionally, an item of 16.7 million euros has been approved to make the foregoing more accessible. This section also includes the implemen-

tation of new technologies, such as a new assistance application called 'Turn up and Go' that will be operational in April 2020.

Improvement plans

The improvement plans also include the creation of 1,500 new parking spaces at stations and ticketing systems for the year 2023 with smart ticketing systems with new mobile payment options. More than 200 new vending machines will be acquired to improve access to the transport network. It is also expected that there will be free Wi-Fi in 85% of trips for the year 2024.

Another project planned is the installation of more than 700 information screens throughout the network and in other areas such as hospitals, schools and work areas.

The Welsh Government is committed to following the example of the Dutch railway and supplying renewable energy for supply at stations and electrification of overhead contact lines. Hence 100% of the energy used will come from clean sources. This plan will be completed with the recruitment of 600 employees that will be added to the current workforce; 200 of them acting as customer service support.

Frequency expansion

With regards to frequency expansion, in December 2019, 294 extra routes will be provided throughout Wales, which represents an increase of 61%. In December 2023, there will be another 285 additional services every

The Welsh Government wants rail connections to have been completely transformed in five years.



In the image above, an overview of the City of Cardiff.

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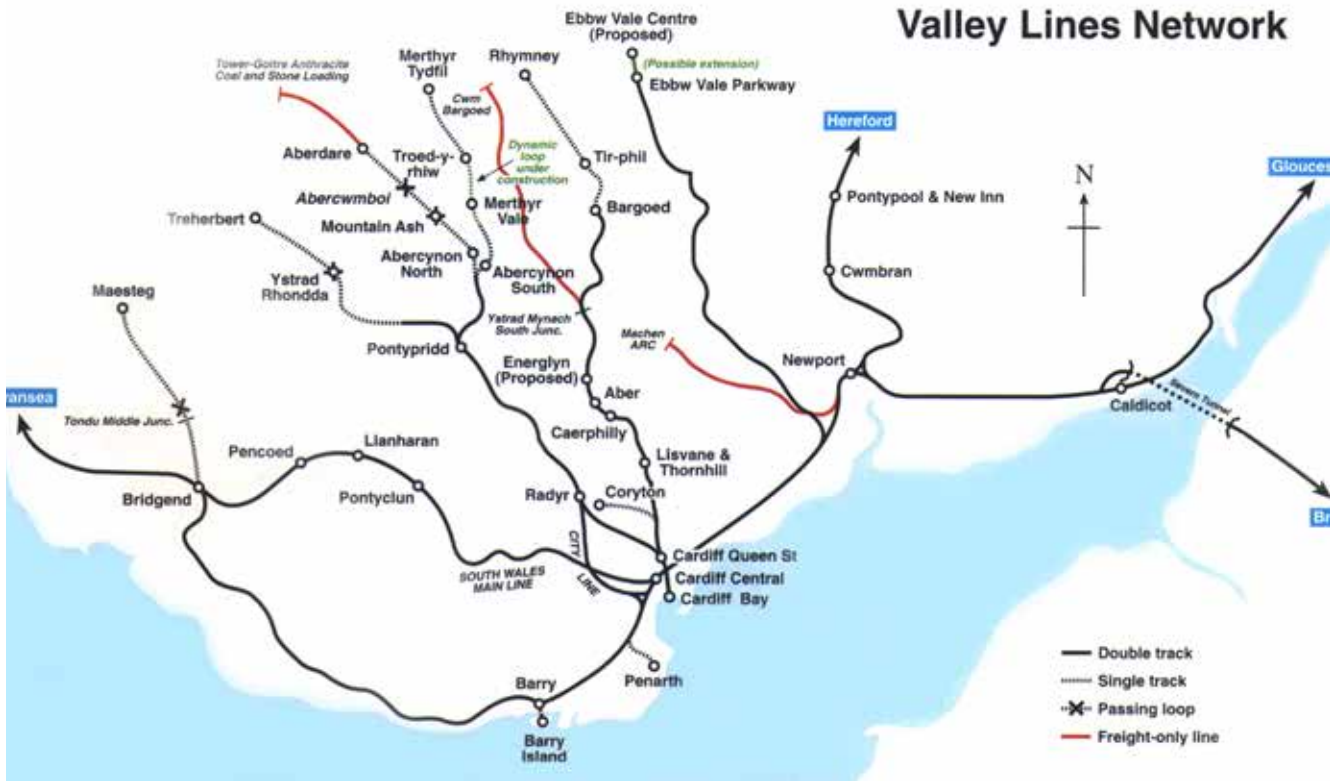
day of the week, an increase of 29% compared to current connections. These improvements include the Ebbw Vale, Cwmbran, Heart of Wales and the North Wales subway (Wrexham-Bidston) lines. To this is added the start-up of a new service that will connect Cardiff and Liverpool.

New trains
One of the big changes will be the renovation of 95% of the rolling

stock by 2023. To achieve this, an allocation of 892 million euros has been set aside for the acquisition of new state-of-the-art rolling stock. As the transport administration manager has specified, half of them will have to be built in Wales. This investment is due to the fact that the average age of the current trains on the routes being 27 years. In this new fleet, trains of three types will be included to complete the services of

Penarth, Barry and Bridgend to the north of Cardiff Central. In terms of the companies in charge of the renovated rail fleet, it should be noted that in August 2018 KeolisAmey selected CAF as a “preferred bidder” to bolster the lines of the Wales and Borders franchise with cutting-edge trains. This contract included the supply and maintenance of 44 units of two coaches and 26 units of three coaches, which, according to the scheduled calendar, will be operationally ready in September 2022. In addition, CAF will build another seven units of two coaches, which will be delivered in 2024. These are units based on the Civity UK platform. The vehicles are designed to be incorporated into regional and commuter services, have the latest security technology and meet high standards of comfort and accessibility. The assembly is carried out at the company’s facilities in Celtic Business Park, Newport (South Wales).

KeolisAmey has also commissioned the Stadler Rail Valencia company with 71 vehicles (36



Citilink-type battery-powered tram trains and 35 Flirt trains) to improve business operations in the Welsh network. Of this amount, the trams will be designed and manufactured in Albuixech and will be destined to operate on the line from Cardiff to the cities of Treherbert, Aberdare and Merthyr Tydfil from the year 2022. In turn, with regard to the Flirt trains, 11 of them will run on diesel and will be intended for use on the metropolitan rail services of Maesteg, Ebbw Vale and Cheltenham, in the south. The other 24 units will be incorporated into the routes that link

One of the major changes will be the renewal of 95% of rolling stock by the year 2023.

the Glamorgan Valley and destinations located north of the city of Cardiff and will have the possibility of running on diesel, power lines or batteries. Together with these two companies, Vivarail has also been selected to supply five of its 230 Class D-Trains.

North Wales
In the North Wales area, the programme includes numerous improvement actions. On one side, in 2022 the new fleet of diesel multiple units (DMU) was introduced on the north coast of Wales in 2022. To increase the capacity of the “North Wales Metro” network,

it will be invested in the renovation of the Shotton Station and Wrexham General stations from April 2024, the construction of new buildings in Blaenau Ffestiniog will be co-financed, and new ticket vending machines will be installed. Regarding new technology, an application will be developed so that users can find the cheapest fares available. Regarding frequencies, there is a new service to Chester to Liverpool Lime Street since May 2019, also from Liverpool to Llandudno and Shrewsbury and from Liverpool to Cardiff (1 train every 2 hours), in addition to direct services between Manchester Airport and Bangor.

Southwest Wales
Plans devised for south-east Wales include the replacement of the entire fleet of class 158 by new diesel multiple units (DMU) in the Cambrian line during the year 2022.

Amongst the improvement plans, the expansion of train frequencies is included.

CAF has been chosen to build new units for Wales.





The train will be the main means of transport in Wales in the coming years after the modernisation plans.

South Wales Metro Model, Stadler will supply 7 of these units.

A year later, new DMU units will also be incorporated on the route from Milford Haven to Manchester. For the "Heart of Wales" line, Class 170 coach units are being refurbished to enter into commercial operation in 2022. The improvement programme has set aside an allocation for the modernisation of the Carmarthen and Machynlleth stations, ready for 2021, and Llanelli for 2025. The number of train frequencies will also be strengthened on the Cambrian line from Shrewsbury to Aberystwyth, Heart of Wales and between Tywyn and Pwllheli. In addition, first class service from Swansea to Manchester will be established from 2024.

Southeast Wales

The changes will begin with the withdrawal of the Pacer model trains (Classes 140, 141, 142, 143 and 144) in December 2019. For their replacement, new vehicles will be incorporated in the year 2022 to the services of the valleys of Treherbert, Aberdare of the fleet. Alongside this are the plans to eliminate the use of diesel

on Central Metro lines by 2024. With regard to the bolstering of train frequencies, there will be a new stretch between Ebbw Vale and Newport for May 2021, and two more between Cardiff and Bridgend from December 2023 onwards. The scheduled services on the Rhymney route and the Treherbert network,

At least four new light rail stations will be built in Cardiff.

WALES AND BORDERS: IMPROVEMENT INVESTMENTS

PROJECT	AMOUNT M€
Electrification on the lines to Treherbert, Aberdare, Merthyr Tydfil, Rhymney and Coryton	823
Rolling stock renewal in 95% of the routes. (2023)	892
New stations, improvements to existing ones and buildings.	216
Station accessibility programme and implementation of the assistance application "turn up and go"	16.7

OTHER IMPROVEMENT ACTIONS SCHEDULED

- Smart ticketing systems (2023).
- Creation of 1,500 new parking spaces at stations.
- Free Wi-Fi on 85% of trips for the year 2024.
- Installation of more than 700 new information screens.
- Renewable energy in stations and electrification of overhead contact lines.
- Frequency extension: 285 additional services every day of the week in 2023.
- New service that will connect Cardiff and Liverpool.
- South Wales Underground Railway.

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between Merthyr Tydfil, Aberdare and Cardiff and Cardiff to Cheltenham.

Coastal Areas

The area on the coast will also benefit from the plans to boost the railways. For the year 2023, there will be new diesel multiple units (DMU) featuring two and three coaches in the connection between Milford Haven to Manchester. On long distance lines running Northbound-Southbound, 12 Mark IV coaches have been refurbished to improve user experiences on services from Cardiff to Holyhead via Shrewsbury. Upgrades are also planned for Chester Station.

South Wales Metropolitan Railway

Amongst the improvement proposals are also the plans for the South Wales Metropolitan Railway. This entails a major project that has as its aims the transformation of the transport system in the Cardiff capital region through the combination of different means of transport

At least four new stations will be built on the Cardiff light rail system.

(trains, buses, light rail systems) to provide swifter, more comfortable and frequent services. This network includes all of the lines to the north of Cardiff, those between Marches to Abergavenny, "Vale of Glamorgan" and the main de South Wales connection, along with the branch routes of Ebbw Valley and Maesteg. The project has been divided into two stages. The first, costing 77 million pounds, has already seen the undertaking of improvement tasks, and has achieved significant progress, such as the new stations at Ebbw Vale Town, which required an investment of 11.5 million pounds and improvements to rail and bus stations in the entire region (for example in Newport). In the beginning of July, a new miles-

tone was reached in this project, with the start of works to build a depot, costing 100 million pounds, which will centralise all South Wales Metropolitan Railway operations. Furthermore, at least four new stations will be built on the Cardiff light rail system (Gabalfa, Crwys Road, Loudoun Square and Flourish). The second stage, scheduled for 2026, will focus on the overhaul of the Valley Lines connections, with the electrification of 80% of its section, and the main railway network in the South. Improvements have been planned to the infrastructure at Rhymney, Coryton and Bay Line on the lines serving Treherbert, Aberdare and Merthyr thus allowing for the improvement of services, amongst other projected actions. 🚆

SOME MAFEX MEMBERS WITH PROJECTS IN WALES AND BORDERS

CAF

CAF is the manufacturer of the new diesel trains for the Wales & Borders franchise, to be operated by KeolisAmey. The contract includes the supply and maintenance of 51 units of two cars and 26 units of 3 cars. The trains are based on the Civity UK platform and they are equipped with the latest security technology, complying with the most demanding specifications in safety, interior design and confort. These units will be equipped with CAF's LeadMind solution for Predictive Maintenance, that gathers and centralises a wide range of train variables, alarms, performance, CMMS data together with third parties data providing real time insights and advanced analytics.



IDOM

IDOM has been established in the UK since

2001 and currently has 150 based professionals and 7 offices across the country, one of

them is in Cardiff (Wales). As a RISQS accredited company, IDOM's team are allowed to work for all UK RAIL administrations such as Network RAIL, TfW RAIL, TfL or HS2.

Just as a taste of IDOM's approach, they were finalist and highly commended in the RIBA international design ideas competition for Aesthetic Overhead Line Structures related to HS2. IDOM's proposal called the 'Needle System' was designed to minimise visual intrusion in environmentally sensitive areas and to complement the contemporary cutting-edge design of new HS2 stations. Needle System combines an elegant, slender asymmetric profile with practical, economical and robust.

STADLER

Stadler will supply 36 CITYLINK Tram-Trains and 35 FLIRT passenger trains to Transport for Wales Rail Services.

The 36 tram-trains that will operated on the Core Valley Line relying on 25 kV as well as battery power will be developed and manufactured by Stadler Valencia. The bidirectional three-car light rail vehicles cover tramway applications and full train regional operations at 100km/h. They have a length of 40 m, capacity for 257 passengers and 6 multifunctional areas for bicycles or for PRM. Of the 35 FLIRT units, 11 will be diesel-operated and used on South Wales Metro services. The other 24 FLIRT units will be tri-mode, ca-

pable of running on diesel, overhead electric wires and battery power. Coming on-stream in 2023, they will be powered by electricity to the north of Cardiff and diesel to the south, providing a cross-city connection.

The use of batteries on tram-trains and tri-modes is an innovative and cost-effective way of providing a fully electric, environmentally-friendly service north of Cardiff by enabling 'smart electrification' of the infrastructure.



Mafex will spearhead the European Project H2020 RailActivation

The project entitled RailActivation is framed within the H2020 invitation to bid and has as its main aim the creation and spearheading of an entrepreneurial and organisational scheme for the adoption of innovation-based strategies in the SME workplace, using the open innovation approach.

The future of our economy and society is closely linked to a model of techno-social organisation that is in tune with the needs that arise from data flows; gathering these via devices, ecosystems, infrastructures and connections of all types. The success of the new industrial revolution entails the use of the best technology available to the railway industry, placing special onus on the human factor.

With this aim, the RailActivation project will have a bearing on the development of new mechanisms and tools based on open innovation strategies that will lend support to the transformation of the railway industry from within towards the exterior. Open innovation is a paradigm that assumes that companies can benefit from external ideas / technologies (Outside-In) and valorise internal ideas / technologies (Inside-Out) to reduce the financial risks associated with innovation and rapidly obtain a competitive advantage. Open innovation entails boosting internal R&D and innovation through value chains based on the collaboration with the technological aspects on offer and demand within the network ecosystems and multiple collaboration efforts.

THE PROJECT'S MAIN AIM IS TO PROVIDE SUPPORT TO RAILWAY SMES IN THEIR TRANSFORMATION THROUGH THE CREATION AND ADOPTION OF OPEN INNOVATION STRATEGIES WITHIN ORGANISATIONS.

RailActivation pursues the alignment of entrepreneurial and innovation strategies. Therefore, the initiative implies changes for the company, in the entrepreneurial structure, the management of human resources, relations between clients and suppliers, even, in the workplace itself. At the same time, it means an improvement in the daily working conditions that leads to increased productivity and business volumes, improving thus companies' competitiveness, thereby driving entrepreneurial culture, through the open innovation approach.

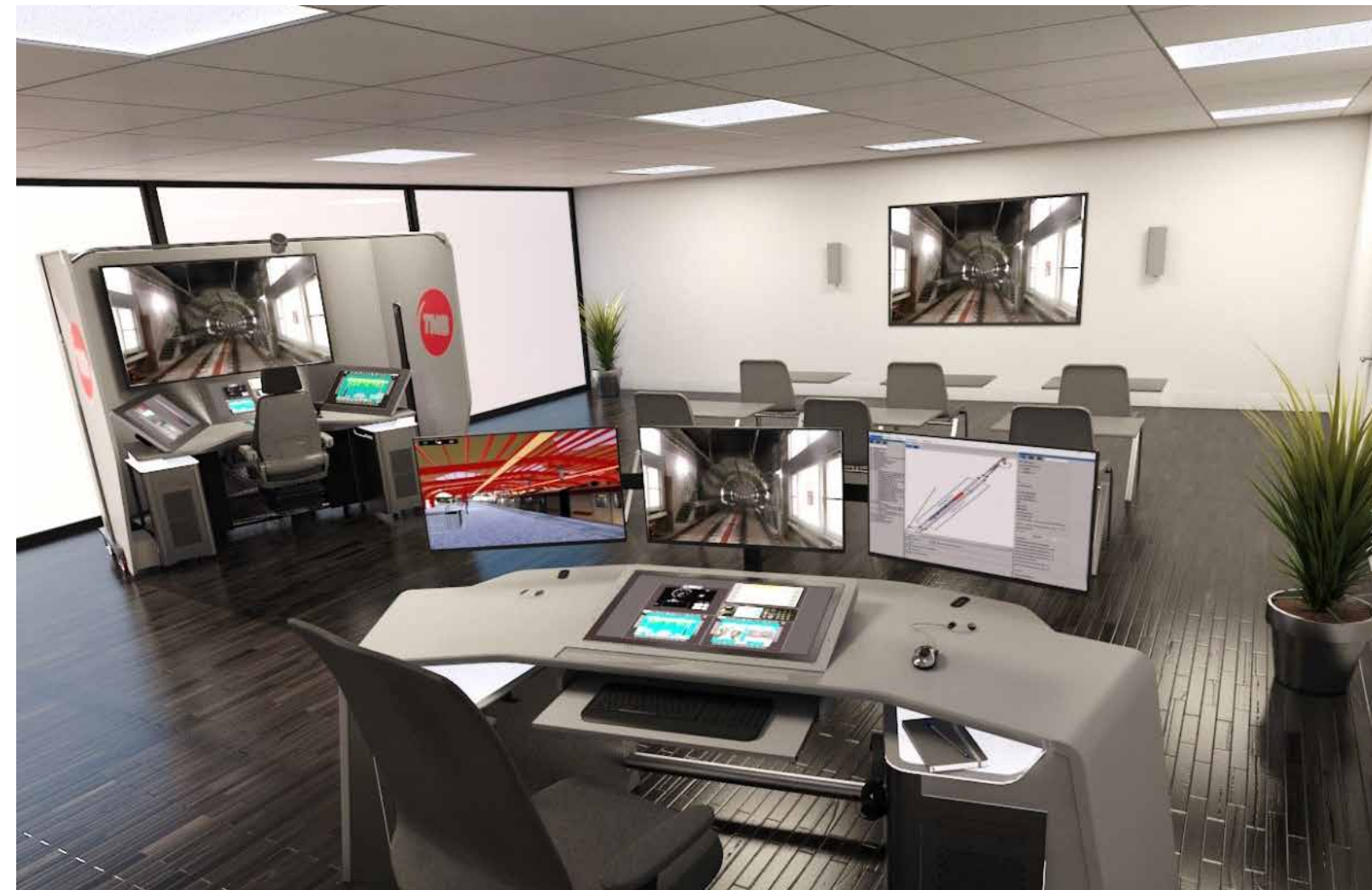
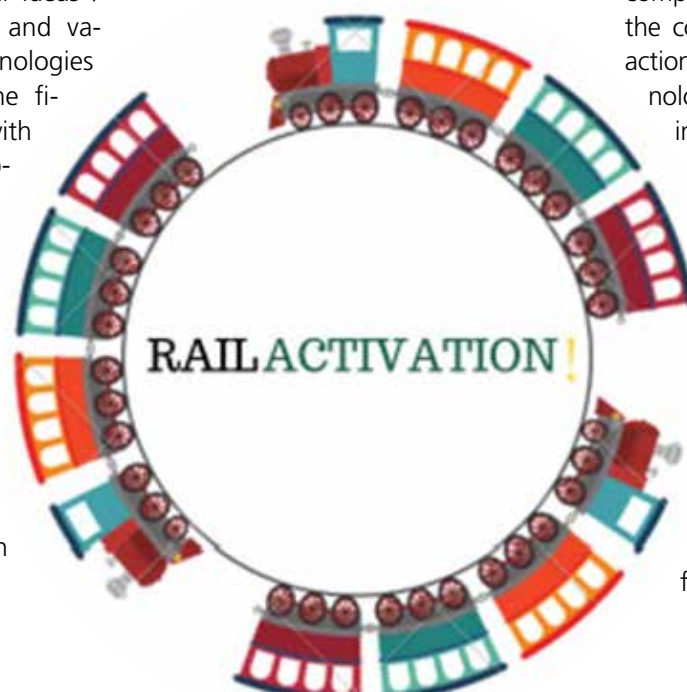
European Project spearheaded in Spain by Mafex

RailActivation is a project coordinated by Mafex, with a European consortium comprised of the Tecnalia technological centre, the Italian Cluster Ditecfer, the German Cluster BTS and the Italian technological centre QUINN. The project, whose execution com-

menced on September 1st, 2019, will run for 24 months, with the expectation that 20 railway SMEs benefit from the initiative.

Open innovation is increasingly recognised as a paradigm, not only for large-scale and hi-tech companies, but also other less intensive contexts involving technology, along with SMEs. The opening of the innovation processes has received major praise from professionals and academics alike. However, background research on open innovation, has focused mainly on large-scale hi-tech firms, along with certain studies that have analysed open innovation in the specific context of the SMEs, this being the sphere in which the large part of this methodology will delve deeper into through the RailActivation project.

This project means, therefore, progress in the backing MAFEX gives in terms of support to improved competitiveness in firms through the commissioning of collaborative actions and projects based on technological and non-technological innovation materials, as an example of entrepreneurial culture and working environments. RailActivation will allocate 75% of its budget to support the implementation of open innovation strategies in the selected SMEs, fostering the cooperation between European companies and similarly boosting the participation of SMEs in R&D financing programmes.



Alstom will develop an automatic driving simulator for Barcelona Metro

Alstom will develop for Barcelona Metro operator, TMB (Transports Metropolitans de Barcelona), a S9000 trains driving simulator, dedicated to lines 9 and 10, the unique driverless ones currently in operation in Spain. The solution will consist of a training system, including a virtual reality station, that incorporate the latest simulation technologies for routes, conditions and obstacles. The simulator will create real scenarios and situations employing the virtual reality technology already used by video games developers. This simulator, which includes a full-scale cabin reproduction of the Alstom's Metropolis S9000 train, will allow instruct operator technicians

ALSTOM WILL DEVELOP AN AUTOMATIC DRIVING SIMULATOR FOR BARCELONA METRO.

in a quick and efficient resolution of incidents on automatic lines, where the reaction time is key to prevent the network and the service being affected. Throughout this training, instructors will be able to simulate real traffic conditions and situations, inputting all kinds of variables, such as train faults, signalling conditions, environmental incidents, and even passenger density. Thus, technicians will be able to practice the skills required to solve incidents and maintain railway sa-

fety, without needing to stop traffic or perform power cuts on the metro lines. The tool will faithfully reproduce specific sections of the railway network with exact replicas of stations, junctions, signals, cables, points of interest, etc. Metro de Barcelona Lines 9 and 10 connect the city centre with other locations in the metropolitan area and the airport. The trains running on these lines belong to the Alstom's Metropolis platform and use an automatic driving system based on CBTC technology.

RailTraffic: Railway Operation Analysis Software

RailTraffic is an application which has been developed by Ardanuy Ingeniería. The tool allows railway companies to optimize their lines' performance through simulation of actual operational parameters.

Running Simulations

RailTraffic defines "service" as the route that the Rolling Stock takes from an initial chainage point to a final one. The application indicates three different aspects: starting speed, each one of the sections that the train passes through and stop time at each station. The simulations analyze the rolling stock's performance and obtains the following results: duration of the trip, train speed (instantaneous, acceleration and average speed); brake force and energy consumption, journey time between stations, etc. RailTraffic takes the following factors into account:

- Rolling Stock: weight and length, maximum speed, acceleration and deceleration curves during service, forward resistance curve, maximum tensile force curve, electrical/mechanical engine performance, maximum braking curve, regeneration

"RAILTRAFFIC" IS A SOFTWARE APPLICATION DEVELOPED BY ARDANUY INGENIERÍA WHICH ALLOWS RAILWAY COMPANIES TO OPTIMIZE THEIR LINES' PERFORMANCE.

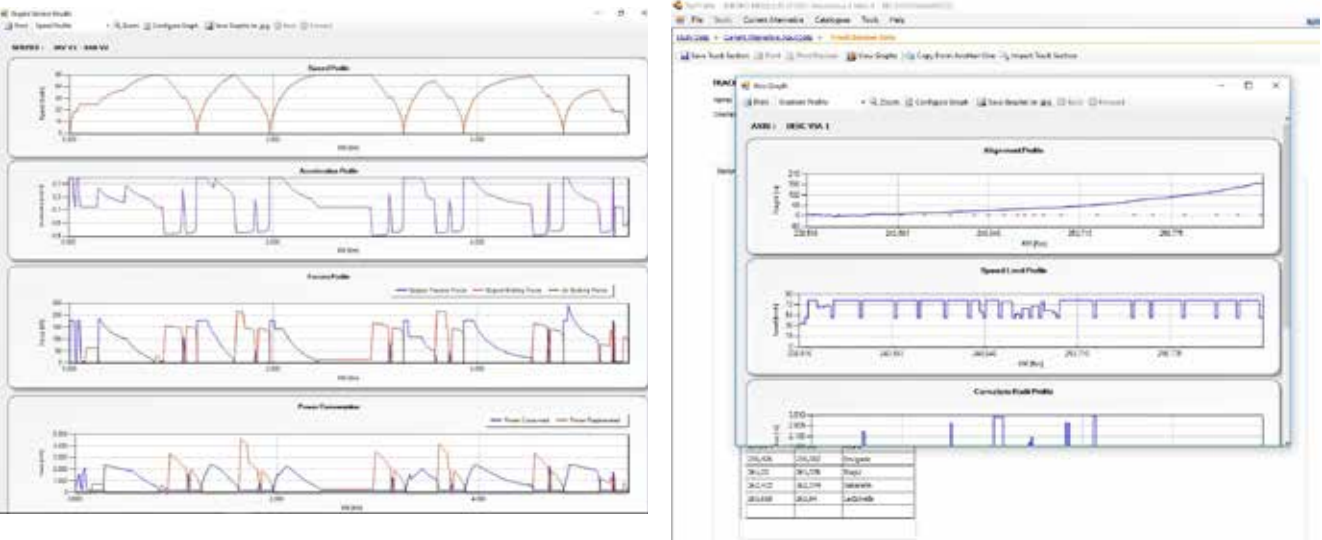
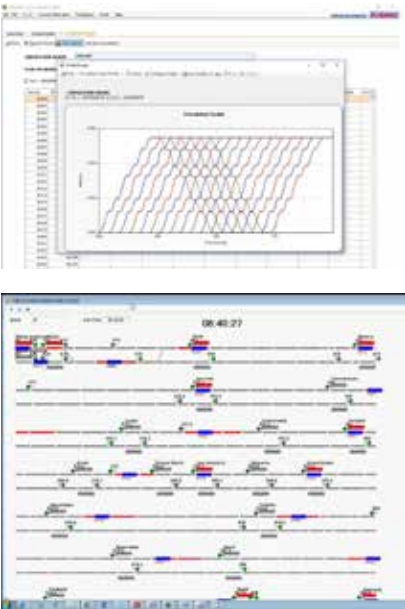
- braking performance, voltage current limitation curve, utilities power, etc.
- Infrastructure: alignment, location of the stations, slopes, tunnel areas, neutral zones, track outlines, etc.
- Operational Parameters: speed limits, stop time at the stations, turnout movement time, mesh Schedule (frequency), etc.
- Signalling System: type of signalling (ATP, target distance, mobile blocking, on-sight), minimum safety distance, location of the signals.

Results

The results obtained from simulations carried out using RailTraffic (service schedules and circulation graphs) are presented in the following ways:

- I. Numeric Data: diverse magnitudes (position, speed, acceleration, considerable stress, etc.) are calculated for each second of the simulation period. This information is then exported to an Excel spreadsheet for further analysis.

- II. II. Graphs: Railtraffic displays various types of graphs along with the results such as trip duration, speed and acceleration profiles according to distance, circulation scheme, etc. These graphs can be exported as images.
- III. Videos: Service routes and graphs can be analyzed using a display unit that shows the trains in motion as well as the busy track sections and signal status.



The New generation of rail propulsion and control systems

Bombardier Transportation introduced at the UITP summit in Stockholm, its new generation of BOMBARDIER MITRAC solutions, redesigned to minimize lifecycle costs, lessen damaging environmental impact and increase overall energy efficiency. The new portfolio includes three new generation technologies: MITRAC Power, MITRAC Pulse, and MITRAC Control. MITRAC Power encompasses the entire propulsion system and high voltage equipment, including air-cooled and water-cooled traction converters. The MITRAC Power 1500 converter achieves energy reductions of up to 35%, 19 dB lower noise emissions, and 25% lower lifecycle costs. MITRAC Pulse covers all energy management solutions, including on-board energy storage products. The

BOMBARDIER TRANSPORTATION INTRODUCED AT THE UITP SUMMIT IN STOCKHOLM, ITS NEW GENERATION OF BOMBARDIER MITRAC SOLUTIONS.

MITRAC Pulse traction battery is used in Bombardier's TALENT 3 BEMU version for catenary-free operations. The battery train has proven to be the most cost-effective and CO2-free alternative to diesel trains in terms of the total cost of ownership over the train's entire service life. MITRAC Control focuses on the Train Control and Management System (TCMS), coordinating the flow of information between the train and wayside systems. MITRAC Control solutions have been around for over 20 years and are continuously updated, maximizing the efficiency and the remote control of the gear.

The Center of Excellence in propulsion and railway control located in Trapaga, Basque Country, has been, and it is, involved in the development and supply of MITRAC propulsion gear. Their work has a presence in projects such as the Zefiro trains, São Paulo monorail, Spanish high-speed trains AVE S102, S112 and S130, Saudi Arabia's Haramain, TRAXX platforms (locomotives) and Talent3 (electric battery based train) or Madrid's and Rome's Metro system. In addition, the prototype of the MITRAC Power 1500 traction converter's, with silicium carbide semiconductors, was tested in the MO-VIA C20 metro vehicle in Stockholm.



LeadMind Energy Efficiency



Neoballast test section (on the left of the photo) between Sils and Maçanet (Girona).

CAF wants to continue promoting the leadership of the railway sector as the most efficient mode of transport from an environmental point of view. To this end, using digitalization and 4.0 technologies as levers, CAF seek to fulfill our commitment to sustainability while offering our clients the efficiency that provides them with competitive advantages in their corresponding services.

LeadMind, CAF's digital platform, regards and stores data from the train and others sources, classifies and compares massive amounts of information, identifies patterns and automates processes to reach the most efficient and profitable solutions; all from a simple interface, with the best user experience,

LEADMIND, CAF'S DIGITAL PLATFORM, CLASSIFIES AND COMPARES MASSIVE AMOUNTS OF INFORMATION.

designed by and for the railway sector.

One of LeadMind's most innovative modules is the Energy Efficiency one which allows the visualization of the fleet or specific Unit's consumption by mode of operation and driving. The dashboards offer in a quickly and structured way the energy consumed in traction, auxiliary systems and regenerated energy, showing its development over time according to date, driver, driving mode, route or normalized by kilometres. Allowing the solution's users to compare operating condi-

tions according to the route and be able to analyze the causes of anomalous consumption, providing a new approach of display their operation in order to make the best decisions. It is important to highlight that all the information is used by CAF to improve designs and develop energy-efficient trains.

LeadMind provides concrete and reliable information to implement action plans aimed at reducing energy consumption, thus achieving greater operational efficiency, increasing competitiveness and improving corporate image.

The Neoballast R&D project carries out its pilot test

COMSA's Technical and Innovation Area has launched the Neoballast pilot test, a new ballast developed by the company, in collaboration with Spanish, Belgian and Italian companies, as part of the European Union's "Fast Track to Innovation" programme. Neoballast is a new sustainable solution for ballast, the material used as a railway track support, consisting of conventional ballast aggregate coated with an advanced binder and end-of-life tyre dust. This new material has advanced properties: it has a longer service life and makes it possible to reduce the thickness of the platform, in addition to providing a better performance in terms of insulation against noise and vibration. The new ballast allows for greater energy dissipation and load distribution which, in turn, can lead to a

COMSA HAS LAUNCHED A NEW BALLAST WITH ADVANCED PROPERTIES

reduction in ballast layer thickness and less need for maintenance. According to the research data, it can result in a saving of 40% of the total cost of the track, including construction and maintenance.

As part of the activities performed to highlight the advantages of Neoballast in real conditions, a pilot test was carried out on a railway line open to traffic. Specifically, the test was conducted in June 2019 on a conventional Adif mixed passenger and freight traffic track between Sils and Maçanet de la Selva, in Girona. To this end, two sections have been built, one with Neoballast, and

another, contiguous to it, with normal ballast. On both sections, sensors have been installed to monitor the track position, its deflection and the reduction of noise and vibrations. As of September, there will be preliminary results from this comparative analysis.

Neoballast is a European project co-financed by the European Commission under the H2020 programme "Fast Track to Innovation". The consortium, led by COMSA, is made up of Mapei, D2S International, Sorigué and Talleres Felipe Verdés. It started in June 2016 and is scheduled for completion in November 2019.

Photoluminescent safety signs with improved anti-graffiti and anti-pollution performance

Currently, other than the question of whether graffiti is considered 'art' or 'vandalism', it is clear that graffiti making modifies the physical appearance of a space. So much so that, depending on the surroundings in which it has been done, it can lead to an immediate clean-up by the facility if this graffiti encroaches on a regulatory product, such as signage, photoluminescent or not, since the sign becomes unserviceable.

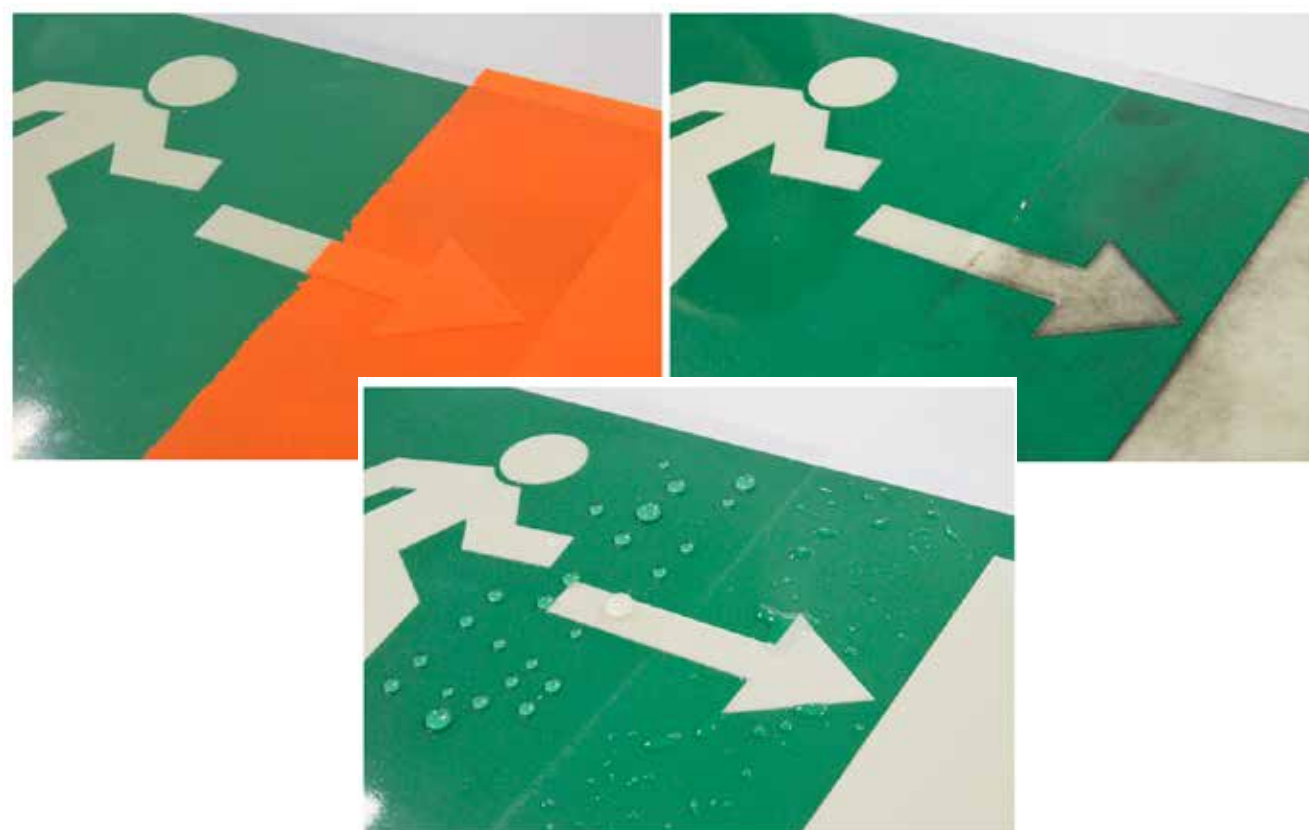
On the other hand, in places with poor ventilation, where contamination is significant, and cleaning services are minimal or non-existent, such as road or rail tunnels, the signaling is soiled easily by the deposits of airborne particles on its surface, even reaching the point where it no longer performs the function for which it was designed.

IMPLASER HAS DEVELOPED A NEW RANGE OF PHOTOLUMINESCENT SIGNALING WITH IMPROVED FEATURES ANTI-GRAFFITI AND ANTI-POLLUTION PERFORMANCE.

For this reason, it is of vital importance for the infrastructure to have effective and durable methods for the cleaning up graffiti and contamination while at the same time not imposing a high cost on the organization.

IMPLASER, a leading company in photoluminescent fire protection signaling products, is well aware of this problem and has developed in collaboration with TECNAN (TECNOLOGIA NAVARRA DE NANOPRODUCTOS, S.L.), a company

dedicated to the manufacture of advanced nanotechnological solutions, a new range of photoluminescent signaling with improved features that prolong the useful service life of signs. The product, based on the application of a nanotechnological coating on the signal surfaces, produces a kind of repellence property that makes it difficult for inks, paints and dust to become stuck. This makes cleaning easier and reduces maintenance costs.



Transforming Transport, the best European big data project

Transforming Transport, led by Indra has been awarded the prize for "best success story" among the 42 projects that promote digital transformation based on data in Europe, developed within the framework of the Big Data Value PPP, the public-private entity that directs the RDI strategy in big data to boost European leadership in this field.

This macro-project, in which Indra coordinated the work of 49 partners from nine European countries, has achieved significant results that will mark a turning point in the world of mobility, transport and logistics.

By facilitating the automated support of decision making, from big data and artificial intelligence, the solutions allow to operation and maintenance to be optimized; increase efficiency and productivity; improve the passenger experience; reduce energy consumption and polluting emissions; as well as facilitating the creation of new business models based on data.

Improvements of up to 60% in the operational efficiency of transport and up to 50% in asset management are the main results obtained in the

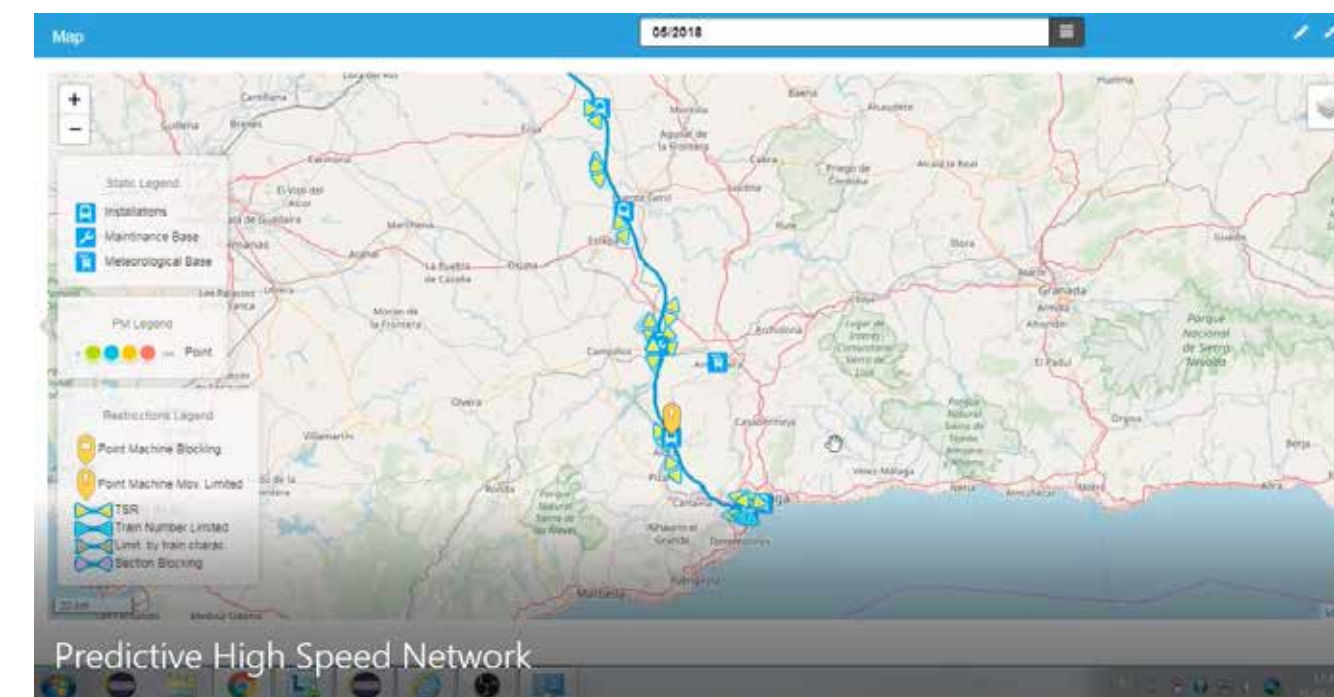
INDRA LEADS THE MACRO-PROJECT TRANSFORMING TRANSPORT. THAT INCLUDES THE WORK OF 49 PARTNERS FROM NINE EUROPEAN COUNTRIES.

13 pilots conducted in roads, ports, airports, railways and cities across Europe.

Thanks to predictive maintenance, it has been possible to reduce the maintenance costs of railway infrastructures by 34%, also minimizing service interruptions and improving passenger safety. The monthly number of interventions in maintenance was reduced by 15% and the monthly polluting emissions caused by rail was reduced by between 15% and 25%.

The project has made use of a total of 164 terabytes of data from 160 different data sources and it has established 130 KPIs, comparing the value before making use of big data technologies and after they have been implemented.

Due to the enormous advantages the solutions developed offer, some of the main infrastructure managers and transport operators in Europe who have been involved in Transforming Transport, want to continue using them.



MEMBERS DIRECTORY

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.
- ▶ 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

Systems, environmental, financial management and IT consulting

- ▶ Aquafriisch, 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.
- ▶ Teknorail - Grupo Eurofinsa
- ▶ TPF Getinsa Euroestudios, S.L
- ▶ Vicomtech

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.
- ▶ Teknorail - Grupo Eurofinsa
- ▶ Trigo Group

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.
- ▶ Sice Tecnología y Sistemas
- ▶ Tpf Getinsa Euroestudios, S.L
- ▶ Typsa - Técnica y Proyectos, 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.
- ▶ Trigo Group
- ▶ Teknorail Group

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.
- ▶ Teknorail Group
- ▶ Tpf Getinsa Euroestudios, S.L
- ▶ Typsa - Técnica y Proyectos, S.A.

Training and simulations tools

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

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.
- ▶ Artech (Electrotécnica Artech 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
- ▶ 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 Ingeniería, 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.
- ▶ Artech (Electrotécnica Artech Smart Grid, S.L.)
- ▶ Bombardier España
- ▶ Caf Power & Automation, S.L.U.

MEMBERS DIRECTORY

- 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.
- Artech (Electrotécnica Artech 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

- Artech (Electrotécnica Artech 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
- Metalocauchó, 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.

Safety

- Albatros, S.A.U.
- Alstom Transporte, S.A.
- Artech (Electrotécnica Artech 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
REFURBISHMENTInfrastructure 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.
- Artech (Electrotécnica Artech 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 Zitón

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

- Albatros, S.A.U.
- Alstom Transporte, S.A.
- Artech (Electrotécnica Artech 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.
- Artech (Electrotécnica Artech 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.

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
- Tecnival S.A.
- Sigma Rail



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
Available now for download
in your app store



rails.arcelormittal.com

**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.

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☎ +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.

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✉ +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)
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✉ +34 945 892 480
✉ comercial@amufer.es
🌐 www.amufer.es

**ARTECHE**

The Artech 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
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✉ marketing@artech.com
🌐 www.artech.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
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✉ 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.

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**AQUAFRISCH, S.L.**

Aquafrisch is a family business founded in 1996 that started as a company manufacturing and distributing water treatment and purification equipment.

Shortly after, she entered the field of maintenance of railway depots and began to manufacture washing machines for trains and various equipment for rail and metro.

Twenty years later, Aquafrisch is consolidated as a manufacturer of machinery for railway depots and water treatment, industrial and potabilization equipment. During these years, Aquafrisch spread throughout the national territory and is also very present in international markets.

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**ARCELOMITTAL**

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

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Energías, 2 pl. 33691 Gijón (ASTURIAS)
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✉ 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)
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✉ +34 91 799 45 01
✉ madrid@ardanuy.com
🌐 www.ardanuy.com

**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
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✉ +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
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☎ +34 976 729 900
✉ j.alzoriz@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.

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CAF POWER & AUTOMATION

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

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



CAF SIGNALLING, S.L

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

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

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 ☎ +34 91 661 37 51
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 🌐 www.cabsignalling.com



CAF TURKEY & ENGINEERING

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

🚩 Parque Científico y Tecnológico de Bizkaia, Laida Bidea, Ed. 205. 48170 Zamudio (VIZCAYA)
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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.

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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.

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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.

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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)
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 📧 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)
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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)
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CUNEXT COPPER INDUSTRIES

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

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 🌐 www.cunext.com



DANOBAT S.COOP.

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

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

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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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 🌐 www.dsaf.es

**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 than 56,000 m² for the design, manufacturing and assembling of turnout systems as well as machining and flash-butt welding of Mn steel crossings, machining of switches and stock rails. Besides, it designs and manufactures locking systems, fastening systems, wear devices, insulated glued joints and transition rails. Our products are installed in more than 21 countries.

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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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www.flexix.com

**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 many different applications and end-markets including ports, shipyards, steel mills, aluminium smelters, railway depots and heavy industries.

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www.gantrex.com

**GEMINIS LATHES, S.A.**

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

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geminislathes.com

**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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**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 possesses the expertise and experience to cover all the phases of a railway project (high speed, conventional, freight, metro, light rail, tramway, depot and workshops). From conception to commissioning and beyond and facing the challenges of an innovative, efficient and resilience Transport System. IDOM accompany the client by providing the correct technical assistance required for the decision making process.

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

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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, South America 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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**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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**INTERNACIONAL HISPACOLD, S.A.**

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

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

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

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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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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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www.newteksolidos.com



LUZNOR DESARROLLOS ELECTRONICOS, S.L.

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

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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 business.

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

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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 that have led to what we are today: PRETENORTE. Technologically, we have equipped our company in Vitoria-Gasteiz with the best state-of-the-art machinery. We continue to incorporate the latest novelties for your complete satisfaction. Pretenorte is highly specialised in pre-stressed steel and its many applications.

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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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REVENGA SMART SOLUTIONS

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

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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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🌐 www.satys.com



SEGULA TECHNOLOGIES

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

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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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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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STADLER RAIL VALENCIA, S.A.U.

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

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Talleres Alegría, s.a.

TALLERES ALEGRÍA, S.A.

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

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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 than 60 years of experience, has been pioneer and leader in the technological development of the Spanish railways, being one of the main suppliers of safety and telecommunication systems for the Spanish Railways Administrations and present in countries as Turkey, Mexico, Algeria, Malaysia and Morocco. Its activity goes from the development, manufacturing installation, commissioning to the maintenance of equipments and systems for railway signalling, train control, Telecommunication, Supervision ticketing and critical infrastructures security.

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TYPSPA

Founded in 1966, TYPSPA 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, TYPSPA 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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**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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**ZELEROS**

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

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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.

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