



## URBAN RAIL TRANSPORT IN SAUDI ARABIA

The metros of Riyadh, Jeddah and Makkah at the head of the current urban development in the Saudi Kingdom.



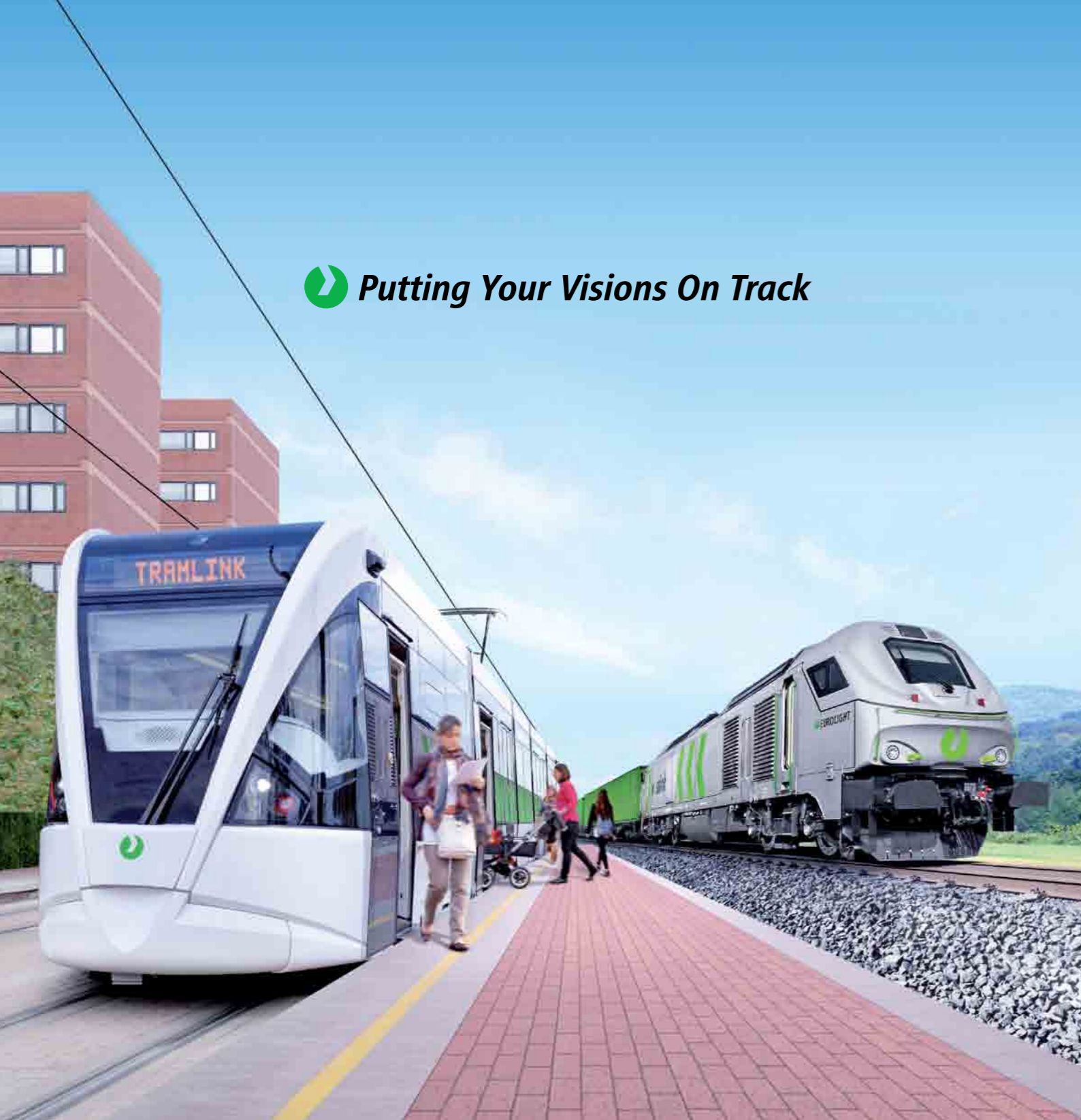
**DESTINATION: SOUTH AFRICA**  
Freight and passenger transport is improved



**MAFEX INFORMS**  
XIII General Assembly 2015



**2016 RAILWAY INVESTMENT**  
5,460 million for Spanish railways



**Putting Your Visions On Track**

Vossloh Rail Vehicles designs and builds universal locomotives as well as rolling stock for urban public transport. The focus is on intelligently interlinking transport systems to provide future-proof solutions for urban, long-distance, public and freight transport. Our products and solutions make a key contribution to keeping people and freight mobile.

[www.vossloh-rail-vehicles.com](http://www.vossloh-rail-vehicles.com)

**vossloh**  
understanding mobility

05 / **EDITORIAL**

06 / **MAFEX INFORMS**  
**MAFEX PARTICIPATES IN THE UIC HIGH SPEED CONGRESS**



Spanish companies participated with the Association, ICEX and Renfe in the world High Speed fair held in Tokyo last July..

**CELEBRATION OF THE ANNUAL GENERAL ASSEMBLY**  
Mafex brought together on June 25 the main Spanish companies in the railway sector

**A MAFEX DELEGATION TRAVELS TO THE US**  
During September 28<sup>th</sup> and October 2<sup>nd</sup>, the Spanish Railway Association travelled to the cities of Sacramento, San Francisco, Oakland and Los Angeles in the US with a delegation composed by 11 companies specializing mainly in rail infrastructure

**RAIL REMAINS A PRIORITY IN SPAIN'S GENERAL BUDGET FOR 2016**  
Grupo Fomento will allocate 5,460 million euros to rail in 2016, 54% of the total budget for infrastructure.

12 / **MEMBERS NEW**

32 / **DESTINATION**



**SOUTH AFRICA: IN SEARCH OF A BETTER FREIGHT AND PASSENGERS RAIL NETWORK**

With South Africa at the head of the investment, the southern cone of Africa has managed to give a strong push to revive investment in rail transport in both passenger and cargo

47 / **IN DEPTH**  
**MODERNITY AND TECHNOLOGY IN URBAN TRANSPORT IN SAUDI ARABIA**



The country is implementing a strong development in its urban rail network in order to improve connections and facilitate the life of citizens. The Riyadh Metro is an ambitious project that will lead to the construction of 6 lines.

60 / **INNOVATION**  
**MAFEX MEMBERS PRESENT THEIR LATEST DEVELOPMENTS**

66 / **AGENDA**

67 / **MEMBERS GUIDE**

siemens.es/railautomation

## Integrated solutions for railway infrastructure challenges

Siemens provides sustainable technologies for railway infrastructures around the world through a portfolio of products and services including integrated solutions for all types of

railway lines: signaling and control technologies, electrification systems, rolling stock, turnkey projects and maintenance for all the areas of railway services.

Answers for mobility.

## Good prospects for the railway sector in Spain for 2016

Dear friends,

With this issue, the fifth and last one for this year, we want to share with you once more the most important news of the Spanish railway industry and its presence in major international markets. For example, on this occasion, members of our Association have been awarded major contracts in the metros of several Latin American cities like Medellin in Colombia, Guadalajara in Mexico, Santiago de Chile, Buenos Aires, Lisbon and Algiers. You will also find details of awards for rail freight operators in Italy, Dinazzano Po, and England Direct Rail Services; ONCF of Morocco, Ecuador railways and trams of Luxembourg and the region of Haaglande in the Netherlands, among others.

Furthermore, we inform you about the activities that the Association has carried out in recent months, including the celebration of the annual General Assembly in which the new members of Mafex were presented: AZVI, DSAF, ECOCOMPUTER, FAIVELEY, HISPACOLD IK4, INABENSA, SICE and TECNATOM, all leading companies in the national and international rail sector.

We also address the budget for 2016 that the Ministry of Development of the Government of Spain recently announced, where the railroad, with 5,460 million euros, remains as the sector

receiving the highest investment, reaching 54% of total investments for infrastructure.

As Mafex, we believe that ensuring a proper investment plan for railway infrastructure ensures sustainable development of this transport mode and allows the country to have a competitive and technologically leading rail industry, as in the case of Spanish companies.

Last, but not least, based on the usual structure of the magazine, we also include an article under the section In Depth on urban transport in Saudi Arabia, where Riyadh, Jeddah and Makkah are noted for their strong commitment to modernity and technology in its urban transport systems. Likewise, we highlight the sections Destination which covers the overall picture that South Africa and other countries in the southern area of the continent offer in terms of railway development, highlighting their investment plans on improving freight rail corridors which will now lead to the main ports of the region.

We hope you enjoy reading this issue of our corporate magazine, thus we would also like to invite you to follow our latest news and publications on the sector and the Spanish rail industry through our social media pages: Mafex in LinkedIn and @MafexSpain on Twitter.

### MANAGEMENT: MAFEX.

**MAFEX STRATEGY AND COMMUNICATION COMMITTEE:** Albatros, CAF Signalling, Idom, Indra Sistemas, Ingeteam, Metalocauchó, Patentes Talgo, Sener, Thales España, Vossloh, Siemens Rail Automation and Bombardier España.

**ADMINISTRATION:** comunicacion@mafex.com. **ADVERTISING:** comunicacion@mafex.com. **SUBSCRIPTIONS:** comunicacion@mafex.com  
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.




Mafex was part of the information pavilion organized by IDEX Spain Exports and Investment at the UIC High Speed World Congress held in Tokyo.

# Mafex participates in the UIC High-Speed congress

SPANISH COMPANIES PARTICIPATED ALONG WITH MAFEX, IDEX AND RENFE IN THE WORLD HIGH SPEED FAIR HELD IN TOKYO

During July 7th – 10th, the ninth edition of the UIC High-Speed Congress was celebrated in Tokyo, where MAFEX was part of the information pavilion organized by IDEX Spain Exports and Investment. This High-Speed global exposure is the most important in the industry and is held every two years in different parts of the world. Its importance is that it is the only event focused particularly on the latest advances in equipment, rail, infrastructure, technology products and services related to

the development of High-Speed rail. This event -sponsored by the International Union of Railways (UIC), which includes 171 members, including national railways, operators, infrastructure managers and public-transport companies, also has the participation of international authorities from both public and private sectors and the presence of major international companies from the industry. On this occasion, MAFEX, shared space with important Spanish companies such as CAF, CAF Signalling, Ineco, OHL, Sener, Talgo

and Teltronic, along with operator Renfe. All of them are leading companies in railway equipment and particularly focused on High-Speed technology. Moreover, in parallel conferences, the Congress was addressed by a number of international experts in rail transport and technology. The objective was to bring together in one space the public and private sectors in order to identify best practices in the implementation of High-Speed projects throughout all stages, including planning, financing, construction, operation and management. 

# Mafex celebrates its Annual General Assembly


MAFEX'S GENERAL ASSEMBLY WAS HELD ON JUNE 25TH WITH LEADING COMPANIES FROM THE SPANISH RAILWAY

The Spanish Railway Association held on June 25th 2015 the General Assembly, which gathered a large group of member companies from Mafex. Currently, the association has 75 members, whose rail turnover in 2014 amounted to over 4,400 million euros and employ over 20,000 people. The ceremony held at the headquarters of the company Patentes Talgo, which was opened by the CEO from Talgo, Jose Maria Oriol, addressed, among other issues, the activities of the association in 2014. Moreover, in the framework of this meeting, several of the companies that joined Mafex since the



Picture taken during the General Assembly on June 25th.

Assembly from the previous year were presented. These companies are AZVI, DSAF, ECOCOMPUTER, FAIVELEY, HISPACOLD, IK4, INA-

BENSA, SICE and TECNATOM, all companies based or implanted in Spain and with a major component on rail exports. 

## ACTIVITIES IN THE LAST QUARTER OF 2015

Over the coming months of this year Mafex plans to organize two trade delegations to African and Asian continents in October and November respectively. Mafex will also organize a Seminar in Valencia (Spain) on "Business Opportunities in rail freight transport and logistics" to be attended by various executives and managers of international companies. This conference will take place during November 16th - 20th. On the other hand, the Spanish Railway Association has organized for November two informative sessions on current issues in the rail sector: sustainability and intra-entrepreneurship, an activity aimed exclusively to

members of the association.

The "1st Conference on Sustainability in the rail sector: The environment as a competitive factor" will take place on November 12 in Bilbao with the collaboration of the Public Environmental Management Company of the Basque Government (Ihobe) and the Cluster Association of Environment Industries in Euskadi (Aclima). It will address topics such as eco-design, recyclability and sustainability to promote the competitive improvement of railway undertakings. It will also count with the participation of the European Railway Association UNIFE, the Technological Corporation TECNALIA, the

company IK Engineering and four rolling stock companies that are Mafex members: Alstom Spain, Bombardier, CAF and Talgo. The Conference on "Intra-entrepreneurship as a strategic solution to the expansive policy of emerging countries in the rail sector" is co-organized by Mafex and the Incubator Business department of the University of Deusto. It will be held on November 16 in Bilbao and will have the participation, in addition to several railway companies with experience in intra-entrepreneurship, of the MEP and member of the Transportation Committee of the European Parliament, Izaskun Bilbao.




## A Mafex delegation travels to the US

SPANISH RAILWAY COMPANIES VISIT SACRAMENTO, SAN FRANCISCO, OAKLAND AND LOS ANGELES WITH MAFEX

During September 28<sup>th</sup> and October 2<sup>nd</sup>, the Spanish Railway Association travelled to the cities of Sacramento, San Francisco, Oakland and Los Angeles in the US with a delegation composed by 11 companies specializing mainly in rail infrastructure to publicize their services and technologies on the West Coast of the country. Currently, the US is investing heavily on rail and has an investment plan of \$25,000 million during the next 3 years in 152

railway projects. An example of this investment is the California High-Speed Rail connecting San Francisco and Los Angeles along 1,287 km, the first of its kind in the United States and which foresees an investment of \$ 68,000 million until 2029. Currently, a fourth 22 kilometres section is being tendered in the Central Valley, where there is Spanish presence in three of the five pre-qualified consortia. The Spanish delegation met with the California High Speed Rail Authority, the main entity responsible for the development and implementation of this High-Speed line between San Francisco and Los Angeles, as well as with officials from

Metro San Francisco (BART) and Metro Los Angeles (LACMTA), development agencies of public transport in respective cities, who unveiled an update on the modernization and extension plan for both metros. For the organization of this activity Mafex, was assisted by the Economic and Commercial Office of Spain in Chicago. In addition, the delegation visited the fair Railway Interchange, held in Minneapolis during October 4-7. This fair is one of the most important events in the US focused on freight rail, where participating companies unveiled their new technologies, products and services in this area. 

## InVitalRail

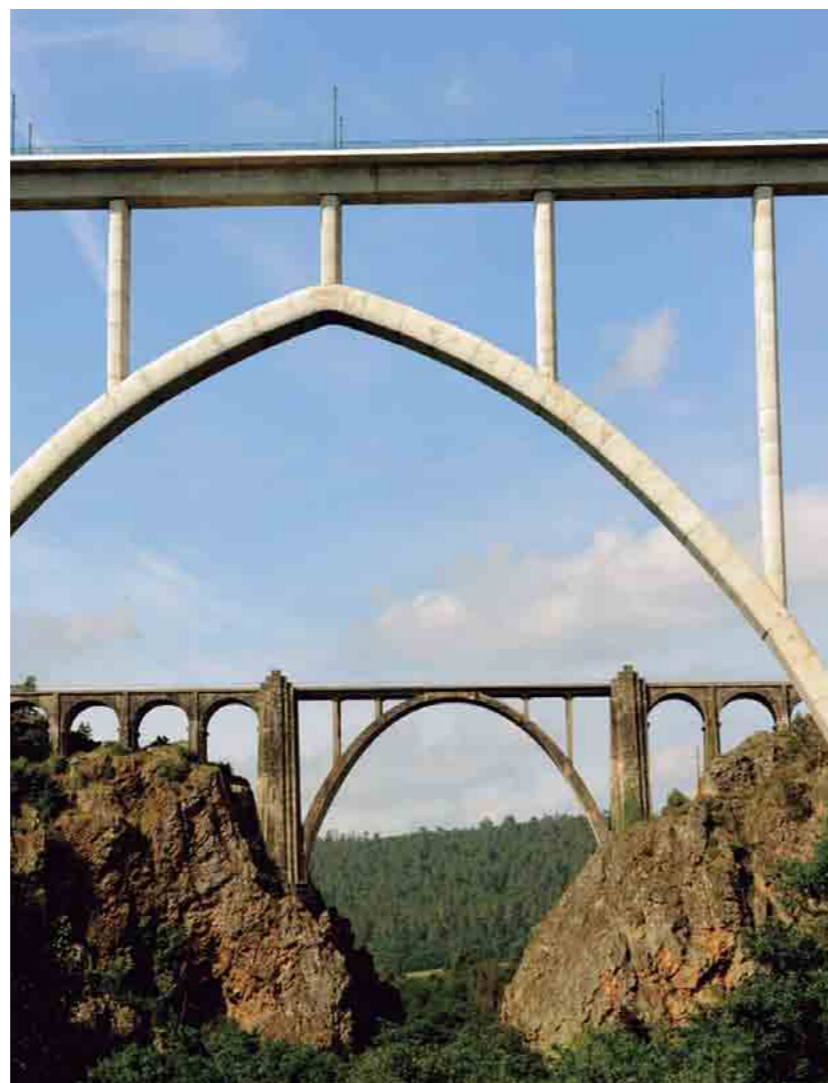
Cutting-Edge Technology for Critical Signalling Systems

- Radio Block Center
- European Vital Computer
- Digital ASFA-On Board Unit & Way Balise
- Safety Detector Processor

Our technologists specializing in ERTMS and ATP systems have invested more than 200.000 hours on research and development over past five years.

[indracompany.com](http://indracompany.com)

# Rail continues to be a priority in Spain's general budget for 2016



THE MINISTRY WILL ASSIGN 5,460 MILLION EUROS TO THE RAILWAY SECTOR IN 2016, 54% OF THE TOTAL BUDGET FOR INFRASTRUCTURE.

According to the State Budget for next year, the Spanish Ministry of Development allocated 5.8% more than in 2015 for investments in infrastructure, reaching 10,129 million euros. The rail sector remains as the one receiving more investment, 5,460 million euros, 54% of the total.

High Speed receives 67% of the investment with 3,679 million euros and the conventional network obtains 420 million euros, an increase of 8% over the previous year; 287 million euros will be destined to commuter lines, a 5% increase, and 275 million euros to rolling stock.

These allocations include, among others, works in the Northwest Corridor with 1,160 million; in the Mediterranean Corridor with 1,343 million and the one connecting the north of the country, worth 1,081 million euros, as well as access to different ports, inclu-

ding Barcelona, with more than 27 million.

Conventional rail has 420 million euros destined to maintenance and improvements to boost freight traffic. Commuter networks, moving around 400 million passengers annually, will receive 205 million for Catalonia, 54 million for Madrid, the Basque Country 4.8 and 12.4 for Valencia, as detailed by the Secretary of State for Infrastructure, Transport and Housing, Julio Gómez-Pomar, during the presentation of the General State Budget (PGE) for 2016 last August. 

# Talgo

The exclusive supplier  
of the **Very High Speed Haramain trains** for the  
Kingdom of Saudi Arabia



[www.talgo.com](http://www.talgo.com)





### New contracts for CAF: Medellín Metro and Luxembourg Tramway

**CAF**  
Metro de Medellín and CAF have signed a new contract for the supply of 20 metro units of 3 cars. The new trains come with the latest technological advances in terms of design, safety and comfort, and they will run in single 3-car consists or as a double consist train. This contract demonstrates the confidence of Medellín Metro in CAF as

this operator currently has 13 CAF trains in its fleet, in operation since 2011. Medellín, the second largest city in Colombia, has two main lines in operation, A and B, extending for a total of 35.5 km in a network of 27 stations.

Furthermore, in early June, CAF and LUXTRAM signed a contract for the supply of 21 trams for the city of Luxembourg for approximately

€83m. The new units belong to Urbos low-floor tramways platform and they offer a capacity for up to 450 passengers. The vehicles will be equipped with Greentech Freedrive system, developed by CAF Power & Automation, for catenary-free operation. The start of revenue service on the line stretch from Luxexpo to the Red Bridge is expected for the second half of 2017.

### Getinsa-Payma Continues its international expansion in the railway engineering industry

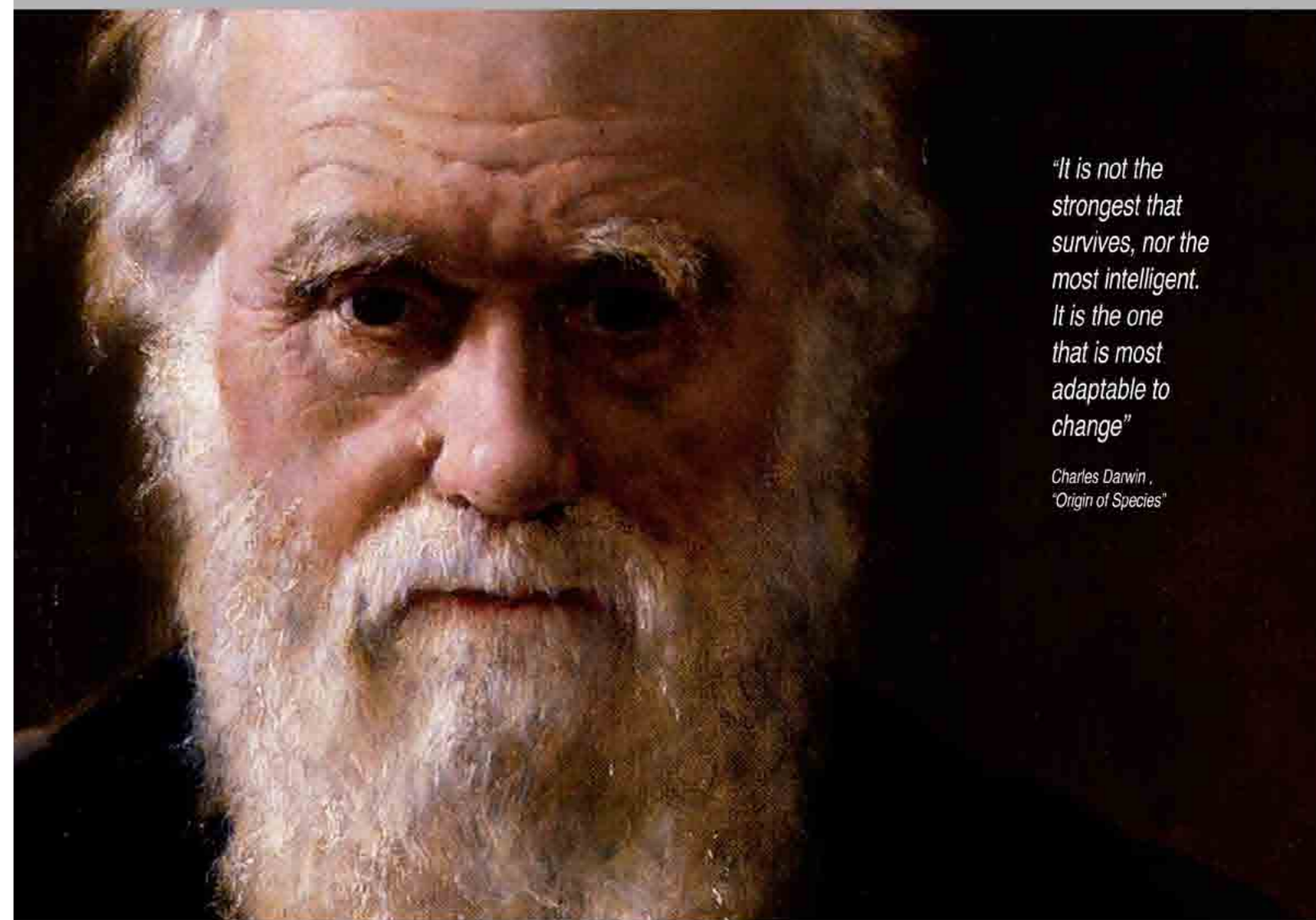


**Getinsa-Payma, S.L.**  
During the third quarter of 2015, Getinsa-Payma has been awarded important railway contracts in three different continents (South America, Asia and Africa). Among these projects, the following are

worth mentioning: Technical Inspection Services for the Civil Works and Metro System in Santiago de Chile, Safety and Quality Audits for the Mughalsarai – New Phaupir Section of the Eastern Dedicated Freight Corridor in In-

dia, and Detailed Design for the Upgrading of the Signaling System in Tanta/El Mansoura/Damiette Railway Corridor in Egypt. The latter is of a special significance, as it widely contributes to the development and modernization of the railway system in the country. It involves 5 main assignments: a preliminary study in order to estimate the costs for the upgrading of the signaling system; preliminary design and functional specifications; preparation of the technical requirements and tender dossier; preparation of the prequalification documents and evaluation of the proposals submitted for prequalification; and technical assistance services during the evaluation of the tender proposals and the awarding of the contract.

*Your project requires collaborators who knows how to adapt.*



*"It is not the strongest that survives, nor the most intelligent. It is the one that is most adaptable to change"*

*Charles Darwin ,  
"Origin of Species"*

*At Amurrio we work on changes since 1880. And on turnouts. On every type of track apparatus and rail projects*

*We endure because we adapt to the needs of each project. Although they are changing.*

*We optimize the design, process, materials and deadlines for each case*

*And when circumstances change, we improve it again.*

*If you want your rail project to evolve, call us.*

*We specialize in changes.*



High Speed



Conventional



Tram



Metro



Heavy Haul



Maskuribai 10, 01470-AMURRIO (ALAVA) SPAIN.  
Tel. +34 945 89 16 00. Fax +34 945 89 24 80.  
www.amurrio.es • info@amurrio.es

### Alstom, together with the Spanish Green Growth Group, signs the Barcelona Declaration

Alstom España

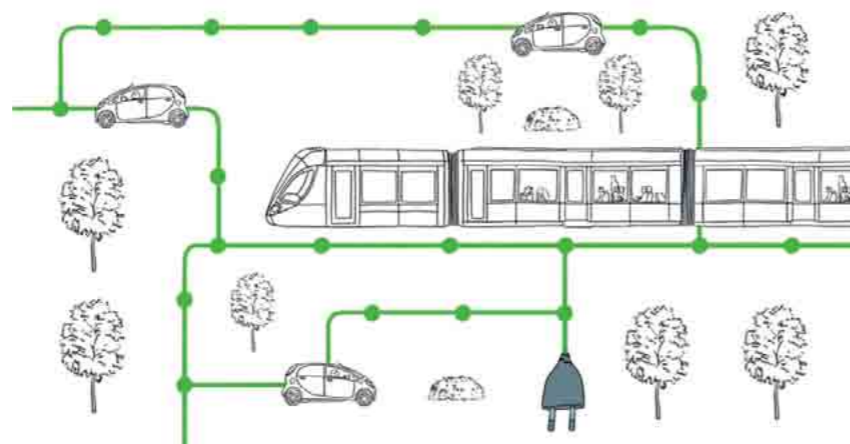
Alstom has presented the Barcelona Declaration, which includes 10 recommendations so that economic policies might create an adequate environment that facilitates the transformation of all the potential of the low-carbon economy into economic growth and employment.

The Declaration, presented within the framework of the 13th Carbon Expo held in Barcelona, has been signed by the 30 companies comprised in the Spanish Green Growth Group, an initiative promoted by the Ministry of Agriculture and Environment. This group

of private institutions would like to transmit, to society and to the public administrations, its vision of an economic growth model that is compatible with the efficient use of environmental resources.

Alstom's involvement in this dec-

laration reiterates the company's commitment to offering sustainable and efficient mobility solutions to society, thereby considering its awareness of the fact that urban development and the growing need for mobility are changing the way of life on the planet.



### Ecocomputer is awarded the maintenance of RailMan Booking for Ferrocarriles de Ecuador and Renfe Viajeros

Ecocomputer

Ecocomputer, an engineering company specialized on railways and security industry, has been

awarded the contract for the IT maintenance (corrective and development level) of the tourist trains booking solution running

at Ferrocarriles de Ecuador Empresa Pública. Also, Ecocomputer has won the bidding process for the IT maintenance and support of the tourist trains booking solution at Renfe Viajeros.

Both operators use the software platform RailMan Booking, de-

veloped by Ecocomputer. It is a powerful software for the management of the reservation and sale of seats in the

tourist trains of a railway operator. Tickets management in tourist trains responds to very different needs from conventional transport. The application (web format) is accessible from any device and manages the full cycle of work of the operator tourist train services: e.g. management of seasons, regular and charter arrivals, sales, rates, discounts, penalties, quotas, detailed reports, billing statistics.

It is worth mentioning the RailMan Booking Online module that allows both agencies and individuals a 24/7 availability search and direct management of tourist bookings.

RailMan Booking is currently used by Renfe Viajeros for the IT operation of the tourist trains: Transcantábrico Train – Grand Luxe, Transcantábrico Train – Classic, Al Andalus Tourist Train and El Expreso de La Robla.

For more information: [www.ecocomputer.com](http://www.ecocomputer.com)



awarded the contract for the IT maintenance (corrective and development level) of the tourist trains booking solution running

sign and developed by Ecocomputer. It is a powerful software for the management of the reservation and sale of seats in the



# DANOBAT

## TURNKEY SOLUTIONS FOR ROLLING STOCK PRODUCTION AND MAINTENANCE

visit our  
new site  
[railways.danobatgroup.com](http://railways.danobatgroup.com)



HORIZONTAL LATHE



PORTAL LATHE

UNDERFLOOR WHEEL LATHE



**DANOBATGROUP**

**DANOBAT**  
Arriaga kalea, 21  
E-20870 ELGOIBAR Spain

Tel.: +34 943 74 80 44  
Fax: +34 943 74 31 38  
[danobat@danobat.com](mailto:danobat@danobat.com)  
[railways.danobatgroup.com](http://railways.danobatgroup.com)



### Vossloh España received orders for eight EUROLIGHT locomotives for the UK and Italy

Vossloh España

Vossloh España will deliver another

7 UKLIGHT locomotives to the British operator Direct Rail Services (DRS) via Beacon Rail Leasing Limited. These vehicles will be used for both, passenger and freight services. This locomotive - named

Class 68 in the United Kingdom - is based on Vossloh's EUROLIGHT platform and has been adapted to UK gauge and British regulations. This third contract will bring DRS' fleet of UKLIGHT locomotives to 32 units.

Furthermore, Vossloh España will supply one EUROLIGHT locomotive to the Italian rail operator Dinazzano Po to be used in freight services.

Designed and manufactured by Vossloh España in Albuxech (Valencia), the EUROLIGHT is a high-power 4-axle diesel-electric locomotive, with AC/AC transmission and low axle load. Characterised by its high traction power and light weight it offers excellent flexibility to rail operators since the units can be operated on main lines as well as on secondary lines.

### Alstom and Faiveley Transport Ibérica SA sign an agreement for the metro of Guadalajara

Faiveley Ibérica S.A.

Alstom has nominated Faiveley

Transport Ibérica, S.A. as the supplier of Passenger Access Doors for the new project Metro Guadalajara (Mexico) Line 3. The manufacture and supply of a total of 432 doors - for 18 trains

of 3 cars - will be held in FT Ibérica plant located in La Selva del Camp (Tarragona), very close to the Spanish Alstom factory of Santa Perpetua de la Mogoda (Barcelona).



# ETCS solutions

## Everywhere it matters, we deliver

**CAPACITY ENHANCEMENTS**  
Provide up to 40% gain without any further investment in infrastructure

**INTEROPERABILITY**  
Enable non-stop rail operations at national frontiers

**SYSTEMS INTEGRATION**  
Design and deliver seamless signalling and communication solutions

**LIFECYCLE COST**  
Optimise trackside efficiency, running costs and maintenance

**ENERGY SAVINGS**  
Reduce power consumption by more than 10%

Millions of critical decisions are made every day in rail network operations. Thales is at the heart of this. A world-leading supplier of ETCS technology, we have been making rail networks safer, more efficient and greener for 70 years. We pioneered ETCS deployment and our customer-focused integrated smart technologies deliver unrivalled signalling and control solutions. Helping decision makers to make more effective responses in critical environments. Everywhere, together with our customers, we are making a difference.



**THALES**  
Together • Safer • Everywhere

### Cetest homologating the new Bombardier vehicles

Cetest

Cetest testing laboratory is currently performing tests for the homologation of Bombardier's new vehicles which are to be put into service soon. Cetest is also carrying out several tests on the wheels of the new high speed Zefiro V300 train.

Moreover, the testing laboratory is making progress with an investigation and analysis test campaign for the traction system of the new double deck regional Dosto FV vehicle which will enter into commercial service soon in FSBB track in Switzerland. In the following months, the electromagnetic compatibility test for the Regio 2N vehicle will be performed. This new generation of EMUs will operate in the French network. CETEST offer personalized services on all five continents, providing service to manufacturers and operators.



### Subterraneos de Buenos Aires awards Amurrio renewal of Line C

Amurrio Ferrocarril y Equipos S.A.

Last November, the company Amurrio Ferrocarril y Equipos SA began supplying switches and crossings for the renewal of the line C of Buenos

Aires, the popular "Subte" of the Argentina's capital. The supply program will last until the beginning of 2016. This contract includes simple turnouts, crossovers and double crossovers, up to a total of almost 30 apparatus for a total of more than three million euros.

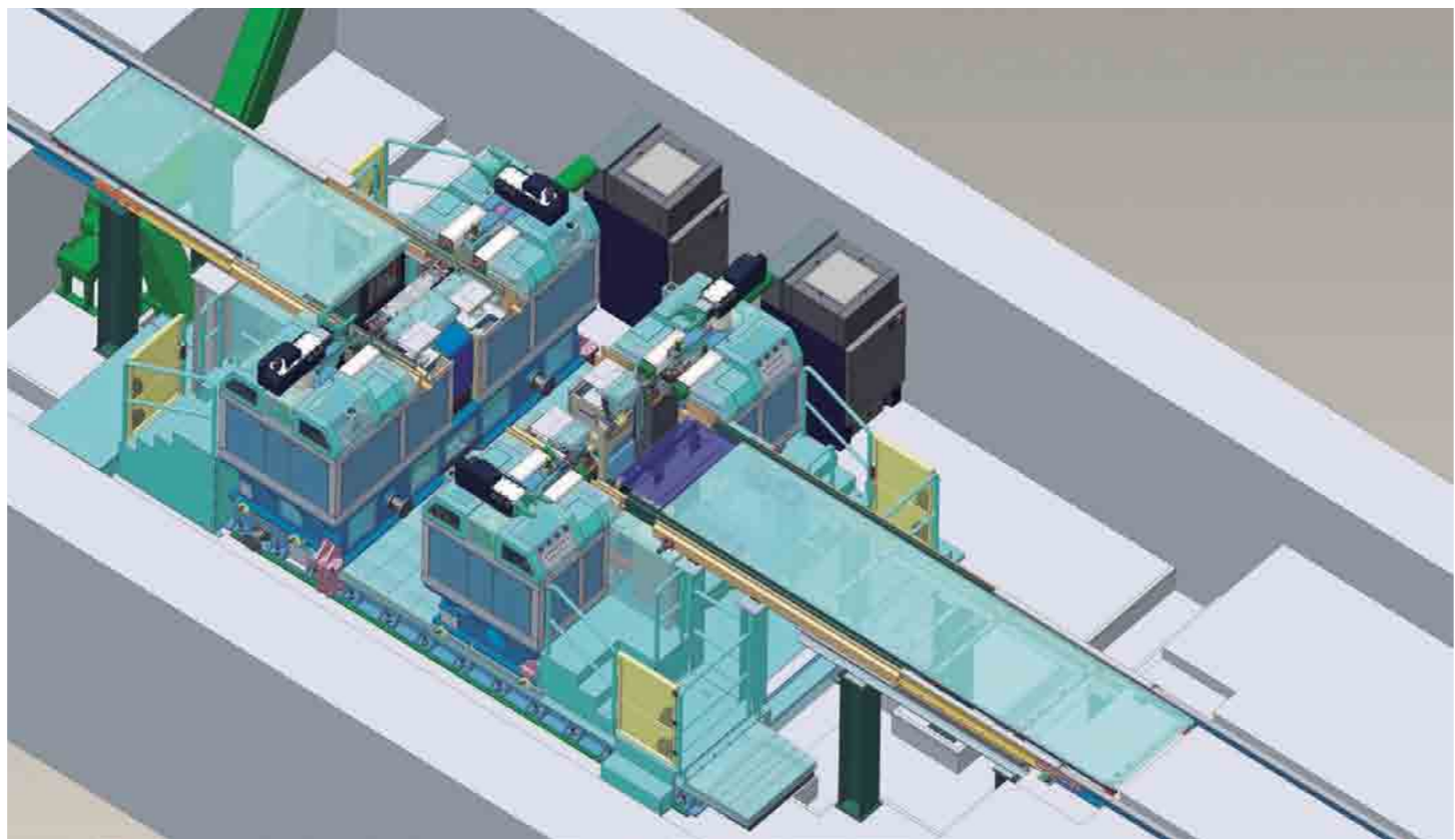
Since this is a renewal, each of the devices has its own geometry, which must be respected, although Amurrio engineers are working to improve and optimize the existing design. It is expected to significantly improve performance and reduce maintenance requirements of the track.



Signalling is not what you see, but what you don't see.  
Relax, this train is running on a CAF Signalling system.

**A Danobat tandem underfloor wheel lathe to install in the UK**

**Danobat**  
The Railway Business Unit of DanobatGroup, which manufactures equipment for the railway industry, has secured an important order in the UK. First Great Western, the UK train operating company, has awarded DanobatGroup a contract for the supply and installation of a Tandem Underfloor Wheel Lathe which will be installed at its Reading Train Care Depot in 2016. DanobatGroup sees this project as a major strategic step in expanding its presence in the UK and reinforces its commitment to this key marketplace. More information at <http://railways.danobatgroup.com/en/underfloor-wheel-lathe>



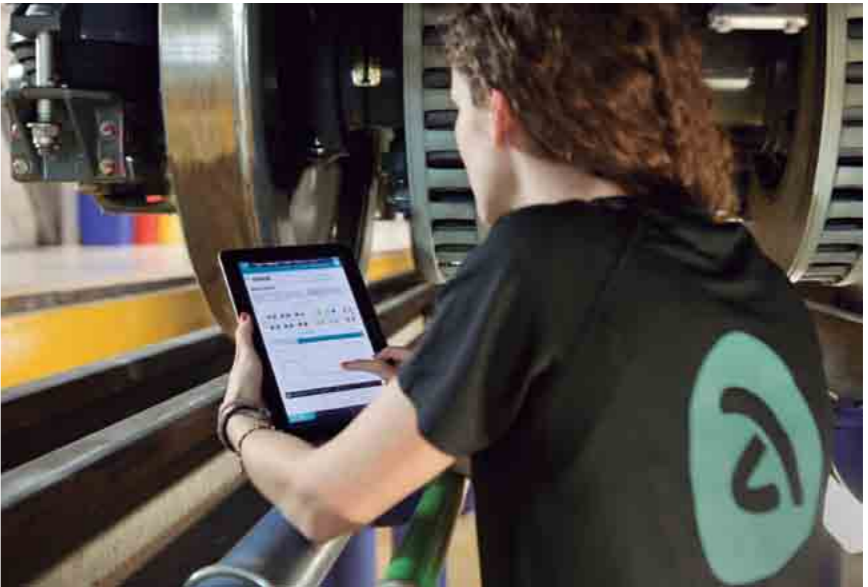
**The Minister of Urban Works, Ana Pastor, visits JEZ Sistemas Ferroviarios, S.L. and Amurrio Ferrocarril y Equipos, SA**

**JEZ Sistemas Ferroviarios, S.L. and Amurrio Ferrocarril y Equipos S.A.**  
Ana Pastor, along with the Secretary of State for Infrastructure, Transport and Housing, Julio Gomez Pomar, the government delegate in Euskadi,

Carlos Urquijo, and the CEO of Adif, Javier Gallego Lopez, was received and accompanied on the visit to Amurrio by the President of the company, Josu de Lapatz and the CEO, Jon Lapatz Benito, while visiting JEZ Sistemas Ferroviarios in Llodio Pastor was received and accompanied by the CEO of the company, Urtza Errazti and the Director of the Technical Bureau,

Angel San Segundo. The Minister and the other representatives took a guided tour in the facilities of both companies, during which they were interested in various aspects of production and received detailed explanations of the particularities of some of the processes. After the visit, Ana Pastor was convinced that the work of the Basque High Speed line –known as the

Basque "Y" - will be completed by 2019 if the current rate of state investment in this project remains. The minister recalled that in this term the government has invested in HS more than 2,300 million euros, and that the budgets for 2016 include a provision of 290 million, plus another allocation of 300 million via Cupo is expected to finance the works carried out by the Basque Government in Gipuzkoa. She added that currently the entire platform of the Basque "Y" linking the three capitals are "under construction or awarded" and that this infrastructure is "going to continue". "Everything leads us to think that the Basque "Y" will be completed by 2019, Pastor added. Amurrio Ferrocarril y Equipos brings its expertise in the design and manufacture of turnouts and crossings for the railway sector, a sector in which it holds a reference position in the international arena. JEZ Sistemas Ferroviarios, a leader in the design and manufacture of satellite equipment, is present in Spain and in many foreign countries. JEZ adapts its developments to the needs of its customers.



**HTM works together with NEM Solutions to improve tram wheel maintenance**

**NEM Solution**  
HTM, the tram operator and maintainer in the Haaglanden region (The Netherlands), is working together with NEM Solutions to improve their tram wheel maintenance process as part of HTM's efforts to continuously improve the technical reliability of the rail system to support the already high level of service to their customers. With this continuous improvement HTM is also looking for resource optimization. NEM Solutions has designed a HTM specific roadmap for improving the wheel maintenance, with the ultimate goal of predictability and overall efficiency through Operation and Maintenance costs reduction. This roadmap has been divided into four main areas: Data ACQUISITION, Data MANAGEMENT, Data ANALYSIS and wheel wear OPTIMIZATION. To facilitate the continuous improvement cycle in the long term, NEM Solutions is implementing A.U.R.A. Wheel, a tool for optimum wheel life cycle management and analysis, to meet the demand for information with the wheel maintenance process. Currently, A.U.R.A. wheel is a knowledge base of more than 36.000.000 wheel measurements, 40.000 cars, and 150 installations worldwide.

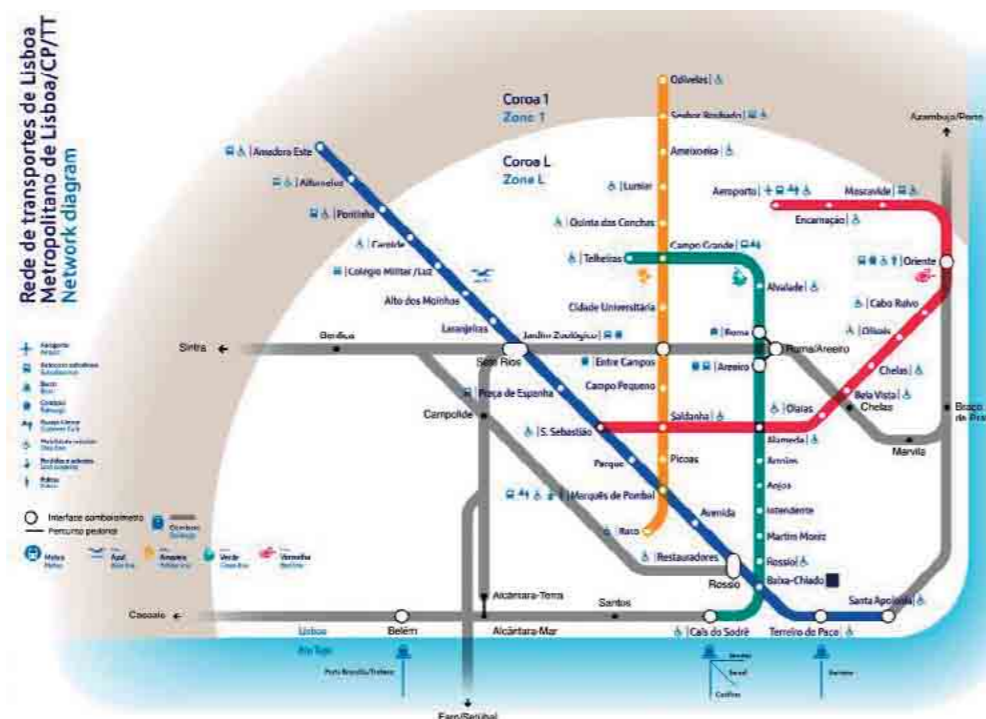


## Maintenance of the Internal Circuit System for Television (ICTV) of Metro de Lisboa

SICE

SICE has received the awarding, from the company Metropolitano de Lisboa, EPE, for the contract of Preventive and corrective Maintenance Services of the Internal Circuit System for Television (ICTV) of the Lisbon metro network, includes more than 1750 surveillance cameras distributed along the four lines together with monitors, racks, keyboards and system control panels, which represents a total of more than 3.000 units.

Lisbon has four independent lines, along 43 kilometers and 55 stations. It is a network designed in a global and intermodal way to optimize all the city resources for transportation. The Metropolitano de Lisboa is the backbone of urban transport of the city.



## Assignia will carry out the extension of Sabadell railway between the stations of Plaza Mayor and Plaza de España

Assignia

Assignia Infraestructuras is one of the companies that will participate in the extension of the FGC railway Sabadell track. Assignia, together

with Benito Arnó company, will perform the works of the track and catenary superstructure, on the section between the stations of Plaza Mayor and Plaza de España with a length of two kilometers of double track. The budget of the contract is, approximately, eleven million euros and its duration of 15 months.

Because of the characteristics of the track (urban and underground) and to reduce the vibration and the noise, the railway will be constructed on top of a floating slab, made up with precast reinforced concrete, and supported by elastomers, directly above the concrete base. The electrification works will be carried out using a rigid catenary system, type PAC-110 and an oval contact wire of 150 mm<sup>2</sup>, because of the reduced gauge inside the tunnel. This solution, applied to underground tracks, enables the replacement of the contact wire by a supporting cable, reduces the use of feeders and, in case of a power outage, it allows the faster replacement of a contact wire section.

This work is carried out within the FGC railway extension project in Sabadell, corresponding to a 4.4-kilometre new section, including four stations (Plaza Mayor, Eix Macià-Cruz Alta, Plaza de España and Ca n'Oriac), the renovation and burying works of Sabadell train station and the construction of sheds at Ca n'Oriac, at the end of the railway line.



## transforming tomorrow



ArcelorMittal is the world's leading steel and mining company, with rail production facilities in Spain, Poland and United States that offer a wide portfolio of products covering rails for subways, trams, trains, light rails, crane rails, crossings, rail accessories and other special products such as cathode bars and track shoes.

Steel is a vital part of the world we live in, and it has an important role to play in helping us forge a more sustainable future. The modern world relies on steel, as for example, for its rail infrastructure. Steel is an essential part of the fabric of life.

Customer satisfaction, market expansion and R&D focus, are ArcelorMittal Europe - Long Products rail strategic basis. Following these axes, the new investments and developments were launched: Head Hardened rail at Gijón Mill and 120 length rail, at Dabrowa mill.

ArcelorMittal es el principal productor siderúrgico y minero a escala mundial, con instalaciones dedicadas a la producción de carril en España, Polonia y Estados Unidos, ofreciendo una amplia gama de productos, tanto carriles para el metro, tranvías, trenes, trenes ligeros, los carriles de la grúa, desvíos, accesorios de vía y otros productos especiales como cátodos y zapatas de oruga.

Estamos convencidos de que el acero desempeña un papel fundamental en el mundo: gran parte del tejido de la vida está hecho de acero, como en el caso de las vías del ferrocarril.

Satisfacción del cliente, expansión de mercado y apuesta por la I+D son la base estratégica de ArcelorMittal Europe - Long Products - Carril. De acuerdo con estos ejes principales se lanzaron las nuevas inversiones y desarrollos: carril de cabeza endurecida en la fábrica de Veriña y 120 m en la fábrica de Dabrowa.





**Thales and Siemens introduce their traffic control and security technologies on the Chamartín – Torrejón de Velasco high-speed section**

Siemens Rail Automation y Thales España

Adif has awarded the Thales and Siemens joint venture, a contract to carry out the works for the signalling facilities, train protection systems, fixed telecommunications and centralised traffic control for the Chamartín-Torrejón de Velasco section. At a cost of €34.8 million, this project will also include works on the 7.3 km long Atocha-Chamartín tunnel and a maintenance period of 36 months. The project will connect the Madrid-Valladolid-North high-speed lines with the Madrid-Seville-Southeast Spain high-speed lines; totalling 37km, of which 7.3km run through the new UIC gauge Atocha-Chamartín tunnel. Siemens Rail Automation will be responsible for modernising the Trackguard Westrace technology electrical interlocking located at Chamartín station and its exten-

sion as far as the new southern head of Chamartín station, and will undertake adjustments to the Centralised Traffic Centre (CTC) responsible for the Madrid-Valladolid and Madrid-Southeast Spain high-speed lines. Furthermore, it will provide its ASFA train protection system in the Atocha-Chamartín tunnel and on the track section up to Torrejón de Velasco. Finally, Siemens Rail Automation will install its Clearguard FS3000 line circuits along with LED signals and associated cabling, and will carry out auxiliary civil engineering works as well as the construction of a technical building in Chamartín. Thales will take responsibility for extending and adapting the existing level 1 and level 2 ERTMS protection system in Chamartín station, including the modification of two control centres. It will also

provide LockTrac electronic interlockings, ERTMS L1 AlTrac train protection equipment, security systems (CCTV) and fixed telecommunications to the Chamartín and Torrejón de Velasco section to facilitate the circulation of trains. Thales will also extend the train traffic control and protection facilities at the Torrejón de Velasco junction, Madrid-Seville high-speed line, with the necessary technology for the link with the new line. It will also adapt the CTC on the Madrid-Seville high-speed line. Thales Spain and Siemens Rail Automation boast lengthy domestic and international experience in high-speed, conventional and metropolitan rail line security systems. Both companies have worked together on projects on different Spanish high-speed lines.

**Bombardier Spanish traction present in the fastest High Speed train in Europe**

Bombardier España

The high speed train V300ZEFIRO, known as Frecciarossa 1000, has started commercial service in Italy. This new train, which could concur in future bids in Spain, made its maiden journey in April from Milan to the capital, Rome. Made in partnership with AnsaldoBreda, it is the newest member of the Bombardier ZEFIRO family. With a top commercial speed of up to 360 km/h, the V300ZEFIRO very high speed train is the fastest train in Europe and its advanced, high acceleration delivers excellent travel times. It is also fully interoperable, meaning passengers can cross European borders without changing trains. Bombardier Transportation, ben-

efitting from the aeronautical experience of Bombardier Aerospace, which lead to the streamlined shape, and design of the train, was responsible for leading the project management, mechanical and engineering product development (including

propulsion and TCMS), manufacturing Bogies and Propulsion, as well as testing, homologation and commissioning of the first 5 train sets. Furthermore, the V300ZEFIRO propulsion is made entirely in the site of Bombardier in Trápaga, in Spain.



**COMPREHENSIVE MANAGEMENT OF INFRASTRUCTURE**

GETINSA-PAYMA

A sole interlocutor, well-equipped to successfully manage the whole cycle of the project, with 42 offices representing the Group around the world.

SECTOR OF ACTIVITIES

- Railways
- Roads and Highways
- Urban Transport
- Airports
- Ports
- Building/Urban Planning
- Water
- Environment

**getinsa-payma**

MEMBER OF  
EPF

BUILDING THE WORLD, BETTER

[www.getinsa.es](http://www.getinsa.es)

C/ Ramón de Aguinaga, 8  
28028 - Madrid (Spain)  
Tel. +34 91 418 21 10

Avda. Cerdanyola, 92-94  
08174 - St Cugat del Valles  
Barcelona (Spain)  
Tel. +34 93 575 28 34



### GMV makes further headway as a supplier of railway solutions in the Arab world

GMV

GMV is playing a key role in Saudi Arabia's projected Mecca-Medina high-speed train line, supplying the train manufacturer Talgo with four onboard systems to be fitted on the 36 trains to run on this line: the intercom and public-address system; the video-surveillance system (CCTV); a specific event-recording system on the train's Ethernet backbone, which addi-

tionally incorporates a train-to-ground communications interface; and a final system providing an interface for displaying onboard diagnosis on each car of the train. Another part of the world where GMV is providing state-of-the-art railway technology is Morocco, where it is supplying an advanced railway fleet-management system (SAE-r®) for the public railway transport operator ONCF (Office National des Chemins de Fer). This project, of great strategic importance for ONCF, will greatly improve its control over passenger-

and freight-transport services and also over its auxiliary track-working machinery and the service vehicles used by ONCF's maintenance personnel and fieldwork groups.

The GMV-developed advanced fleet management system (SAE-r®) takes in 300 electric and diesel locomotives, 95 railway machines, 300 service vehicles and 200 hand-helds for fieldwork teams and will also carry out centralized monitoring of all fleet operation.

The project, which includes integration with up-and-running corporate systems and also third-party availability of vehicle position information, is topped up with an advanced historical records tool to allow an exhaustive retrospective analysis to be made of railway operation (punctuality, operation incidents, etc).

The solution developed for ONCF is based on GMV's trademark railway and tram fleet management system, which has already been supplied for clients such as Spain's railway operator RENFE, Servicios Ferroviarios de Mallorca, the Warsaw tramline and the tram system of Zaragoza, among others.

Both projects have successfully passed the validation stage and have now entered the installation phase.

### IDOM responding to the challenge of the sands, Ouargla (Argelia)

Idom

Ouargla, city with 130,000 inhabitants, consists of two urban centres: Ksar (the old town) and Hai Nasr (the new town). Within a few months, a tramway designed with advanced engineering will connect the two centres.

"Entreprise Métro d'Alger", the public company responsible for this new infrastructure, has already worked with IDOM on other projects such as the tramway of Constantine and the metro of Algiers.

The success of the work carried out on these projects has been a deciding factor for the Ouargla tram Joint Venture (composed of the companies Rover Alcisa-Assignia-Elecnor) to once again put

their trust in Idom. 5 km section has 11 stops, and among the challenges of the project is that of resolving the problems associated with the presence of sand on the tracks and infrastructure.



"Veo que las distancias se acortan"

La manera de ver el futuro puede ser trazando nuevos caminos. Caminos como la innovación, la apertura al mercado internacional o la integración con el medio ambiente, que son los que acostumbramos a transitar en el área de ingeniería civil y arquitectura de SENER.

Infraestructuras ferroviarias, alta velocidad, metros y tranvías, aeropuertos, puertos, trabajos marítimos, hidráulica, medio ambiente, arquitectura y urbanismo. Desde estas áreas proyectamos las obras que contribuyen al bienestar de la sociedad.



"I see distances getting shorter"

The way to see the future can be through the opening of new routes. Routes such as innovation, developing international markets or integration with the environment are paths the SENER civil engineering and architecture unit is accustomed to travelling.

Conventional and high speed railways, metros and light rail trains, airports, ports, maritime works, hydraulics, environment, architecture and urban planning. Are just a few areas where we create milestone works in our journey towards the society's well being.



ARGELIA • ARGENTINA • BRASIL • CHINA • CHILE • COLOMBIA • COREA DEL SUR • E.A.U. • ESPAÑA • ESTADOS UNIDOS • INDIA • JAPÓN • MÉXICO • POLONIA • PORTUGAL • REINO UNIDO

# South Africa: towards a rail network that will improve freight and passenger transport

WITH SOUTH AFRICA AT THE HEAD OF INVESTMENT, THE SOUTHERN CONE OF AFRICA HAS MANAGED TO GIVE A STRONG PUSH TO ITS INVESTMENTS TO REACTIVATE RAIL TRANSPORT IN BOTH PASSENGER AND CARGO SECTORS, ONE OF THE MOST PROFITABLE AND QUICK WAYS TO REACH THE PORTS AND EXPORT COMMODITIES.

African governments consider the establishment and improvement of existing rail corridors for the transport of goods to major ports in the region and the implementation of mass transit systems for passengers is a priority right now. The majority of consignments dedicated to infrastructure investments are being devoted to rail. South Africa, Namibia, Zambia, Zimbabwe, Botswana, Angola and Mozambique are the main countries with an active railway improvement plan.



Gautrain train (South Africa) has been an example for African authorities to invest in the passenger network thanks to the high number of users who use it.

## SOUTH AFRICA

**It has a third of all railway lines in Africa, positioning it not only as the country with the most extensive network, but makes the South African region the most interconnected by this mean of communication, allowing an integrated development.**

South Africa currently has 22,300 km of railways, the largest rail network in Africa. This network provides connections to neighbouring countries, which allows a good export of its raw materials. At present, 40% of international trade in the other member countries of the Southern Africa Development Community (SADC) use transport infrastructure in South Africa in order to export their materials. This has caused the need for a good rail transport Infrastructure, especially freight, since approximately 15% of cargo is transported through rail, being especially important for mining, industrial, agriculture and automotive sectors.

Passenger transport, however, is still far from being the first choice for citizens when travelling.

South Africa has experienced a break of rail investment that has left both its tracks as totally obsolete and neglected rolling stock. The urgency and necessity of having an efficient railway communication led the government to approve the investment plan for 2012-2030. The year 2013 became a turning point for transport in South Africa as it was at that time when the investments to take place were decided. After 30 years of neglect, the government finally announced plans to revitalize the railway system in the country and support major investment programs to improve infrastructure and acquisition of new equipment. Transnet Freight Rail (TFR), the state rail operator announced that more than 300-BNR (€20,000 M) should be invested in improving infrastructure, while Prasa, the operator of state-owned passenger services operator, affirmed the allocation should be of 150 MR (€10M) in rail passenger services. In addition, "investments mainly focus on acquir-

ing rolling stock for more than 40,000 million euros, as well as remarkable works regarding signaling and infrastructure. To achieve the goal of improving trade between South Africa and international markets, transport infrastructure will be modernized, rail and port ", according to the Commercial Office of the Embassy of Spain in South Africa.

The modernization of the fleet of locomotives and wagons is necessary and is expected to increase in the next 5 years the number of locomotives to 3,300 and wagons to 85,000. Currently the plan is in its phase of "consolidation and selective expansion 2010-2015" which is carrying out "a greater focus on asset management, increasing the use of existing, and expanding commuter rail transit services to the public. Transportation planning, led by the central government, aims to formulate credible long-term plans, synchronizing with spatial planning and aligning investment activities in infrastructure from both provincial and local governments ", comments the Commercial Office.

For excellent rail capacity, main and priority improvements include:

- Fleet renewal of trains.
- Expand the capacity of mineral exports.
- Intensive application of information technology to transport systems through which flow is increased through new railway signaling systems and control of road traffic.

### Transport of goods

Transnet is the public company that controls freight rail transport, pipelines and major ports. Among its various divisions there are two which are dedicated exclusively to the railway subsector:

- Transnet Freight Rail: dedicated to freight management and rail freight terminals.
  - Transnet Rail Engineering: dedicated to the repair and maintenance of the fleet and their improvements.
- The railway sector has lost importance in recent years in favor of road transport due to lack of investment



The opening of 7,300 kilometers of network to improve freight will provide an increase in rail transport from 79% to 92% in 2019.

in modernization of its lines. Furthermore, with regard to freight, also it raised expanding lines to transport ore: coal and iron are also projected. The company has announced plans to open 7,300 kilometers of lines of its subsidiary, offering grant private concessions to operate lines over a long term period.

The South African government plans to invest more than €1,450 M in the development of Integrated Rapid Public Transport Networks (IRPTNs), improving coordination between Prasa and

Transnet operators, and the creation of multimodal transport systems (passenger: + bus and rail freight : road + rail).

In South Africa, the share of rail services under the general haulage is predicted to increase from 79% to 92% around 2019. According to studies made by the company Transnet, rail is around 75% cheaper than road transport in South Africa..

The comprehensive railway development projects in South Africa led by Transnet will achieve a position as the

key logistics center in sub-Saharan Africa, through several expansion projects, including a major commercial rail corridor connecting the areas of Gauteng, Limpopo and Mpumalanga, South Africa, the capital of Mozambique, Maputo.

The project also includes a rail link to Swaziland, which would mean the emergence of an integrated regional rail system, promoting the further development of various industries within that corridor. The line of 146 kilometres between the two countries, along

with the improvement of adjacent networks, will be vital in commercial terms.

In the short term, a rail link between Botswana and South Africa of 105 km will take place. There is also a project for the construction of the Limpopo-Durban line (north-south), which accounts for 60% of freight traffic, connecting the main economic center of the country (region Gauteng- Johannesburg) to the port of Durban. In long term, the



In the picture above, the locomotive AFRO4000, diesel locomotives for South Africa manufactured by the company Vossloh Spain.



New X'Trapolis train developed by Alstom to fit the track width of 1,067 mm in South Africa.

following actions are likely to happen:

- Coastal line rail link between the Western Cape and KwaZulu-Natal through Eastern Cape.
  - Sishen line connecting the railway network in Gauteng iron ore, Botswana and the Waterberg mine through the line between West Rand and Mahikeng.
  - Trans-Kalahari Railway, rail link outputs the Botswana coal through the port of Walvis Bay in Namibia.
- Moreover, Transnet has proposed itself to improve the reliability and efficiency of the South African railway networks,

and in 2014 it won a contract for the construction of 1,064 locomotives; 599 electric locomotives constructed by the companies CSR ZhuZhou Electric Locomotive and Bombardier Transportation South Africa and 465 diesel locomotives will be delivered by GE South Africa Technologies and CNR Rolling Stock South Africa. The contract for €3,600 M is the largest investment in rolling stock performed by Transnet. This latent renewal of the South African fleet need is evident, according to certified transport ministry sources, to ensure that 51% of it is totally obsolete. "But improvements should also result in signaling the railway line, in the management and ticketing systems and the quality and services of existing stations", according to the South African Commercial Office.

#### Passenger transport

Prasa is the public company responsible for managing this sector. In recent years Prasa has presented several plans to address the major rail projects that South Africa urgently needs. Prasa plans, according to the Com-

mercial Office of the Embassy of Spain in South Africa, to implement a new system of railway signaling technology in its network of commuter to replace the old system. The company reports that nearly 80% of their existing signaling facilities have become outdated and the rest is not able to respond to modern, safe railway operations.

As for specific projects, include the expansion of the South African High Speed line as well as the projects of urban mass transit systems in large cities.

Recently, the process of renewal of rolling stock of the intercity service Metrorail has begun, which operates in the provinces of Gauteng, Western Cape, KwaZulu-Natal and Eastern Cape. The success of the railway transport system is significant in Western Cape, which absorbs 30% of the volume of passengers. However, this percentage is considerably lower in the rest of the country where barely 15% of total urban passenger is achieved. For passenger transport the most important High Speed work focuses on the section Johannesburg- Durban, where a private participation in the

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

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

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

The formula of the new energy *i+c*



[www.ingeteam.com](http://www.ingeteam.com)

[traction@ingeteam.com](mailto:traction@ingeteam.com)

**Ingeteam**

READY FOR YOUR CHALLENGES



Railway authorities of Angola, South Africa and Namibia on the visit to Spain that Mafex organized in September 2014.



Mafex trade delegation to South Africa with the Department of Transport.

form of PPP projects is desired. In July 2014, the consortium Prasa and Gibela, led by Alstom concluded the financial closing of the contract signed on

October 14th 2013 for the supply of 600 Mega X'Trapolis trains (3,600 cars) for the next 10 years. The contract includes the construction of a local manufactur-



Representative of Zambia Railways Limited in the conference organized by Mafex in 2014.

ing plant in Dunnottar, 50 km east of Johannesburg. In addition, the consortium Gibela will provide technical support and the supply of spare parts over a period of 18 years. The total value of this contract amounts to €4,000 M. The model trains traveling at 120 km/h, is the X'Trapolis Mega, the new X'Trapolis train developed by Alstom to fit the track width of 1,067 mm in South Africa. The first 20 trains will be manufactured at Alstom's plant in Brazil, while the remaining 580 will be manufactured in South Africa in the new plant of Dunnottar. This project, with a local content higher than 65%, will create more than 1,500 direct jobs at the local factory and 33,000 indirect jobs over the next 10 years.

Another major contract is the one signed by Vossloh Spain with Swifambo Rail Leasing to supply 70 engines for use in transporting passengers in 2013. Swifambo will provide Prasa

locomotives. The contract includes the supply of 20 diesel-electric locomotives, some already delivered and in service, and 50 dual locomotives with deliveries to begin in 2016. For the year 2014/2015 and 2015/2016 have been allocated 4,000 million (€286 million) and 5.300 billion rand (€379 million) respectively to continue the program and invest in new rolling stock.

### The Spanish know-how at the disposal of the country

Currently the Spanish railway industry is interested in planned investments in rolling stock, particularly locomotives, since a general renewal of all the South African fleet is being carried out. South Africa not only requires improving the railways but also an investment in rolling stock. Also, the modernization of the fleet of locomotives and wagons seems necessary, because it is more efficient to provide a differ-

ent type of rolling stock for each type of goods transported.

The high degree of specialization of Spanish companies in the subsectors that include infrastructure and transport equipment could be an advantage to access this market.

The main conditions to be met by private companies to be beneficiaries of supply contracts are mainly four:

- Creation of direct and indirect employment with the location of production in the country, 65% of the component must be local or manufactured locally.
- Compliance of BBBEE guidelines (Broad Based Black Economic Empowerment)
- Creation of programs that promote the formation of South African young professionals in the railway sector.
- Use of rail technology compatible with the current South African network.

### URBAN TRANSPORT PROJECTS

Prasa's modernization plan for urban transport plans an investment of 123 bn R (€8,000 M) and AIMS to make a strong emphasis on the replacement of rolling stock, integration of ticketing systems and integrated telecommunications networks. Furthermore the following extensions are foreseen:

- **Baralink Rail Corridor.** Provide better rail access to Soweto and older Baralink areas:  
Baralink: ± 10 km, 3-4 stations  
North-South link: ± 5 km, 2 stations  
Link Lenasia: ± 19 km, 8 stations

- **Daveyton – eTswatwa Rail** Extend the line and existing services to the east of the terminus in Daveyton in the areas of Chris Hani, eTswatwa and Knoppiesfontein. With an area of 10 km, 4-5 new stations. Phase 2 will add 18 kilometres, and 6-8 stations

- **Moloto Rail Corridor Phase 1: Construction of the rail corridor between Tshwane and Siyabuswa.** It will have 120 kilometres and 8-10 stations. The cost of the investment will be 14bnR excluding the costs of the purchase of rolling stock.

- **Motherwell Rail Loop** Construction of the railway line of 7.5 km with 4 stations to provide rail access to Motherwell communities. Construction began in 2013 and is expected to be operational in 2016.



### THE EXAMPLE OF GAUTRAIN - HIGH SPEED IN JOHANNESBURG

South Africa's economic hub, located in the province of Gauteng, suffers from a high degree of congestion on main roads, especially between the cities of Johannesburg and Pretoria. The main transport infrastructure between these two cities are basically focused on road transport, congestion and experiencing results in a high cost in economic terms, in travel time, number of accidents, pollution and quality of life. These were the reasons that led the Gautrain line to be developed.

The Gauteng Provincial Government raised several alternatives to relieve congestion, finally committed to building a system of High-Speed trains which, as well as facilitating transport of passengers, will

also contribute to the economic development of the region while having other environmental advantages over alternative transport.

#### Characteristics of the line

Thus, the construction of the Gautrain project is a fast passenger line of about 80 km. The line linking Johannesburg, Pretoria, Ekurhuleni and OR Tambo International Airport and was conducted through the Franco-Canadian consortium Bombela, the largest public-private partnership in Africa. With a standard gauge of 1.067mm, the trains run at an average speed of 160km/h. This project has also been heavily criticized, fruit of the variations in costs thereof. Initially it was budgeted at €280M, following the upward review of €500M, with the environmental impact study, finally won by €1,400 M.

Reviews argued that alternatives such as an efficient bus system could reach similar levels of service at a much lower cost. About 62,000 daily passengers will require service that was not viable in this transport mean.

These questions were never subjected to public debate when the project was designed, prompting a public outcry, however, it has proven to have been a success by the number of daily passengers who use it to travel between Pretoria, Johannesburg and the International airport. In fact, an extension of the Gautrain in the near future is being considered, in addition to a 3,000 million rands (€ 215 million) investment to increase rolling stock and ease congestion on its trains, according to the Commercial Office of the Embassy of Spain in South Africa.

# TRANSPORT THINKING

RAILWAYS | AVIATION | ROADS | URBAN TRANSPORT | PORTS

We are transport thinking.  
We are engineering.  
Our essence comprises experience, quality, technology, innovation, efficiency and cost effectiveness. This is the value proposition we were born with 45 years ago, sticking by it and thus becoming a global leader in transport engineering and consultancy with projects in more than 45 countries. We work both with private and public clients to whom we offer an integral perspective in each of our transport modes. The expertise of our 2,500 professionals allows us to be what we are: transport at the service of society.

**ineco**

Bringing people & places together

HIGH SPEED RAILWAY STATIONS, SPAIN | STUDIES FOR THE HIGH SPEED LINE MALDIA - HOWRAH, INDIA | HIGH SPEED TRAIN ANKARA - ISTANBUL, TURKEY | HIGH SPEED RAIL NETWORK TRAIN CONTROL SYSTEMS SPAIN | HARAMAIN HIGH SPEED TRAIN MAKKAH - MADINAH, SAUDI ARABIA | SPANISH HIGH SPEED RAIL NETWORK INFRASTRUCTURES, SPAIN | CPTM LINES, BRAZIL | HS2 HIGH-SPEED, UNITED KINGDOM

# Other countries in South Africa are investing in rail

ANGOLA, ZIMBABWE, NAMIBIA, ZAMBIA AND MOZAMBIQUE ARE OTHER COUNTRIES IN THE SOUTHERN AFRICAN CONE WHO WANT TO RENEW THEIR RAILWAY NETWORKS. THE SUCCESS ACHIEVED IN SOUTH AFRICA AND THE IMPERATIVE NEED TO EXPORT ITS RAW MATERIALS HAVE LED THEIR GOVERNMENTS TO INVEST IN THE SECTOR.

## ANGOLA



According to the strategic direction of the Government Program for Transport for the quadrennial 2009-2012, priorities were: total recovery of the national railway system, upgrading and modernization of the railway company offices, acquisition of new equipment, rehabilitation of equipment already used and a connection with the existing rail system of neighbouring countries, as well as the establishment of vocational training centres dedicated to the rail sector.

At the time of independence, Angola had 3,052 km of track, leaving almost all infrastructures inoperative during the war. The national system uses a gauge of 1,067 m in 2,800 km of roads and 0.60 m in other 154 Km. Today's rail network is formed by three main lines. CFL (Luanda Railway Company), CFB (Benguela Railway Company) and CFM (Namibe Railway Company).

As recently said by Angola's Transport Minister, Augusto da Silva Tomás, Angola will build three railway lines soon in the capital with the objectives of improving public passenger transport and encouraging the development of national economy. He also said that the installation of metropolitan railways in Luanda is at the stage of feasibility, as there is a need to grow in the passenger transport sector.

In parallel, the African country is promoting a plan for the development of a railroad that will link Angola to neighbouring Zambia and Namibia, which is important for the revitalization of integrated trade between the three States.

### Projects to be completed before 2017

During the recent participation of the General Director of the National Institute of Angola in the V International Railway Convention organized by Mafex, he specified that before 2017 the following must be completed:

- Duplication of track in Luanda's suburban area (Luanda-Baia, 36 kms), and the construction of roads for passengers in order to eliminate 12 level crossings.
- Construction of a new line (11 km double track) joining the CFL line with the International Airport of Luanda (NAIL).
- Construction of 6 new intermodal stations in the suburban area of Luanda.
- Acquisition of 10 locomotives (4 DMU cars) for the suburban traffic of Luanda.
- Construction of new DMU maintenance and repair offices.
- Construction of a logistics platform in Lombe (Malange).
- Construction of a logistics platform in Lubango (Huila).
- Construction of a logistics platform in Menongue (Cuando Cubango).
- Construction of a logistics platform in Luau (Moxico).
- Construction of 3 new professional training centres.
- In addition, the Lobito Corridor runs through four provinces: Benguela, Huambo, Bie and Moxico and integrates important territorial areas in the DRC and Zambia. This will make major advances in ports, platforms, etc.

### Projects under study

- Creation of a rail structure linking Luanda-Malange with the new Luanda airport and the new port Barra do Dande, as well as building a new line to the north.
- Build a light rail network in Luanda (RFL).
- In addition, the country aims to expand the network of CFL Malange to the Democratic Republic of Congo, build a line from Luacano (CFB) to Zambia (± 510 kms), build a line from Junction (CFM) to Namibia, expand the line from CFM Menongue to Zambia, thus connect the three existing lines forming a railway link with neighbouring countries.

## ZIMBABWE



The rehabilitation of roads, rolling stock and telecommunications systems are the three main requirements according to the Investment Authority of Zimbabwe to restore the rail network.

The country has 2,760 km of railways, of which 95% is intended for the transport of goods, 3% to passengers and the remainder to real estate. The network is antiquated, outdated and rarely used in the passenger sector. So Zimbabwe's Investment Authority recently announced a program for the rehabilitation of roads, rolling stock and signaling and telecommunications systems of the national network. Some projects will be carried out in the form of public-private collaboration (PPP), such as works on routes to Mozambique from Harare-Machipanda and Dabuka- Chicaulacuala, Harare-Dabuka-Beitbridge and Lake Victoria Falls-Bulawayo -Dabuka- Harare.

In addition, the following actions are planned: recovery and replacement of locomotives, rolling stock and other equipment; rehabilitation of locomotives,

wagons and supply of rolling stock components, as well as updating the existing ones; provision of new locomotives, coaches and wagons; purchase of support equipment for track maintenance and workshops.

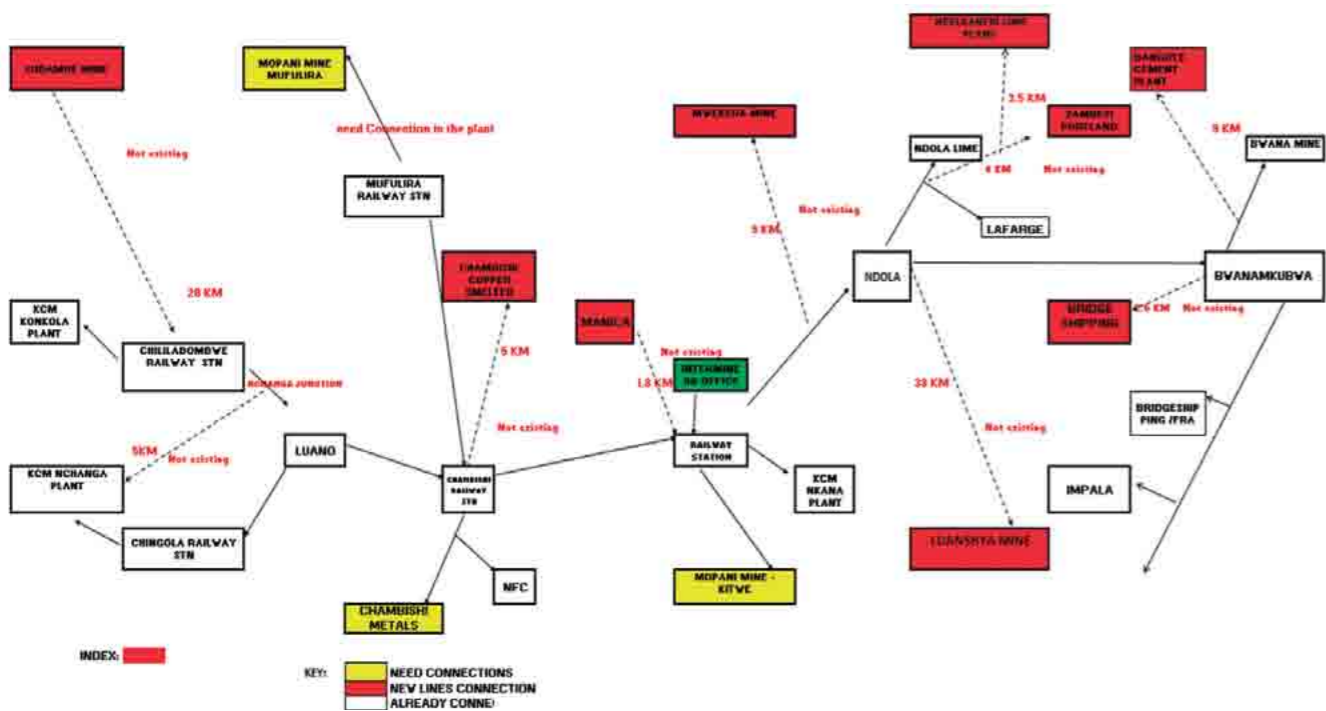
### Expansion lines

Key initiatives to expand the rail network include:

- Rail link Lion Den - Kafue
- Shamva -Moatize Link
- Railway shuttle Harare -Chitungwiza
- Updating the line Harare-Beira

Despite these initiatives the country has currently not announced any feasibility studies. In addition, most of the planned projects for regional transport which leads to the conclusion that urban transport and freight transport have yet not been improved.

ZAMBIA



Zambia has a special interest in developing its network and the Development Agency of the country sees the need to revive exports.

The country's Development Agency (ZDA) indicates that the economy will grow about 8% annually in the next five years. An improvement that is necessary for a strong boost in transport connections with a subsequent increase in exports, especially copper, in foreign markets. To this end, the Government plans to launch a large number of works such as: Chingola's connection to Jimbe, on the border with Angola; the branch

Kafue (Zambia) -Zawi (Zimbabwe); Tazara Nseluka line with the port of Mpulungu; railroad expansion Mchinji/ Chipata to reach the port of Nacala (Mozambique); and the connection with Namibia. Currently, the following works are projected:  
• The rehabilitation of freight rolling stock in order to increase transport volumes.  
• Invest €5.8 M to rehabilitate 13 defective locomotives  
• Destine €11.4 M to rehabilitate 640 wagons  
• In addition, ZRL must acquire complete subsets of its locomotives and

wagons to be able to re-produce and modernize rolling stock equipment..  
• There is also the need to strengthen the capacity of ZRL employees through training and development of their abilities.  
• Rehabilitate all tracks coating covering a total distance of 214 km.  
• Reconstruction of international links of mines (USD50Million)  
• Reparation and rehabilitation of the railway and Mulobezi infrastructure (USD 103 million)  
The rehabilitation of roads aims to increase track capacity and train speeds to an average of 70 km/h for freight trains and 80 km/h for passenger trains.

NAMIBIA

In Namibia, the Trans-Kalahari Railroad project will connect its network with Botswana in order to enable export of coal production through the port of Walvis Bay. Initially, the private sector itself would be willing to finance and build the stretch in Botswana, for which international cooperation is also contemplated.

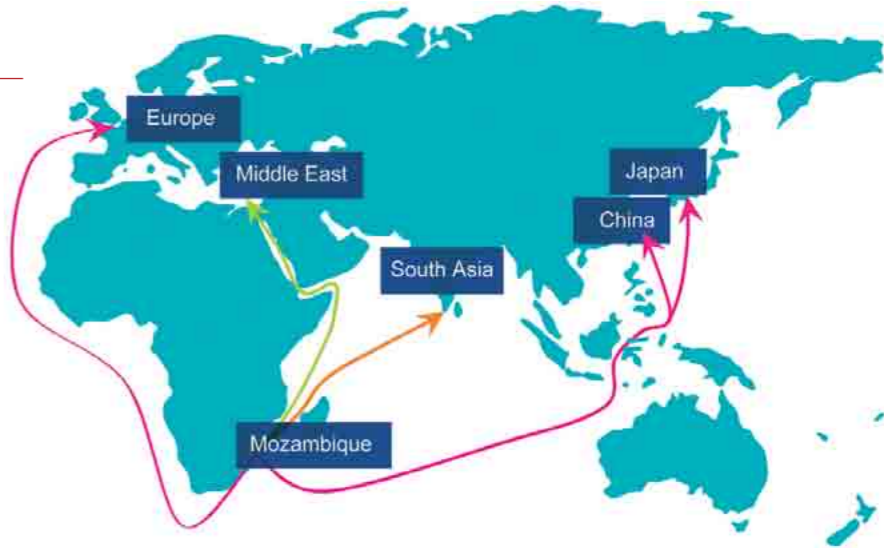
The country has insufficient capacity of rolling stock, which is also outdated and the average age is 48 years. Moreover, the frequency of the same in route is very low due to mechanical problems, which make the railway a transport mean with low usage. In order to improve the situation, some railway projects have been proposed, such as TKRail, a railway line

with a width of 1,067mm. The route proposed will connect: Mmamabula through Mabutsane, Ghanzi Junction, Gobabis, Omitara, Okahandja and Walvis Bay. Due to the wide track, it is considered to be a good opportunity for a railway connection to eastern, central and western Botswana (Mmamabula-Mamuno) and Buitepos to Walvis Bay.

MOZAMBIQUE

Mozambique has almost 3,000 km of railways, but these were destroyed after the war of independence. The national railway company, Caminhos de Ferro de Moçambique, CFM, estimated that in order to recover them, over € 18,000 M should be invested.

To attract private investors and share the costs, Mozambique has adopted a legal framework, which develops public-private partnerships (PPP). So far, it has been the mining industry that has stimulated the development of rail-port systems and has led the modernization of the rail network around corridors connecting inland countries with ports in Mozambique. The corridor linking the port of Maputo in the south, to the port of Beira in the centre and the port of Nacala in the north are the main centres for regional economic development, not to mention the transport of passengers, which the CFM has also predicted.



In these large infrastructure projects, Spanish companies can contribute a lot. In this country, reaching almost 3,000 kilometres long, a north-south connection is necessary. This is an area of great potential, given its geographical location as a natural transit corridor and point of access to the sea for several landlocked countries, reason for which the restructuring of its rail system is so important.

Projects for freight rail systems include Nacala and Beira. In the first case, it is a key corridor for landlocked neighbouring countries such as Malawi and Zambia, with the support of the African Development Bank (ADB) and the Japanese International Cooperation Agency (JICA). Meanwhile, the "Beira Railway Project" aims to rehabilitate the system in central Mozambique.

SOME MAFEX PARTNERS WITH PROJECTS IN SOUTH AFRICA

• **FAIVELEY TRANSPORT**  
The company Faiveley Transpot has included bogie brakes in the 15E trains;

locomotive brakes in the 20E; and brakes in freight transport with the South African company Transnet. In addition, for new lo-

comotives, Transnet has provided General Electric with dryers and CNR with diesel locomotives.

• **VOSSLOH ESPAÑA**  
Supply of 70 locomotives to be used on passenger services  
The internationalization strategy developed in recent years by Vossloh España allowed a contract with the South African company Swifambo Rail Leasing (Swifambo) for the supply of 70 locomotives to be used on passenger services. Swifambo will supply the locomotives to the Passenger Rail Agency of South Africa (PRASA).  
The contract includes the supply of 20 diesel-electric locomotives type AFRO4000, some of them already delivered and in service, and 50 dual-mode locomotives of the type AFRODual with deliveries to begin in 2016. These dual-mode locomotives are equipped with a diesel engine of 2800kW and pantograph to run on both electrified and non-electrified lines providing flexibility and operating costs reduction to the operator.





Clifton Beach



Cape Town

## SOUTH AFRICA,

FLORA, FAUNA, DESERTS, SEA ...A COUNTRY THAT WILL MAKE YOUR STAY UNFORGETTABLE

If what you like is to know other cultures, visit the ancient African tribes, Zulu, Xhosa, Ndebele etc. with whom you can share your culture. In addition, you should certainly visit the most emblematic cities: **Cape Town**, with its strong Dutch influence and its Vineyard Route; **Johannesburg**, "the forest city" and the richest in the country, which owes its existence to the discovery and exploitation of vast deposits of gold; **Soweto**, home of the resistance to apartheid, today vibrant example of an urban black society; **Pretoria**, "Garden City" and administrative capital of the nation; **Durban**, modern resort on the Indian Ocean with beautiful beaches and warm waters all year round.

Another interesting point on the route is the town of **Oudtshoorn** where you can visit the Cango caves and explore its many tunnels that lead to tremendous rooms filled with stalactites and stalagmites that create together huge natural columns. In addition to the Cango Caves, Oudtshoorn is famous because in it there are numerous ostrich farms. You can take a ride on an ostrich, try ostrich meat or omelette and buy all sorts of items.

### Wildlife

And how could it be otherwise, if you have time, you should not pass taking a **safari in the famous Kruger**, where you can observe the animals in the middle of wildlife. It has about 2,000 kms of roads to explore the wilderness on this famous park. An area of 18,989 square kilometres, which is the home of a huge number of impalas, more than 30,000 zebras, 17,000 wildebeest, 12,000 elephants.... The best way to discover its treasures is in a jeep, guided by professionals who will be happy to explain details and curiosities about its fauna and vegetation in the most idyllic corners of the park.

### The Sea and the beach

The Sea is another attraction offered in this country. You can dive with sharks and along your journey through the **Garden Route** you will find the opportunity to observe the great white shark in its natural habitat. This magnificent creature is very common in the area, especially in the waters of Gansbaai, a picturesque town located near Hermanus, about 200 km from Cape Town.

But if you what you really need



Kruger Park



Garden Route

is relax, you can enjoy some of the best beaches in all of Africa. Cape Town is the area that offers the most spectacular beaches. Long Beach is a captivating beach with 4 km long. It is the best place to walk by the sea or even for horseback riding. Another good beach area is Clifton Beach, and of course, the most popular area of the city, the Garden Route. Here we must highlight Pittenber Bay, a beautiful bay to relax and enjoy the ocean. Durban is undoubtedly the city with the most beach culture, as what they call Beachfront is like a town centre linked to the beach. Of course, Durban is also a mecca for windsurfing beaches thanks to the wind. And in the southern part of the city there are also excellent beaches for diving.

**assignia**  
INFRAESTRUCTURAS

## Think Rail, Think assignia

- More than 50 years of experience in railway infrastructures
- No. 1 Spanish Company in international high speed contracts

### Ongoing works

ARGELIA | MOROCCO | CHILE | MEXICO | VENEZUELA | INDIA | SPAIN | GEORGIA | TURKEY



SUBWAY & TRAMWAY



HIGH SPEED & TRADITIONAL LINES



INFRASTRUCTURE TRACK & STATION



OPERATIONS & MAINTENANCE



SPECIALIZED HEAVY DUTY MACHINERY

# Modernity and technology in urban transport in Saudi Arabia



THE COUNTRY IS HOLDING A STRONG DEVELOPMENT OF ITS URBAN RAIL TRANSPORT NETWORK IN ORDER TO IMPROVE THE CONNECTION AND EASE THE LIFE OF CITIZENS. THE RIYADH METRO IS AN AMBITIOUS PROJECT THAT WILL LEAD TO BUILDING SIX LINES WITH 176.4 KM LONG IN TOTAL AND AN INVESTMENT OF 22,500 MILLION DOLLARS.

Saudi Arabia has a population of just over 27 million. The most populous and most economically active cities are Riyadh (the capital), Jeddah, Makkah, Medina and Dammam. It is a country with excellent business and investment opportuni-

ties in many sectors, including rail transport. It currently has a railway network with a length of 1378 km and serves only to connect the capital and the main towns together which led to consider a major restructuring for communications both within cit-

ies and between some of them, such as the Makkah-Medina High Speed line.

As for urban transport, the metros of Riyadh, Jeddah and Makkah are the most relevant and require improved communications to help people transport.

Riyadh will have a metro with 6 lines

The metro will constitute the backbone of the public transport system in Riyadh. It is a network of six lines with a total length of 176 km and 85 stations. It is a major project which will unify and serve the most populated areas, public facilities, education areas, shops, etc. Among the major unions we must highlight the King Khalid International Airport and King Abdullah Financial District, major universities, the city center and the public transport hub. The project also includes five connecting stations as well as full integration with the bus network. It aims to facilitate the transport of passengers between different levels of public transport in Riyadh. In July 2012 the construction of a public transport system was announced (which will end in late 2018) to relieve traffic in a city of 5.8 million people, which is expected to grow to 8.3 million by 2030. On 1 August of the same year the four consortia for the construction of the subway line that had to submit a proposal within the next four months were selected. On July 29, 2013 the winners were announced. The construction of lines 1 and 2 (63.3 km and 42 stations in total) was awarded to BACS Consortium, led by Bechtel and includes Almadani General Contractors, Consolidated Contractors Company and Siemens. Line 3 was awarded to the consortium Arriyadh New Mobility, which will include the provision of engineering and architecture of the Spanish company IDOM. The consortium led by the Spanish company FCC along with the Korean Samsung, the French Alstom, the Dutch Strukton, Freyssinet Saudi Arabia and the Spanish TYPSA will be in charge of the construction of lines 4, 5 and 6 (64.6 km and 25 stations)

\$22,500 M will be invested to carry out all the subway system, in which Spanish companies have a high participation. Works began in 2014 and is expected to be operational by end of 2018.

**Spanish presence**

The Spanish companies are taking a strong interest in this project. IDOM is responsible for the detailed design of line 3, as part of a consortium led by Salini-Impregilo. The 41 km long line (26 km high, 6 underground and 9 km in area) has 20 stations and 2 interchange stations with Line 1 and Line 6. IDOM is responsible for the complete design: route, tunnel, viaducts and level sections, with stations (underground and elevated), and the transfer station with Line 6), workshops, garages, and roadworks and landscaping necessary for integration into the urban landscape. An extensive and multidisciplinary team of IDOM is shifted to the Saudi capital to develop the first phase of the project. The permanent staff assigned to the project exceeds 250 professionals from different disciplines, from electrical engineers, roads, architects, telecommunications, etc. Moreover, a consortium led by FCC was awarded the megaproject valued at just under €6,000 M to implement three of the six new lines of Riyadh city's subway. Along with FCC, which controls 28% of the consortium and estimated revenues of 1,700 million thanks to the project, is Alstom, which is responsible for supplying trains following the parameters used in the new line 9 of Barcelona's subway. The budget is €1,200 M for the manufacture of 69 trains of two cars each. The trains, which operate without a driver, will be divided into three classes: first, families and singles. The firm will also provide signaling and power systems.

**LINE 1**

This is the blue line. It will have a length of 38 kilometres and 26 stations, 4 of them with connections to other lines. It will link the north and south along Olaya street to Al-Hayer. Most of the line will run underground.

**LINE 5**

Green, 12.9 kilometres long, 12 stations and connections to two subway lines.

**LINE 3**

The orange line will be the focus of Al-Madina Al-Munawarah Road - Prince Saad Bin Abdurrahman I Road, with a total length of 40.7 kilometres. It will have 22 stations

**LINE 4**

It is identified with the colour yellow line and will join King Abdullah financial district to King Khalid International Airport. It will be 29.6 kilometres long and will have 8 stations.

**LINE 2**

The red line linking the east and west of the city. It will have 25.3 kilometres, 16 stations and will connect King Abdullah street to the King Fahad Stadium.

**LINE 6**

Violet, runs along 30 km and will have 8 stations.

**SUCCESSFUL TENDERERS**

**LINE 1 AND 2**  
BACS consortium: Bechtel, General Contractors Almadani, Consolidated Contracts Company and Siemens.  
Budget approx.: \$10,100 M

**LINE 3**  
Arriyadh New Mobility Consortium formed by Electrical Work Group (Bombardier Transportation and Ansaldo STS), Salini-Impregilo (IDOM), Larsen & Toubro and Nesma.  
Budget approx.: \$5,900 M

**LINE 4, 5 AND 6**  
FAST: FCC, Samsung, Alstom, Strukton, Freyssinet Saudi Arabia, TYPASA.  
Budget approx.: \$7,900 M

The joint venture between TYPASA and the British engineering Atkins (DJV) is conducting, since then, the construction consortium (FCC, SAMSUNG, Strukton, Freyssinet), the conceptual design and construction of the three lines. TYPASA, meanwhile, is mainly responsible for the design of deep underground stations and tunnel boring machine and mine along with the remodeling of the road network and urban integration of line 3. At present, TYPASA has allocated around 110 technicians in this project which will require, at the time of maximum deployment, 250 professionals.

**Station design**

Modernity and technology are the defining characteristics of subway stations. All have been designed according to a pattern of unified architecture to give the project a unique identity. The High Commission for the Development of Arriyadh organized an architectural competition and invited offices and most important architectural firms to provide innovative designs for the main four metro stations. The result is a city where modernity, grandeur and technology are implemented in the design.



#### Qasr Al-Hokm district station:

The Norwegian firm Snohetta was awarded the design. The station will serve as interchange between lines 1 and 3. The exterior is designed as an urban

plaza with a large canopy to provide shade. Inside, through the reflective cover the underground levels are visually linked, as a periscope, reflecting the outside inwards and the interior

outward. To make travel more pleasant, the interior will have an access to a garden that can be accessed from the orange line and platform of the blue line. In addition, natural light will get

through the cover to be performed with a collection system of daylight in order to have light during the day without using energy and heat without attracting the heat to the building.



#### Metro Station King Abdullah Financial District:

Zaha Hadid Architects from the UK has won the competition to design the station, located in the east of the northern ring road and slightly west of King Fahd street.

It will serve as an exchanger between lines 1, 4 and 6, in addition to being connected to monorail KAFD. The station has an area of 8,150 m<sup>2</sup>, overall gross area 48,000 m<sup>2</sup>. With six platforms in four public floors and two levels

of underground parking, metro station KAFD will be integrated into the urban context of the financial district in response to the functional requirements of a multimodal transportation center and the vision of the district. The

project extends beyond the single station typology emphasizing the importance of building a dynamic public space, multi-function, not just a perceived middle ground through rapid transitions, but also concerning a public space for the city. The design features the station is in the center of a network of roads, overpasses and underground lines under KAFD plan. Connectivity diagrams and traffic around the place have been mapped and structured to clearly define pedestrian routes within the building, optimize the internal circulation and avoid congestion. The resulting configuration is a three-dimensional network defined by a sequence of sine waves (generated from the repetition and variation of the frequency of daily traffic flows station) acting as a backbone building to circulation.

These waves spread over the station and point strictly their internal arrangement, moving the architectural concept abroad.

#### Station next to the Palace of Justice in Medina Al Munawarah Road:

IDOM is responsible for the detailed design (construction) of the track and its associated components, 41 km length and 22 stations of the Line 3. In developing the design, IDOM has achieved the perfect balance in terms of the coordination of the different disciplines involved, one of the Key Success Factors of the project. The project includes the basic and construction design of twenty-two stations developed from the several prototypes provided by the client. In the case of underground stations, it has been necessary to develop an entirely new prototype, given the constraints imposed by the narrow streets in the neighbourhood of Batha. This has been seen by IDOM as an opportunity to increase the spatial quality of the stations and introduce natural light, improving the navigation of the stations and the overall experience for the user. In elevated stations IDOM's commitment to energy efficiency and sustainability as-

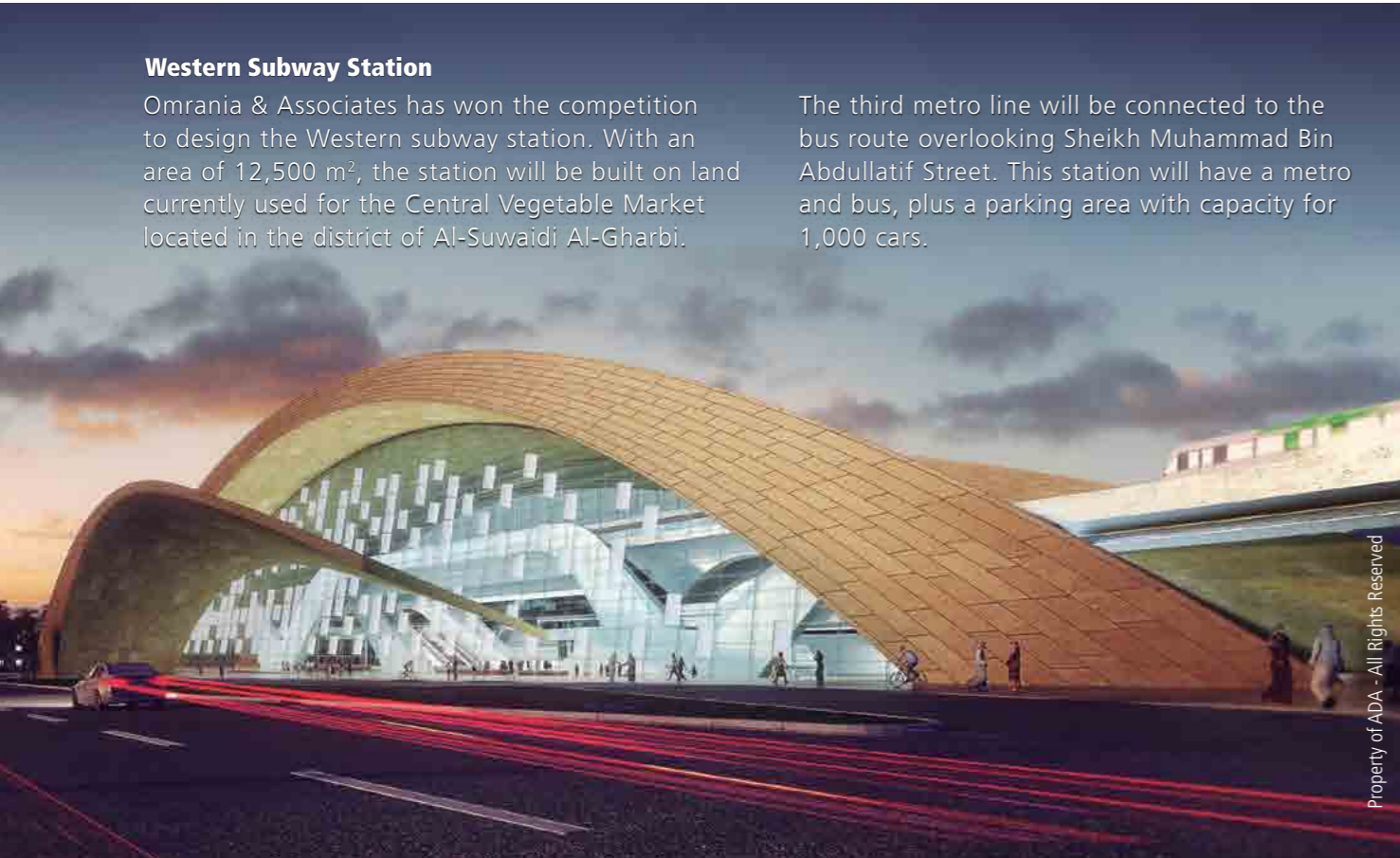
essment is one of the building's design highlights proposed with three clear objectives: Reducing energy and water consumption, use of low environmental impact materials and minimize maintenance. Riyadh's weather conditions are extreme with a dry climate, a very high solar radiation and high temperatures that can reach 48°C. In the original design of IDOM, the main strategy to reduce the energy consumption was based on bioclimatic concepts. Due the roof's design, the building is able to reduce direct solar incidence while allowing maximum daylighting levels. For this purpose a series of skylights were installed facing north, reducing the demand for cooling and artificial lighting simultaneously. The roof itself was defined by means of an optimization study of photovoltaic panels, which produced 45% of the consumption of fixed installations of the building. The reuse of water is the other key strategy for assuring the water savings, because all types of water are recycled to reuse for irrigation after the required treatment



Western Subway Station

Omrana & Associates has won the competition to design the Western subway station. With an area of 12,500 m<sup>2</sup>, the station will be built on land currently used for the Central Vegetable Market located in the district of Al-Suwaidi Al-Gharbi.


The third metro line will be connected to the bus route overlooking Sheikh Muhammad Bin Abdullatif Street. This station will have a metro and bus, plus a parking area with capacity for 1,000 cars.



Alstom Spain, in charge of the security system and passenger information

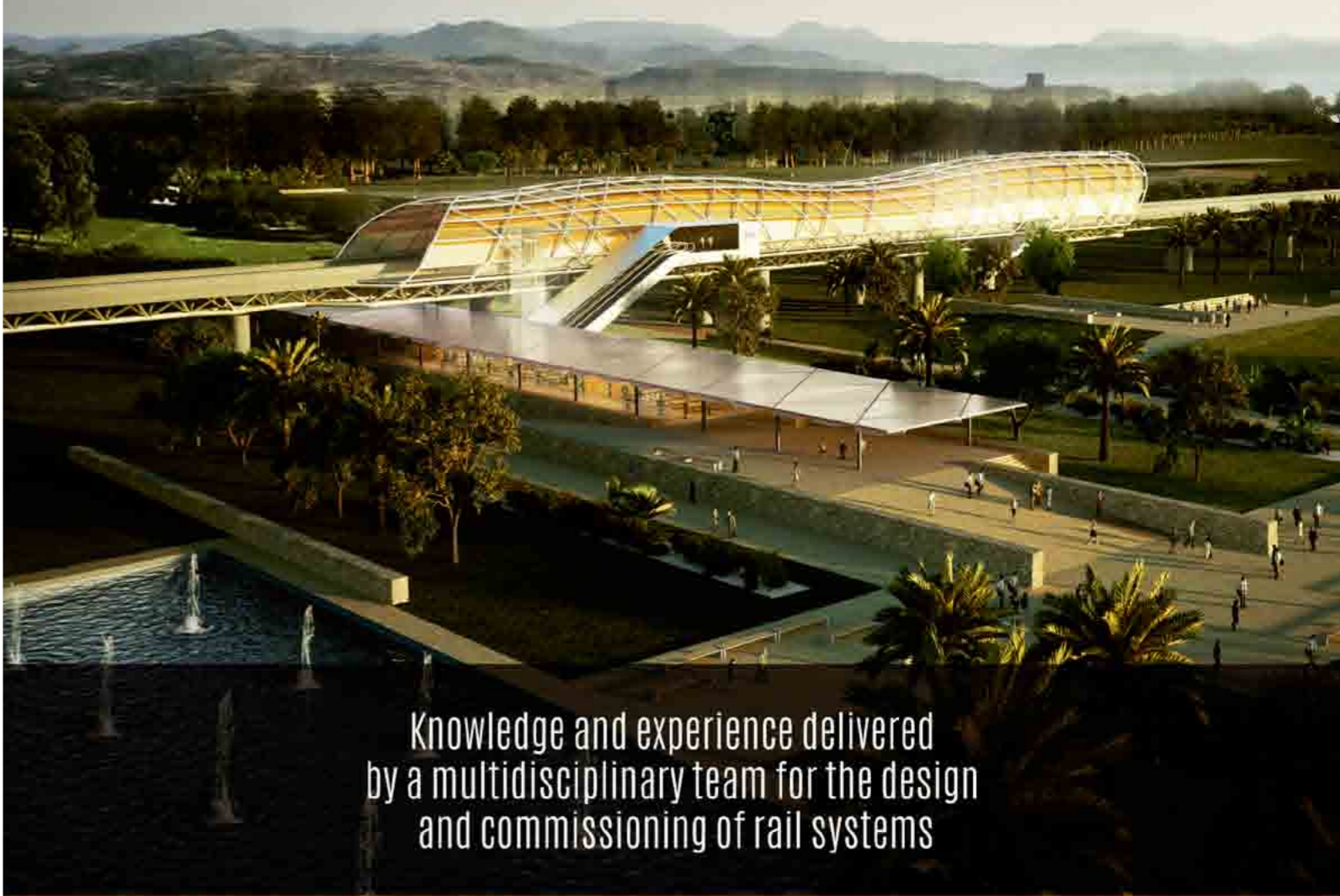
Alstom has been awarded the construction of a fully automatic driverless metro system equipping three of the six lines of the city. Alstom will provide the city of Riyadh with a full comprehensive subway system that combines subsystems from the latest generation of the company. It includes rolling stock (69 Metropolis trains), the signaling system Urbalis, HESOP energy recovery system and Appitrack, a quick rail installation system that allows the installation of the tracks three

times faster than using traditional methods. Alstom Spain is developing the security system and passenger information for three of the six lines with which form the future network of the Riyadh Metro. Alstom will also implement the internal wireless communications network (TETRA radio communication type) for operation and maintenance. The technology developed by Alstom Spain integrates information from more than 5,000 teams.



# ENGINEERING TOMORROW'S RAILWAY

[www.idom.com](http://www.idom.com)



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

- |          |                      |
|----------|----------------------|
| Angola   | Morocco              |
| Belgium  | Peru                 |
| Brazil   | Poland               |
| Canada   | Portugal             |
| Chile    | Romania              |
| China    | Saudi Arabia         |
| Colombia | United Arab Emirates |
| India    | United Kingdom       |
| Libya    | United States        |
| Mexico   |                      |



Zaragoza 23 - 48015 Bilbao

T / +34 94 479 76 00  
[orico@idom.com](mailto:orico@idom.com)  
[cortega@idom.com](mailto:cortega@idom.com)

[www.idom.com](http://www.idom.com)

**JEDDAH METRO**

Jeddah, the country's second largest city, has 3.5 million inhabitants. It is currently facing serious problems of mobility by the lack of adequate infrastructure, especially in relation to public transport.

The construction of Jeddah's metro is part of a new infrastructure plan that includes the construction of several metro, bus and tram lines, among others. This infrastructure plan foresees an investment of 10,500 million euros over the coming years in the Metro project, with the intention that it is fully operational by 2022.

The project will involve the creation of 3 lines with a total length of 152 km and 72 stations, which contribute together with other planned projects (a 48 kilometres long tram and 40 suburban stations and 83 kilometres and 13 stations) to deliver quality public transport, which is presently non-existent in the city.

The project will achieve an increase of 1% to 30% of users who use public transport in Jeddah.

To make this project possible, it has been estimated that for installation and administration of the 500 jobs, another 500 for maintenance and 1500 for the manufacture of components of the train cars will be created.

Jeddah's subway will have three metro lines. The first line (orange) with a length of 67 km will have 22 stations. It



will link Mecca Road to Obhur.

The second line (blue), 24 kilometres long, will have 17 stations and will link King Abdulaziz International Airport with Old Airport Road.

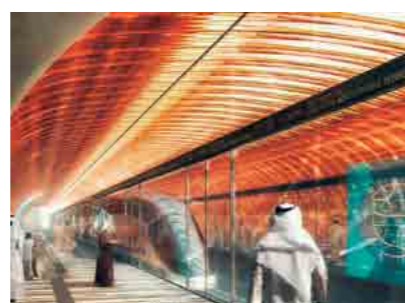
The third line (green), 17 km, will have seven stations and will run through Palestine Road for 17km.

The public transport system in Jeddah will also have 816 buses that will operate 2,950 service stations in the city.

The design and construction services are divided into three contracts: Aecom Arabia Company Ltd. won a licitation of €25 M for the consultation of the preparation to start construction; French engineering company Systra won the contract for preliminary engineering design (€60M); while the design of stations will be carried out by the company Foster + Partners, which will be responsible for the design of the train and branding.



In the images above, the extension of the city. At the bottom, 3 infographics showing the future metro of the city.

**MAKKAH METRO**

The Metro of Makkah, officially known as Makkah Mass Rail Transit is a metro system consisting of four lines. This project will add to the existing line of Al Mashaaer Al Mugaddassah, which opened in 2010 and is part of the Public Transport Programme of the city, with a budget of 16,000 million euros and will include integrated bus services.

The new lines that will form the MMRT project will have a total length of 180 km and 88 stations and a budget of 13,000 million euros. It will be built in three phases over the next 10 years: Phase I will include the construction of lines B and C by 2017, while the lines A and D will be built in future phases. The project was commissioned by the Development Commission of Makkah (DCOMM) and will be led by Makkah Mass Rail Transit Company (MMRTC).

**Spanish presence**

Isolux Corsán, in consortium with the Turkish company KolinInsaat Turizm Sanayi ve Ticaret AS and the Arab Haif company, has been selected for the construction project of lines B and C of Makkah's metro with an overall budget of more than 2,300 million euros, according to the company.

The client, Metro of Makkah, has begun negotiation with the consortium and the signing of the contract in the coming months is expected.

The section of line B in the contract, 11.9 kilometres, will involve the construction of 3 stations. The section of Line C, with 13 kilometres, will include the execution of 6 stations, including the completion of two major interchanges.

The main elements of the scope of the contract are the stations and interchanges with civil works, access ramps, large decks and porches, and tunnels. The tunnels are divided into different sections according to different methods of construction: 19,616 meters of tunnel in mine, 8740 meters of tunnel with TBM and 4105 meters of cover tunnel. The project also involves the execution of more than 1175 meters of viaducts and large walkways.



The city of Mecca is fully restructuring its communications. These images show the city and some of the future metro stations.



MAFEX MEMBERS PRESENT IN PROJECTS IN SAUDI ARABIA

► **CAF**  
CAF is one of the Middle East's main rail suppliers. The company has different strategic contracts for the supply and maintenance of regional trains in Saudi Arabia. On the one hand, Saudi Railways

Organization (SRO) signed an agreement with CAF in 2008 for the supply of eight train units composed of 6 cars each. These units provide service now in Riyadh-Dammam line, in extreme weather conditions of up to 55°C. The train includes first and second class areas,

cafeteria services and specific areas for people with reduced mobility. At present, CAF is supplying 4 additional trains with the same characteristics for SRO. Furthermore, CAF signed a contract with Saudi Railway Company (SAR) for the design, manufacture and supply of the most up to date Push-Pull units for regional services. These are two types of bidirectional trains providing daytime and night time services. Trains providing daytime services comprise 2 locomotives and 9 cars whilst those providing night time services comprise 2 locomotives and 13 trailer cars. Capable of reaching over 200 km/h, these new units boast family sections, prayer areas, dining cars, sleeper cars and car carrier wagons. They also include cars specifically designed for persons with reduced mobility, with PRM WCs as well as places for wheelchairs. The new trains will run in the North-South line operated by Saudi Railway Company which links the capital, Riyadh with Hall and Qurayyat



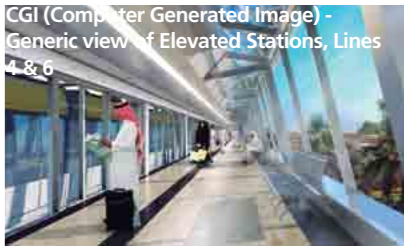
► **FAIVELEY TRANSPORT**



Platform screen doors Faiveley installed in Princess Nourah University. King Abdullah Financial district Riyadh Metro

► **SENER**

SENER has been awarded the contract to perform the Independent Checking Engineer (ICE) services for package 3 of the Riyadh metro, owned by Arriyadh Development Authority (ADA – the executive arm of the High Commission for the Development of Arriyadh). Package 3 includes metro lines 4, 5 and 6, which cover more than 60km of track and more than 25 stations in total, with elevated, at-grade and underground sections.



► **IDOM**

IDOM is responsible, since 2013, for the detailed design (construction) of the track and its associated components (viaducts, tunnels, false tunnels and platform at ground level), workshops and garages, park & rides, stations and all the complex at street associated with the immediate passage of the Line 3 of the Riyadh Metro.

Technical data:

- Length line 41 km, of which: 26 km are viaduct, 6 km underground and 9 km on Surface
- Structural components associated with the line: viaducts, tunnels cover

tunnels Platform at ground level

- Workshops and garages
- Park & rides
- Urban integration on surface
- Stations: 22
- Garages: 2
- Workshops

An extensive multidisciplinary team from IDOM are based in Saudi Arabian capital developing the first phase of the project.

Our firm is working in this country on numerous projects, including the design of the Abi Bakr as Siddiqe road and the projects of the PP12 and PP10 combined cycle plants.

► **TYPSA**

The joint venture formed by TYPESA and the British engineering Atkins (DJV) is conducting, since then, the conceptual design and construction of the three lines for the construction consortium (FCC, SAMSUNG, Strukton, Freyssinet). TYPESA is mainly responsible for the design of deep underground stations and the tunnel with tunnelling machines and mine along with the remodeling of the road network and urban integration of line 3. At present, TYPESA has assigned about 110 technicians to the project which will require, at the time of maximum deployment, 250 professionals.

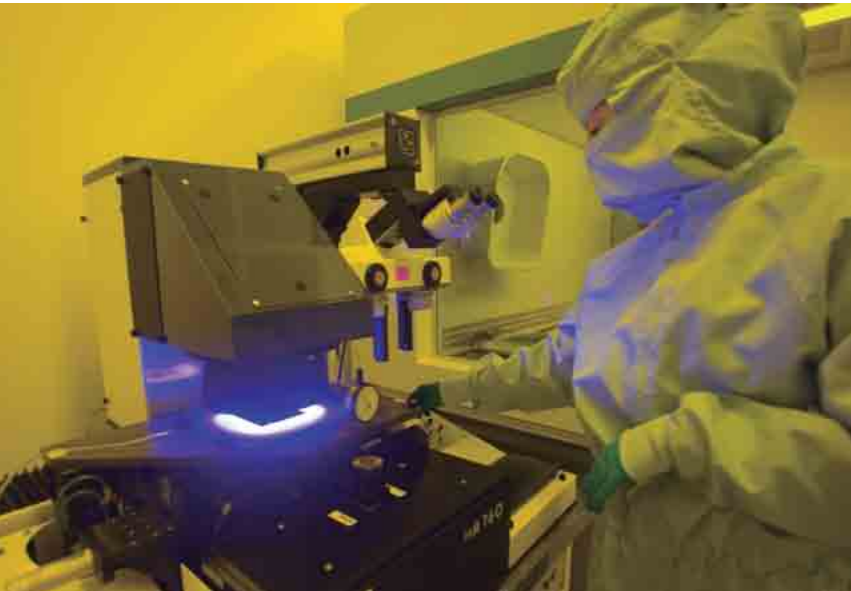


► **ALSTOM ESPAÑA**

Alstom in Spain develop the passenger information and safety system for three of the six lines of the future Riyadh metro system. Alstom's engineering centre and technology laboratory in Madrid will design and commission the central system that will manage video surveillance, public address systems

and passenger information screens in stations and on trains. It will also implement the internal wireless communication network (TETRA-type radio communication) for operation and maintenance. The technology developed by Alstom teams in Spain will process information from more than 5,000 devices (among them, almost 2,000 security cameras

installed in stations, workshops and trains and on lines). The solution has the capacity to simultaneously manage millions of data on the status of the lines, incidents at stations, changes in the electricity supply, operational management, timetables and safety alerts, providing both passengers and the operator with real-time information.



Begitren focuses on non-invasive techniques without direct contact and responds to the needs of the sector.



## Begitren, towards Rail Safety Assistive Systems

THE BEGITREN PROJECT, DEVELOPED BY VICOMTECH-IK4 AND VISUAL LINE, IS A TECHNOLOGICAL RESEARCH PROJECT AIMED FOR MANAGING, SUPERVISING AND SUPPORTING DRIVING RAILWAY VEHICLES.

**B**egitren is a Technology Research Project for the railway sector, carried out by Vicomtech-IK4 and Visual Line and co-funded by the Basque Government (Gaitek Programme). The project can be described as an initial prototype of a global solution based on image capture sensors and computer vision techniques, for the management, supervision and support of train driving. Begitren focuses on non-invasive and direct contactless technologies, responding to the current needs of the sector.

The research programme has been designed to combine numerous sources of information and provide a solution to aid train and rolling stock movements. The solution will complement information from geospatial sensors and railway cartographic data, providing users with a comparison between the current speed and the speed limit (giving a warning if the speed limit is exceeded), the distance to points of interest, trip data, etc.

Several sensors are in development phases and have shown significance in the application to Rail Safety Assistive Systems. These aids will be created as systems which give support to the driver in avoiding hazardous situations, advising the driver about risk factors, and addressing the all-important human factor of excessive speed.

Different types of assistive systems can be found in the market, many of which have been adopted from the automotive industry, where the technology is reaching maturity. However, the problems in these two sectors have fundamental differences and technologies addressed to road traffic must be adapted to the rail sector. Begitren will attempt to make significant progress in signal detection sensors to alert the driver to the prevailing limitations on a specific section of their route.

Begitren acquires images from a camera located in the train's tractor unit, facing ahead of the train. These images are sent through to

an embedded processing unit. Here computer vision algorithms are applied to analyse and identify the signals. Finally, the operator is notified by an interface designed using Human Machine Interface techniques that minimise the changes to the train drivers normal behaviour, whilst also ensuring that the data arrives in a coherent and understandable manner.

Begitren does not directly intervene with the train's control systems. It maintains the Human in the Loop principal. However, one of the future aims of research in the field is to progressively increase the levels of automation and the technologies direct intervention in the control of the train. In the long term, through research in data analysis, event modelling and prediction, and a greater understanding of human factors, it is hoped that human factors in response to hazardous situations will be further minimised thus leading to an objective of zero rail accidents.

## Bringing The World To You



**RailPersonnel**  
*Matching people and positions*

**Having the right people for your jobs is essential for your success.**

**We are rail industry specialists and understand your specific needs and circumstances.**

**Working with Rail Personnel gives you access to a global pool of talent with the right skill sets and flexibility.**

**We are experienced in dealing with international companies, resulting in streamlined and efficient recruitment and contracting procedures.**

**Rail Personnel Contracting. Rail Personnel Recruitment. Matching People and Positions for over 20 years. Perfectly.**

**[www.railpersonnel.com](http://www.railpersonnel.com)**



The country is working on providing new features to the three main existing GIS applications.

## Innovation in Public Transport Information Systems

THE GIS SYSTEM DEVELOPED BY IDOM IS CONCEIVED AS AN INTEGRATION PLATFORM THAT WILL FACILITATE THE INTERCONNECTION OF MORE THAN TWENTY INFORMATION SYSTEMS, BOTH FROM WITHIN THE DEPARTMENT OF TRANSPORTATION AND EXTERNAL FACTORS WITH DIRECT INFLUENCE ON TRANSPORT PLANNING.



as an integrated platform which will facilitate the interconnection of more than twenty information systems, both from within the Department of Transportation as well as external actors who directly influence the planning of transport. Specifically, we are working on providing new functionality to the three main existing GIS applications, substantially improving the services offered by these applications. The aim is to promote the use of public transport, ensuring access to information in real time, on traffic, schedules, incidents, parking, available services, etc. For the managers of the system, the objective is to simplify and stream-

line the planning, design, construction, operation, and maintenance of transport infrastructure. Existing technology applications, object improvement

- Darb, public portal with applications for the citizen
- Mobile Darb, public portal for mobile devices.
- GeoTrans, Intranet application integrated with everyday tools by the Technical Department of Transportation
- GeoPortal, used to exchange

IDOM has had an office in the city of Abu Dhabi for several years where many projects in the field of mobility and transport have been developed.

## DWPM, new measuring equipment

IT IS THE LATEST PROFILE MEASURING EQUIPMENT DEVELOPED BY THE COMPANY DANOBAT, ACHIEVED WITH ROLLING STOCK MAINTAINERS AND OPERATORS

The interaction between wheels and rails is one of the key factors on the dynamical behaviour of rolling stock, and consequently, on the safety and comfort of railway vehicles, so it is necessary to detect with high accuracy and frequency the dif-

ferent parameters of the wheels and in particular the contact profile. The DANOBAT DWPM, latest generation of Wheel Profile Measuring System, is the result of years of research and development work together with competent railway vehicle maintainers and operators.

The system measures the following wheel parameters:

- Wheel flange height
- Wheel flange thickness
- qR factor
- Back-to-back distance
- Wheel diameter

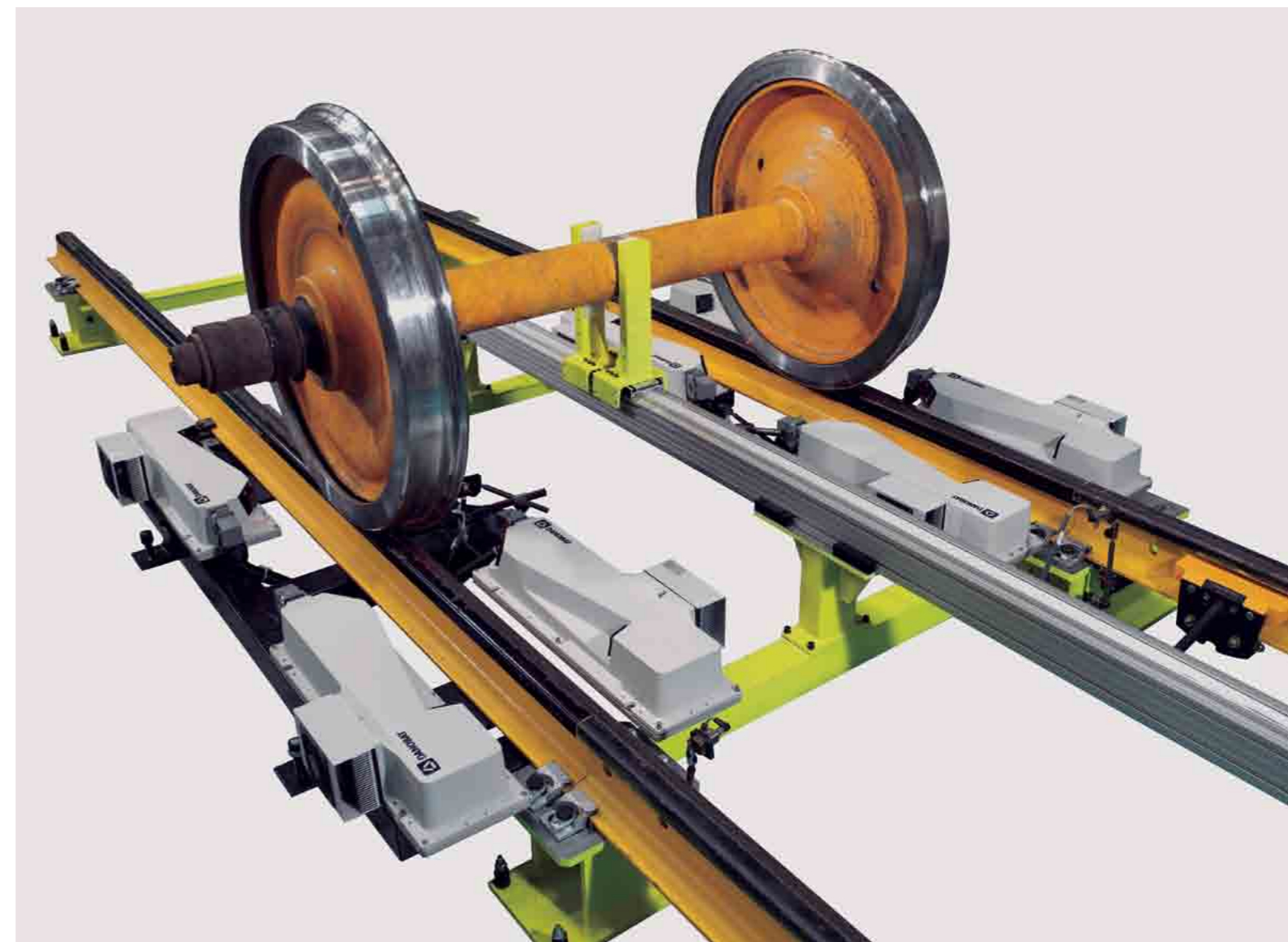
Designed to be installed in maintenance depots, the DANOBAT

DWPM Wheel Profile Measuring System helps railway vehicle operators and maintainers by automating the wheel profile measuring process and the transfers of captured data to other systems.

Under elements which protect and isolate the equipment, the installation of the system is easy and fast and it is not necessary any civil works or sleepers removal.

Full view of running profile of railway wheels allows getting high accuracy and complete wheels' features information.

More information at: <http://railways.danobatgroup.com/en/wheel-profile-measuring>



## New bogie generation for Citylink - One train for two systems



VOSSLOH ESPAÑA CONSOLIDATES ITS LEADERSHIP IN THE SEGMENT OF THE TRAIN-TRAMS WITH THE NEW GENERATION OF LIGHT RAIL VEHICLES, THE CITYLINK.

Citylink is a modular and versatile light rail vehicle family customizable to fit any network requirements and mobility demands maintaining core features as bogies, body shell structure design and dynamic concept which benefits each project with standardized and reliable solutions.

CityLink platform covers from tramway applications up to full train regional operations at 100km/h; it has been approved for both types of operations according to BOStrab and main line EBO/EN, UK (GMRT) regulations. It is a tramway perfectly adapted for urban services thanks to a very powerful braking system and an impressive visibility combined with regional rail performances like its excellent running dynamics and a heavy rail crash-energy management system.

A new bogie generation design is the core of the main successful features of the Citylink vehicle:

**1.** Barrier-free low-floor vehicle: Thanks to the exceptional low height of the bogie, the compartments are low-floor throughout with smooth and gentle longitudinal ramps allowing easy access even of persons of limited mobility.

**2.** Easy access for different platform types: Doors can be located at different heights to use existent infrastructure platforms without extra investments.

**3.** Excellent riding quality and comfort: The compact bogies with secondary pneumatic suspension offer the comfort and riding experience of the regional trains but in a low-floor tram size vehicle.

**4.** Designed for any network, even old tram tracks: The compact light-weight bogie with its torsional properties and suspension concept ensure smooth and quiet running even on vintage tracks where irregularities are frequently encountered. The Citylink is also able to negotiate narrow curves of 22m of radius providing the benefit of being used in existing curved streets without infrastructure adaptation.



**The family CityLink started with the metric gauge projects for Alicante (FGV) and later on for Mallorca (SFM) in Spain, but jumped one step forward with the international gauge development which allowed Vossloh to offer a barrier free, modern and very high-tech vehicle solution. Currently, Vossloh is delivering successfully electric vehicles to Karlsruhe (750Vdc), hybrid ones to Chemnitz (Diesel-750Vdc) and dual ones to Sheffield (750Vdc-25KVa). Today, CityLink family has become a worldwide reference for all tram-trains systems.**

## Axles & Gearboxes: ultrasonic inspection systems for train wheels

DEVELOPED BY IK4-IDEKO TOGETHER WITH CAF WHEELS, THE FIRST DEVICE CONTRIBUTES TO INCREASED SAFETY IN RAIL TRANSPORT, AS IT MAKES IT POSSIBLE TO DETECT RADIAL DEFECTS IN THE ROLLING BAND. THE SECOND SYSTEM IS A POSITIONER THAT WILL ALLOW MEASURING OF RESIDUAL TENSIONS IN THE WHEELS. THIS IS A CRUCIAL PARAMETER FOR SAFETY, SINCE EXCESSIVE RESIDUAL STRESSES CAN CAUSE CRACKING DURING SERVICE.



The Basque technology centre IK4-IDEKO has developed an ultrasonic inspection system together with the train manufacturer CAF Wheels, Axles & Gearboxes. This system secures a sound condition of train wheels and is thus a significant contribution to rail transport safety. The device was delivered to CAF recently with the purpose of becoming an approved supplier of rolling stock (wheels, axles and wheelsets) in Italy, as it meets the demanding certification standards of this country. This, of course, greatly enhances its market position. Moreover, this device allows the inspection to be carried out on all manufactured wheels prior to

assembly, using state-of-the-art pulse-echo ultrasound and tandem techniques to detect defects on the entire thickness of the wheel tread.

The high flexibility and modularity make that the system can easily be adapted to different geometries and sizes of railway wheels. On the other hand, the positioning device for measuring residual stress, also developed together with CAF, allows to tackle one of the main problems of these measurements as the residual stress varies significantly with depth. The system is simple in design, easy to operate and precise, which makes it possible to use it during both the manufacturing

period and the measurements to be performed during the maintenance cycle.

After completing the design of both systems and checking correct operation, experts from the technology centre have trained staff who will use the system.

The development of this device was made possible thanks to the specialisation of IK4-IDEKO in NDT. This field requires skilled professionals who meet stringent approval standards with international certification. The inspection and measurement division is one of the main areas of research of the technology centre, a benchmark company in the Basque Country in Advanced Manufacturing.

## UPCOMING EVENTS THAT WILL BE ATTENDED BY MAFEX



Corporate Magazine

**Mafex**Online version  
FREEPrint version  
ASK FOR RATES

16,000 potential readers!

Contact telephone number: +34 944 70 65 04. Suscription: [comunicacion@mafex.es](mailto:comunicacion@mafex.es)<http://magazine.mafex.es/en/>

@MafexSpain

MAFEX



## MEMBERS DIRECTORY

## INFRASTRUCTURE

Engineering  
and consultancy

► Aquafrisch, S.L.  
 ► Ardanuy Ingeniería, S.A.  
 ► Aries Ingeniería y Sistemas, S.A.  
 ► CAF Power & Automation  
 ► Colway Ferroviaria, S.L.  
 ► Getinsa-Payma, S.L.  
 ► Ibertest, S.A.E.  
 ► Idom  
 ► Instalaciones Inabensa  
 ► Ineco  
 ► ITK Ingeniería, S.A.  
 ► LKS Ingeniería, S.Coop.  
 ► MB Sistemas, S.Coop.  
 ► NEM Solutions, S.L.  
 ► Sener Ingeniería y Sistemas, S.A.  
 ► Typsa

Civil engineering  
construction

► Assignia Infraestructuras, S.A.  
 ► Azvi  
 ► Instalaciones Inabensa, S.A.  
 ► Parrós Obras, S.L.  
 ► PRECON - Prefabricaciones  
 y Contratas, S.A.U.  
 ► Rover Alcisa, S.A.

## Electrification

► Alstom Transporte, S.A.  
 ► Ardanuy Ingeniería, S.A.  
 ► Arteché  
 ► Getinsa-Payma, S.L.  
 ► Idom  
 ► Ineco  
 ► Ingeteam Power Technology, S.A.  
 ► Instalaciones Inabensa, S.A.  
 ► La Farga Lacambra, S.A.U.  
 ► Luznor  
 ► Parrós Obras, S.L.  
 ► Semi, S.A.  
 ► Telice  
 ► Typsa

Fixed material: components  
and equipment

► Alstom Transporte, S.A.  
 ► Amurrio Ferrocarriles  
 y Equipos, S.A.  
 ► Aquafrisch, S.L.  
 ► Arcelormittal España, S.A.  
 ► Aries Ingeniería y Sistemas, S.A.

► Arteché  
 ► Duro Felguera Rail, S.A.U.  
 ► Elektra - Grupo Elektra, S.A.  
 ► Faiveley  
 ► Hicasa - Hierros y Carbones, S.A.  
 ► Idom  
 ► Ikusi- Ángel Iglesias, S.A.  
 ► Instalaciones Inabensa  
 ► Ineco  
 ► ITK Ingeniería, S.A.  
 ► Jez Sistemas Ferroviarios, S.L.  
 ► Parrós Obras, S.L.  
 ► Redalsa, S.A.  
 ► Siemens Rail Automation, S.A.U.  
 ► Talleres Alegría, S.A.  
 ► Thales España GRP, S.A.U.  
 ► Valdepinto, S.L.

## Security

► Actia Systems, S.A.U.  
 ► Alstom Transporte, S.A.  
 ► Ardanuy Ingeniería, S.A.  
 ► DSAF. Dinámicas de Seguridad  
 ► Ecocomputer S.L.  
 ► Idom  
 ► Ikusi - Ángel Iglesias, S.A.  
 ► Implaser 99, S.L.L.  
 ► Ineco  
 ► Manusa Door Systems  
 ► Sice  
 ► Siemens Rail Automation, S.A.U.  
 ► Telice  
 ► 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  
 ► Getinsa-Payma, S.L.  
 ► GMV Sistemas S.A.U.  
 ► Idom  
 ► Ikusi- Ángel Iglesias, S.A.  
 ► 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  
 ► Thales España GRP, S.A.U.  
 ► Typsa

## Maintenance

► Alstom Transporte, S.A.  
 ► Amurrio Ferrocarriles  
 y Equipos, S.A.  
 ► Aquafrisch, S.L.  
 ► Aries Ingeniería y Sistemas, S.A.  
 ► Azvi  
 ► Danobat  
 ► Duro Felguera Rail, S.A.U.  
 ► Ibertest, S.A.E.  
 ► Idom  
 ► Ikusi - Ángel Iglesias, S.A.  
 ► Ineco  
 ► Instalaciones Inabensa  
 ► 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 - Ángel Iglesias, S.A.  
 ► Ineco  
 ► LKS Ingeniería, S.Coop.  
 ► Luznor  
 ► Manusa Door Systems  
 ► Parrós Obras, S.L.  
 ► Thales España GRP, S.A.U.  
 ► Typsa

Quality control, inspection  
and certification

► Cetren  
 ► Ibertest, S.A.E.

INFORMATION AND DATA  
SYSTEMSSystems and equipment for  
collection and ticketing

► Alstom Transporte, S.A.  
 ► Ardanuy Ingeniería, S.A.  
 ► Calmell Group  
 ► Ecocomputer  
 ► Idom  
 ► Ikusi - Ángel Iglesias, S.A.  
 ► Indra Sistemas, S.A.

- Manusa Door Systems
- Sice
- Thales España GRP, S.A.U.

#### Communications, information systems and passenger information equipment

- Alstom Transporte, S.A.
- Ardanuy Ingeniería, S.A.
- Cables de comunicaciones Zaragoza, S.L.
- CAF Power & Automation
- Ecomputer
- Getinsa-Payma, S.L.
- Idom
- Ikusi - Ángel Iglesias, S.A.
- Indra
- Ineco
- P4Q Electronics, S.L.
- Sice
- Siemens Rail Automation, S.A.U.
- Telice, S.A.
- Thales España GRP, S.A.U.
- Typsa

#### ROLLING STOCK

#### Passenger car manufacturers

- Alstom Transporte, S.A.
- Bombardier España
- CAF - Construcciones y Auxiliar de Ferrocarriles, S.A.
- Patentes Talgo, S.L.
- Vossloh España, S.A.

#### Manufacturers of freight wagons

- Alstom Transporte, S.A.
- Bombardier España
- CAF - Construcciones y Auxiliar de Ferrocarriles, S.A.
- ITK Ingeniería, S.A.
- Talleres Alegría, S.A.
- Vossloh España, S.A.

#### Locomotive manufacturers

- Alstom Transporte, S.A.
- Bombardier España
- CAF - Construcciones y Auxiliar de Ferrocarriles, S.A.
- Patentes Talgo, S.L.
- Vossloh España, S.A.

#### EQUIPMENT AND COMPONENTS ROLLING STOCK

##### Traction and control systems

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

##### Components

- Actia Systems, S.A.U.
- Albatros, S.L.
- Al-Ko Record
- Alstom Transporte, S.A.
- Alte Technologies, S.L.U.
- Aries Ingeniería y Sistemas, S.A.
- Arteche (Electrotécnica Arteche Smartgrid, S.L.)
- CAF Power & Automation
- Cetest
- Elektra
- Faiveley
- Fundiciones Garbi, S.A.
- Funor, S.A.
- Gamarra, S.A.
- Hispacold
- Ikusi - Ángel Iglesias, S.A.
- Indra
- Ingeteam Power Technology, S.A.
- Metalocauchos, S.L.
- MGN Transformaciones del Caucho, S.A.
- P4Q Electronics, S.L.
- SEIB, Servicios Electrónicos Industriales Berbel, S.L.
- Siemens Rail Automation, S.A.U.
- Teknorail Systems, S.A.
- Valdepinto, S.L.

##### Equipment and machinery for the manufacture of rolling stock

- Aquafrisch, S.L.
- Aries Ingeniería y Sistemas, S.A.
- Cetest
- Danobat
- ITK Ingeniería, S.A.
- MB Sistemas, S.Coop.

##### Interior

- Alstom Transporte, S.A.

- Alte Technologies, S.L.U.
- Colway Ferroviaria, S.L.
- Idom
- Industrias E. Díaz, S.A.
- Kelox, S.A.
- LKS Ingeniería, S.Coop.
- Teknorail Systems, S.A.
- Valdepinto, S.L.

##### Security

- Actia Systems, S.A.U.
- Albatros, S.L.
- Alstom Transporte, S.A.
- Ardanuy Ingeniería, S.A.
- Cetest
- DSAF. Dinámicas de Seguridad
- Idom
- Ikusi - Ángel Iglesias, S.A.
- Implaser 99, S.L.L.
- Indra
- 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.
- Aries Ingeniería y Sistemas, S.A.
- CAF - Construcciones y Auxiliar de Ferrocarriles, S.A.
- Cetest
- Danobat
- Faiveley
- Ibertest, S.A.E.
- Ikusi
- Industrias E. Díaz, S.A.
- Ingeteam Power Technology, S.A.
- Kelox, S.A.
- Luznor
- Metalocauchos, S.L.
- NEM Solutions, S.L.
- Patentes Talgo, S.L.
- Siemens Rail Automation, S.A.U.
- Talleres Alegría, S.A.
- Teknorail Systems, S.A.
- Vossloh España, S.A.

##### Quality control, inspection and certification

- Cetren
- Ibertest, S.A.E.
- Tecnatom



#### ACTIA SYSTEMS, S.A.U.

- Pol. Ind. Los Olivos - Calidad, 66 28906 Getafe (MADRID)
- P: +34 91 665 26 26
- F: +34 91 665 23 24
- sales@actiasystems.com
- www.mobility.actia.com

Actia is a company based in Spain with a number of subsidiaries in more than 15 countries, devoted to the research, design and manufacturing of electronic platforms, on board and fixes systems, using the latest technologies for the railway industries, not just in security, information and entertainment but also in the communication and transferring of data. It's available with a wide range of electronic equipment and services which meets all needs for different means of public transport like High Speed train, InterCity, Regional train, Suburban train, Train-Tram, Tram and Underground.

Actia partakes in each stage of the manufacturing process of its products: analysis of needs, design systems, equipment manufacturing, set up service, warranty period, substitution y renovation. Thanks to Actia innovatory efforts and staff, it has more than 100 applications in Spain, USA and the UK.



#### ALBATROS, S.L.

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

Albatros Corporation is specialised in the design, manufacture, commercialization, and maintenance of equipment for the railway industry. Albatros is formed by various units of engineering and manufacture in Spain as other countries.

We have a team of over 500 employees, selling over 100 million Euros a

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



#### AL-KO

- Ctra. Durango-Elorrio, 25 48220 Abadiano (BIZKAIA)
- P: +34 94 621 57 40
- F: +34 94 681 37 04
- erik.geluk@al-ko.es
- www.al-ko.com

AL-KO, a pioneer in the manufacture of shock absorbers in Spain, offers wide range of shock absorbers and suspension elements, backed by its engineering versatility that provides innovative technical solutions to meet the needs of its customers.

This fact has lead AL-KO, to carry out -in all its plants- major investments in research and testing facilities, as well as in expansions and refurbishments with the objective of implementing a flexible, efficient and profitable production, also in small series. All this serves to make AL-KO a competent party in developing effective solutions in the field of suspension.



#### ALSTOM TRANSPORTE, S.A.

- C/ Martínez Villergas 49, edificio V 28027 Madrid (MADRID)
- P: +34 91 334 58 00
- F: +34 91 334 58 01
- fernando.sunyer@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.



#### ALTE TECHNOLOGIES, S.L.U.

- Pol. Ind. El Plà Camí de Can Gurri, 1 08185 Lliçà de Vall (BARCELONA)
- P: +34 93 840 70 12
- F: +34 93 861 85 61
- info@alte-technologies.com
- www.alte-technologies.com

Alte Transportation, S.L. main activities are design, sales, manufacturing and maintenance of Toilet Modules with vacuum systems, Air Conditioning systems and Modular Interiors. All these products are designed with our own technology and they are specifically designed for the railway sector.

Alte main facilities are in Lliçà de Vall (Barcelona, Spain) and Raimat (Lleida, Spain). The company has more than 100 staff and extended network of agents worldwide with annual turnover of 18 million Euro. Our knowhow is built on 25 years doing several interior projec



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

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

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

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



#### **AQUAFRISCH, S.L.**

► C/ Ignacio Zuloaga, 10  
28522 Rivas Vaciamadrid  
(MADRID)

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

Aquafrisch is a service oriented company. Our task is to provide our customers needs with reliable results. Aquafrisch provides a wide offer in equipment and services in both working fields for the company:

1.- Aquafrisch Rail: solutions for railway equipment in depots and workshops.

2.- Aquafrisch Agua: solutions for water treatment both in consumption and waste waters.



#### **ARCELORMITTAL ESPAÑA, S.A.**

► Apdo. 570. Edificio Energías, 2ª pl.

33691 Gijón (ASTURIAS)

► P: +34 985 18 71 67  
► fernando.sainz-varona@arcelormittal.com  
► www.arcelormittal.com/rails+specialsections

ArcelorMittal is the world's leading steel and mining company and it is part of a small group of rail manufacturers 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.



#### **ARIES INGENIERÍA Y SISTEMAS, S.A.**

► Paseo de la Castellana, 130  
28046 Madrid (MADRID)

► P: +34 91 570 27 37  
► F: +34 91 570 27 66  
► mrey@aries.com.es  
► www.ariestesting.com

Aries Ingeniería y Sistemas is a worldwide leading company specialized in turn-key test systems projects for the railway industry (rolling stock and infrastructure). Aries's services range from feasibility studies and concept design, to turn-key solutions, including maintenance.

Aries develops its own state-of-the-art technology, which it incorporates into its solutions.

The company, is featuring over 25 years of experience in the sector, also offers client-specific R+D consulting for both: railway rolling stock and infrastructure.

Aries relies on its modern technology and its highly qualified team to create successful and efficient solutions.

Aries is present in more than 22 countries, employs a strategy directed at specific markets which allows a strong, stable, and profitable growth. The company has offices in Madrid, Miami and Shanghai



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

► Derio Bidea, 28  
48100 Mungia (BIZKAIA)

► P: +34 94 601 12 00  
► F: +34 94 615 56 28  
► ilh@arteche.es  
► 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 Arteche's history, becoming an asset which has contributed to our international growth and to the development of innovative solutions.



#### **ASSIGNIA INFRAESTRUCTURAS, S.A.**

► Avd. Quitapesares 11  
Pol. Emp. Villapark  
28670 Villaviciosa de Odón,  
(MADRID)

► P: +34 91 567 28 70  
► F: +34 91 571 96 28  
► info@assignia.com  
► www.assignia.com

Assignia Infraestructuras is a company that is part of the Essentium Group, which is based in Spain.

It has international experience in the development, execution, management and operations of large infrastructure projects of all kinds, including concessions and services.

Assignia has participated in all high-speed railway projects in Spain. Its experience is reflected in the various projects developed including infrastructures, superstructures, stations, new lines or renovations of lines in circulation that include: high-speed, conventional and sub-urban lines, trams and metros, the expertise in the sector is complemented by performing maintenance works thereof.

The in-house machinery park (available for widths 1,435 and 1,668 mm), the flexibility and international presence of the company in countries like Mexico, Venezuela, Turkey, Morocco, India, Algeria and Chile, gives Assignia

an unquestionable distinction in the railway sector.



#### **AZVI**

► C/ Almendralejo, 5  
41019 SEVILLA

► P: +34 954 999 320  
► F: +34 954 999 200  
► azvi@azvi.es  
► www.azvi.es

Azvi is a hundred-year-old Company specialised in Civil Works whose origins are in railways, forming part of the history and evolution of the railways and its infrastructures in Spain and abroad. Throughout these years, Azvi has participated in numerous construction, rehabilitation, conservation and maintenance projects over more than 1,000 kilometres of track, of which almost 450 km have been High-Speed Rail built within the last 25 years. Azvi also has a large and modern machinery park which allows the company to carry out works with its own machines and a Logistics Centre equipped with modern facilities and state of the art resources in order to centralize a variety of support services to railway activity, such as MachineryPark, materials, maintenance, checking and repairing shops. Research and Development is also an important issue for Azvi. Through its own R&D department, Azvi invests in railway research and development, in collaboration with various public and private entities and investigation groups.



#### **BOMBARDIER ESPAÑA**

► Avda. Burgos, 17  
Complejo Triada-Torre A  
28036 Madrid (MADRID)

► P: +34 91 383 62 00  
► F: +34 91 383 61 98  
► susana.bargsten@es.transport.bombardier.com  
► www.bombardier.com

Bombardier Transportation, a global leader in rail technology, offers the broadest portfolio in the rail industry. Bombardier Transportation Spain is one of the leading exporters of the Spanish railway industry, employing more than 750 people in its plants and offices in Trápaga (Biscay), San Sebastian de los Reyes and Alcobendas (Madrid), Madrid and Barcelona, and taking part in some of the major railway projects in the country.

Its Propulsion Systems plant located in Trápaga (Biscay) and its Centre of Excellence in Rail Signalling Engineering located in San Sebastian de los Reyes (Madrid) are world top technological centres, leading the requests for Bombardier's propulsion and signalling systems for Spain and for the rest of the world. Exports represent already more than 85% of its activity.



#### **CABLES DE COMUNICACIONES ZARAGOZA**

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

► P: +34 976 72 99 00  
► F: +34 976 72 99 72  
► comercial@cablescom.com  
► www.cablescom.com

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



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

► Padilla, 71 - 6  
28006 Madrid (MADRID)  
► P: +34 91 436 60 00  
► F: +34 91 436 60 11  
► caf@caf.net  
► www.caf.net

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



## CAF POWER & AUTOMATION

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

CAF P&A is a global manufacturer of electric power solutions as well as information and communications systems for the rail industry. CAF P&A have equipped more than 5,000 vehicles world wide including, metros, light rail, locomotives and high-speed trains.

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

a team of experienced, competent and dynamic specialists. CAF P&A develops, manufactures and deliver high reliability solutions adapted to each and every client's specific needs in compliance with railway standards.



## CAF SIGNALLING

► C/ Sepúlveda, 7B  
28108 Alcobendas (MADRID)  
► P: +34 91 798 27 50  
► F: +34 91 661 37 51  
► cabsignalling@cabsignalling.com  
► www.cabsignalling.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.



## CALMELL GROUP

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

The first company of the group, Calmell, S.A. was founded in 1970, focusing its activity on the manufacture or graphic products. Currently, the Calmell Group is the leader in access control and identification, through its companies Calmell S.A., Affix S.L., Idoneum S.A., which are respectively engaged in producing the supports (tickets, cards,...), developing specific software and hardware, personalization and security.

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

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



## CETEST

► Lazkaibar, s/n  
20200 Beasain (GIPUZKOA)  
► P: +34 943 028 690  
► cetest@cetestgroup.com  
► www.cetestgroup.com  
Test and analysis services for:  
■ Design verification and validation.  
■ Full homologation of new products and vehicles.  
■ Failure analysis and optimization.  
Fully accredited test lab with more than 40 years of experience in railway testing. Test services cover the following areas:  
■ Structural components.  
■ Running gear.  
■ Suspension systems.  
■ Vehicle dynamics.  
■ Noise and vibrations.  
■ Aerodynamics.  
■ EMC and energy consumption.  
■ Mechatronics.  
■ Special instrumentation (Instrumented wheelsets, instrumented pantograph).



## CETREN

► C/ Sierra de Cazorla, 1 – Las Matas.  
28290 Las Rozas (MADRID)  
► T. Certificación: +34 91 127 97 27/ 97  
► T. Formación: +34 91 127 92 27/ 29  
► Certificación: cetren@cetren.es  
► Formación: formacion@cetren.es  
► www.cetren.es

Cetren, as expert on the railway sector, has over 30 years experience in promoting and certifying the quality in this sector. Our experience and exclusive dedication to railways allows us to offer global solutions for

certification, as the Spanish Notified Body according to European Interoperability Standards and also acting as Independent Safety Assessor and Certification Entity of rail products, processes and services.

Cetren is also the first private center expert in railway staff training, as approved by the Ministry of Public Works and Transport since 2007.



## COLWAY FERROVIARIA, S.L.

► Ganduxer, 5-15 - Desp. 4  
08021 Barcelona (BARCELONA)  
► P: +34 93 414 65 12  
► F: +34 93 414 16 64  
► 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.



## DANOBAT

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

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

It gathers extensive experience and qualifi-

cation in the rendering of services such as engineering services, equipment integration, complex project management, and collaboration with the customer all along the life of the project.

Danobat has a strong international presence and references in the most relevant customers.



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

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

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

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

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



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

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

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



## ECOCOMPUTER S.L.

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

Ecocomputer S.L. is a technology firm based on North Spain (Asturias and Cantabria) and focused on the design, development and implementation of IT solutions on the railways industry (ie: ticketing, booking, passenger information system) and access control and time&attendance business. Founded on 1999, it holds a wide portfolio of own products as a result of years of evolution and adaptation to customer needs.

Ecocomputer provides as well onsite IT maintenance services for the railways operators and administrator infrastructure companies (Railway Control and Regulation Centres, security infrastructure, IT equipment).



## ELEKTRA-GRUPO ELEKTRA S.A.

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

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

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



### FAIVELEY TRANSPORT IBERICA, S.A

► Pol. Ind La Drecera – c/ Mecánica,  
23 – 43470 La Selva del Camp  
(TARRAGONA). c/Antonio Cabezón  
s/n – 28034 Madrid (MADRID)  
► T: +34 917282159  
► F: +34 917282157  
► [jesus.delatorre@faiveleytransport.com](mailto:jesus.delatorre@faiveleytransport.com)  
► [www.faiveleytransport.com](http://www.faiveleytransport.com)

Faiveley Transport Ibérica, S.A. is a firm focused on design, production, and maintenance of auxiliary equipments for railway industry (locomotives, rolling stocks, trams and metros). Our product range include also the design, production, installation and maintenance of Platform Screen Doors (PSD).

FT Ibérica is the branch for Spain, Portugal and Mexico market of International Group Faiveley Transport. Our main facilities are in La Selva del Camp (Tarragona –Spain) and Commercial offices in Madrid.



### FUNDICIONES GARBI, S.A.

► B° Munsaratz, 33  
48220 Abadiano (BIZKAIA)  
► P: +34 94 621 54 80  
► F: +34 94 681 73 86  
► [garbi@fundicionesgarbi.es](mailto:garbi@fundicionesgarbi.es)  
► [www.fundicionesgarbi.es](http://www.fundicionesgarbi.es)

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

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



### FUNOR, S.A.

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

Castings in carbon steel, alloy steel and stainless steel.

Our products:

■ Steel casting.

■ Raw castings or fully machined.

Examples:

■ Bogie components.

■ Pivots.

■ Motor housings.

■ Pressure rings.

■ Axle boxes.

■ Links...



### GAMARRA, S.A.

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



### GETINSA-PAYMA, S.L.

► C/ Ramón de Aguinaga, 8  
28028 Madrid (MADRID)  
► P: +34 91 456 09 82  
► F: +34 91 456 09 83  
► [internacional@getinsa.es](mailto:internacional@getinsa.es)  
► [www.getinsa.es](http://www.getinsa.es)

With more than 40 years of experience in Transport Infrastructure Projects in Spain and all around the world, Getinsa-Payma, S.L. has grown into a top engineering firm in Spain and an international benchmark in the sector. In Spain, Getinsa-Payma has played a leading role both in the modernization of the conventional railway and in the development of the new high speed railway network. Our services include project management and engineering & consultancy services, involving all phases of the project, from feasibility studies up to commissioning and technical assistance for the operation and maintenance of railway infrastructure. Our experience covers civil works, track and platform, signaling and telecommunication systems, as well as electrification (electric substations, overhead lines, etc.). We are currently working on railway projects in Europe, Middle East, Africa, Asia, South America and USA.



### 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](mailto:ahernandez@gmv.com)  
► [aags@gmv.com](mailto:aags@gmv.com)  
► [www.gmv.com](http://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.



### 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](mailto:info@hicasa.com)  
► [www.hicasa.com](http://www.hicasa.com)

HICASA specialises in the storage, transformation, distribution and commercialisation of railway materials, rails and railway accessories of all types in accordance with both European (UNE EN), as well as American (ASTM) Standards, not to mention others such as AREMA, etc. HICASA belongs to a private group of companies, GEVIR, which is made up of four enterprises in Spain, and is special in the sense that it combines its role of distributor with that of manufacturer, given that it possesses its own specialist light rail factory, a fact which endows it with a unique market profile. We can boast of a roofed surface area at our installations of over 13,000 m² where we dispose of modern cutting and drilling machines that enable us to transform iron and steel and to supply orders of any format and measurement, in accordance with the specifications requested by our clients. We export over 50% of our products abroad.



### IBERTEST, S.A.E.

► Ramón y Cajal, 18-20  
28814 Daganzo de Arriba  
(MADRID)  
► P: +34 91 884 53 85  
► F: +34 91 884 50 02  
► [www.ibertest.es](http://www.ibertest.es)

Ibertest is a company that since 1970, designs and manufactures machines and complete laboratory installations "Turn Key" for high precision materials testing. Our equipment offers a global solution for R&D Investigation and Quality Control of all types of materials, englobing static and dynamic testing of the different elements in conventional and high speed railway, that includes: Tracks, Sleepers, Track Support Assembly, bogies & etc. Our solutions guarantee the high demanding safety requirements established by national and international standards.



### IDOM

► Zarandoa 23  
48015 Bilbao (VIZCAYA)  
► P: +34 94 479 76 40  
► F: +34 94 475 93 64  
► [cortega@idom.com](mailto:cortega@idom.com)  
► [oscar.rico@idom.com](mailto:oscar.rico@idom.com)  
► [www.idom.es](http://www.idom.es)  
► [cortega@idom.com](mailto:cortega@idom.com)  
► [oscar.rico@idom.com](mailto:oscar.rico@idom.com)  
► [www.idom.es](http://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 25 countries with 42 offices throughout Angola, Arabia, Argelia, Belgium, Brazil, Canada, Chile, Colombia, Ecuador, France, Germany, India, Laos, UAE, Spain, U.S.A., Libya, Morocco, Mexico, Peru, Poland, Portu-

gal, Rumania, Turkey and United Kingdom.

More than 2.500 staff possesses the expertise and experience to cover all the phases of a railway project ( high speed, conventional, freight, metro, light rail, tramway, depot and workshops..), from conception to commissioning and beyond.

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 socio-economical analysis, basic and detailed design, operational and maintenance plans, works supervision, testing and commissioning.



### IKUSI - ÁNGEL IGLESIAS, S.A.

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



### ASOCIACIÓN IK4 RESEARCH ALLIANCE

► Pol. Azitain 3K, 2ºG  
20600 Eubar (GIPUZKOA)  
► T: +34 94 382 03 50  
► [otegi@ik4.es](mailto:otegi@ik4.es)  
► [www.ik4.es](http://www.ik4.es)

K4 Research Alliance es una alianza de

centros tecnológicos, privada e independiente, de referencia en el ámbito tecnológico europeo. Está integrada por 9 entidades del País Vasco: AZTERLAN, CEIT, CIDETEC, GAIKER, IDEKO, IKERLAN, LORTEK, TEKNIKER y VICOMTECH.

IK4 Research Alliance tiene por objeto la generación, captación y transferencia de conocimiento científico-tecnológico principalmente al tejido empresarial, con el fin de contribuir a la mejora de su competitividad y, en general, al progreso de la sociedad.

Actualmente reúne 1275 personas y en 2014 tuvo unos ingresos de 102 M€.



### IMPLASER 99, S.L.L.

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

Implaser is a Spanish company focused in developing innovative security signs for railway projects. Innovation and quality are our mainstays, as we were the first SME being certified in R+D+I in Spain. Implaser has all the range of products certified by AENOR with photoluminescent values of 150, 300, 580 and 720 mcd/m². We are also specialized in the manufacturing of informative, security and accessibility stickers for coaches, to be used both indoor and outdoor.

Hard work and great concern for innovation has allowed us to develop new products, such as photoluminescent systems combined with electroluminescent and guiding systems by LEDs.



### INDRA

- Avda. de Bruselas, 35  
28108 Alcobendas (MADRID)
- P: +34 91 626 88 58
- F: +34 91 626 88 68
- dmeza@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.



### INDUSTRIAS E. DÍAZ, S.A.

- Ctra. de Castellón, Km. 6,2  
52720 La Cartuja (ZARAGOZA)
- P: +34 97 645 40 07
- F: +34 97 645 40 13
- m.eugenia@industrias-ediaz.com
- www.industrias-diaz.com

Industrias E. Díaz, S.A. founded in 1968, manufactures side and cab WINDOWS for railways, metro and tram.

It counts with highly qualified personnel as well as a technical staff able to make any kind of design. Its facilities of 11,000 m² of built, contains the most sophisticated technology and means of test and homologations.

It is certificated ISO 9001:2000. In order to respect the environment, it does not use hexavalent chrome in its modern installations of chemical treatments, decreasing toxic substances emissions.



### INECO

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

Global leader in transport engineering and consultancy, it has contributed to the development of transport infrastructures for over 45 years in more than 45 countries. Its high level technical specialisation allows its activity to diversify into new markets and reinforce its presence in those where it is already established. Its participation in the whole railway system in Spain has led the company to develop important international projects like the Makkah-Madinah high speed in Saudi Arabia, the Ankara-Istanbul line in Turkey and the HS2 project in the United Kingdom.



### INGETEAM POWER TECHNOLOGY, S.A.

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

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

Our capacities and the experience on the railways sector allow us to offer technological solutions that significantly contribute to reach our customers' strategic objectives, leading to maximize operational efficiency.

We strive towards on offering in-house/state-of-the-art developments for.



### INSTALACIONES INABENSA, S.A.

- Energía Solar, 1 -  
Palmas Altas  
41014 (SEVILLA)
- P: +34 95 493 60 00
- F: +34 95 493 60 05
- inabensa@abengoa.com
- www.inabensa.com

In the railway sector, Inabensa is an international reference for overhead lines,

traction substations, communications and ancillary installations: high voltage, low voltage, lighting and ventilation.

Inabensa undertakes turn-key projects, ranging from designing, supplying and installing to maintaining electrification system for both conventional and high-speed railways, freight, subways, trams and monorails.

It also holds one of the most advanced pools of rail plants in the sector, highly sophisticated with the utmost functionality and approved for use in the EU. Inabensa has its own overhead line equipment technology, CAVE overhead line and TkMx overhead line, and it also has an R&D department focusing on energy storage systems, bidirectional substations, detection of broken rail and software development.



### 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 conti-

nents guarantees the best technical assistance at any place of the world.



### ITK INGENIERÍA, S.A.

- Parque Científico Tecnológico de Gijón - Parcela 5 - Edificio ITK.  
33203 Gijón (ASTURIAS)
- P: +34 985 35 50 00
- F: +34 985 35 70 50
- itk@itk-ingenieria.es
- www.itk-ingenieria.es

One line of business in which ITK has become involved has been the development, supply and assembly of installations and equipment for the rail sector.

ITK's work takes in all aspects of a project, starting with the precise definition of the needs of the client to offer an integrated solution that brings together construction, production, environmental and personnel aspects via analysis, calculation and engineering.

Installations, vehicles and equipment are delivered in an operational state with their corresponding operating and maintenance manuals and even training courses for outside staff, integral maintenance for the life of said installations and a complete after-sales and repair service.



### JEZ SISTEMAS FERROVIARIOS, S.L.

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

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

Our Technical Department (Department of R&D) ensures we have the capability of designing and producing points and crossings (turnouts, crossovers, scissor crossovers and diamond crossings) or parts for them, such as hard steel man-

ganese crossings or spare tongues. At JEZ Sistemas Ferroviarios, S.L. we fit our developments to meet clients needs.



### KELOX, S.A.

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

Kelox launched its railway activity in 1977, manufacturing catering equipment for dining cars on longdistance lines.

The experience and knowledge acquired over the years have become Kelox specialist in the design and full supply of galleys and catering equipment for high-speed, shuttle and regional trains.

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



### LA FARGA LACAMBRA, S.A.U.

- Ctra. C-17z - Km. 73,5  
08508 Les Masies de Voltregà (BARCELONA)
- P: +34 93 859 40 20
- F: +34 93 859 55 30
- josep.anfruns@lafarga.es
- www.lafarga.es

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

La Farga Lacambra provides global solutions for copper materials and its alloys such as CuMg, CuSn or CuAg, integrating the whole productive process and ensuring the maximum technical qualities. These products satisfy the needs of the market for all kind of lines and speeds around the world.

**LKS INGENIERÍA, S. COOP**

- Goiru kalea, 7  
20500 Arrasate  
(GIPUZKOA)  
► P: 902 03 04 88  
► F: 943 79 38 78  
► arrasate-mondragon@  
lksingenieria.com  
► www.lks.es

Through more than 25 years of existence, LKS DIARADESIGN has experienced a progression toward its consolidation on areas such as transport design, engineering and transport infrastructure.

Rolling Stock Design: Design consultancy, Concept design, Exterior styling, Interior styling, Design engineering, Branding, colour & trim. Railway Infrastructure: Feasibility studies, Landscape architecture, Infrastructure design, Technical assistance, Program & Project Management, Environmental consulting.

**LUZNOR**

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

Luznor Company is specialized in the design, manufacture and commercialization of professional torches (for railway industry), emergency lighting (for industry and architecture) and other Electronic devices.

Luznor offers you (in its factory in Vitoria) highly qualified technicians, a high standard of quality, an effective system development, manufacture and testing, and above all, a philosophy of commitment to our customers allowing us to offer innovative products equipped with advanced technology and recognized prestige.

**MANUSA DOOR SYSTEMS**

- Avda. Via Augusta, 85-87 -  
6ª planta.  
08174 Sant Cugat del Vallès  
(BARCELONA)  
► P: + 34 902 321 400  
► P: +34 935 915 700  
► F: +34 902 321 450  
► F: +34 932 185 610  
► manusa@manusa.com  
► www.manusa.com

Manusa is the Spanish market leader in design, production, installation and maintenance of automatic door systems. Established in 1966, it has 12 delegations in Spain, branches in Portugal, Brazil, Singapore and India and international presence in more than 70 countries around the world. Manusa develops specific products for public transport, such as platform screen doors (PSD) and ticket gates for access control, as well as one-way corridors, onboard doors and tunnel partitioning doors, always with the Manusa technology support.

**MB SISTEMAS, S. COOP.**

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

MB SISTEMAS is part of MONDRAGON CORPORATION.

We develop turnkey "World Class" engineering projects, implementing automation solutions into the Assembly and welding phases of manufacture process for car body structures of railroad passenger cars.

We give "ad hoc" solutions for the customer's needs; having implanted successfully our facilities around the world. As engineering we develop both, robotic installations and special machines for any assembly process.

**METALOCAUCHO, S.L.**

- Polígono Erratzu, 253  
20130 Urnieta (GIPUZKOA)  
► 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 freight trains, taking the latest technological advances of the rubber world, vibration control and damping systems.

**NUEVAS ESTRATEGIAS DE MANTENIMIENTO, S.L.**

- Paseo Mikeletegi, 54 - 2º  
20009 Donostia (GIPUZKOA)  
► P: +34 943 30 93 28  
► F: +34 943 30 93 26  
► gparada@nemsolutions.com  
► www.nemsolutions.com

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

**P4Q ELECTRONICS, S.L.**

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

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

**PARRÓS OBRAS, S.L.**

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

Family business with over 25 years experience in civil construction and iron and steel industry for the railway sector. Parros Group which is specialized in pile driving and catenary foundations, has implemented the 80% of the foundations of the entire Spanish High Speed Network.

Whether conventional railway network or Highspeed Railway (AVE), PARROS GROUP is distinguished by the versatility of our machines adapted "Ad hoc" for auxiliary civil works from the railway, with automatic switching to the three Spanish gauges. Also innovative is our implementing system of noise barriers from the railway track and its foundations. Generic activities of building and general construction.

**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.

**REDALSA, S.A.**

- General Solchaga, s/n  
P. I. de Argales, Apdo. 719  
47008 Valladolid (VALLADOLID)  
► P: +34 983 27 13 16  
► F: +34 983 27 37 68  
► redalsa@redalsa.com  
► www.redalsa.com

■ Rail electrical welding LBS are arranged to form 288 meters for high-speed train stretch and conventional rail network.

■ Engineering services and integral management for electrical welding factories and management of rail stockpiles.

■ Regeneration of used rails to make LBS.

■ Providing fastening complet sys-

tems. Manufacture of metallic elements for diferents fastening systems. Iron sheets J2.L1 or P50 for J2 and Elastic fastening clips SKL-1, SKL14, SKL12 and new variant to "Fast-Clip".

■ Rail ultrasonic inspection, using hand-held equipment and self-propelled movil equipment until 90 Km/h.

■ Maintenance and repair work of train coaches in our factory. Our facilities are equipped with 3 Km of railway and 3 railway

access to RFIG. We have all the necessary traction resources of 1668 track width.

■ Thermal aluminium welding kits distribution.



#### ROVER ALCISA, S.A.

► C/ Ochandiano, 18 - Edificio A  
Parque Empresarial El Plantío  
28023 Madrid  
(MADRID)

► P: +34 91 444 44 80

► F: +34 91 444 44 81

► aleon@roveralcisa.com

► www.roveralcisa.com

The Rover Alcisa Group came into being in 1962, and brought together its corporate activities in Construction, Property Development, Engineering, Mining Extraction and New Technology, giving rise to a diversified corporate group ready to take on new investments.

The Rover Alcisa Group is present on all fronts and in all fields of civil works. Indeed, its position as leader is plain to see.

It has a wealth of experience in all kinds of overland infrastructures: highways, dual carriageways and motorways. In addition to its strong position in this sector, it also has a notable and unique presence in railway infrastructure: high-speed, metro and tram. Its involvement in one-of-a-kind projects as part of the Spanish rail network turned this corporate group into one of only a handful throughout Spain specializing in large-scale projects whose implementation is technically complex.



#### SEIB- SERVICIOS ELECTRÓNICOS INDUSTRIALES BERBEL, S.L.

► Calle de San José, 6 (Nave 19)  
28320 - Pinto (MADRID)

► P: +34 91 692 53 71

► F: +34 91 692 60 98

► seib@seib.es

► www.seib.es

We are designers of products and electronic processes that since 1994 industrialize the knowledge of our clients in their products.

Currently, SEIB boasts the most advanced range of products and services on the market in industrial electronics and an own Know-How present in all activities of the company, from the simplest solutions to more complex developments and projects. In 2008, we started the development of own products and now launched the generation 2.0 in which we apply the design to reduce the consumption of raw materials and processes, using components and cutting-edge techniques to increase functionality and reduce the cost of products in rolling stock.

What do we have to change about these products to transform into that you need?



#### SEMI, S.A. (GRUPO ACS)

► Manzanares, 4

28005 Madrid (MADRID)

► P: +34 91 701 77 00

► F +34 91 521 85 97

► ferrocarril@semi.es

► www.semi.es

► www.grupoacs.com

A society in international expansion. With the adaptability of a small business, the infrastructure of a big company and the financial backing of a large group. SEMI is encompassed in the major companies of Industrial Services sector of the ACS group. Focused in the industrial field, SEMI build in-

frastructures 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.



#### SENER INGENIERÍA Y SISTEMAS, S.A.

► Severo Ochoa, 4 (PTM)

28760 Tres Cantos (MADRID)

► P: +34 91 807 70 8 / 717 4

► F: +34 91 807 87 32

► dep.infra@sener.es

► www.sener.es

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)

► T: +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.



Talleres Alegría, s.a.

#### TALLERES ALEGRÍA, S.A.

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

► P: +34 985 26 32 95

► F: +34 985 26 60 1

► talegria@talegria.com

► www.talegria.com

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



#### 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



#### 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](mailto:telice@telice.es)
- [www.telice.es](http://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.



### THALES ESPAÑA GRP, S.A.U.

- Serrano Galvache, 56  
Edificio Álamo 4º,  
Planta Sur  
28033 Madrid (MADRID)
- P: +34 91 273 76 80
- F: +34 91 273 78 67
- [jose.villalpando@thalesgroup.com](mailto:jose.villalpando@thalesgroup.com)
- [www.thalesgroup.com](http://www.thalesgroup.com)

Thales is a World leader in Mission Critical Solutions for Land Transportation. Thales Spain, with more than 60 years of experience, has been pioneer and leader in the technological development of the Spanish railways, being one of the main suppliers of safety

and telecommunication systems for the Spanish Railways Administrations and present in countries as Turkey, Mexico, Algeria, Malaysia, Egypt and Morocco.

Its activity goes from the development, manufacturing installation, commissioning to the maintenance of equipments and systems for railway signalling, train control, Telecommunication, Supervision ticketing and critical infrastructures security.



### TYPESA

- C/ Gomera, 9  
28703 San Sebastián  
de los Reyes  
(MADRID)
- P: +34 91 722 73 00
- F: +34 91 651 75 88
- [madrid@typsa.es](mailto:madrid@typsa.es)
- [www.typsa.com](http://www.typsa.com)

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



### VALDEPINTO, S.L.

- Calle Águilas, 9 - Nave 11

### 28320 Valdepinto (MADRID)

- P: +34 91 691 42 68
- F: +34 91 691 57 03
- [lauraparra@valdepinto.net](mailto:lauraparra@valdepinto.net)
- [www.valdepinto.com](http://www.valdepinto.com)

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

We have four main product lines:

- All types of machining (specialists in electrical insulation).
  - Screen printing, Signs and Engraving low-relief.
  - Metal transformation and welding.
  - Design and fabrication of transformers and coils of high/low voltage.
- Our philosophy is to always offer all our clients an unbeatable value for Money, combined with an excellent service.



### VOSSLOH ESPAÑA, S.A.

- Pol. Ind. del Mediterráneo  
C/ Mitxera, 6  
46550 Albuixech  
(VALENCIA)
- P: +34 96 141 50 00
- F: +34 96 141 50 02
- [info@ve.vossloh.com](mailto:info@ve.vossloh.com)
- [www.vossloh-rail-vehicles.com](http://www.vossloh-rail-vehicles.com)

The Vossloh España Engineering Center has a commitment to innovation. State-of-the-art technology and optimum quality are the characteristics of the whole range of products developed and produced in the Valencia plant.

As one of Europe's leading rail industry manufacturers, we design and build locomotives as well as passenger trains.

Closely linked with the industrial heritage of railways and with the benefit of more than a century of experience, our goal is to design and manufacture advanced-technology, high-performance locomotives for present and future public transport networks, to create new passenger vehicle concepts and to provide comprehensive maintenance services.



feel the way, not the railway



railway suspension, noise and vibration control products and subsystems [www.metalocauchos.com](http://www.metalocauchos.com)

# oaris

Cutting-edge technology at 350 km/h

- Higher passenger capacity, thanks to distributed traction configuration.
- Designed for cross-border operation.
- Custom interior for enhanced comfort.



SOLUCIONES FERROVIARIAS GLOBALES  
COMPREHENSIVE RAIL SOLUTIONS

ROLLING STOCK  
SIGNALLING  
SERVICES  
EQUIPMENT & COMPONENTS  
TRANSPORT SYSTEMS

[www.caf.net](http://www.caf.net)