MAFEX
Mafex corporate magazine
Spanish Railway Association
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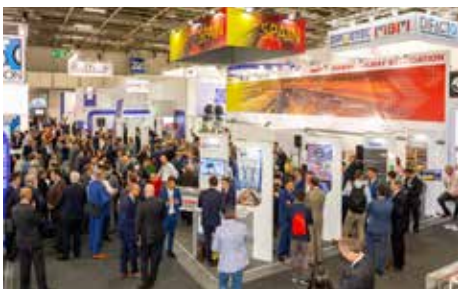
The Spanish railway industry consolidates its commitment to innovation

DESTINATION
Bolivia intensifies its plans to achieve a modern railway network.

INTERVIEW
Isabel Pardo de Vera Posada, President of the Railway Infrastructure Administrator (Adif).



MAFEX INFORMS
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Good results for the Spanish railway industry

Dear friends,

We are reaching the end of 2018 and in Mafex, we continue working on the growth, competitiveness and protection of the interests of the Spanish railway industry. In this regard, the assessment of the most recent activities is extremely positive. The participation at InnoTrans has created high expectations and has also helped to gauge new industry needs and to be aware of the main challenges that the industry is currently facing, such as the growth of cities, climate change, digitization and interoperability. These factors place the railway industry in a preferential position to become the axis around which future mobility revolves.

"Mafex reports" publishes in this edition an article on the development of this important world event in which Mafex coordinated, for the eighth time in succession, the joint participation of 50 Spanish companies, along with Adif and Renfe Operadora. The event was also attended by the Minister of Public Works, José Luis Ábalos, the President of Adif, Isabel Pardo de Vera, and the President of Renfe Operadora, Isaías Taboas, to support the Spanish railway industry.

This section also covers other news such as the good results obtained by the Technological Delegation organized by Mafex with the participation of 11 UK companies aimed to increase technological collaboration between Spain and the United Kingdom, offering the opportunity to understand the local ecosystem that supports innovation in both countries or the association plans for 2019, which will reinforce its competences in three strategic areas through the international, competitiveness and innovation and communication committees.

In addition, it should be noted that, within the competitiveness area, one of the latest steps has been the preparation of a position paper "Supporting railway R&D as a key factor to improve the competitiveness of the sector". It emphasizes the need to make a change to address the new challenges of the sector, such as digitization, automation, urbanization and climate change. To achieve this goal, it should be a commitment of government agencies in terms of innovation, an active presence in forums, in which its future is decided and developed, and the ongoing effort of private parties.

As usual, we also gather the latest news of the 11 associated companies, including the awarding of new projects, purchase of affiliates and appointments, among others, in the section "Partner News".

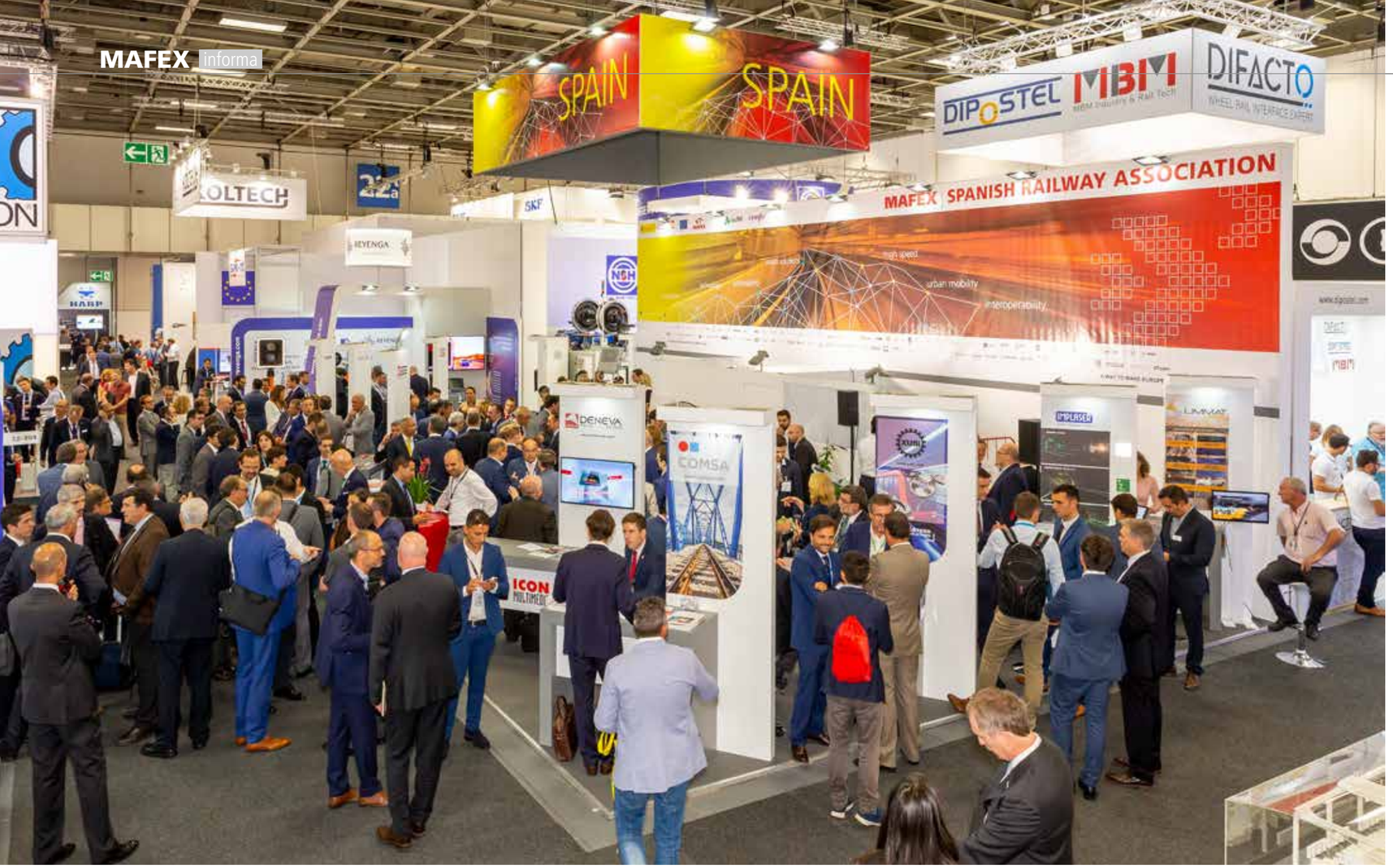
"Destination" includes a detailed analysis of the railway industry in Bolivia, a country in which railway will be one of the key elements included in the modernisation programs to boost passenger and freight connection. Among the most relevant projects is the Central Bi-Oceanic Corridor, whose importance lies in the great boost that will lead to the commercial exchange among neighbouring countries.

Other key issue discussed in "In Depth" section is Metro Lima and Callao's lines 3 and 4. These are two of the most relevant projects in terms of country's infrastructure due to their technical features and dimensions. Their implementation will lead to a satisfactory response to new mobility needs in these two urban centres.

In addition, five technological innovations developed by Mafex partners are included, which underline the great importance of R&D in the Spanish industry.

We hope that all these contents are of your interest and will help to get to know, once again, the latest news of the industry, the most recent advances and the technological developments in which we work to become railway a more efficient and sustainable transport.

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



InnoTrans 2018:

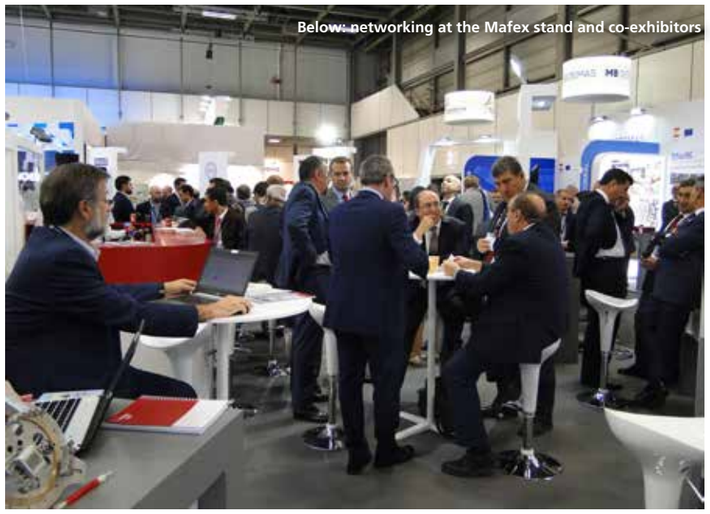
Railway innovation, taking centre stage at the Spanish Pavilion

MAFEX HAS COORDINATED, FOR THE 8TH CONSECUTIVE EDITION, THE PARTICIPATION OF 50 COMPANIES IN THE OFFICIAL SPANISH PAVILION, AMONGST WHICH RENFE AND ADIF WERE ALSO PARTICIPANTS.

The participation in Innotrans 2018 has achieved, once again, positive results for the Spanish railway sector. Under the auspice of Mafex, the Spanish Pavilion has been one of the most visited at the trade fair, due to the large number of technological innovations presented and the interest aroused amongst professionals from all over the world eager to find out more about know-how, the solid experience and the innovative advances of the exhibiting companies.

This edition has enjoyed the visit of the Minister of Minister of Public Works, José Luis Ábalos; President of Adif, Isabel Pardo de Vera and the President of Renfe, Isaías Táboas. Ábalos voiced his support to a very competitive industry, which has made its way around the world, thanks to its highly-skilled workforce and its firm commitment to R&D. In this regard, during his address at the Mafex stand, the minister stressed that "Spanish companies have become global leaders in the design, construction and management of railways." This excellence is demonstrated by the participation of these companies in railway projects throughout the world." He added, this is the reason the Spanish railway sector has become the flagship railway partner owing to its multiple qualities, its extensive technical knowledge, the highly-qualified nature of its experts, as well as the working synergy of the multidisciplinary teams, all of the foregoing evident in the planning, design and implementation of numerous transport systems.

The Spanish railway sector has become the preferred railway partner thanks to its multiple qualities.



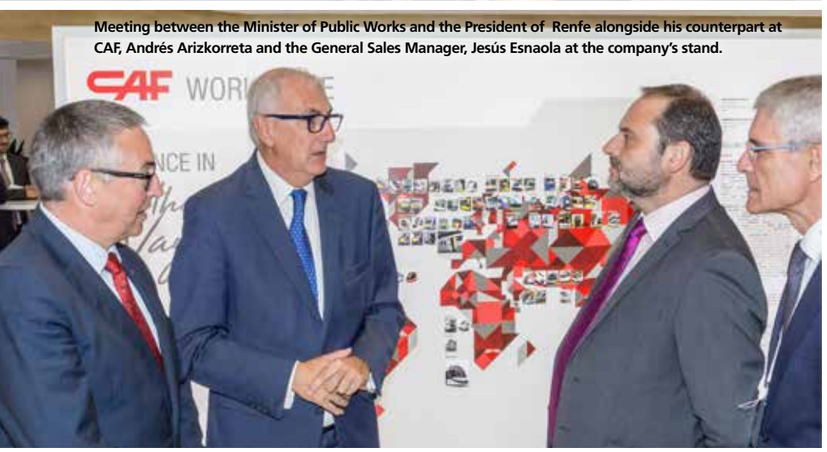
Below: networking at the Mafex stand and co-exhibitors

Mafex coordinated for the 3rd consecutive edition the participation of 50 companies in the official Pavilion, in addition to Renfe and Adif.

Antonio del Río, Head of Business - Transport and Alberto Herrero International BDM of ICON Multimedia attend a visitor.

From left to right, a selection of moments from meetings held by the companies; Enrique Sánchez and José Antonio Morales, Sales director and rail solutions director from the Integration and Engineering Projects BU of IKUSI, Inka Guixá, General Manager of La Farga, Angel Letosa, Head of LN Signalling and Security, Carlos López, Head of LN Transportes and Francesc Alavedra, Regional Manager for Catalonia and the Balearic Islands at SICE.

Víctor Ruiz, President of Mafex, making an address at the Association's Stand.



Meeting between the Minister of Public Works and the President of Renfe alongside his counterpart at CAF, Andrés Arizkorreta and the General Sales Manager, Jesús Esnaola at the company's stand.

A moment of the visit of the Minister of Public Works and the president of Renfe in Innotrans 2018 at the Stadler Rail stand alongside the President of Stadler Rail Valencia, Iñigo Parra and Group CEO, Thomas Ahlburg.

The wide-ranging delegation of this year was formed by companies such as: Adif, Albatros, Amurrio, Aquafrisch, Arcelormittal, Ardanuy Engineering, Electrotechnical Arteche Smartgrid, Ceit-IK4, Cetest, Colway railway, Comsa, Danobat, Duro Felguera Rail, Flexix, Funorsa, Gamarra, GMV, Goal Systems, Goratu Machine Tools, CAF Group, Icon Multimedia, Ikusi, Implaser, Ingeteam Power Technology, Indra, Transformers Industrial, Ineco, International Hispacold, Jez Rail Systems, Kelox, La Farga, Limmat, Lander Simulation and Training Solutions, MB Systems S. Coop, Metalocaucho, MGN Transformations of Rubber, Nem Solutions, Newtek Solids, Patents Talgo, Premium, Renfe Operadora, Revenga Smart Solutions, Segula, Sice, Workshops Alegría, Corral Machining Workshops, Tecnatom, Tecnivial, Telice, Teltronic, Thales Spain, Uromac Systems, UTE Ogi (Azvi - Tria), Virlab Testing Laboratory or Xubi Gears among others. Likewise, other multinational companies with facilities in Spain and also partners of Mafex such as Alstom, Bombardier, Siemens, Stadler or Thales, were present at the fair through the corporate stands of their parent companies.

For Mafex, the presence in the world's largest transportation showcase was a unique opportunity to analyse the priority factors in which the Association works for the global future of the railway. Amongst these, aspects such as sustainability, R&D, the digital ecosystem, and interoperability come to the fore.

One of the conclusions of this edition is that factors such as the growth of cities, climate change, digitalisation and interoperability place the train in a preferential position to become the axis on which the mobility of tomorrow turns.

The increase of the population in urban areas, for example, makes it necessary to look for more sustainable and environmentally friendly solutions, which is why it is necessary to continue with the defence of the railways to accomplish its being located in the main focus of the transport strategies in the long-term, as well as fostering their greater presence throughout the world.

At InnoTrans, the need to pay special attention to the rapid technological advances and the path towards digitalisation that take place in our times was also evident. Innovation is not an option, moreover an obligation and the aim is not to fall behind and take advantage of the great competitive advantages and opportunities to incorporate the most cutting-edge advances into production processes.

The Minister of Public Works, the President of Renfe, the President of Adif and the President of Bombardier Spain, Oscar Vázquez, at the Bombardier stand in Innotrans.

Moment from the meeting held with Kaspars Rokens, COO of RB Rail AS, and Kaspars Briškens, Head of Business Development, at the Association's stand next to senior management from CAF, Comsa, Sener along with Mafex's representation.

In this sense, fervent support in favour of European and Spanish R&D+i must be firmly championed.

Another point of debate in this edition was interoperability. A field that Mafex considers a priority and where it is necessary to move forward with the endeavours undertaken on a European level to achieve an open and integrated rail system that allows for the development of an increasingly competitive mode of transport.

The delegation of the Basque government integrated by the Deputy Minister of Infrastructures and Transport, Antonio Aiz, the head of SPRI, Alex Arriola, the director BTI- Spri Germany, Marta Sarricolea, the head of ETS, Aitor Garitano and Imanol Leza, CEO of Euskotren, together with the 30 Basque exhibiting companies in InnoTrans.

Mafex is **bolstered** and **committed** to new collaborative spaces, innovation and technological developments

THE SPANISH RAILWAY ASSOCIATION WILL CONTINUE ITS WORK GEARED TOWARDS THE PROMOTION, REPRESENTATION AND DEFENCE OF THE SECTOR IN 2019. IN THIS CONTEXT, AN INTENSE ACTIVITY SCHEDULE IS COMPLETED. FURTHERMORE, IT BOLSTERS ITS ACTIONS AS A FACILITATING AGENT THAT MAKES ITS ASSOCIATED COMPANIES MORE TECHNOLOGICALLY MORE ADVANCED PROVIDING THUS A DIFFERENTIATING ELEMENT.

Presently, the services and technology developed by the 86 members who form Mafex are present in 95 countries around the world. Their highly-qualified workforce, experience in special projects and its own know-how have made them preferential partners in the modernisation and expansion plans of transport networks over the five continents. The companies that are part of Mafex represented, according to official data, 75% of the Spanish exports of the sector in the year 2017. During that same year, they invoiced an amount of 14.5 billion euros. Referring exclusively to its railway activity, the amount stood at 5 billion euros.

The Spanish railway industry continues its positive growth path, but at the same time, it faces new global transport challenges such as sustainability, digitalisation, interoperability and foreign competition, amongst others.

To provide maximum support to its associates, Mafex will continue with its multiple tasks, with the ultimate goal of assisting companies in their internationalisation processes, and defending the general interests of their associated companies to achieve, through cooperation, the very highest standards of possible competitiveness for the same.

To achieve maximum results in all fields of interest, we have opted to strengthen actions in four major areas:

First, the International area, represented by the **International Committee** formed by 16 partner companies. Focused on the promotion of internationalisation and the identification of new opportunities for all members of the Association. In this context, one more year, a complete plan of activities of external promotion for 2019 is being worked on, which includes commercial delegations, fairs and study missions to markets of special interest to identify new opportunities. Within this programme, the organisation of the second edition in Bilbao of the trade fair "Rail Live!" will also be tackled in March or the "7th Mafex International Railway Convention" in June. The Committee also relies on the implementation of its own services, such as Colabora +, a Strategic Intelligence System and all the issues related to Commercial Policy. This last point is of special interest also to create new business opportunities and closely observe the commercial defence instruments, ensuring an effective protection of the interests of the Spanish railway sector and avoiding bad practices.

For its part, in the **area of Innovation**, the Competitiveness and Innovation Committee, recently renewed in October and comprised of 20 member companies, will continue in 2019 as a facilitator of activities that make its members more competitive, innovative and technologically advanced to offer thus a differentiating element. In this field, it is committed to the continuity of group work and cooperation to advance key aspects such as sustainability, digitisation and industry 4.0, the identification of strategic projects (technological surveillance) or the promotion of the implementation of new business management models.

Thirdly, **from the Marketing and Communications Division**, the line of action will be set out with regard to the continuity of the strategies of promotion and dissemination, both nationally and internationally, of the capabilities of the partners and of the Spanish railway sector. For this, we will continue working with the different channels and tools, such as positioning notes, Mafex magazine, RS, web, etc. In addition, different sector reports will be published annually, based on statistical data and topics of interest.

Finally, to boost the **defence of the interests of the Spanish Railway Sector from Mafex** is involved in different business and institutional forums such as UNIFE (Association of the European Railway Industry) or CEOE (Spanish Confederation of Business Organisations) as well as a regular collaboration with several public and private bodies and firms.

> The services and technology developed by the 86 members who form Mafex are present in 95 countries around the world.

Víctor Ruiz, re-elected as President of Mafex

Víctor Ruiz, an engineering graduate from the Polytechnic University of Madrid and currently CMO Rail & Special Sections of ArcelorMittal Europe-Long Products and President of Mafex since 2006, has been re-elected to continue to steer the chairmanship of Mafex for the period 2018-2022.

It is similarly noteworthy that in the renewal dated July 11, the Mafex management committee approved the appointment of three Vice-Presidents in order to strengthen the role of the Association; Luis Fernández, from the Thales Spain company, as first Vice-President, María Concepción Ortega from the company Idom, as second Vice-President and Pedro Fortea, current general director of the same, will also hold the position of executive Vice-President. These appointments form, together with President Victor Ruiz and Secretary Jaime Hernani, the latter being General Manager of the Agex Group, a federation which Mafex has been a member of the internal positions of the Association since its creation.

COMPETITIVENESS COMMITTEE 2019

- ALBATROS
- ARDANUY INGENIERÍA
- ARCELORMITTAL ESPAÑA
- BOMBARDIER ESPAÑA
- CAF
- ICON MULTIMEDIA
- IDOM
- IK4
- IKUSI
- IMPLASER
- INGETEAM POWER TECHNOLOGY
- INSERAIL
- LA FARGA
- MGN CAUCHO
- PATENTES TALGO
- SEGULA TECNOLOGÍAS ESPAÑA
- THALES ESPAÑA
- TECNATOM
- TRIA INGENIERIA
- TYPSA

> The companies that are part of Mafex represented, according to official data, 75% of the Spanish exports of the sector in the year 2017.

New Mafex partner: TRIGO GROUP Spain

Trigo Group Spain is a supplier of quality services dedicated to industrial sectors, throughout the supply chain. Founded in 2001, it offers quality assurance services in products, maintenance, industrial media management and metrology with more than 600 highly-skilled professionals. Within it there are already 81 companies, 1 university centre and 4 technological centres which add 86 members to Mafex.

> Over the last year, the companies that form Mafex invoiced the amount of 14.5 billion €, of which 5 billion corresponded to railway activities.

Technological delegation
to the United Kingdom

BETWEEN OCTOBER 1ST AND 5TH, MAFEX, THROUGH ITS COMPETITIVENESS COMMITTEE ORGANISED A TECHNOLOGICAL DELEGATION TO THE UNITED KINGDOM COMPOSED OF 11 SPANISH COMPANIES TO FIND OUT MORE ABOUT THE INNOVATION ECOSYSTEM IN THE BRITISH RAILWAY SECTOR.

The business delegation aimed to increase technological collaboration between Spain and the United Kingdom, offering the opportunity to understand the local ecosystem that supports innovation and receive real-time information on projects, prototypes, business plans, as well as explore and meet partners potential, through technological cooperation between the two countries.

Organised in tandem with the Department for Transport-DfT, the delegation began with a Technical Workshop on innovation in the United Kingdom, where speakers of renowned prestige participated. Spanish companies had the opportunity to learn first-hand the strategies and good practices of RSSB, HS2, Network Rail, Innovate UK, CDTI, and Transport For London. During the delegation, visits were made to the Centres of Excellence in Infrastructure (University of Southampton), Centre of Excellence in Digitalisation (University of Birmingham), and Rolling Stock Excellence Centre (University of Huddersfield), also counting on the participation of the UK Tram and having the chance to observe the different research lines that are carried out in each one of them.

A Tri-Country B2B Matchmaking Event was also carried out in collaboration with the English Rail Alliance Cluster and the German BTS Cluster within the framework of the RVE Expo in Derby with more than 40 meetings between the participating Spanish companies and the members of the different clusters of in attendance.

During the same trade fair, a workshop was also organised with Porterbrook, a company dedicated to the leasing of rolling stock where the Innovation Hub project that they have recently launched was presented.

Isabel Pardo de Vera Posada, President of the Railway Infrastructure Administrator (Adif).

"The railroad must remain steadfast at the forefront of technological development"

THE PRESIDENT OF ADIF, ISABEL PARDO, UNVEILS FUTURE PLANS AND ANALYSES THE KEY ASPECTS THAT HAVE TURNED THE INSTITUTION INTO A NATIONAL AND INTERNATIONAL BENCHMARK.

Mafex Magazine: Adif is a world leader in high speed rail. Furthermore, it appears as a leading expert in conventional line management, stations, deployment of signalling and security systems. What have been the keys to occupying this outstanding position? How are you planning to maintain it?

Isabel Pardo de Vera: The keys to the development of Adif and Adif AV as companies at the fore of the administration of railway infrastructures are based fundamentally on the work and continuous effort of all the workforce of both companies and on the determined commitment that the country as a whole makes to modernising the railway and guarantee a more sustainable model of mobility and thus guaranteeing territorial cohesion. The implementation of high-speed lines causes a dynamic effect in the whole railway network, including the conventional network, since the need to improve the performance of all connections that materialise from a new high-speed corridor allows us to multiply the positive effect of the infrastructure. And alongside this, all of the foregoing combined with the difficulty of the coexistence of different gauge widths, an issue that has been a challenge of constant innovation to be able to take full advantage of the whole railway network.

Our intention is to continue with the deployment of the high-speed network that is planned by the Ministry of Development, to consolidate national rail routes connected to the European high-speed network to ensure maximum performance, the highest levels of operational safety, unmatched reliability and the swiftest travelling times between all the regions. We also forecast a substantial improvement in metropolitan transport, since the problem of mobility is of greater complexity in the large metropolitan areas of our country. Under this scenario, commuter networks are basic elements in the guarantee of a universal and sustainable mobility that allows cities to continue growing in dynamism and habitability.

Mafex Magazine: In this new professional stage at the head of Adif, what aims have been flagged as priorities in terms of infrastructure, management, R & D, etc.?

Isabel Pardo de Vera: This new stage is clearly marked by a firm commitment to bolstering the role of Adif and Adif AV's actual workers. The commitment and dedication of the entire railway network is the best tool with which to face new challenges and achieve aims, which can be summarised in the pursuit of continuous improvement in all aspects:

- Improvements in infrastructure, so that any part of the railway networks (high speed, conventional, metric width) boast optimum conditions for railway operations
- Application of technological improvements in all areas, from project management, such as through the implementation of the BIM methodology throughout the entire life cycle of the infrastructure, to auscultation, monitoring of our assets.
- Improvements in conservation and maintenance, through asset management that allows the allocation of resources, which by definition are and will be scarce, in a rational and perfectly planned manner.
- Improvement in management, taking advantage of the possibilities posed by the technological innovations that make electronic administration possible, the automation of contracting processes, the use of energy in our buildings, etc ...

Ultimately, the basic aim is that Adif and Adif AV are companies in a process of permanent improvement, which incorporate the technical and methodological advances that enable a better service to railway operators, to citizens and all this guaranteeing the best use rational and efficient public resources that are invested in our sector.

Mafex Magazine: According to the new organisational structure of Adif, focused on five general directorates, what are the strategic priorities?

Isabel Pardo de Vera: Adif's new organisational structure seeks above all the maximum sustainability of the Spanish railway system and the viability of Adif as manager of the Railway Network of General Interest in the short, medium and long term, reinforcing the role of the conservation areas, capacity management and construction, meaning that each of these areas has become a General Directorate within the firm itself.

This reshuffle responds to the intention of granting each of these areas of activity greater weight within the company, with the necessary coordination between them. On the other hand, with the aim of providing efficiency, transversality and greater coordination to the productive and operational areas, the General Directorate of Strategic Planning and Projects has been created, with which it is intended to ensure the alignment and imbrication of those entrusted with applying Adif's Strategic Plan 2020 in all areas of the organisation.

The aim is also to align and provide viability and pragmatism the achievement of its objectives, integrating functional analysis and projects as an essential part of the planning process. The other major innovation is the creation of the General Directorate of Security, Processes and Corporate Systems, which is configured as a corporate area mainly focused on the safety culture in each and every one of the activities of the railway infrastructure manager, as well as in the standardisation and strengthening of all the processes and systems on which the work of the company is deployed and developed.

Furthermore, one of the characteristics that must be stressed in this new management structure is that it is composed mostly of managers with a long professional career within the company; people who know the firm inside out, its operation, areas for improvement and synergies that can be produced, and who are aware of the transversality that is required for the optimal functioning of the company. It is a very railway-based management team, which will provide all its knowledge and experience so that the company continues to improve.

Mafex: The high-speed corridors, as well as the maintenance of the network, are included in Adif's action plan. How is work progressing? In the project portfolio, will initiatives such as the Mediterranean Corridor or the Regional Rail Nuclei be given a boost? How important is the Atlantic Corridor?

Isabel Pardo de Vera: Currently, all the high-speed corridors whose development was commissioned by the Ministry of Public Works to Adif are under execution. Each of them is in a different phase, obviously, but it should be noted that the investment effort made by the company is ongoing and aimed at making available to the public the new infrastructure in the shortest possible timeframe, always ensuring that the new lines meet the highest safety standards.

Although it is complicated to synthesise the state of progress of all the high-speed actions that Adif is currently undertaking, a qualitative classification can be established as follows, without it being an exhaustive list of all investments in high-speed operations:

- Corridors that are mostly in the phase of platform works or due to start soon, such as the Murcia-Almería, Navarro corridor, the Basque 'Y', the stretch of the line between Pedralba Galicia and Taboadela (Ourense) and the Extremadura line, although in the latter they have already begun superstructure works in part of the route that runs through the Extremadura autonomous community.
- Corridors with superstructure works, in which the platform is practically finished or is being worked on an existing one, such as the Pajares bypass, La Encina-Xátiva-Valencia, Valencia-Castellón (2nd phase), and the Monforte- Murcia except for the underground works of Murcia.
- Lines with works in a highly advanced state, but still without having begun the testing phase, such as Venta de Baños-Burgos, and the Zamora-Pedralba de la Pradería section.
- Line in the testing phase prior to service start-up, whose authorisation is the responsibility of the State Railway Safety Agency: Antequera-Granada, Chamartín-Atocha-Torrejón de Velasco and Vandellós-Tarragona.

The new Adif organisational structure seeks above all the maximum sustainability of the railway system.

As for the rest of the issues, the momentum to the European strategic corridors is obviously maintained. The Mediterranean Corridor is a key infrastructure for the economic and social development of the entire peninsular Mediterranean arch and Adif is absolutely committed to advancing in all the sections that will come into being as the corridor from Algeciras to the French border with completion of work in the time horizon of the year 2023. Similarly, the Atlantic Corridor is the other major axis of European transport that connects the peninsula with the heart of the continent. The inclusion of new stretches of railway lines in this corridor will allow us to qualify for funding through European grants to standardise these lines to the standards set by the Interoperability Technical Specifications, and from Adif we will take advantage of all European funding that is accessible to improve our network.

To conclude, it is noteworthy that the plans of the Cercanías nuclei seek to introduce the necessary improvements in the metropolitan networks to guarantee the reliability of the facilities, the renewal of railway material and even the incorporation of duplications, extensions or new sections of line at certain points with a high level of congestion. All of the foregoing, with the aim of guaranteeing sustainable mobility in the most significant urban agglomerations of our country.

Adif considers investment in R&D+i to be a highly important element.

Mafex: Another important aspect will be the opening to competition of passenger transport, planned in the EU for 2020, with new private operators. Is the role of Adif key? What is your vision of this process from your position?

Isabel Pardo de Vera: Of course, the role of the Infrastructure Manager is absolutely pivotal in this process, as it is the responsibility of capacity allocation for railway operators in a transparent and non-discriminatory manner. It is also an essential function of the Infrastructure Administrator to manage the traffic of all railway operators, which must also be carried out in a non-discriminatory manner; the information generated during the management process of authorised traffic flows must also be made available to operators in a transparent manner and open to all of them. Likewise, maintenance and preservation activities must be adapted to the new context of liberalisation, in the sense that the Infrastructure Administrator must carry out a long-term planning of network maintenance and large-scale renovations, which must be planned be consulted with the railway operators that provide services as well as with the candidates that opt for the allocation of capacity in a certain line. Achieving adequate coordination in this regard is one of the challenges of the liberalisation process.

The position of Adif in this process is very limited by the Directives in which the fourth railway package is framed, as are the rest of European railway infrastructure managers. Yet, within this legislative framework that clearly sets out the duties of administrators in the new de-regulation scenario, and that is fundamentally based on guaranteeing the possibility of competition in national passenger transport through the implementation of application and capacity allocation processes, traffic management and carrying out maintenance tasks and renewal of the network, which are transparent and non-discriminatory, each Member State, each rail network, each national market has certain singularities that will condition in some way the way of implementation of liberalisation. On behalf of Adif, the aim is to pose a realistic scenario in relation to the immediate incorporation of new operators, and therefore we will try to promote framework agreements for capacity allocation, a tool provided in the directives that we believe allow us to ensure a certain stability and continuity for the applicants, for their financial planning, and optimisation of the capacity of the infrastructure for Adif itself.

The process of de-regulation of the national passenger transport market implies adapting to a more complex and dynamic relationship environment, in which, in addition, the Directives strengthen independence in the management of Infrastructure Managers as well as the role of the regulator, that in our country is represented by the National Commission of Markets and Competition. All stakeholders must adapt to this new scenario.

Mafex: From the Association we have been championing a greater support and participation of the Spanish public companies within the sector in the sphere of railway R&D+i. What do you think Adif's role will be in this matter?

Isabel Pardo de Vera: Adif considers investment in R&D+i as being a highly important element to achieve productivity improvements, amelioration in terms of management and operational enhancements that enable a more competitive and efficient rail sector. This need for cons-

tant improvement in any process must be perfectly aligned with research, development and innovation, so that investments in this area have a direct return for the company. Sometimes we think of R&D+i as something that has to revolutionise a certain sector, when in fact there are many ways to achieve small improvements in operations and management that, cumulatively, represent a significant leap in productivity, or in customer satisfaction, or in increments of the effectiveness in the use of scant available resources. All these improvements are also the result of R&D+i actions.

In any case, the railways must continue to be at the forefront of technological development, to continue being the representation of an efficient, safe, comfortable and reliable mode of transport, and at the same time to be able to offer better services in those areas where there is a margin of improvement to attract higher traffic volumes.

Mafex Magazine: Adif has also opened a solid path around the world with its wide range of comprehensive services. How do you value this process of knowledge transfer and the international growth of the organisation? Do you have prospects for the coming years?

Isabel Pardo de Vera: As a company responsible for the administration of the railway infrastructures of the Railway Network of General Interest of the State, Adif has a commitment and vocation of service fundamentally geared towards the citizenship of the State. International operations must be evaluated without losing sight of the situation indicated. In this sense, Adif must participate in all European and global forums in which ideas, knowledge and best practices are shared. Likewise, Adif's knowledge and management are highly valued by other administrations and private operators or managers, and for that reason the value of this knowledge and our working systems is very interesting for the company. However, we believe that the leading role in the international arena and in the business opportunities generated in the railway sector must fall to the private sector. Adif's position in the international arena is understood more from the point of view of the image of the Spanish railway sector and its global functioning as a system, acting as a link and traction of Spanish companies in a representative manner.

It is very valuable that companies in the sector are able to associate in an integrated way in groups such as Mafex.

Mafex Magazine: Precisely, in terms of internationalisation, the Spanish railway industry has established itself as a key partner of the administrations to carry out successful projects in the five continents. What importance does it attach to the collaboration between Adif and the business sector to continue to move forwards in the development of transport?

Isabel Pardo de Vera: Undoubtedly, this collaboration is essential to disseminate and raise awareness of the level of excellence of the Spanish railway industry, as indicated above. Our rail network and our rail sector serve as a model and are a benchmark for success in many countries, and we must continue to divulge this and show the capacity of our sector in the rest of the world, as that is the image that manages to generate the appropriate trustworthiness and then receive tenders and contracts in highly important projects.

Mafex Magazine: In this sense, the different stakeholders (official bodies, institutions, administrations, etc.) work very actively in supporting companies abroad. What do you think about the work in the railway field of associations such as Mafex?

Isabel Pardo de Vera: In a world as competitive as today's, and with an impressive degree of development in many countries, it is necessary for many companies, if not essential, to find the formula to find partners that allow them to tackle projects that increasingly grow in complexity, cost and demands. It is therefore very valuable that companies in the sector are able to associate in an integrated manner in groups such as Mafex, as this makes it easier to reach many more projects and markets, in short to open new business opportunities. At the same time, this type of association collaborates by offering a vision of efficiency and modernity of our country abroad.

Metrotenerife provides technical assistance in peru and ecuador

METROTENERIFE HOLDS ITS POSITION IN THE INTERNATIONAL MARKET WITH THE AWARD OF THE SERVICES OF TECHNICAL CONSULTANCY FOR THE CUENCA TRAM, IN ECUADOR, AND FOR THE RAILWAY LINE FROM LIMA TO CHOSICA, IN PERU.

Metrotenerife has finalised its contract with the Municipality of Cuenca, for monitoring and technical advice in the phases of pre-operation and operation of the new guided transport system in the city in Ecuador. This contract, in the sum of 3,500,000 dollars, has a duration of three years and six months.

On the other hand, Metrotenerife is also giving consultancy services in Peru for an engineering project on the Lima-Chosica railway corridor, of 41 kilometres in length, in order to analyse the re-adaptation of this line, currently exclusively for freight to a mixed high-capacity line for cargo and passengers. Metrotenerife is participating in this project, with a 60% holding, together with two partners, the Canarian (Spanish) company Trazas Ingeniería and the Peruvian company, Green Life S.A.C. The contract will be signed for an amount of €2,042,712.22 and an initial duration of six months.

The integral vision and the experience acquired by Metrotenerife in almost twenty years' activity and management has been decisive in its designation for the provision of technical assistance in the countries of Ecuador and Peru.

Alstom ships the first Citadis X05 Lusail tram manufactured in Barcelona

ALSTOM SPAIN

Alstom is shipping the first Citadis X05 trams for Lusail manufactured in Barcelona. The shipment of this first tram forms part of a contract to supply a turnkey tramway system for Lusail, which will include 28 Citadis tram sets, 23 of which will be manufactured in Barcelona. This is the second Citadis X05 project developed in Barcelona, once Santa Perpetua site has been nominated at a world reference center for the manufacturing of the latest generation Alstom trams. Last March, it was finished the first of the 54 trams for Sidney.

Currently, the site is producing metros for Lima, Panamá, Santo Domingo and Singapour, and trams for Lusail, Sidney and Frankfurt. The new tranway system is part of the ambitious infrastructure project taking place currently at the Emirate, who will host the 2022 FIFA World Cup. The tramways being manufactured at Barcelona would become part of the new sustainable mobility network in the city that will celebrate the main matches, such as the opening ceremony or the final game.

CETEST has provided more than 30 instrumented wheelsets so far this year

CETEST

The development of instrumented wheelsets is a growing activity within CETEST, that this year 2018 has beaten record with the instrumentation and calibration of more than 30 wheelsets for all types of vehicles.

Regarding EMUs, for example two wheelsets have been supplied to Kawasaki to test the LIRR EMU (NY), and another two wheelsets to Bombardier to test the double-deck M7 vehicle for the Belgium National Railways. Likewise, CETEST has provided instrumented wheelsets for the homologation of CAF projects in the United Kingdom: EMUs and DMUs for Northern Arriva and EMUs for Transpennine Express.

CETEST has also developed instrumented wheelsets for testing other type of vehicles such us Alstom´s electric locomotive in India, Boston tramway, high speed connection to the Oslo airport, (Flytoget), Metro Quito, maintenance machine for the swiss manufacturer Matisa, or a wagon for Greenbrier.

CETEST´s solution for instrumented wheelsets is being used around the world. Anywhere, Anytime.

Instrumented and calibrated wheelset by CETEST for Bombardier.

Óscar Vázquez, new president for the Canada-Spain Chamber of Commerce

BOMBARDIER TRANSPORTATION SPAIN

Óscar Vázquez has been appointed President in the last General Assembly of the Canadian Chamber of Commerce in Spain. The Spanish engineer, who currently chairs Bombardier Spain, has held several positions of responsibility in the company, both in Spain and in England, Austria, Singapore and Switzerland, as a member of the management committees of a large part of the divisions of Bombardier Transportation.

Óscar Vázquez thanked the chamber's assembly for their confidence in him. In this new role, the current Managing Director of the country and Chairman of the Board in Bombardier Spain will represent and promote bilateral relations, as well as strengthening trade links between Canada and Spain.

Vázquez has also had words of thanks for Alberto Echarri, who he replaces and who took stock of his ten years of management at the head of this body.

The Chamber of Commerce Canada-Spain (CCCE), is a non-profit entity that promotes trade and is aimed at strengthening relations between the two countries. Canada is the best valued investment destination by Spanish companies outside the European Union.

PT LEN and Teltronic will cooperate in the integration of ETCS and CBTC signalling over TETRA technology

TELTRONIC

PT LEN Industri, Indonesian state-owned company that provides electronic infrastructure solution, and Teltronic, a Spanish company specialized in the design, manufacturing, supply and maintenance of critical telecommunications systems, signed during InnoTrans a Memorandum of Understanding to explore a joint development for interface of LEN's ETCS and CBTC signalling system and Teltronic's TETRA and/or LTE telecommunication system.

Teltronic accumulates a wide experience in the integration with rail signalling systems, with references that have proven the efficiency of TETRA for this kind of services. This is possible through the Teltronic end-to-end solution that comprises of all the elements of the communications system, including system infrastructure, specialized on-board radios and user interfaces, and Control Centre specifically designed for transportation, CeCo-TRANS.

CAF closes the acquisition process on the polish firm Solaris

CAF

The process of acquiring the Polish firm Solaris Bus & Coach and its inclusion into the CAF Group was successfully closed yesterday.

After a closing period of over a month, and after obtaining the approval of the Polish and German Anti-Trust Authorities without any obligations or reservations for the parties, a definitive agreement has been reached whereby CAF acquires 100% of the shares of Solaris Bus & Coach.

This transaction will ensure the leadership of the CAF Group and Solaris in the supply of innovative solutions in urban public transport in Europe and will strengthen the position of both brands in the international markets

Carmen Librero, new president of Ineco

INECO

The Board of Directors of Ineco, at its meeting held on Friday, 28 September 2018, named Carmen Librero as the company's president.

She served as Secretary General of Transportation of the Ministry of Public Works between 2012 and 2018, having previously held other high-level positions in Aena, such as General Director of Air Navigation, Director of Engineering and Operation and Director of Planning, Economic Control and Management. She has also served as Transportation Advisor as part of Spain's Permanent Representation in the European Union.

Stadler secures contract in Ticino: nine tram-trains for the FLP

STADLER RAIL VALENCIA

Modern, bright Stadler tram-trains will soon be running on the regional line between Lugano and Ponte Tresa in Switzerland. Stadler and Ferrovie Luganesi SA (FLP) signed a contract for the delivery of nine metre-gauge TRAMLINK tram-trains. The order is linked to an option for 3 additional vehicles. Negotiations for a twenty-year maintenance contract for the vehicles are well under way.

Tram-trains are an intelligent cross between a tram and a train. There is no need for passengers to change from a tram to a regional rail vehicle on such a direct route. The TRAMLINK for the FLP is a seven-car bi-directional vehicle. It can reach a maximum speed of 80 km/h. The vehicle is 45.4 m-long and 2.4 m-wide and they meet the collision security standards for rail vehicle categories EN 15227 C-IV and C-III, scenario III.

These new trains represent a huge step forwards.

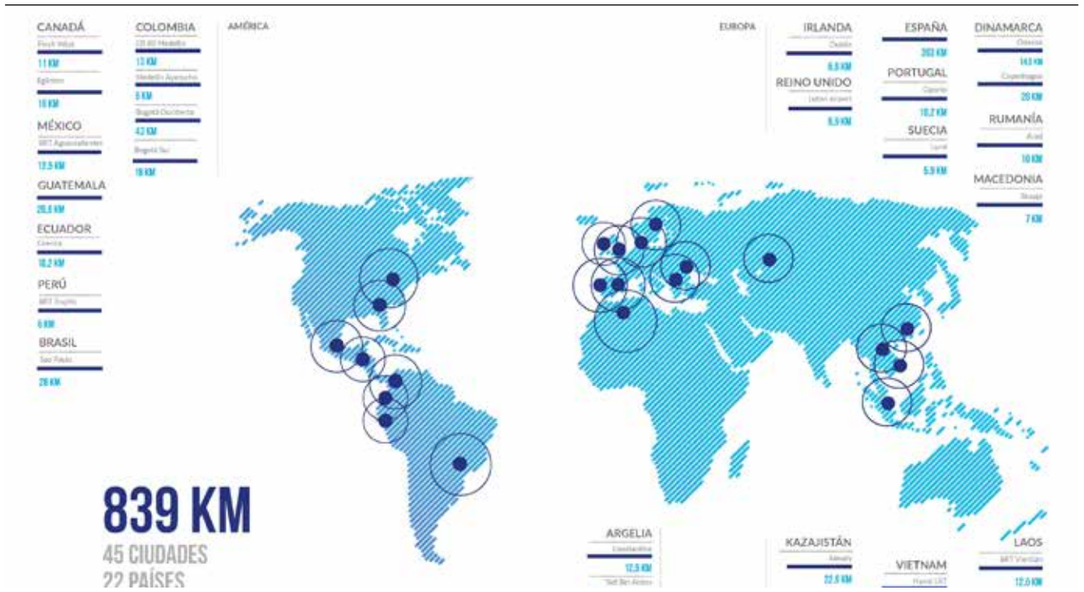
Up to 300 passengers can now experience a journey in air-conditioned vehicles with a low-floor design throughout that makes it easy for everyone, including those with limited mobility, to board and alight.

TPF Getinsa-Euroestudios to conduct studies for 2 monorail projects in Egypt

TPF GETINSA-EUROESTUDIOS

TPF GETINSA EUROESTUDIOS is participating in the preparation of the preliminary studies and tender documents for the construction of two monorail lines under an EPC+F+I contract scheme. The 6th of October City Rail Transit Monorail will have a length of 42 km, whereas the New Capital Rail transit Monorail will cover a distance of 52 km.

Greater Cairo and its surrounding areas are currently undergoing a process of urban transport infrastructure improvement, so these two monorail projects are expected to play a crucial role in enhancing urban development in the zone. Under this major contract, TPF GETINSA EUROESTUDIOS will deliver technical studies encompassing transportation issues, civil works and railway systems. The assignment also covers social-economic and legal assessments for tendering the works as well as the provision of technical assistance to the client during the tendering and negotiating procedures.



IDOM, designer of the RING 3 LRT Copenhagen in Denmark

IDOM

IDOM Consulting, Engineering and Architecture engineering, has been consolidated in recent years as a leading company in the design of major European urban transport. IDOM last successes was to have been chosen as designer of the Copenhagen LRT Ring 3. IDOM will be the designer of the winning builder group of CW-L Lyngy lot of 5.7 km long and the CW-VBG Vallensbæk/Brøndby/Glostrup lot of 12 km length.

These two projects join the Odense tram project in Denmark where IDOM has performed preliminary design and detailed design project and has already begun construction in 2018.

IDOM has developed more than 839 km of urban transport lines in 45 cities and 22 countries, including professional services from previous studies (alternatives, demand, traffic, financial and economic studies), preliminary and basic designs, operation and maintenance plans necessary for the bidding of the works and in some of them including the follow-up of the works and tests.

Mova Solutions, the innovative proposal by Indra for the transport sector

INDRA

Indra has presented Mova Solutions, its innovative offer to lead the way towards the future of mobility and technology in the transport sector. The proposal focuses on the new digital and integration capabilities, specialization and innovation demanded by the market combined with Indra's reliability, business know-how, transportation technology, and the unique experience of its team of professionals.

This combination has resulted in a portfolio of end-to-end solutions focused on leading smart mobility, which covers the entire cycle of our clients' transportation projects: from engineering and consulting to the solutions of collection, operation and control, security, communications, user experience and aftermarket services.

Indra's aim is to build the mobility of the future, to lead the transformation of mobility that drives the new digital environment, and strengthen its position as market leader and a key technology partner for its clients.

Limmat and its partner Gamba Konsulenttjenester enter into an agreement with Norske Tog

LIMMAT GROUP

The young Spanish engineering firm and railway 4.0 solutions provider, Limmat Group, together with its Norwegian partner, Gamba Konsulenttjenester, signed a framework agreement with the main Norwegian railway vehicle owner, Norske Tog, on Thursday September 27. The aim of the agreement is to provide technical advice and support to facilitate the modernization and maintenance of its fleet over the next four years.

This contract is part of Norske Tog's ambitious strategic plan to modernize its fleet in order to respond to changes in the Norwegian railway network and adapt to its modern and innovative market.

Ingeteam opens a new electrical equipment factory

INGETEAM

Ingeteam has acquired a plant for the manufacture of electronic power and control equipment, which will produce power converters directed at applications in the railway traction, mining, marine, steelmaking, generation plants, power grids and energy storage sectors. The facilities have a manufacturing floor space of 5,500 m^2 and a further 1,000 m2 of office space. This investment is in line with the forecasts for an increased demand for electrical control equipment in the various sectors in which the company operates.

The factory, located in the Basque Country (Spain), is to be fitted out for the work required by Ingeteam, with plans to start equipment production in January 2019 with a workforce of around 50 employees. Here, the complete power converter manufacturing cycle will be covered: supply chain management, industrialization, manufacture and quality control. The factory will also be equipped with the appropriate test benches for routine tests of the finished products and also tests on prototypes prior to type approval.

Also, a new test bench for railways traction systems was inaugurated early this year.

Bolivia reactivates its railway system

WITHIN THE FRAMEWORK OF THE "ECONOMIC AND SOCIAL DEVELOPMENT PLAN 2016-2020", THE RAILWAY WILL BE ONE OF THE FOCAL POINTS CONTAINED IN MODERNISATION PROGRAMMES IN ORDER TO BOOST PASSENGER AND FREIGHT CONNECTIONS. AMONGST THE MOST RELEVANT PROJECTS IS THE CENTRAL BI-OCEANIC CORRIDOR AND THE METROPOLITAN ELECTRIC TRAIN OF COCHABAMBA.

Bolivia, with a surface area of 1,098,581 km² and located in the central-western region of South America, boasts a strategic geographic location for cross-border territorial connections. It runs from the central Andes, through part of the Chaco, to the Amazon and has land borders the north and east with Brazil, the south with Paraguay and Argentina, and the west with Chile and Peru

The country has a population of 11,217,864 million inhabitants and has put the improvement of transport as one of its development aims towards the year 2020. Within these plans, the railway will be one of the focal points in the modernisation and booster programmes. Of all the initiatives envisaged, the Bioceanic Corridor stands out, due to its economic and trading importance, whilst serving as a driving force for the economy. The route, for which an investment of 8 billion dollars has been allocated, will connect the ports of Santos (Brazil) in the Atlantic and those of Ilo and Matarani (Peru) in the Pacific.

Structure

The Bolivian rail network has a length of 3,697 kilometres; that were completed in the 1950s. Presently, the infrastructure has changed very little, although small new sections have been included and improvements have been carried out in others on an ongoing basis. The tracks are of metric gauge throughout their extension, which allows for the interconnection with Brazil and Argentina on the eastern part, and for the western area interconnects with Chile and Peru.

The current infrastructure is partial (Cochabamba-Guaqui to the Pacific and Montero-Puerto Suarez to the Atlantic). The layout is divided into two large branches, which are not connected to each other: Andean and Oriental.

The improvement of the rail network forms part of the Government of Bolivia's plans.

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The first one is managed by the Andina S.A. Railway Company (FCASA). With this route, of 2,274 kilometres, the city of La Paz is linked with Chile (Charaña-Arica) and Peru (Guaqui), and Potosí with Chile (Avaroa-Antofagasta) and Argentina (Villazón-La Quiaca). In turn, the Eastern network, run by the Eastern Railway Company S.A. (FCOSA), connects the Bolivian city of Santa Cruz with Argentina (Yacuiba-Pocitos) and Brazil (Puerto Suárez-Quijarro-Corumbá), running through 1,244 kilometres.

Of these, 643 correspond to the eastern sector, while 539 belong to the southern sector and the other 62 kilometres belong to the northern branch.

The passenger services offered by the company are the Regional Train, Oriental Express, Southern Rail and the line of Rail-buses that allow for the integration of the populations of the Chiquitania, the Pantanal and the Bolivian Chaco. Furthermore, being a multimodal transport operator, it provides transport and logistics solutions. It manages and operates Puerto Continental, located in the town of Quijarro on the Paraguay-Parana Waterway.

Both companies were created in 1995, the date on which the National Company of State Railways (ENFE) was capitalised. This change meant that the government left operational control to FCASA and FCOSA, but not their ownership, which remains in the public sector.

Investment

The railway system constitutes for the Government of Bolivia, "A swift, cheap means of transportation and the mobilisation of important quantities of people and products, in a manner appropriate to the characteristics of the territory." For these reasons, the fostering of these networks has been included as one of its programmes' aims. In this sense, the "Economic and Social Development Plan 2016-2020" devotes 23% of its budget, 11.172 billion dollars, to investments in the infrastructure sector (roads, railways, ports airports, fluvial routes). For two years, work has been undertaken on the recovery and improvement of existing roads through refurbishment and maintenance actions, as well as the construction of new routes in order to articulate strategic territories of the country. The aim is for 100% of the Bolivian

RAILWAY NETWORK OF BOLIVIA: MAIN DATA

Extension	3,697 kilometres
Routes	- Andean Branch (2,274 kilometres) - Eastern Route (1,244 kilometres)
Major companies	- Andina S.A. Railway Company (FCASA). - Oriental S.A. Railway Company (FCOSA).
Investment in infrastructures (Economic and Social Development Plan 2016-2020)	11.172 billion dollars
Featured projects	- Bi-Oceanic Railway Corridor -Interconnection of railway networks - Modernisation of the Western network -Construction of branch for the Mutun steelworks project - Metropolitan train Cochabamba

"The Economic and Social Development Plan 2016-2020" devotes 23% of its budget to infrastructure.

The railroad, one of the transport nodes with the greatest momentum in Bolivia.

BOLIVIA

population to be integrated through transport systems in their different modalities.

The main actions in this period until 2020 focus on managing the construction of the Bi-Oceanic Railway Corridor, creating the company in charge of planning and managing the infrastructure, as well as carrying out the interconnection between the two railway branches (Western and Eastern). The renewal of the Western Network and the construction of the route that supports the development of the Mutun steelworks project (30 kilometres of the Motacucito-Mutun section, first stage amounting to 90 million dollars) are also amongst the plan's priorities.

The development of this plan has already obtained its initial results. In this period, progress has been made in the negotiations for the start of the Central Bi-Oceanic Railway Corridor (CFBC) Brazil-Bolivia-Peru that connects the Port of Santos (Brazil) with the Port of Ilo (Peru). Alongside this, the railway section for urban transport has been built in the departments of Cochabamba and Santa Cruz. Likewise, progress has been made in the construction of the Motacucito-Mutun-Puerto Busch section, a branch that will contribute to the development of the country's steel industry. To all this, the Montero-Bulo Bulo rail link is added, which will contribute to the interconnection of the CFBC.

The need to continue working on the maintenance of existing infrastructures, as well as the expansion plans foreseen for the coming years, makes Bolivia a destination of significant interest for those companies that want to contribute to the expansion, improvement and modernisation of transport in the country.

Bolivia is a destination of significant interest for those companies that want to contribute to the expansion, improvement and modernisation of transport in the country.

The Rail-Bus as it passes through the Sierra, Eastern Sector.

Freight transport: Towards an intermodal and competitive rail system

RailPictures. Image by David Gluber.

TO ACHIEVE A FREIGHT RAIL SYSTEM BOASTING GREATER CAPACITY, WORKS ARE UNDERWAY IN THE COUNTRY ON THE INTEGRATION OF THE TERRITORY THROUGH INTERMODAL TRANSPORT SYSTEMS AND IN CONNECTIONS WITH THE MAIN PORTS AND LOGISTIC NODES.

Bolivia is a large producer of raw materials, especially minerals, agricultural and forestry products. In general, owing to their large volume and weight, it is necessary to provide a transport service that facilitates the entire process, contributes to improving productivity and reduces road traffic. It is worthwhile highlighting that the country has a high potential as a logistic bridge between its two oceanic watersheds. A situation that affords sizeable business opportunities within and beyond its borders.

Nowadays, the rail freight system is configured through two networks that cover different areas. On the one hand, the western one that shifts mining products. This branch connects the extraction zones of Oruro and Potosí with the Chilean port of Antofagasta in the Pacific, and accesses Córdoba and Buenos Aires in Argentina. On the other hand, the eastern segment, where soy is transported, which allows the connection of eastern Bolivia with Argentina, through the border area of Yacuiba. The current load capacity per axis does not exceed 15 metric tons (MT), a figure that must be increased to cope with the volume of goods to be transported in the future.

Well aware of these new challenges and needs, the Government has also targeted the improvement of freight traffic. Thus, it is included in the "Economic and Social Development Plan 2016-2020". Within the chapter entitled "Universalisation of basic services" a section dedicated to rail transport is included.

Since the implementation of this plan, advancements have been made in the construction of the

BOLIVIA

Motacucito-Mutún-Puerto Busch railway section, which will contribute to the bolstering of the country's steel industry. Alongside this, up to 2020 work will continue on the construction of logistics platforms that allow for the integration of the national territory through intermodal transport systems (road, rail, river and air), for the benefit of producers, exporters and importers, strengthening connections between the different regions for commercial purposes and promoting distribution points to consumption centres.

To comply with the forecast result, as detailed in this development plan, a series of actions will also be implemented, such as the development of a "Logistics Infrastructure Plan" throughout the country, the advance in the design of the "Comprehensive Transport System" with a multimodal approach and specialist logistics infrastructure; in addition to the connection of the different modes of transport prioritising agricultural and mining products. The aim is to foster the integration of networks, forging links with the main ports and nodes (with intermodal platforms) and international transits.

New rail corridors

One of the key points that will contribute to the development of transnational logistics chains will be the future Central Bi-Oceanic Railway Corridor. With this project the transport capacity and the volume of freight that will be mobilised by rail will increase. Two of the main connections will be those established between the Port of Ilo and La Paz and between Santa Cruz and Puerto Quijarro. According to the market study, in 2021, 10 million tons / year will be mobilised, while in 2055, this figure will stand at 24 million.

Regarding the rolling stock to be acquired, the large volume that will be transported along with the diverse nature of the products (mineral bulk, liquid bulks, agricultural products, steel materials, cars, chemical products, containers, etc.) have also been borne in mind. Thus, the planned coaches will feature specific technical characteristics with a maximum length between hooks of 20 metres; a height of 5 metres and a maximum width of three metres. The trains will have a capacity of 4,000 gross tons, equivalent to 2,800 net tons. Each of them will be comprised of 40 wagons.

With a view to the future, the planned improvements in the transport of goods by rail will place Bolivia in a strategic centre for international trade.

Up to 2020, boosting intermodal transport systems will be worked on.

RailPictures. Image by David Gluber.

In the image, locomotives of the Eastern Railway company.

BOLIVIA

Intermodal transport will be strengthened with projects such as the Bi-Oceanic Railway Corridor.

Bi-Oceanic Railway Corridor:
Linking the Atlantic and Pacific by train

ONE OF THE MOST RELEVANT INTERNATIONAL TRANSPORT WORKS, BOTH FOR BOLIVIA AND NEIGHBOURING COUNTRIES LIKE BRAZIL AND PERU, IS THE CENTRAL BI-OCEANIC RAILWAY CORRIDOR (CFBC). THIS INITIATIVE AIMS TO JOIN THE PACIFIC OCEAN WITH THE ATLANTIC THROUGH A RAILWAY LINE RUNNING 3,755 KILOMETRES.

This project has also been dubbed "The Panama Canal of the 21st Century", and is already considered as the largest infrastructure project in Latin America. The journey will start in Puerto Santo (Brazil) entering Bolivia through Puerto Suárez, passing through the eastern municipalities of Santa Cruz: Montero and Bulo Bulo, until reaching the high plateau of La Paz, to conclude at the Port of Ilo, in Peru. On its way it will cross the Andes mountain range and the Bolivian Amazon Rain Forest. The estimated cost of the works is 13.7 billion dollars. This project aims to increase transport capacity to 10 million tons per year at around 100 kilometres per hour. With regard to passenger traffic, the estimated speed for the transport of up to six million users is 160 km/h, more than double the current one.

The significance of this new connection lies in the major boost it will give to trading exchanges between the surrounding countries, as well as in the increase that exports and imports will experience to other markets, by reducing costs and transport times. Likewise, it will be an axis of territorial integration that will foster economic and social cohesion, thus driving the evolution of the population, sustainable development and improving competitiveness. The corridor will become a bridge between the Atlantic and Pacific Oceans designed to consolidate regional connectivity conditions and take advantage of cross-border synergies.

Another of its great advantages for international trade is its increased outreach to the Asian market. In this

CFBC: STRATEGIC RAILWAY STUDIES

Study	Successful Bidder	Amount allocated
Study into Commercial Prospects, Market and Logistical Alternatives.	Consultrans- Tas Euro Projects -Contegral (Spain-Belgium-Bolivia).	792,449.90 dollars (679,456 euros).
Complementary study of layout alternatives, track design and final alignment. Preliminary basic design of the CFBC construction and operation costs.	Egis Rail - Egis international - Ghenova Ingenieria (France-Spain)	3,503,017.41 dollars (4,085,070 euros).
Strategic Study and Resulting Corridor.	Consultrans-Gondar- Spanish Railways Foundation (Spain)	1,200,000.00 dollars (1,399,390 euros).
Assessment Study Strategical Environment.	INECO-Cobodes (Spain-Bolivia)	354,438.16 dollars (303,899 euros)

***Source: Ministry of Public Works, Bolivian Services and Housing.**

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CFBC: Investments in Bolivia

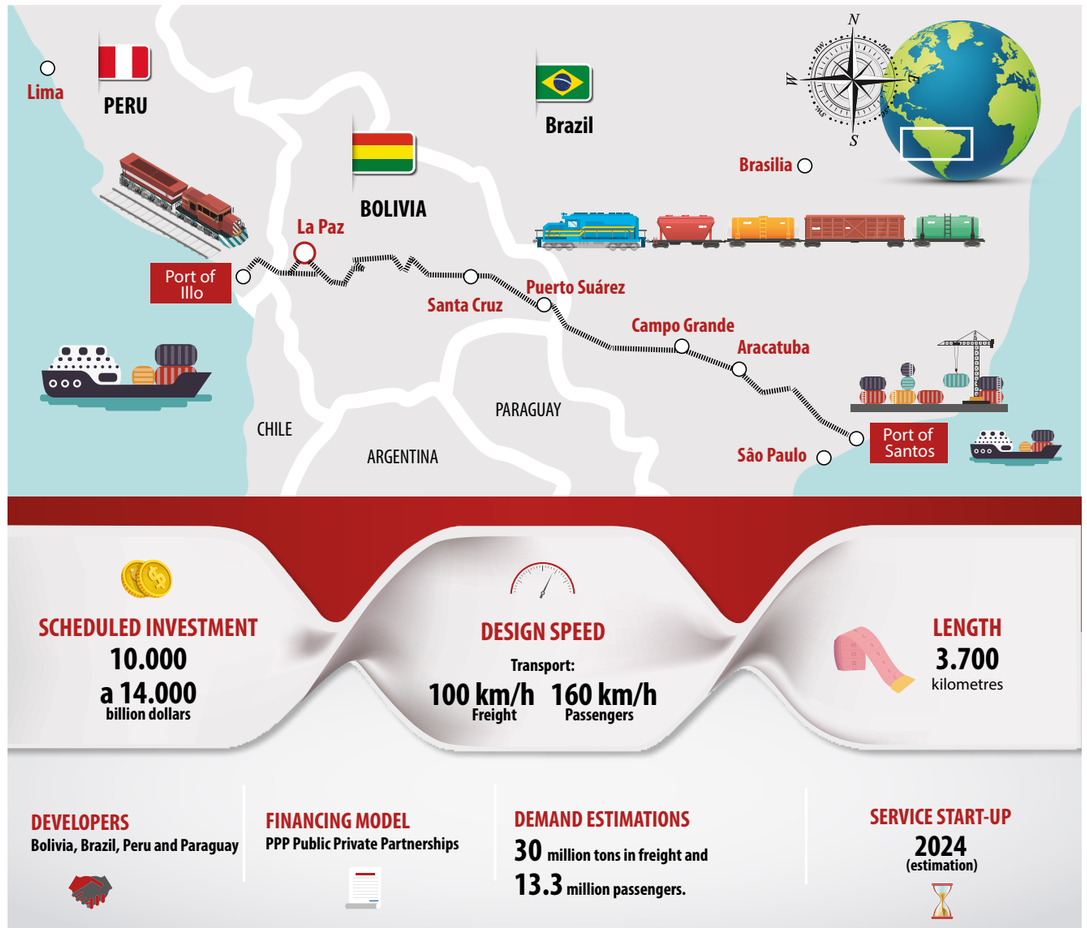
Description	Cost (M $ and €)
Investment in infrastructure	5,835.99
Section -Eastern Network	1,643.65
Section - Interconnection	2,820.67
Section-Andean Network	1,053.96
Investment in rolling stock	1,301.28
Locomotives	396
Coaches	473.28
Passenger train	432
Base maintenance costs	180.65
Infrastructure maintenance	129.80
Workshops / Depots	50.85
TOTAL INVESTMENT NECESSARY	7.000.21

This corridor will be an axis of territorial integration that will foster social economic cohesion.

sense, it is considered that the network would contribute to reduce to 25 days the journey between Brazil and Asia. In this way, the connection times would be considerably reduced.

In order for the entire 3,755 kilometre route to become operational, modernisation and expansion work must be carried out in the countries through which it will pass. On the one hand, in Brazil, 1,900 kilometres of track will be rehabilitated. On the other hand, the construction of another 340 kilometres is scheduled in Peru, between La Paz and the port of Ilo, the adaptation of the Brazilian infrastructure in the borders and the branch of Paraguay, which in turn would connect with Uruguay and Argentina. The bulk of the works will take place in Bolivia, through which 1,894 kilometres of the network will run.

In this territory, around 1,500 kilometres of track must be modernised or added. Precisely, it is in this country where the largest investment is planned (between 7 and 10 billion dollars / 8.163 and 11.661 billion euros) since it is necessary to connect its two rail networks (the Andean and the Eastern). Furthermore, 500 kilometres of network have to be built to connect Santa Cruz de la Sierra and Oruro / Cochabamba. In turn, the



BOLIVIA

railway infrastructure must be updated to improve operations, since tons per axle and a speed of 70 kilometres per hour for passengers and 40 for freight.

The construction of this transcontinental corridor is driven by Bolivia, along with Peru, Brazil, Paraguay and Uruguay. In addition, as indicated by the Bolivian Ministry of Public Works, Services and Housing, the project "is advancing at a steady pace" and has the international backing of countries such as Spain, Germany, Austria, Switzerland and the United Kingdom, with which there is already signed Memorandum of Understanding for technological and financial cooperation.

Project Background

The weight of this project has gained relevance in recent years. The reports began in 2013, with clear aims in line with the "National Development Plan of Bolivia". Amongst these, the bolstering of Latin American integration and the expansion of opportunities to access the advantages of a complementary neighbourhood.

In this context, the Ministry of Public Works, Services and Housing through the Deputy Ministry of Transportation, announced the construction of a first phase that included the "Railway Studies of the Pre-Investment Programme in Strategic Transportation Projects", through the Loan Agreement Number 2498 / BL-BO with the Inter-American Development Bank (IDB) for 6.8 million dollars (7,929,870 euros). The aim was to ascertain the technical, economic, social and environmental viability of the corridor. All of the foregoing was reflected in four reports: 1. Study into Commercial Prospects, Market and Logistical Alternatives; 2. Strategic Study and Resulting Corridor. 3. Strategic Environmental Assessment Study. 4. Complementary Study of Layout and Definitive Alignment Alternatives, Preliminary Basic Design of the CFBC, Construction and Operation Costs.

Amongst their findings, it is worthwhile highlighting that it is indicated that by the year 2021, 6.16 million passengers / year could be transported, with a service programme composed of 11 daily departures in each travelling direction. This figure would increase to 13.35 million passengers in 2055, which means an average annual growth rate of 2.3%. The main departure-arrival relationships are focused between Santa Cruz and Cochabamba and Santa Cruz Puerto Quijarro. With regard to freight rail, the volume that will be reached by 2021 is estimated at 9.9 million tons. An amount that will be exceeded until reaching a maximum of 24.2 million tons by 2055, in line with forecasts. In this case, as indicated by the Ministry of Public Works, Services and Housing, the most important origin / destination relationships within the corridor are those between the Port of Ilo and La Paz and between Santa Cruz and Puerto Quijarro. In terms of signalling, a global configuration is intended for the entire corridor, which envisages two locations for the Central Control Post (CCP) and Centralised Traffic Control (CTC). The first one in Cochabamba and the other in Santa Cruz.

The line has been designed using conventional signalling and a CTC for the centralised remote control of the security installations. An ATP system (Automatic Train Protection) ASFA model (Signal Announcement and Automatic Braking) will also be installed. The communications system would be formed by a longitudinal fibre optic line and fixed and mobile networks. With regard to the rolling stock, at the end of 2017, the Andina-FCA Railway Company awarded Stadler Valencia the tender for the supply of three state-of-the-art SALi locomotives. Due to their design and performance levels, they will become the benchmark in this corridor. In the last two years there have been a series of agreements that have given a major boost to the project. In September 2017, the "First Plenary Meeting of the Bi-Oceanic Operating Group (GOB)" was held. In this event, in San Benito (Cochabamba), there were delegations from all the countries that are involved in the development of the future corridor. Germany, Argentina, Austria, Bolivia, Brazil, Spain, Italy, Paraguay, Peru, Switzerland and Uruguay were interested in knowing the results of the technical roundtables set up to delimit the characteristics of the works.

In June 2018, the ministers of the transport area of the five participating countries (Peru, Bolivia, Brazil, Paraguay and Uruguay) met in Lima to evaluate the technical and financial studies already completed, with a view to commencing works in 2019. According to the Bolivian minister of Public Works, Milton Claros, the act served to advance in the selection of the most suitable financial options for the project with an estimated cost between 7 and 10 billion dollars, confirming that a Swiss-German consortium proposal is on the table, along with expressions of interest from the United Kingdom and Spain, among others.

At the end of August 2018, the President of Spain, Pedro Sánchez, signed a "Memorandum of Understanding" in Santa Cruz, which opened the door to the participation of Spanish companies in the construction of this mega-project.

The most recent step took place in September of this year, in Innotrans, where Bolivia has submitted to the international sector the project with the highest potential in Latin America. The challenge for the countries involved now is to start work in 2019.

CENTRAL BI-OCEANIC RAILWAY CORRIDOR (CFBC)

Design Parameters	
Maximum slope	25 thousandths
Minimum curve radius	300 m
Maximum speed	100 km / h (freight trains) 160 km / h (passenger trains)
Load per axle	25 tons
Rails	54 Kg/m
Sleepers	1,000 mm
Maximum cant	160 mm
Type of traction	Diesel
Locomotives	56 (Year 2021) and 132 (Year 2055)
Coaches	2,320 (Year 2021) 5,568 (Year 2055)
Trains	22 (Year 2021) 48 (Year 2055)
Main freight transport terminals	Viacha, Puerto Suarez, Santa Cruz, Santivañez-Cochabamba, Oruro.
Secondary freight transport terminals	Pailón, S. José de Chiquitos, Bulo Bulo, Buen Retiro.
Main passenger stations	Puerto Suárez, Santa Cruz, Cochabamba, Oruro, La Paz.
Secondary passenger stations	Carmen Rivero, Robore, S. Jose de Chiquitos, Montero, Cotoca, Puerto Pailas.
Passengers / year	6,169,709 (2021) 13,353,511 (2025)

***Source: Ministry of Public Works, Bolivian Services and Housing.**

***Source: Ministry of Public Works, Bolivian Services and Housing.**

CORRIDOR DATA

CORRIDOR	WIDTH (MM)	INTEROCEANIC PORTS	LENGTH	INVESTMENT (M $ AND €)	REMARKS
Central Bi-Oceanic Railway Corridor (BRAZIL-BOLIVIA -PERU)	1,000	Puerto de Santos (Brazil). Puerto de Ilo (Peru).	3,750	7,000	The project is part of the IIRSA's prioritised portfolio.
North Trans Continental Corridor (BRAZIL-PERU)	1,435	Puerto Do Acu (Brazil) Puerto Paita Piura (Peru).	4,800	20,000	Future analysis project.

BOLIVIA

Cochabamba electric train:

Towards sustainable mobility

THE METROPOLITAN TRAIN WILL JOIN THE MUNICIPALITIES OF SIPE SIPE, VINTO, QUILLACOLLO, COLCAPRIHUA, SACABA AND COCHABAMBA THROUGH THREE LINES THAT WILL HAVE A LENGTH OF 42 KILOMETRES AND FEATURE 43 STATIONS.

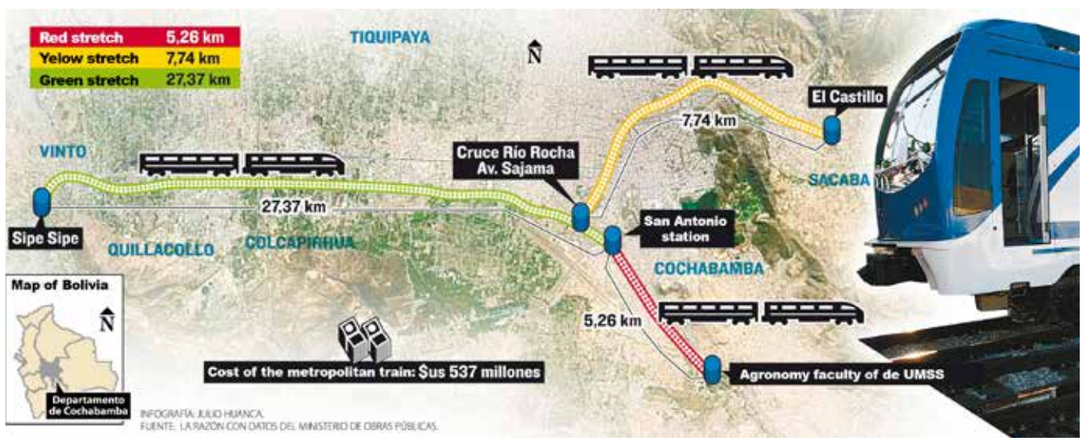
Bolivia, together with national connections, also works on improvements to urban rail transport. In La Paz and Sucre, bus networks predominate as major public transport systems; although in other areas, steps have already been taken to integrate rail as a means of transport with great advantages due to its high capacity, respect for the environment and integration into the natural surroundings.

A clear example is the metropolitan electric train of Cochabamba, the third largest city in the country, which is located between the valleys of the Central Mountain Range and articulates terrestrial communications between the west and east of Bolivia. It is one of the most emblematic projects in urban mobility and the first of these characteristics of the country. Its implementation is entrusted to the "Asociación Accidental Tunari", formed by the Spanish construction company JOCA, belonging to the ICADI Group, and the Swiss Molinari Rail AG. This contract includes the design, construction and support operations during the first three years the line is running.

In August of 2017, the president of Bolivia, Evo Morales, inaugurated the commencement of the works. An act which highlighted the commitment to this modern railway, which will boast an investment of 448 million dollars (383 million euros) and will be financed by the National Treasury. The construction will be made with the form of slab track, which reduces noise in transport, and will work with electricity, to meet the Government's strategic objectives of developing "collective, ecological and sustainable transport."

12 trains have already been awarded to Stadler Rail AG for these new lines.

This train is one of the flagship projects and the first of these characteristics of the country.



Above, the projected stretches of the future train and a selection of its stations.

The works officially began in August 2017 and remain ongoing.

The new train will provide a fast and safe service to travellers.

Rolling stock

The Tunari consortium has awarded Stadler Rail AG the manufacture of the 12 trains for these new lines. The contract, which signed in February, also includes support for technical maintenance over three years.

The units will be delivered from August 2019 onwards. They will be able to reach a maximum travelling speed of 80 kilometres per hour.

Santa Cruz Tramway

Another of the projects in the region is the Santa Cruz Tramway, the largest of the nine departments of Bolivia, which has a population of 2.7 million people.

Although the award was abandoned and the initiative has come to a standstill due to going over-budget, the proposal could be resumed in the future.

SOME MAFEX MEMBERS WITH PROJECTS IN BOLIVIA

TPF GETINSA EUROESTUDIOS

TPF GETINSA EUROESTUDIOS has been working in Bolivia since 2012. The company has been involved in the infrastructure development process, with a project portfolio totaling more than 10 million USD. In the railway sector, the Company has been engaged in the project for the renovation of the Cochabamba – Arani railway line, 64,5 km long. In the framework of this assignment, we have been working on the Identification Study and the Technical, Economic and Social and Enviromental Studies. This line runs through the Valle Alto of Cochabamba across flat and undulating land, with an altitude of 2,500-2,600 m above sea level and low slopes on soil subject to sheet and wind erosion.

INECO

The Ineco-Cobodes consortium has developed a strategic environmental assessment study for the Central Bioceanic Railway Corridor, a project undertaken by the government of Bolivia and funded by the Inter-American Development Bank (IDB), which will connect the Pacific Ocean to the Atlantic Ocean.

The works include the identification and evaluation of the strategic environmental and social impacts throughout the whole CFBC's path in Bolivia.

The study aims to safeguard the vast natural heritage in the region, which consists of a multitude of natural areas with high biodiversity; and improve the quality of life of Bolivian people.

STADLER RAIL

SALi locomotive: At the end of 2017, Stadler Valencia and the Bolivian Ferroviaria Andina-FCA signed a contract for the supply of the first three state-of-the-art "SALi" locomotives. Due to its design and performance, SALi is destined to become the benchmark locomotive of the **Bioceanic Rail Integration Corridor.**

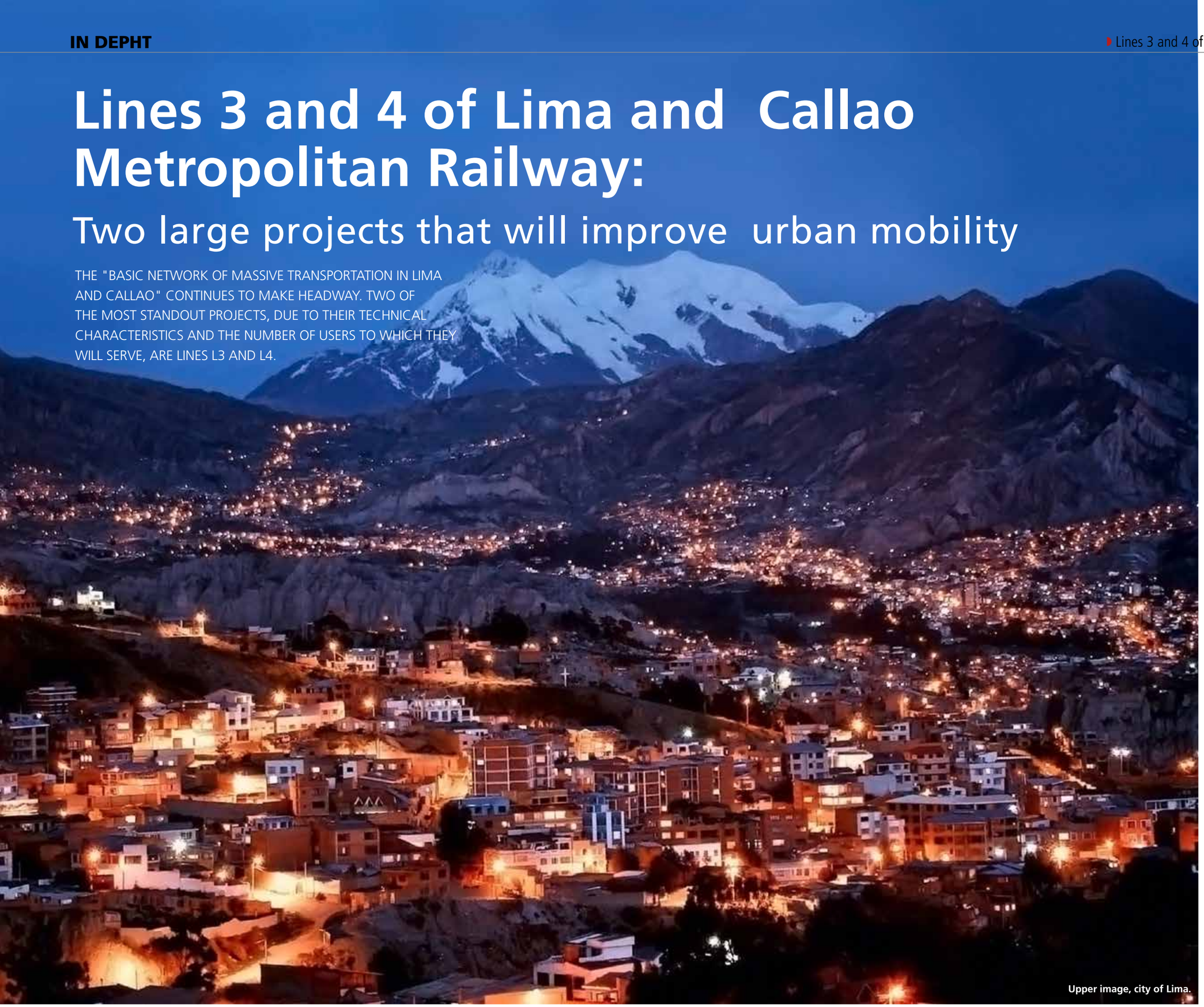
SALi (South American Light Loco) is a diesel-electric locomotive type Co'Co' with an ultra-light weight design and with forefront technology to successfully face the challenges entailed in operating on metre-gauge track under conditions of great altitude (over 5,000 m above sea-level) and capable of reaching a speed of 100km/h, combining a high-power output at great altitude with reduced fuel consumption. It features 6 AC traction motors and two acoustic and heat-insulated driver's cabs, to enhance comfort under extreme temperature conditions.

Tranvía de Cochabamba: Stadler will also supply 12 trams to Cochabamba with capacity for 200 people that will start commercial service in 2020.

Lines 3 and 4 of Lima and Callao Metropolitan Railway:

Two large projects that will improve urban mobility

THE "BASIC NETWORK OF MASSIVE TRANSPORTATION IN LIMA AND CALLAO" CONTINUES TO MAKE HEADWAY. TWO OF THE MOST STANDOUT PROJECTS, DUE TO THEIR TECHNICAL CHARACTERISTICS AND THE NUMBER OF USERS TO WHICH THEY WILL SERVE, ARE LINES L3 AND L4.



Upper image, city of Lima.

Two of the main cities of Peru, Lima and Callao, have decided to opt for an underground rail link as a public transport system with the aim of improving the quality of communications of its population and seeking out sustainable mobility alternatives. As in most of the large urban centres throughout the world, they have a high level of traffic congestion on the roads, with high indexes of pollution, traffic jams and road saturation.

To all this is added the constant growth of the capital by new zones and districts, which make it even more necessary to provide these areas with effective displacement systems.

Mobility Plans

The metropolitan area of Lima and Callao is located in the centre of the country, facing the Pacific Ocean. Lima, with more than nine million inhabitants, is the political and administrative center; while Callao, 15 kilometres from the capital, is the main seaport of Peru, as well as one of the most important in all of South America. From an economic, social and cultural viewpoint, they constitute a unit, meaning it is considered necessary that any development in terms of mobility be with a joint programme. In this regard, in September 2018, Congress approved the creation of the "Urban Transportation Authority (ATU) for Lima and Callao". With this body, the planning, management and implementation powers of the actions for both cities are unified in the Ministry of Transport and Communications. Its main aim is to build an integrated transport service that would allow for the unifying of routes, road infrastructure and tariffs. Furthermore, within this authority the managements and offices that administer the Metropolitan, the Lima Metropolitan Railway and the corridor buses are merged. Aside from these recent organisational changes, the work is also focused on the development of a Transportation Master Plan with a view to 2025 by the

municipal authorities. A programme that will open up the possibility of planning new centralities around the future mass transit stations, and facilitate the transformation of Lima and Callao into better connected, more livable cities with a modern communications network.

Modernisation of transport

In these advances towards the modernisation of high-capacity urban transport, which increases the use of non-motorised modes, the railway has for years played a significant role. Given the need to have new means of communication, in December 2010, the "Basic Network of the Lima Metro-Mass Transport Electric System of Lima and Callao" was approved. This system initially had five planned lines; although, three years later, in 2013, an additional branch line (Line 6) was added, which meant that the total planned extension is 165 kilometres. At present, the only operational service is that of L1, which crosses the metropolitan area from south to northeast, on an elevated viaduct, along a 35-kilometre route and 26 stations. In addition, two underground lines are under construction, whose construction tenders were awarded in 2014. It is Line 2, which will cover the metropolitan area from east to west along 27 kilometres of extension, and eight kilometres from what will be the future Line 4, which will run under the Elmer Faucett avenue. The complete route of both lines is planned for 2024.

After the construction of L1 (Villa El Salvador-San Juan de Lurigancho), in April 2011 another step was taken with the signing of the construction tender contract for the provision of rolling stock, the operation and maintenance of this network and the construction of the major workshops. Three years later, in April 2014, the agreement for the construction, provision of units, operation and maintenance of the L2 (Ate-Callao) was signed. This second branch is advancing at a steady pace, as indicated by the Minister of Transport and Communications, Edmer Trujillo, in May 2018, and "the start-up in 2021 of the section between the Municipality of Ate and July 28, where connects with Line 1, with seven stations completed, 10 trains in service and 12 kilometres."

Additionally, two metropolitan rail lines are under study, which make up the remaining route of Line 4 and the full route of Line 3. The reports of the first (L4) began in February 2015, while those of the second began in September 2014 and were approved by Proinversión in November 2015, while studies for the future Line 4 began in February of 2015.

A modern metropolitan rail network is backed.

Illustrative map of the Lima Metro network.

LINE 3: A strategic network

THE LINE 3 OF THE LIMA AND CALLAO METROPOLITAN RAILWAY IS A PROJECT OF SPECIAL RELEVANCE, AS IT WILL BE THE MOST EXTENSIVE WITH REGARD TO THOSE THAT HAVE BEEN PROJECTED ON THE NETWORK. IT WILL FEATURE 29 STATIONS AND WILL BENEFIT AN AREA OF INFLUENCE OF, AT LEAST, EIGHT DISTRICTS OF THE CAPITAL.

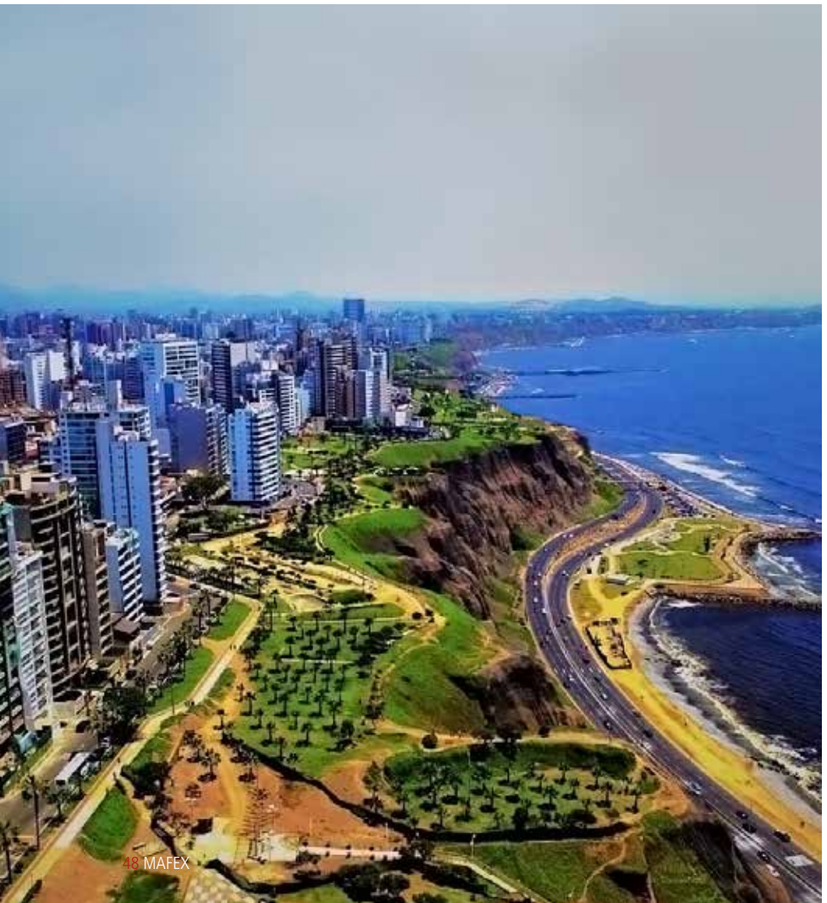
One of the most eagerly awaited projects to complete the metro network of Lima and Callao is the construction and commissioning of Line 3. It is a project involving major relevance, since of all the branches projected for this network, it is not only the one that will demand the most, yet moreover it is the most extensive and complex from a technical viewpoint. The route will go from north to south and will benefit the population of at least eight districts under its area of direct influence.

Amongst these are San Martin de Porres, Los Olivos, Comas, Independencia, Lima, Rimac, Lince, San Isidro, Miraflores, Surquillo, Santiago de Surco, San Juan de Miraflores.

According to the scheduled plans, the underground line will feature 29 stations. When fully operational, there will be about 85 trains of eight coaches each one.

It is an "engineering endeavour of major significance and magnitude, where its inclusion in the urban area becomes a determining variable for the development and evolution of the city," as indicated in the first study conducted in this regard.

From the beginning, the Ministry of Transport and Communications (MTC) has entrusted its coordination to the Agency for the Promotion of Investment "Proinversión". This body is responsible for the development of investment studies, in addition to promoting the public-private partnership needed to start up the line.



Consultancy Agreement

In October 2014 the "integral consultancy" contract was signed with the Metrotres consortium, composed of Ingerop Conseil et Ingenierie, PricewaterhouseCoopers Corporate Finance SL, PricewaterhouseCoopers S.Civil de RL, Bustren PM SL, Alpha Consult SA and Metropolitana Milanese SPA (the Consultant) and adjudicator of the tender.

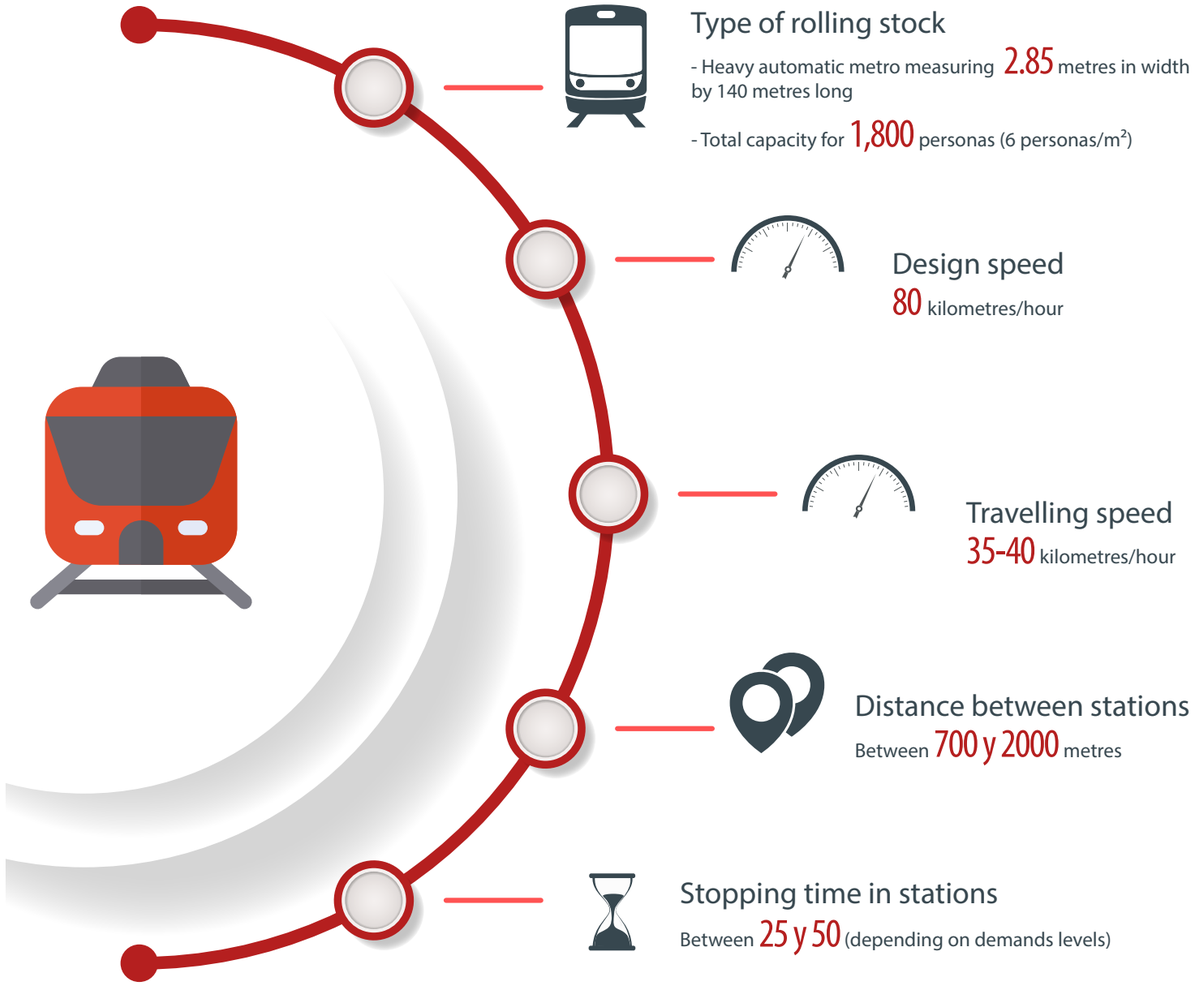
At present, according to Proinversión, "the consultant is drafting the studies that will allow us to obtain the suitability to be able to undertake start-up within the framework of the National System of Public Investment (SNIP)". Specifically, its mission is to "identify, formulate, evaluate and obtain the technical, economic, financial, environmental and sustainability of the implementation". The aim is to find a tender operator to oversee "the drafting of the final engineering studies (design), financing, construction, electromechanical equipment, acquisition of rolling stock, operation and maintenance of the road, approximately 32 kilometres in length". The idea that is being considered is that the modality be through co-financing. The term of the tender is still under evaluation, as is the awarding date that is yet to be defined.

Of the five lines projected for this network, it will be the most extensive and the one that will have the greatest demand levels.

The main purpose of the commercial operation of this line is "to resolve, at least in part, the great problem of displacement in the main north-south axis of the city". It is expected, therefore, that its implementation contributes to the improvement in travel times. Alongside this considerable reduction of time in the journeys, furthermore, numerous benefits such as greater business competitiveness, by optimising access to working centres; an optimal connection to public transport of the inhabitants of the neighbourhoods located away from the centre, as well as an increase in the attractiveness of the city, with less pollution and better accessibility, etc. will similarly be achieved. Likewise, there will be a decrease in operating costs, by reducing the number of vehicles on the road.

It is estimated that by the year 2030, the population residing in the area under study will reach 900,000 inhabitants.

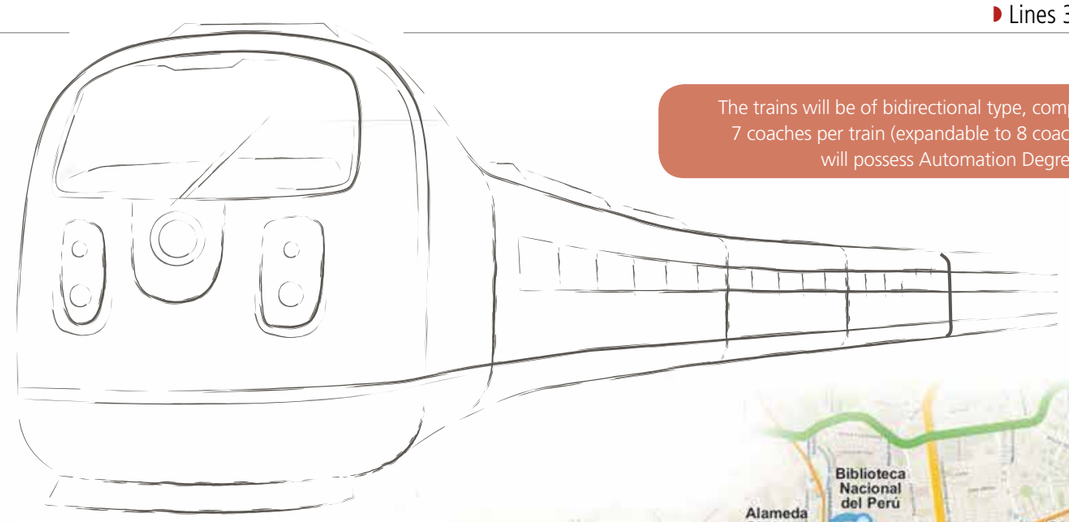
The main purpose is to resolve, at least in part, the great problem of displacement in the main north-south axis of the city.



BASIC PARAMETERS OF LINE 3 LAYOUT

PARAMETER	VALUE
LLength and width of platforms	150-24-30 metres (Between 4-7 metres in width).
Track width-Between axis-Distance platform to platform during stop	1,435 metres-3.80 metres-6.60 metres.
Lower and outer diameter of the tunnel in monotube	9.2 metres-10 metres.
Minimum length elements	20 metres.
Maximum slope	3.50%
Slope in track devices (Maximum recommended)	0% -0.5%
Recommended slope in station	0% -0.5%
Slope in marshalling yards, third tracks and (Maximum advised)	0% -0.15%
Insufficiency of maximum cant	100 mm.
Maximum cant variation (dz / ds)	2.5 mm / m at 80 km / h.
Maximum non-compensated transverse acceleration	0.65 m / s^2
Maximum acceleration	0.2 m / s
Maximum vertical acceleration	.2 m/s^2

Source: Pre-investment study at profile level of L3.



The trains will be of bidirectional type, composed of 7 coaches per train (expandable to 8 coaches) and will possess Automation Degree GoA4.

Total length: 38,2 km

Total investment: € 4,789 billion

The total capacity of the Line will make it possible to serve a total of 2.7 million passengers / day per by the year 2055 horizon.

Direct benefits to

3 million people

13 districts directly

San Juan de Miraflores, Miraflores, San Isidro, Lince, Jesús María, Lima, Rímac, San Martín de Porres, Independencia, Los Olivos, Comas, Puente Piedra

Hence, it is considered a project of "strategic nature" that will bring large-scale advantages to a sizeable number of inhabitants. The estimated demand initially indicates that there will be 2,500,000 daily trips made on this branch.

Itinerary

With regard to the proposed route, within the two major possible layouts, 11 options were analysed in detail. Finally, "alternative 11.1" with a length of 38.2 kilometres and 29 stations was recommended. The terminals of this route would be: Avenida San Felipe northbound and Atocongo southbound. At the same time, the typical road axes from North to South would be: Av. Chillón Trapiche, Av. Panamericana Norte, Plaza de Armas, Abancay, Av. Arequipa, Av. Alfredo Benavides and Panamericana Sur.

Amongst the advantages for which the consortium selected in the study this option stresses having an independent route of the metropolitan railway, which would thus contribute to a better coverage of the territory and improve the mass transport offer in the city's main axis. Likewise, the analysts considered that it had lower technical risks and constructive deadlines and lower expenses derived from the replacement and adaptation of existing stations. In addition, it was estimated that the route was the most appropriate since it passes through Plaza de Armas, which would endow the line with a station in the historic centre.

Another reason was that there were adequate plots in its vicinity to locate the workshops and main garages to the north and other workshops and depots to the south.

The indicated route would be totally underground and the infrastructure would be made with TBM (Tunnelling Boring Machines) since it is considered the most appropriate method, except in two sections. In the first of them, the A1, to the north, a construction is recommended by means of a trench; while in the second, excavation by conventional methods (NATM), by the conditions of the land and its short length (2.4 kilometres approximately).

To implement the suggested alternative, the report indicates that the necessary investment is 5.623 billion dollars (4.789 billion euros); which includes the studies, the works, the rolling stock, as well as the general expenses.

Railway systems

For the commercial operation of line 3, the acquisition of state-of-the-art rolling stock is projected.

It is planned to purchase eight-car trains, which will feature Driverless CBTC technology. To respond to the peaks of greater demand of passengers, the aim is to establish frequencies of up to 90 seconds, and high fleet levels (between 69 and 86 trains). On the other hand, with regard to the superstructure, a slab-track system has been selected; whilst for the signalling, it is recommended in the report to implement an automated CBTC-UTO system. Another important aspect in the electrification of the line is that a catenary system is planned at 1500 Vcc, which will have rigid overhead line in tunnel sections and the standard overhead line in the exterior. Another new addition is that the departure and arrival process, which will be totally closed, will have a control and sale system for tickets based on 100% contactless technology.

Finally, in the conclusions of this broad report, it is recommended that in the next phase, which is feasibility, certain aspects such as the final location of the stations be studied in detail based on a definitive demand study. Furthermore, the need to build, in the short term, the stations of Atocongo, San Felipe and the Incas in accordance with the demand is highlighted; and to review the possible alternatives of the Plaza de Armas and Abancay stations.

This important project is ongoing and remains one of the main initiatives that the Government wishes to promote in terms of transport. As reported in June 2017 by the Executive Director of the Autonomous Authority of the Mass Transit Electric System of Lima and Callao (AATE), Carlos Ugaz "the construction of lines 3 and 4 would begin in 2019, thus, it is estimated that by 2025 the construction and operation of both will be completed ".

It is an engineering project in which its inclusion in the urban area becomes a determining variable.

Jorge Chávez Airport, where there will be a stop of the L4.

LINE 4: A grand engineering project

Along with L3, another of the main projects to complete the modern metropolitan rail network of Lima and Callao is the future Line 4. The first steps date back several years. On May 9, 2012, the director of Investment Promotion at ProInversión (the state agency in charge of fostering and organising concessions in infrastructure), Héctor René Rodríguez, announced that the Ministry of Transportation and Communications (MTC) decided that the construction of the Line 4 of the metropolitan railway be undertaken at the same time and in parallel to that of Line 2.

Connections

L4 will connect the east with the west of the city. Specifically, from the District of La Molina to Ventanilla, and will also pass through the Jorge Chávez International Airport. The next stage was in March 2014, when the first section of this branch of L4 was awarded, together with the whole of Line 2. That is, it was included in the same construction plan for L2.

The selected consortium was "Metro de Lima Line 2", formed by Odebrecht, Graña y Montero, Construtora Andrade Gutierrez, Queiroz Galva and two Spanish companies, ACS (through its subsidiary Iridium) and FCC (through Vialia Concesiones), with Metro Madrid offering support as technical advisor of the project. In turn, this consortium relied on TYPSA to carry out the construction design of the section of Line 2, between the Benavides Station to the port of Callao, and of the entire L4 branch.

In these sections, the company was responsible for the design of all the elements that make up the system and the necessary accessory works, which involve 14 underground kilometres dug using a tunnel boring machine, and 14 stations excavated using the cut and cover method.

The construction and operation over 35 years of Line 2 and the branch to the L4 airport is a grand infrastructure project that has been allocated a budget of 3.800 billion euros.

Its relevance has made it one of the largest engineering projects in Latin America. The L2 will have 27 kms running underground and 27 stations, while the Av. Faucett-Av. Gambetta of the L4 will be eight kilometres in length, also underground, and eight stations; one of them, the one corresponding to the connection with the airport.

The importance of this project also lies in the fact that it will be the first underground and fully automatic mass transportation system in Peru. It is estimated that the L2 and the L4 branch of the Lima and Callao Metro will move around 660,000 passengers a day and will benefit 2.5 million people, especially the residents of the following 10 districts: Ate, Santa Anita, El Agustino, San Luis, La Victoria, Cercado, Breña, Bellavista, Carmen de la Legua and El Callao. In addition, they will be connected to the current L1 and future lines (L3, L4 and L6). Regarding the development of the rest of the L4, in 2014 Proinversión called a public tender to recruit the consultant who will be in charge of carrying out the pre-investment studies.

Consulting

Subsequently, on April 15, 2015, the consultancy contract of the L4L Consortium was signed. This Joint Venture is formed by Euroestudios SL, Geocontrol Andina SAC, Geocontrol SA, TEC-Cuatro SA-Peru Branch, Kapak Consulting SA, Logit Engenharia Consultiva Ltda. And Qursor SAC The work was divided into three stages. The first of these, the "Pre-investment studies at profile level", in which eleven possible alternatives were traced to select the most indicated. Finally, this branch will be about 28 kilometres long and will run underground from the end of the stretch of Line 4 (already put for tender), which is between Av. Gambetta and Av. Faucett, to the east of the city through the corridor of Avenida Javier Prado.

Secondly, the consortium was then entrusted with the "Pre-investment Studies at Feasibility Level", in which the chosen route was evaluated from functional, socioeconomic, financial and environmental viewpoints, in order to ascertain the project's viability.

As indicated by the awardees "In this stage, all the underground works of the route: tunnel (with tunnel boring machine, conventional methods or sheltered screens), stations (between screens or in large caverns) and access wells to stations or for ventilation and evacuation

were analysed in greater detail." Also, at this stage, the security installations of the underground work are defined (tunnel ventilation systems, stations and wells, evacuation routes in tunnels and stations, emergency lighting systems, signalling, public address systems, surveillance cameras, anti-intrusion systems, etc.). Finally, the consortium also carries out the "Development and promotion of the carrying out of integral projects awarded through the tender", which includes the strategic evaluation of the project, the economic-financial evaluation of the tender, or the drafting of the processes' grounding and the tender agreement, amongst other aspects. As for L3, it is expected that the winning bidder awarded with the project will be responsible for the preparation of the final engineering studies (design), financing, as well as the construction, electromechanical equipment, acquisition of rolling stock, operation and road maintenance. The date for this is yet to be determined.

New solutions to growth

With the start-up of these two lines, a satisfactory response will be given to the new needs of Lima and Callao. The demographic and economic growth has increased the travel demand of its inhabitants to move, hence the importance of putting a modern metro system at their service to improve travel and minimise traffic.

Aware of its importance, the Government continues working on the implementation of these branches to complete the network that was projected in 2010. An aim that was stressed again in September 2018 by the General Director of Transportation Tenders of the Ministry of Transport and Communications (MTC) of Peru, José Salardi, in Canada.

There, he unveiled L3 and L4, as one of the most relevant initiatives in his investment portfolio and reminded us that for both projects there has been investment of 5.961 billion dollars (5.197 billion euros) and 4.440 billion dollars (3.871 billion of euros) respectively.

Line 4 will connect the east with the west of the city once operational.

SOME MAFEX MEMBERS WITH PROJECTS IN LINES 3 AND 4 OF LIMA AND CALLAO METROPOLITAN RAILWAY

ALSTOM SPAIN

Alstom site in Santa Perpètua (Barcelona) has been responsible for the design, manufacture and commissioning of all the rolling stock that circulates on Line 1 of the Lima Metro. After a first contract for the supply of 19 trains, the Peruvian operator entrusted again Alstom Spain to expand the fleet, with 20 additional units.

Once is completed the delivery and commissioning of these additional trains, the first metro line of the Peruvian capital will have a fleet of 39 Metropolis trains that will serve more than 48,000 passengers per hour. The Metropolis for Lima features large doors, low floor, extra wide seats and gangways between the coaches. Additionally, dynamic information displays and an interior design favoring natural light will improve passengers' safety and comfort.

BOMBARDIER TRANSPORTATION SPAIN

Peru has the longest train viaduct in the world. A 35 kilometers and 26 stations line that run through the metropolitan area formed by the conurbation of Lima and Callao.

The incredible passenger traffic registered in August, about 406,000 a day, has exceeded the projected demand for 2035, has led not only to an increase in the fleet but to an improvement in the layout. Bombardier participates in most of these renovations (creation of garages, double changeways or a new access in Villa El Salvador) that will take place between October and November.

Bombardier also incorporates the SW embarkation and update equipment, which allows to interact with the existing signaling on the line and to safely operate the new trains.

Of the five original trains, 44 new Alstom trains were added in order to provide the service with the appropriate frequencies.

The tests will include one to ensure that the headway (time between two consecutive trains) continues to be less than 180s and keeps the good projections of the line.

TPF GETINSA EUROESTUDIOS

The Line 2 of the Lima and Callao Metro Network, with a total length of 26,87 km including 21 km of tunnel and 27 stations, links the Eastern districts of Lima (Ate and Santa Anita) with the centre of Lima and Callao (East-West Line). It is a complementary line that integrates with the Line 1 of Lima Metro (Villa El Salvador – San Juan de Lurigancho) and with the Line 1 of the BRT corridor (Chorrillos-Independencia), which traverses the city from South to North.

TPF Getinsa Euroestudios is in charge of the procurement support, detailed design, ventilation study and construction technical assistance of the sections 1A and 1B of the Line 2 of the Lima and Callao Metro Network, as well as of the branch line Faucett Av. – Gambeta Av.

The company has also been responsible for the comprehensive projects for the concession of the Line 4 of the same system.

INDRA

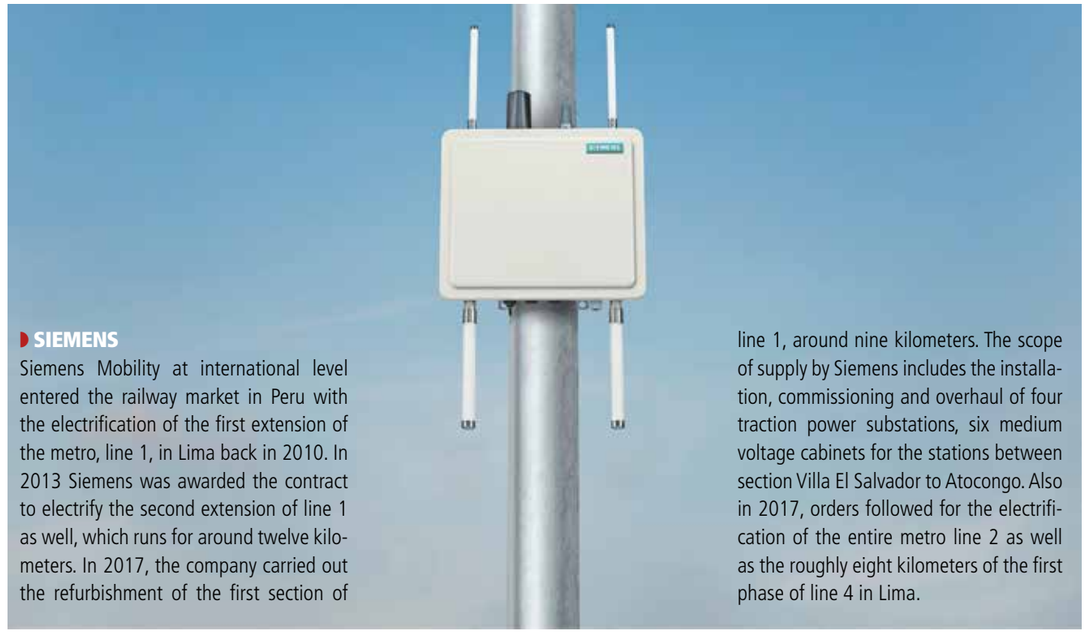
Indra has done the technological migration of the existing sales and control systems in operation in Lima's subway and it has installed and set up the systems for the new 10 stations.

This technological migration included the migration of over one million cards, 80% of the cards in less than two months, equipment and software from the 16 stations in operation, without interrupting the operation of a service with more than 180,000 travelers a day at 16 stations. After opening the new stations, the flow of travelers exceeded 300,000 a day. Indra's solution contributes to improve the traveler information, revenue control, maintenance and increase of equipment operation time, among others.

SOME MAFEX MEMBERS WITH PROJECTS IN LINES 3 AND 4 OF LIMA AND CALLAO METROPOLITAN RAILWAY

TRIA

Graña&Montero awarded Tria in 2017 with the works involving trackway in Line 1 project. Our due was essential to improve the operational flexibility and to reduce train lapses. Works were carried out without stopping the exploitation of the line by developing an intense pre-engineering work along with a precise planning and a perfect logistic coordination. This high-impact works were fulfilled in shifts up to 12 hours, followed by the protocol to hand it over. Geometric checks of the track were made plus several overtakes of a commercial train (at increasing speeds) until the regular passage speed was accomplished. Then, the system was ready to be delivered to the Concar&GyM engineers and make it official. Tria signed on a new contract for line 2 in December, 2017th.



SIEMENS

Siemens Mobility at international level entered the railway market in Peru with the electrification of the first extension of the metro, line 1, in Lima back in 2010. In 2013 Siemens was awarded the contract to electrify the second extension of line 1 as well, which runs for around twelve kilometers. In 2017, the company carried out the refurbishment of the first section of line 1, around nine kilometers. The scope of supply by Siemens includes the installation, commissioning and overhaul of four traction power substations, six medium voltage cabinets for the stations between section Villa El Salvador to Atocongo. Also in 2017, orders followed for the electrification of the entire metro line 2 as well as the roughly eight kilometers of the first phase of line 4 in Lima.

TELTRONIC

Teltronic was chosen to supply the TETRA communications system of Lima Metro's line 1 and its solution, eNEBULA, has helped to ensure its smooth operation thanks to its scalability, which allowed a progressive deployment without interruption of service, and redundancy of the main elements that eases to achieve the high levels of availability required in transport environments.

In addition to the infrastructure, whose installation was made keeping in mind the continuous earthquakes in the area (supports movements up to grade 7), the deployment was completed with on-board terminals that provide voice and data services, portable terminals for security and maintenance personnel and dispatch equipment in the control center and stations.

TYPSA

TYPSA is working on final designs for Lima Metro comprising the section of Line 2 from Oscar Benavides station to Port of Callao station, and the entire Line 4, including the workshop yard for the maintenance of Line 4 and its rolling stock.

The design services are being provided to the construction consortium integrated by DRAGADOS, FCC, SALINI-IMPREGILO and COSAPI.

TYPSA is responsible for the design of all the metro system elements and the necessary ancillary works, including a total of 14 km of TBM-bored tunnel and 14 cut&cover underground stations.

In recent years, TYPSA Peru has positioned itself as a leader in the Peruvian engineering and consulting market, incorporating the Group's international quality, integrity and sustainability standards.

A new battery train is unveiled at Innotrans

BOMBARDIER UNVEILED ITS NEW ELECTRIC BATTERY TRAIN, THE TALENT 3. THE BEMU VERSION OF THE TALENT 3 IS CHARACTERISED BY BEING EQUIPPED WITH LITHIUM-ION BATTERIES.

The Innotrans fair, the largest railway fair in the world, was held on September 18-21 in Berlin. And, like every year, Bombardier participated in the event. One of the most outstanding elements was its interactive stand that, due to modern technology, allowed visitors to enjoy an immersive experience. Bombardier took advantage of the event to present its wide portfolio of technological solutions, focused on solving the needs of its customers around the world.

During the fair, Bombardier presented its new battery train, the TALENT 3 in an original exhibition, where violinists, skiers and even climbers participated.

The Spanish factory of Bombardier in Trápaga (Vizcaya) is part of this project, participating in the development of its traction converter.

The BEMU version of the TALENT 3 is characterized by being equipped with lithium-ion batteries (BEMU, battery-electric multiple-unit), being able to operate, also, on non-electrified lines, thus allowing uninterrupted rail connections.

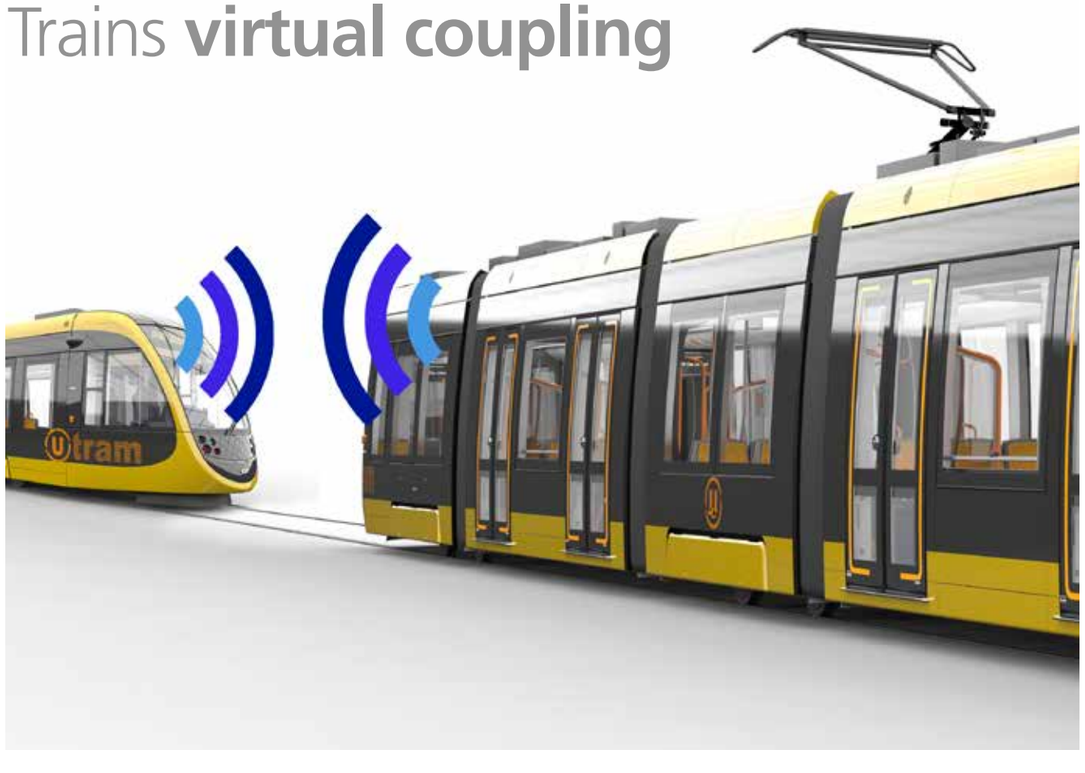
The train provides an ecological alternative to diesel trains, significantly reducing CO2 emissions and noise pollution.

During the fair, Bombardier made a virtual reality exhibition that allowed visitors to immerse themselves in a 360º experience in cities around the world, whether is was riding the INNOVIA monorail in Bangkok, a FLEXITY tram in Zurich or a MOVIA metro in Stockholm.

In addition, its interactive stand allowed customers to appreciate first-hand, through virtual reality, innovative mobility solutions perfectly adapted to the needs of different cities: from stable urban environments to megacities, through fast-growing cities or even totally new environments.

A visit by journalists to the company's factory in Hennigsdorf put the finishing touch on Bombardier's participation in Innotrans 2018.

Trains **virtual coupling**

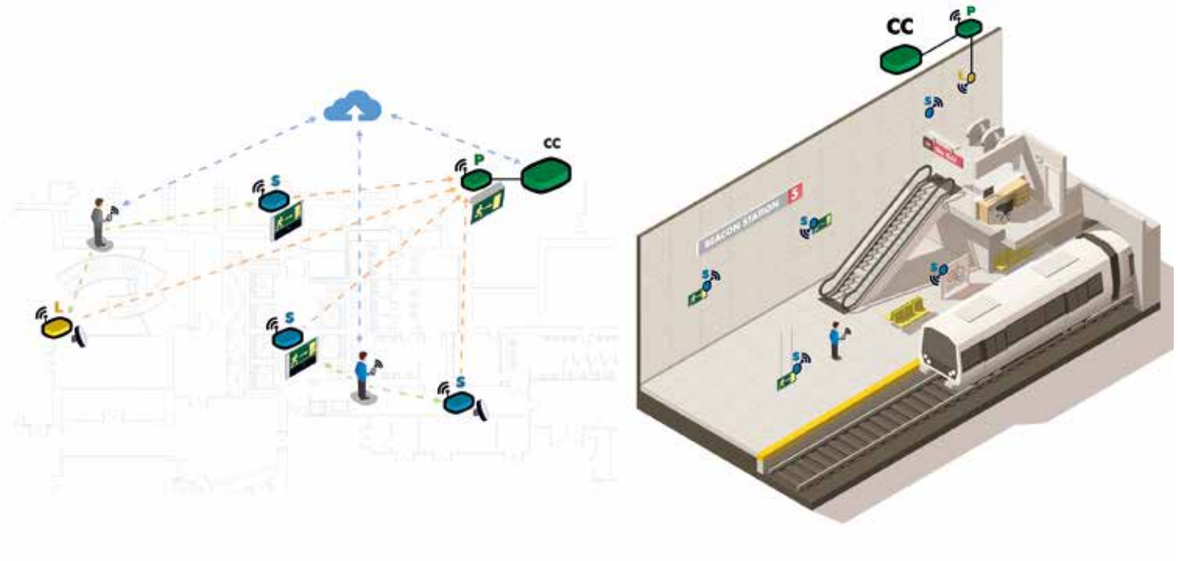


THIS WORLD PREMIERE EXHIBITION OF CAF INVOLVES THE FIRST USE OF THE NEW TCMS WIRELESS TRAIN TRUNK NETWORK TO CONTROL FUNCTIONS SUCH AS PROPULSION, BRAKING, DOORS, LIGHTS OR PASSENGER INFORMATION. THIS DEVELOPMENT IS BASED ON THE SHIFT2RAIL INITIATIVE.

CAF presented a first implementation of the Virtual Coupling mechanism using two fully operational rail tramways at InnoTrans international exhibition, which was held last September in Berlin.

Under the name "Connected Trams" this world premiere showcase involves the first deployment of the new TCMS wireless train backbone to control functions like propulsion, braking, doors, lights or passenger information. The control of distance between vehicles is achieved through sensor data fusion and transmitted information between both trams, together with the use of tram dynamic models.

This development lays under the Shift2Rail initiative and will serve as foundation for the incremental design and implementation of whole system-wide Virtual Coupling based operation. Virtual Coupling of trains will revolutionize in the next years railway operations by increasing capacity and flexibility dramatically"



IMPLAGUIDE - intelligent security in underground public transport stations

What is it?
IMPLAGUIDE is an Autonomous Smart Safety Signage System in public transport, underground stations and large facilities. It consists on signaling with beacon technology integrated to help to the geolocation of the user. This system is able to connect to the Cloud and to the Control Center for a real-time User-System interaction, through an APP. IMPLAGUIDE is a patented system.

What is it for?
- Safer evacuation; personalized orientation to each user depending on their location and the conditions of the environment in real time.
- Assistance for the guidance and information on the points of interest.

BECAUSE "THE NEAREST EMERGENCY EXIT MAY NOT BE THE SAFEST," IMPLASER INNOVATES WITH A SYSTEM THAT IMPROVES THE SAFETY, QUALITY OF LIFE AND ACCESSIBILITY OF ITS USERS, IN THE SMART CITY ENVIRONMENT.

- Location of people: help in case of rescue, to avoid crowds of people.
- Verification of security or maintenance routes.
- Variable mapping and energy saving: through sensors.

Advantages?
- Wireless; beacon technology, which emit Bluetooth signs.
- Accessible guidance by audio.
- It is invisible to the user. It has an easy installation and its maintenance is minimum.
- Energetically autonomous (small solar cell).
- Bidirectional real-time communication between Control Centre-User, through the Cloud.

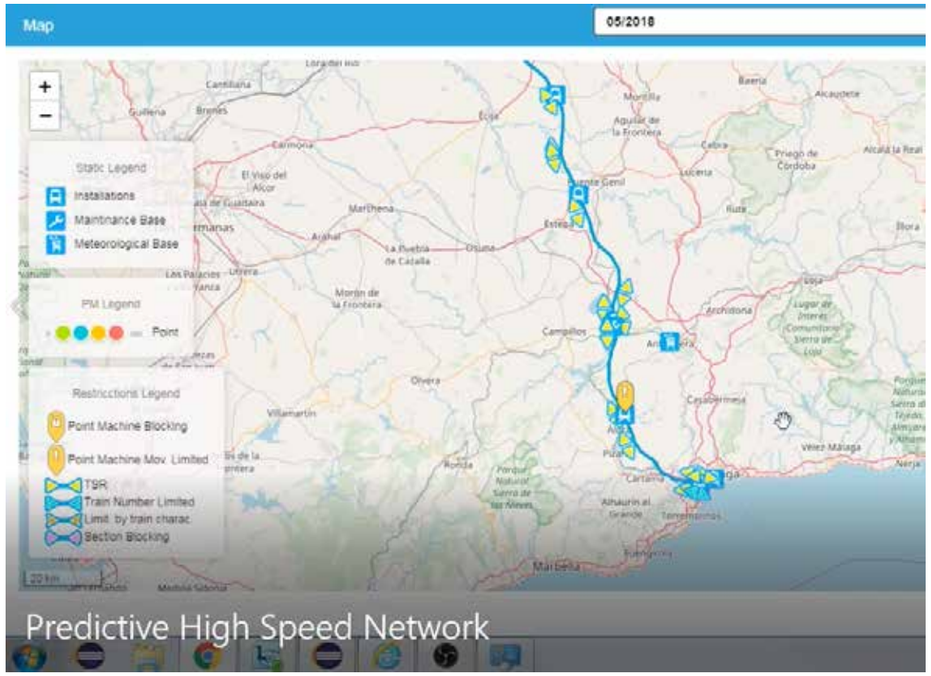
Who?
This System is developed by IMPLASER with HOWLAB research group from University of Zaragoza, in collaboration with INYCOM.
The project is granted by the subprogram SME INSTRUMENTS of the European Program Horizon 2020.

SALi - The new locomotive generation for Latin America: A commitment to the "Bioceanic Corridor"

Stadler is specialised in the design of locomotives for international corridors. Following in the wake of its predecessor the EURODUAL in cross-border European rail corridors, SALi, due to its design and performance, is destined to become the benchmark locomotive of the Bioceanic Rail Integration Corridor which, crossing Bolivia, will link the Peruvian port of Ilo with the port of Santos in Brazil.
This locomotive is based on other models of the company including the necessary modifications to operate in South America. With a nominal power of 2500 BHP (1865 kW), even operating at high altitude, it reaches a maximum speed of 100 km/h and its weight can vary between 16 and 18 ton/axle. The monocoque structure, very light and resistant and with AAR design, is reinforced against frontal collisions.

IT IS A CO'CO' DIESEL-ELECTRIC LOCOMOTIVE WITH AC/AC TRACTION, AN ULTRA-LIGHTWEIGHT DESIGN AND WITH FOREFRONT TECHNOLOGY, TO SUCCESSFULLY FACE THE CHALLENGES ENTAILED IN OPERATING ON METRE-GAUGE TRACK UNDER CONDITIONS OF GREAT ALTITUDE (OVER 5,000 METRES ABOVE SEA-LEVEL) COMBINING A HIGH-POWER OUTPUT AT GREAT ALTITUDE WITH REDUCED FUEL CONSUMPTION PROJECT DEVELOPPED BY STADLER RAIL VALENCIA.

The bogies are characterized by their simple and robust design, low track efforts and high traction capacity. SALi can transport up to 30% more cargo than the current locomotives in the region. The AC traction chain with 6 asynchronous traction motors increases the adhesion performance, reliability and availability of the machine.
SALi features two acoustic and heat-insulated driver's cabs, to enhance comfort under extreme temperature conditions.
It complies with all the safety and visibility requirements, in accordance with the latest trends and ergonomic criteria. The locomotive also includes a modern diagnosis and location system that facilitates the management of fleets to the operator.
Stadler Valencia will supply the first three SALi locomotives to the Bolivian railway operator Empresa Ferroviaria Andina-FCA in 2019.



Big data and artificial intelligence
to improve the operation and maintenance of high-speed rail

MOVA TRAFFIC, FROM INDRA, ALLOWS FOR THE PREDICTING OF DEGRADATION OF EACH ELEMENT OF THE INFRASTRUCTURE, THE PROBABILITY OF FAULT AND ITS SEVERITY.

Indra has started to roll out a new big data and machine learning module in its propietary control solutions, Mova Traffic, which has already demonstrated during the preliminary tests its capacity to improve the operation and maintenance of high-speed rail.

The work is part of the Transforming Transport project, lead by Indra, which is one of the largest projects funded by the H2020 program of the EU and aims to improve mobility in Europe through the use of big data.

Indra is leading the smart rail maintenance pilot project in Spain, in the high-speed section between Cordoba and Malaga, in collaboration with Adif, Ferrovial Agroman, Thales and CI3. The pilot project has made progress in gathering data associated with the train maintenance and operation activities, topology and weather conditions.

Thanks to the integration, analysis and modeling of data, with the use of big data and artificial intelligence, the tool can be used to predict the degradation of each element of the infrastructure (track, interlocks, switches, etc.), the fault probability and their severity. The operator can access all of this information about the assets, maintenance and traffic, as well as how to generate reports and charts. This new information is used in decision-making processes, improving the planning of maintenance activities, facilitating how predictive maintenance is carried out, reducing costs and the degradation of the infrastructure.

The team is currently working to incorporate all of this information with the rail operation information through DaVinci, the rail management platform and Indra's TMS system, with the aim of also optimizing the use of the rail infrastructure. The purpose is to have a real-time system that uses the results of the predictive model developed, together with the data of traffic and the planned schedule of trains.

MEMBERS DIRECTORY

INFRASTRUCTURE

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

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

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

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

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

Signaling and traffic control
- Alstom Transporte, S.A.
- Ardanuy Ingeniería, S.A.
- Bombardier España
- Cables y Comunicaciones Zaragoza S.A.
- CAF Signalling
- DSAF. Dinámicas de Seguridad
- GMV Sistemas S.A.U.
- Idom
- Ikusi
- Implaser 99, S.L.L.
- Indra Sistemas, S.A.
- Ineco
- Luznor
- P4Q Electronics, S.L.
- SEMI, S.A.
- SICE
- Siemens Rail Automation, S.A.U.
- Telice
- Tecnalia
- Tecnivial Infraestructuras
- Teltronic, S.A.U.
- Thales España GRP, S.A.U.
- TPF Getinsa-Euroestudios
- Typsa

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

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

INFORMATION AND DATA SYSTEMS

Systems and equipment for collection and ticketing
- Alstom Transporte, S.A.
- Ardanuy Ingeniería, S.A.
- Calmell Group
- Ecocomputer
- Idom
- Ikusi
- Indra Sistemas, S.A.
- SICE
- Thales España GRP, S.A.U.

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

ROLLING STOCK

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

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

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

EQUIPMENT AND COMPONENTS ROLLING STOCK

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

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

Equipment and machinery for the manufacture of rolling stock
- Aquafrisch, S.L.
- Cetest
- Danobat
- MB Sistemas, S.Coop.

Interiors
- Alstom Transporte, S.A.
- Colway Ferroviaria, S.L.
- Convenzar
- Idom
- Patentes Talgo, S.L.
- Stadler Rail Valencia S.A.U.
- Kelox, S.A.
- Teknorail Systems, S.A.
- Valdepinto, S.L.
- Zfoam, S.L.

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

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

Quality control, inspection and certification
- Tecnatom

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

MEMBERS DIRECTORY PER SECTOR

AKKA TECHNOLOGIES SPAIN, S.L.U.

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

ALBATROS, S.L.U.

- **Albatros 7 y 9 - P.I. "Pinto Estación" 28320 Pinto (MADRID)**
- **T: +34 91 495 70 00**
- **info@sepsa.es**
- **www.sepsa.es**

Albatros is a Spanish company, with trademark SEPSA and subsidiary of the German group Schaltbau, specialized in the design, manufacture and marketing of equipment for trains, metros and trams. It consists of two engineering units: Power electronics (design and manufacture of auxiliary power converters and battery chargers) and On-board Systems (design and manufacture of PACIS, communication systems, control systems and other integrated systems).

SEPSA is a leader in providing of auxiliary components for trains and is one of the first supply companies in such competitive markets as Europe, the United States and Latin America. The headquarters are located in Spain, where a powerful engineering department is located. In addition, Albatros has factories in Pinto (Spain), New York (USA) and Sao Paulo (Brazil).

ALSTOM TRANSPORTE, S.A.

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- **german.ruiz@transport.alstom.com**
- **www.alstom.com**

As a promoter of sustainable mobility, Alstom Transport is the only railway manufacturer present in the full spectrum of transport systems, equipment and services.

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

AMURRIO FERROCARRIL Y EQUIPOS, S.A.

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- **F: +34 945 89 24 80**
- **info@amufer.es**
- **www.amufer.es**

Amurrio Ferrocarril y Equipos, S.A. is one of the international market leaders in the design, production and installation of railway materials. Our rolling stock interchanges and crossings are installed in high-speed rail lines, underground lines, tram lines, and conventional railways throughout Europe, Asia, America and Africa.

In the area of metal foundry, we have the experience, the knowledge and the people to produce, process and mechanize machine tool parts and sets of great technical complexity in carbon steel manganese steel and other steel alloys.

AOIFE SOLUTIONS, S.L (GALGUS)

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

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

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

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

AQUAFRISCH, S.L.

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- **P: +34 91 380 03 33**
- **F: +34 91 778 60 02**
- **aquafrisch@aquafrisch.com**
- **www.aquafrisch.com**

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

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

1. Aquafrisch Rail: solutions for railway equipment in depots and workshops.
2. Aquafrisch Agua: solutions for water treatment both in consumption and waste waters.

ARCELORMITTAL ESPAÑA, S.A.

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

ArcelorMittal is the world's leading steel and mining company and it is part of a small group of rail manufactures whose production has developed notably in the specialized high-speed, heavy- haul, metro, conventional lines and other applications are light rail and tram in the different qualities of normal carbon steel, micro alloyed and head hardened rails.

ArcelorMittal quality has been recognized by customers around the world, from Europe through Asia to Oceania, America and Africa.

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

ARDANUY INGENIERÍA, S.A.

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

Ardanuy is a consultancy company that specializes in studies, designs, works management and technical consultancy pertaining to Rail, Metro, Tram and Cable Transport.

The company was founded in December 1992 and is made up of a team of over 100 Engineers and Architects. Other experts also act as consultants to Ardanuy staff on specific projects.

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

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

ARTECHE (ELECTROTÉCNICA ARTECHE SMARTGRID, S.L.)

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

Arteche Group's business is focused on providing equipment, applications and solutions for the electricity and railway sector worldwide.

In power generation, transmission, distribution, industry, and railway technologies, the group has become a key player in the search for answers to new challenges.

A position maintained by a deep knowledge of the different international electricity systems, efficient client-oriented organization and remarkable investment in research and development.

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

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

AZVI

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

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

Azvi also has a large and modern machinery park which allows the company to carry out works with its own machines and a Logistics Centre equipped with modern facilities and state of the art resources in order to centralize a variety of support services to railway activity, such as MachineryPark, materials, maintenance, checking and repairing shops. Research and Development is also an important issue for Azvi.

Through its own R&D department, Azvi invests in railway research and development, in collaboration with various public and private entities and investigation groups.

BIGDA SOLUTIONS (METEO FOR ENERGY S.L.)

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

The company undertakes development projects involving Big Data and artificial Intelligence technology to optimise

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

BOMBARDIER ESPAÑA

- **Complejo Miniparc III – Edificio K 1ªPlanta C/Caléndula 93 - 28109 Soto de la Moraleja (MADRID)**
- **P: +34 91 658 55 00**
- **F: +34 91 650 75 18**
- **javier.hinojal@rail.bombardier.com**
- **www.bombardier.com**

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

CABLES DE COMUNICACIONES ZARAGOZA

- **Polígono de Malpica, Calle D, nº 83 50016 Zaragoza (ZARAGOZA)**
- **P: +34 976 72 99 00**
- **F: +34 976 72 99 72**
- **comercial@cablescom.com**
- **www.cablescom.com**

Founded in 1971, Cables de Comunicaciones has been steadily building its reputation as a respected business in the field of communications cables. Cables de Comunicaciones has cemented its position and its products are now used in over 50 countries around the world.
The company has a wide range of products that are certified according to the standards of the leading telecomm and railway operators in the majority of countries in Europe. It is dedicated to designing and developing excellent telecommunications, signalling, instrumentation, data and fibre optic cables.

CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES, S.A.

- **José Miguel Iturrioz, 26 20200 Beasain (GUIPÚZCOA)**
- **P: +34 943 880 100**
- **F: +34 943 881 420**
- **caf@caf.net**
- **www.caf.net**

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

CAF POWER & AUTOMATION

- **Parque Tecnológico de San Sebastián. Pso. de Mikeletegi, 58 -2º. 20009 San Sebastián (GUIPÚZCOA)**
- **P: +34 943 30 92 51**
- **F: +34 943 30 92 52**
- **info@cafpower.com**
- **www.cafpower.com**

CAF P&A is a global manufacturer of electric power solutions as well as information and communications systems for the rail industry.
CAF P&A have equipped more than 5,000 vehicles world wide including, metros, light rail, locomotives and high-speed trains.
One of the main strategic lines is the development of its own technology. To do so, as a major asset, CAF P&A has a team of experienced, competent and dynamic specialists. CAF P&A develops, manufactures and deliver high reliability solutions adapted to each and every client's specific needs in compliance with railway standards.

CAF SIGNALLING

- **Avenida de la Industria, 51 28108 Alcobendas (MADRID)**
- **P: +34 91 789 27 50**
- **F: +34 91 661 37 51**
- **cafsignalling@cafsignalling.com**
- **www.cafsignalling.com**

CAF Signalling, the technological subsidiary of the CAF Group, provides rail traffic signalling, both in Spain and abroad.
As such, it offers railway signalling solutions and remote control for Railway infrastructures. CAF Signalling, boats the Company's own in-house engineering and expertise to take on "turn-key" railway signalling projects with recognition from several Railway Administrations in Spain and other countries in Europe, America, Africa, Middle East and Asia.

CAF TURNKEY & ENGINEERING

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

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

CALMELL GROUP

- **Pol. Ind. Pla d'en Coll C/ Fresser, 12 C 08110 Montcada i Reixac (BARCELONA)**
- **P: +34 93 564 14 00**
- **F: +34 93 564 58 22**
- **calmell@calmell.net**
- **www.calmell.com**

The first company of the group, Calmell, S.A. was founded in 1970, focusing its activity on the manufacture or graphic products. Currently, the Calmell Group is the leader in access control and identification, through its companies Calmell S.A., Affix S.L., Idoneum S.A., which are respectively engaged in producing the supports (tickets, cards,…), developing specific software and hardware, personalization and security.
In the public transport sector it works for integrators and operators supplying any kind of support for ticketing and reader/writer systems. With a strong international presence through its network of representatives and distributors, the Calmell Group is able to satisfy your needs on a global level.

CETEST

- **Lazkaibar, s/n 20200 Beasain (GUIPÚZCOA)**
- **P: +34 943 028 690**
- **cetest@cetestgroup.com**
- **www.cetestgroup.com**

Test and analysis services for:
- Design verification and validation.
- Full homologation of new products and vehicles.
- Failure analysis and optimization.

Fully accredited test lab with more than 40 years of experience in railway testing.
Test services cover the following areas:
- Structural components.
- Running gear.
- Suspension systems.
- Vehicle dynamics.
- Noise and vibrations.
- Aerodynamics.
- EMC and energy consumption.
- Mechatronics.
- Special instrumentation (Instrumented wheelsets, instrumented pantograph).

CITEF (FUNDACIÓN PARA EL FOMENTO DE LA INNOVACIÓN INDUSTRIAL)

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

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

COLWAY FERROVIARIA, S.L.

- **C/Botánica, 149-151 08908 L'Hospitalet (BARCELONA)**
- **P: +34 93 414 65 12**
- **F: +34 936 39 8 610**
- **acolomerf@colway-08.com**
- **www.colway-08.com**

Colway Ferroviaria,S.L., company belonging to the COLWAY Group, specializes in the design, engineering, manufacture, supply, installation and commissioning of turnkey railway vehicle interiors. Through the integrated management of modular supplies, based on experience, knowledge, research and innovation, the company achieves the satisfaction of the needs and expectations of its customers: railway manufacturers and public administrations. Colway capabilities include Modular System solutions for Rail Interiors as Toilet Modules, Front hoods, saloons, walls, Buffet, Restaurant areas, vestibules.

COMSA CORPORACIÓN

- **C/ Julián Camarillo 6A, 2ª planta 28037 Madrid (MADRID)**
- **P: +34 913 532 120**
- **F: +34 913 504 954**
- **jalvarez@comsa.com**
- **www.comsa.com**

COMSA is the company of COMSA Corporación specialised in the construction of railway infrastructures. Founded in 1891, the company provides a comprehensive service in the field of railway construction and maintenance, electrification, and control and communication systems of high speed rails, conventional rails, metros and tramways. In this business activity, it is leader in Spain, where has been involved in the construction of all high speed lines, and has permanent operations in Argentina, Brazil, Lithuania, Mexico, Poland, Portugal and Turkey. It has also taken part in a large number of projects in other markets such as Italy, the Philippines, Taiwan, Malaysia, India, etc. This extensive experience has been the key for its consolidation in the railway sector and has enabled it to become the leader in the railway construction industry.

CONVERZAR

- **Pol.Ind.Malpica C/F Oeste Grupo Gregorio Quejido, Nave 64 CP 50016 – (ZARAGOZA)**
- **P: +34 976 138 097**
- **sergio.boillos@converzar.com**
- **www.converzar.com**

Since 1975, Converzar is a company dedicated to distribution and converting of adhesive tapes, abrasives and liquid adhesives.
Experience, quality, flexibility, agility and commitment to people and the environment, are values that best identify us. Our principal lines of business are designed to provide

the best solutions to especific needs of our customers:

1. DISTRIBUTORS of adhesive tapes, liquid adhesives and abrasives. We have the Preferred Converter of 3M, we also work with leading brands in the adhesives market, which guarantees the quality of our products and makes us reliable suppliers.

2. CONVERTING AND MANUFACTURE of adhesive materials. Satisfying the requirements of our customers, Converzar offers comprehensive solutions from design, development, prototypes and series phases, to the application phase of our product, also offering automation options.

We have a large parquet of last generation machinery of: Laminators, Lathes, Cutters Stamping machines, CNC andLaser cutting and engraving.

CREATIVITIC INNOVA, S.L.

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

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

DANOBAT

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

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

DSAF – DINÁMICAS DE SEGURIDAD, S.L.

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

DSAF is a company structure devoted to People's Movement Safety. It is committed to providing new technologies applied to design and project implementation, as well as initiatives that guarantee an approved evacuation safety level in this generalized risk society.

Emergency signalling is DSAF's main application area; it develops photoluminescent, electroluminescent and LED signalling systems for people evacuation in risk situations and environments: tunnel evacuation safety, vessel evacuation safety, building evacuation safety…

DSAF safety applications are developed in three big areas: tunnel safety (road / railway), safety in vessels, and buildings.

DURO FELGUERA RAIL, S.A.U.

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

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

ECOCOMPUTER S.L.

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

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

ELEKTRA-GRUPO ELEKTRA, S.A.

- **Carrer de Cervantes, 147 08221 Terrassa (BARCELONA)**
- **P: +34 937 33 77 77**
- **railway@elektra-sa.es**
- **www.grupoelektra.es**

Grupo Elektra is a market leader in the field of electrical and electronic equipment distribution for manufacturers of rolling stock, maintenance and railway equipment manufacturers.

Being the leading company in the railway sector in the supply of electrical equipment. Your solution provider in electrical products for railway, with specific tecnical support. Elektra Group is composed of an extensive Spanish national network and has companies in Romania, India and USA.

FLEXIX

- **Polígono Industrial Pinoa, 1 D 48170 Arteaga-San Martín Zamudio (VIZCAYA)**
- **P: +34 944 97 71 80**
- **F: +34 944 977 190**
- **flexix@flexix.com**
- **www.flexix.com**

Flexix develops, manufactures and sell worldwide injection and extrusion rubber parts, rubber-metal, rubber-plastic and assemblies.

We belong to Kächele-Flexix Group, with plants near Stuttgart and Munich (Germany), Zamudio (Spain) and a logistic warehouse in Houston (USA).

Our products for the railway sector, are mainly for infrastructures, absorption of vibrations under track, tie pads for sleepers, with different stiffness, new developments, materials, competitiveness, non-conductivity (or yes, if necessary), non-harmful gases.

Type of parts Flexix produces: Ducts, bellows, tubes, silentblocks, joints, bumpers, axles, links, valves, bearings.

Mixtures: nr, sbr, epdm, cr, nbr/hnbr, eco, aem, acm, vmq/silicone, fkm/fpm.

FUNDICIONES GARBI, S.A.

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

Founded back in 1972, Fundiciones Garbi has evolved from a traditional foundy to a Global Service Company for industry.

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

FUNOR, S.A.

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

Castings in carbon steel, alloy steel and stainles steel.

Our products:

- Steel casting.
- Raw castings or fully machined.

Examples:

- Bogie components.
- Pivots.
- Motor housings.
- Pressure rings.
- Axle boxes.
- Links.

GAMARRA, S.A.

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

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

GANTREX, S.A.

- **Pol. Ind. Izarza 4N – 48115 Sondika (VIZCAYA)**
- **P: +34 944 53 50 84**
- **info.bilbao@gantrex.com**
- **www.gantrex.com**

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

Products:

- All sections of rails
- Metallic railway sleepers
- Rail fixing Clips
- Rubber pads for rails
- Steel columns for trains maintenance
- Embedded rail fixation systems (recycled rubber)
- Embedded rail fixation systems (polyurethane)
- Hydraulic buffers

GMV SISTEMAS, S.A.U.

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

Since 1994 GMV provides Intelligent Transport Systems, offering turnkey solutions and specific products. GMV develops applications adapted to sector needs, including satellite navigation, mobile communications, passenger information, fare collection systems and monitoring-and-control centers. GMV's railway portfolio

includes fleet management system, SAE-R®, providing operators with an all-in system for planning and management, and other products like CCTV, PA-Intercomm and Passengers Video Information, as well as electronic fare collection systems for railway sector.

GORATU

- **PLerun Kalea, 1, 20870 Elgoibar, (GUIPÚZCOA)**
- **P: +34 943 74 80 60**
- **sales@goratu.com**
- **http://www.goratu.com**

Under the trademark of the prestigious market leader GEMINIS, Goratu develops horizontal and multiprocess lathes of the highest technology.

We offer customized solutions for high specialization technologies.

60 years of experience and specialized knowledge in the Railway Sector have let us to the design and manufacture of lathes for manufacture and maintenance of axles, wheels and wheelsets.

HICASA - HIERROS Y CARBONES, S.A.

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

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

HICASA belongs to a private group of companies, GEVIR, which is made up of four enterprises in Spain, and is special in the sense that it combines its role of distributor with that of manufacturer, given that it possesses its own specialist light rail factory, a fact which endows it with a unique market profile. We can boast of a roofed surface area at our installations of over 13,000 m^2, where we dispose of modern cutting and drilling machines that enable us to transform iron and steel and to supply orders of any format and measurement, in accordance with the specifications requested by our clients. We export over 50% of our products abroad.

ICON SISTEMAS DE INFORMACIÓN Y DATOS

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

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

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

IDOM

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

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

IKUSI

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

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

IK4 RESEARCH ALLIANCE

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

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

The IK4 Research Alliance sets out to generate, capture and transfer scientific and technological knowledge mainly to the business framework. This way it contributes towards improving the competitiveness of companies and the progress of society. Nowadays it gathers a staff of 1275 and an income of 102M€ in 2014.

IMPLASER 99, S.L.L.

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

Implaser is a Spanish company focused in developing innovative security signs for railway projects. Innovation and quality are our mainstays, as we were the first SME being certified in R+D+I in Spain. Implaser has all the range of products certified by AENOR with photoluminescent values of 150, 300, 580 and 720 mcd/m^2.

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

INDRA

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

Indra is a world leader and pioneer in the supply of technological platforms for railway operations management, control and supervision, having specific solutions already tested on high speed and conventional lines and metropolitan operations. Indra is also a leader in ticketing systems for transport operators and has facilities and projects all over the world. Furthermore, Indra develops high-precision safety and signalling systems. At this moment in time, Indra's solutions are completely unique because of their high level of integration and adaptation to the current and future necessities of the railway environment whatever may be the most state of the art technological and operative options. Indra has managed to open a competitive market for the first time based on technological and economical competitiveness.

INECO

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

Global leader in transport engineering and consultancy, it has contributed to the development of transport infrastructures for over 45 years in more than 45 countries. Its high level technical specialisation allows its activity to diversify into new markets and reinforce its presence in those where it is already established.

Its participation in the whole railway system in Spain has led the company to develop important international projects like the Makkah-Madinah high speed in Saudi Arabia, the Ankara-Istanbul line in Turkey and the HS2 project in the United Kingdom.

INGETEAM POWER TECHNOLOGY, S.A.

- **Edificio 702. Parque Tecnológico de Bizkaia 48160 Derio (VIZCAYA)**
- **T: +34 94 655 90 00**
- **F: +34 94 403 98 37**
- **traction@ingeteam.com**
- **www.ingeteam.com**

Ingeteam is an expert leader in the development of electrotechnical and power electronics systems providing involving energy exchanges at large.

Our capacities and the experience on the railways sector allow us to offer technological solutions that significantly contribute to reach our customers strategic objectives, leading to maximize operational efficiency. We strive towards on offering in-house/ state-of-the-art developments for:

- Rolling Stock: Traction Systems and TCMS
- Infrastructure: Energy Recovery Systems.

INTERNACIONAL HISPACOLD, S.A

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

Hispacold is a World leader company for climate systems specialized in comfort for people with more than 30 years' experience. Hispacold designs and manufactures HVAC solutions for all rail vehicles: trams, metros, EMUs, DMUs, LRVs… with proven and reliable technology solutions. In Hispacold each activity is based on a solid quality culture and on a real commitment with the environment.

Quality certifications ISO 9001, ISO 14001, OSHAS 18001 are only the smallest part of this working way.

Hispacold is a company of Irizar Group SC, which employees more than 3.000 people in the five continents and has a global turnover of more than 550 Million €.

This gives Hispacold the benefits from a multinational organization while maintaining an individual company spirit.

Hispacold's presence in the five continents guarantees the best technical assistance at any place of the world.

INSERAIL, S.L.

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

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

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

JEZ SISTEMAS FERROVIARIOS, S.L.

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

JEZ Sistemas Ferroviarios, S.L. is committed to designing, manufacturing, supplying and maintenance of all types of manganese steel switches and railway track systems, in addition to moulded cast steel parts for the general industry. Our Technical Department (Department of R&D) ensures we have the capability of designing and producing points and crossings (turnouts, crossovers, scissor crossovers and diamond crossings) or parts for them, such as hard steel manganese crossings or spare tongues.
At JEZ Sistemas Ferroviarios, S.L. we fit our developments to meet clients needs.

LADICIM (UNIVERSIDAD DE CANTABRIA-LABORATORIO DE LA DIVISIÓN DE CIENCIA E INGENIERÍA DE LOS MATERIALES)

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

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

LA FARGA , S.A.

- **Colonia LaCambra s/n 08509**
  Les Masies de Voltregà
  (BARCELONA)
- **P: +34 93 850 41 00**
- **F: +34 93 859 55 30**
- **gustau.castellana@lafarga.es**
  jordi.vilaro@lafarga.es
- **www.lafarga.es**

La Farga Yourcoopersolutions is a model company in the railway sector, with more than 200 years' experience in the copper industry.
A solid international presence and continuous innovation in the search for new alloys have enabled it to produce high-service materials.
La Farga Lacambra provides global solutions for copper materials and its alloys such as CuMg, CuSn or CuAg, integrating the whole productive process and ensuring the maximum technical qualities.
These products satisfy the needs of the market for all kind of lines and speeds around the world.

LAMAIGNERE CARGO

- **Edf. Servicios Generales.**
  Centro de Carga Aérea Madrid-Barajas
  Ofi. 608 28042
  Madrid (MADRID)
- **P: +34 91 312 01 22**
- **F: +34 91 312 01 66**
- **fherrero@lamaignere.com**
- **www.lamaignere.com**

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

LANDER SIMULATION & TRAINING SOLUTIONS, S.A.

- **Portuetxe, 23ª Local B3**
  20018 San Sebastián
  (GUIPÚZCOA)
- **P: +34 943 21 74 91**
- **F: +34 943 21 74 91**
- **aohlsson@landersimulation.com**
- **www.landersimulation.com**

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

LIMMAT M&M S.L.

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

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

LUZNOR

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

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

MB SISTEMAS, S. COOP.

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

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

METALOCAUCHO, S.L.

- **Polígono Erratzu, 253**
  20130 Urnieta (GUIPÚZCOA)
- **P: +34 943 33 37 55**
- **F: +34 943 33 37 51**
- **info@metalocaucho.com**
- **www.metalocaucho.com**

MTC specialises in the design and manufacture of anti-vibration and suspension solutions for Rolling stock. The Company was established in 1982 and currently has three manufacturing sites, located in Spain (HQ), China and India. In 2009 the company was awarded IRIS Certification. MTC, being among the leading companies in its sector, supplies to the main Rolling stock Constructors worldwide, including Alstom, Bombardier, CAF, CSR, CNR, Hyundai Rotem, Siemens, Talgo, Vossloh). We also collaborate with Operators for the supply of spare components for their overhaul projects. Our main products are rubber-metal primary and secondary suspensions, focusing on primary springs (conical or chevron type), guiding bushes, guiding links, secondary air springs and emergency springs, traction rods, elastic bushings, buffers, layer springs as well as a diverse range of associated rubber-metal solutions.

MGN TRANSFORMACIONES DEL CAUCHO, S.A.

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

MGN was established in 1957 and since then it has been developing its activity both designing and manufacturing rubber-metal components, mainly for the railway industry. MGN invests in research and innovation as a basis for the development of elements to be adapted in the new understanding of passenger and fright trains, taking the lastest technological advances of the rubber world, vibration control and damping systems.

NEWTEK SOLIDOS S.L

- **Pol. Abendaño. Urdaneta bidea, 3B.**
  Zarautz - (GUIPÚZCOA)
- **P: +34 943 83 59 42**
- **contact@newteksolidos.com**
- **www.newteksolidos.com**

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.

NEM. NUEVAS ESTRATEGIAS DE MANTENIMIENTO, S.L.

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

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

P4Q ELECTRONICS, S.L.

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

At P4Q we are involved in the complete development of electronic devices and lean production services. We are structured as an integral supplier of electronics solutions, focused in flexibility and quick development. We design under customer specs and approval. Being a partner of our customers giving global support attending local production demands. Is the basis of our strategy. We have facilities in Albuquerque (NM), USA as well as in Spain.

PARRÓS OBRAS, S.L.

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

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

PRETENSADOS DEL NORTE S.L.

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

PRETENSADOS DEL NORTE produces the best prestressed wire for railway sleepers in the world. More than 30 years' experience, PRETENORTE only uses the best raw materials and we can supply any need required by the client. We have supplied prestressed steel for several projects around the world and our material is considered the one with the best quality in prestressed WIRE world. We have the best and most modern machinery and a highly qualified team of experts and engineers. We also produce prestressed steel used in precast concrete parts and structures.

PATENTES TALGO, S.L.

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

Talgo, leading High Speed rolling stock manufacturer in Spain, has over 70 years of experience manufacturing very high speed, high speed, intercity and regional trains, tilting passenger coaches and locomotives.
The company is also a pioneer in providing complete maintenance solutions to railway operators worldwide, and is specialized in the design and manufacture of maintenance equipment for any type of rail vehicles.

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

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

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

SATYS INTERIORS RAILWAY SPAIN

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

Kelox launched its railway activity in 1977, manufacturing catering equipment for dining cars on longdistance lines. The experience and knowledge acquired over the years have become Kelox specialist in the design and full supply of galleys and catering equipment for high-speed, shuttle and regional trains. Our style of design is characterised by harmony; it is beautiful, ergonomic and functional, always according to the customer specifications.

SEMI, S.A. (GRUPO ACS)

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

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

SEGULA

- **Oquendo 23, 1ª planta 28006 Madrid (MADRID)**
- **T: +34 917 991 112**
- **F:+34 917 991 113**
- **www.segula.es**

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

SENER INGENIERÍA Y SISTEMAS, S.A.

- **Avda. Zugazarte, 56 48930 Getxo Las Arenas (VIZCAYA)**
- **P:+34 94 481 75 00/+34 91 807 70 68**
- **F:+34 94 481 75 01/+34 91 807 87 32**
- **dep.infraestructurasytransporte@sener.es**
- **www.ingenieriayconstruccion.sener**

Sener is one of the leading engineering and technology groups in Europe with over one billion euros of annual turnover, more than 5,000 professionals and a continuously growing international presence with offices in more than 15 countries. In the field of railway engineering, Sener count on an extensive experience in metros, light rail trains systems and tramways, conventional railway line, freight transport and High Speed Lines. Sener's activities range from preliminary, conceptual and feasibility studies, basic and detailed engineering to project management services, supervision of works, value engineering or ICE services.

SICE TECNOLOGÍA Y SISTEMAS

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

SICE Tecnología y Sistemas, (SICE TyS) is a multinational group of Companies, technology and systems integrators operating in the fields of traffic and transport, environment and energy, telecommunications and all types of industrial processes.
SICE TyS's transport activities are focused on meeting the needs of users, operators and transport operation concessionaires in the transport sector.
As a systems integrators and systems suppliers, they offer unique technological solutions tailored to all kind of installations.
Design of the Centralized management of all services that complement any form of public or private transport and integrates different solutions and systems:

- Security&Safety Systems for Metros and Railways
- Telecommunications Systems for Metros and Railways
- Signaling: (Interlocking, Level Crossing, CTC)
- Electric BRTs
- Ticketing
- Public transport prioritization
- Consulting Engineering (OFITECO): Railways lines, Tunnels, Load test (railways bridges).

SIEMENS RAIL AUTOMATION S.A.U.

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

Siemens Rail Automation is the resulting Company after the acquisition of the Invensys Rail Dimetronic group by Siemens. The new division offers integrated mobility solutions through the most advanced technologies for railway signalling and train control. Our main purpose is the supply of "turn-key" projects, including all the phases of design, development, supply, manufacturing, installing, testing, commissioning and maintenance of railway signalling systems and automatic train control systems for either mass transit applications as main line and high speed lines.
The solutions and systems of Siemens Rail Automation allow railways and metropolitan networks to improve the safety of their railway application; increase the capacity of the lines; reduce operating costs; optimize maintenance works; obtain a better usage of its rolling stock, having at the same time lower energy consumptions rates and to decrease energy consumption.

STADLER RAIL VALENCIA S.A.U.

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

The new Spanish División of Stadler has a long history as rail vehicles provider. Stadler Rail Group completed the purchase from the Vossloh Group of its Spanish business unit of manufacture of locomotives and light rail vehicles at the end of 2015. This acquisition falls within the long term growth strategy of the Stadler and reinforces its position as one of the leading manufacturers of railway vehicles with new products and the access to new markets.
Technology and quality are the key points of the entire range of products developed and produced in the Valencia plant. Closely linked with the industrial heritage of railways and with the benefit of more than a century of experience, Stadler Rail Valencia designs and manufactures state-of-the-art locomotives as well as passenger trains and provides a comprehensive range of services such as the maintenance of the vehicles, spare parts logistics, technical support or training.

TALLERES ALEGRÍA, S.A.

- **C/ Peña Santa, 7 - P.I. Silvota 33192 Llanera (ASTURIAS)**
- **P: +34 985 26 32 95**
- **F: +34 985 26 60 1**
- **talegria@talegria.com**
- **www.talegria.com**

Talleres Alegría with more than 100 years at the service of railway´s networks, offers to its customers a wide range of fixed track equipment with the best quality and service conditions. Following its own technical design or its customer's, Talleres Alegría manufactures among other turnouts for High Speed Lines, conventional Lines, subway and Tramway lines, as well as End Forged Switch Points and Track Vehicles. Being aware of the relevance of comfort within the railway sector, Talleres Alegría has collaborated with leading companies developing and applying technical solutions for mitigating noise and vibrations during the crossing over the turnouts.

TECNALIA (FUNDACIÓN TECNALIA RESEARCH AND INNOVATION)

- **Albert Einsten, 28 Parque Álava 01510 Miñano (ÁLAVA)**
- **P: +34 664 359 613**
- **F: +34 901 706 009**
- **Hugo.martinezdelahidalga@tecnalia.com**
- **www.tecnalia.com**

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

TECTATOM

- **Avda. Montes de Oca, 1 San Sebastián de los Reyes 28703 Madrid (MADRID)**
- **P: +34 91 659 8600**
- **F: +34 91 659 8677**
- **correo@tecnatom.es**
- **www.tecnatom.es**

Tecnatom has more than 50 years of experience in the application of Non Destructive Testing (NDT) to the inspection of components.

It also offers its high technological level in the development and application of inspection systems and techniques to the railway market, where security and quality control are increasing required.

Tecnatom can provide its depth knowledge on materials currently used or tested in the railway sector (metals or new materials carbon-fiber based), taken advantage of its activities in the nuclear and aerospace sectors.

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

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

TECNIVIAL

- **C/ Livorno nº59 19004 Marchamalo (GUADALAJARA)**
- **P: +34 949 32 50 00**
- **F:+34 949 25 20 80**
- **export@tecnivial.es**
- **www.tecnivial.es**

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

The challenge for a permanent evolution, technological innovation, and customer´s satisfaction are our identity signs. In Tecnivial we specialize in all types of fixed signalling for roads, both conventional and high speed lines; in this last section are one of the companies approved by the Railway Infrastructure Administrator (ADIF). We have extensive experience in railway stations signalling, carefully following the specifications of the corporate identity manuals. We develop comprehensive and customised signage projects, from project design to final installation and maintenance service.

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

TEKNORAIL SYSTEMS, S.A.

- **Paseo de la Castellana, 91 28046 Madrid (MADRID)**
- **P: + 34 91 515 60 00**
- **F:+ 34 91 564 72 86**
- **info@teknorail.com**
- **www.teknorail.com**

Teknorail Systems, S.A. is a company belonging to the EUROFINSA Group, whose activity focuses on the development of railway interior projects, aimed both for the refurbishment of existing vehicles and also for new rolling stock, with a scope of supply that ranges from the design and engineering to the industrialization and material supply, including the technical assistance to the car commissioning.

Teknorail's main goal is to provide its customers with high-quality solutions for railway interiors by means of innovation, global project management, modular supply and flexible solutions.

TELICE

- **Pol. Ind. Onzonilla, 2ª fase 24391 Ribaseca (LEÓN)**
- **P: +34 987 22 10 04**
- **F: +34 987 26 44 07**
- **telice@telice.es**
- **www.telice.es**

Telice is a Spanish company with 39 years of experience in several fields of technology installation, especially for the railway sector.

Our activities cover design, installation and maintenance for Railway Electrification Systems, Railways Safety and Signalling, Optical Fiber, Industrial Automation and Electrical Installations Our extensive experience has made Telice a preferred partner for carrying out work and providing services for important railroad administrations and major construction and technology companies in the railroad industry.

Teltronic, S.A.U.

- **F-Oeste, 12 P.I. Malpica 50016 Zaragoza (ZARAGOZA)**
- **P: +34 976 46 56 56**
- **F: +34 976 46 57 20**
- **fsanjuan@teltronic.es**
- **www.teltronic.es**

Backed by over 40 years of experience in the design, manufacturing, and deployment of Professional mobile radio projects worldwide, Teltronic presents a broad portfolio of critical communication solutions for transport sector, providing complete solutions: network infrastructures, control centres, and end-user equipment, including specialized onboard systems specifically designed to meet train, metro, tram and LTR needs.

The company's technical independence and willingness to customize its solution to each specific project allow Teltronic to fulfil the most demanding requirements in both communication and security systems.

THALES ESPAÑA GRP, S.A.U.

- **Serrano Galvache, 56 Edificio Álamo 4º, Planta Sur. 28033 Madrid (MADRID)**
- **P: +34 91 273 72 00**
- **F: +34 91 273 78 67**
- **jose.villalpando@thalesgroup.com**
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TRIA started with a core of railway engineers, providing solutions for automatic gauge changing technologies. They were demanded EPC type solutions that included civil works, fabrication of mechanisms, electrical engineering and installations, automation and control, track & catenary, comunications, signalling, etc.

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TRIGO GROUP

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

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