

SIGNATURES

ACTIVITY REPORT 2018



SYSTRA



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At SYSTRA,

working on the route of a line

opens the way for thousands of passengers,

delivering a highly technical bridge

makes a region shine,

designing the automatic metro network for a city

means orchestrating collaboration between
all a project's key players,

installing the very latest railway signalling

contributes to safer transport,

including eco-design at the heart of our projects,

gives rise to more sustainable mobility.



All these technical and technological feats are performed
by women and men who share the same values:
an ongoing insistence on excellence, the benefits of working
in connected teams, and uniqueness through bold leadership.

From our expertise centres all over the world,
they advise, design and build new mobility to make SYSTRA
the Signature Team for transportation solutions.

So that everyone can move forward their own way.

SYSTRA



SYSTRA, THE SIGNATURE TEAM FOR TOMORROW'S MOBILITY



PIERRE VERZAT
CHIEF EXECUTIVE OFFICER

What did 2018 represent for SYSTRA?

Pierre Verzat: 2018 was first about pursuing strong international growth, which was very successful in terms of order intake, turnover and profitability. But it was also, and above all, a year of defining our strategy for the next three years around our ambition to be a 'Signature Team' for transportation solutions. We identified three levers to achieve this: investing in SYSTRA's men and women, developing our leadership in our market, and improving our robustness and efficiency. In parallel, we also reinforced our resilience in working on the structural topics of safety, ethics and CSR. Specifically, I'm thinking of our investments in eco-design, our digital solutions like BIM in One Click, our efforts regarding our environmental footprint, with the reduction of greenhouse gases by more than 30% for SYSTRA SA, and the awards we have won for our exemplary safety performance. These are differentiating themes for our company.

What does it mean to be a 'Signature Team'?

P. V.: Our clients already have a good impression of SYSTRA. Our experience and references inspire confidence; our capacity for being a bold source of proposals have made us a partner of choice. Clients have the same goal as our teams, to satisfy transport users, and we speak the same language, that of excellence serving the development of mobility. Being a 'Signature Team' isn't about being first everywhere, all the time. It's being there where it matters, on the complex projects with the greatest impact, on the solutions that will shape the future of mobility. It's ensuring that people think of SYSTRA because of its unique way of approaching assignments, its ability to seek out the best expertise and mobilise them to push ever further. It's about making our values and corporate culture, our concern for safety and ethics, and our bold leadership, key elements that clearly position us as an obvious choice.

Does this ambition have an impact in terms of organisation?

P. V.: Getting people to work together is a driving force behind developing SYSTRA and our clients' projects. In 2018, we structured and strengthened our technical network around Bridges & Civil Engineering expertise; this essentially boils down to the creation of a single, transversal and global business line, capable of addressing all our local markets. Our 'Bridge' teams, wherever they are, all know each other, how to work together, and respond to tenders in a unified manner. It is a true strength being able to pull together and integrate our expertise. The model will be extended to other product lines, notably systems. It is a virtuous process that attracts clients, partners and talent.

| BEING A 'SIGNATURE TEAM' ISN'T ABOUT BEING FIRST EVERYWHERE, ALL THE TIME. IT'S BEING THERE WHERE IT MATTERS. |

What drives SYSTRA's commitment?

P. V.: For 60 years we have been accompanying every major transition in mobility. We need to go even further in the development of sustainable transportation solutions and be at the heart of future transformations in mobility. In addition to the energy we devote to our original business lines, we are developing partnerships with contractors; taking part in leading edge projects like the Hyperloop; investing in structuring solutions like BIM; and embracing the digital revolution to develop new tools and new relationships. Generally speaking, the major challenges facing our societies such as urbanisation, demographic growth and protecting the environment are at the heart of our thinking. And we do it thanks to the commitment and passion of the men and women of SYSTRA, to keep delivering better answers for the challenges of today and tomorrow. —



MESSAGE FROM THE SUPERVISORY BOARD



— PIERRE IZARD
VICE CHAIRMAN* OF THE SUPERVISORY BOARD, CHIEF TECHNOLOGY & RAIL SYSTEMS OFFICER, SNCF

— JEAN-YVES LECLERCQ
CHAIRMAN** OF THE SUPERVISORY BOARD, CHIEF FINANCIAL OFFICER, RATP

“2018 was a year of economic turnaround for SYSTRA. The plan presented by the Executive Board bore fruit and we congratulate all employees who put in so much hard work and commitment.

Having confirmed our underlying strength in the essentials, we now need more than ever to prepare for the future, in an international context that is unstable and highly competitive. But these challenges also represent outstanding opportunities. Current transformations in the transport sector are true revolutions. Transport modes are changing, cities are evolving, concerns linked to ecology, all over the world, are today at the centre of public and political debates. The solutions provided by sustainable mobility are essential in thinking about ecological transition. And SYSTRA has a decisive role to play in these industrial and social mutations.

As shareholders, we count on the energy and commitment of the employees, in their daily pursuit of excellence, to continue to build a story of success for SYSTRA, in France and internationally. The human and technical resources of SYSTRA, and the market's evolution allow us to be very confident about the Group's future. We are in the right place at the right time, with the necessary qualities to turn these opportunities into collective successes. Clients expect excellence and bold leadership from us, we won't disappoint them.”

*Chairman until 28/03/2019 **Chairman from 28/03/2019

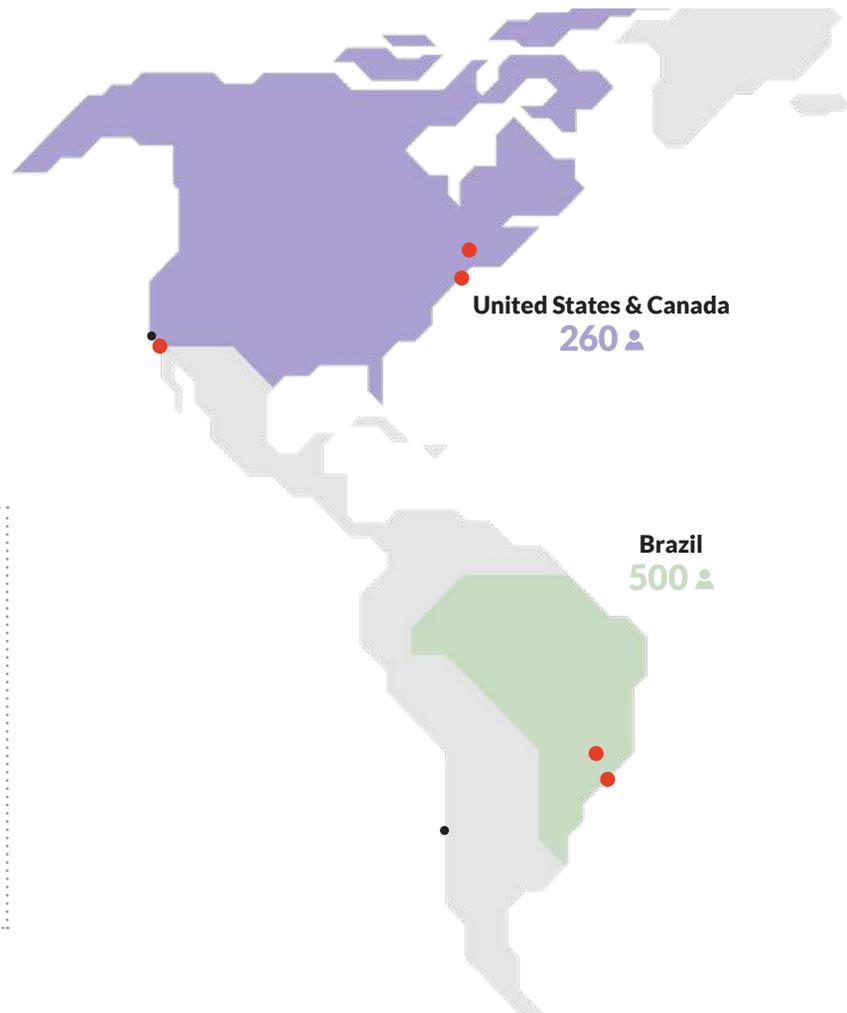
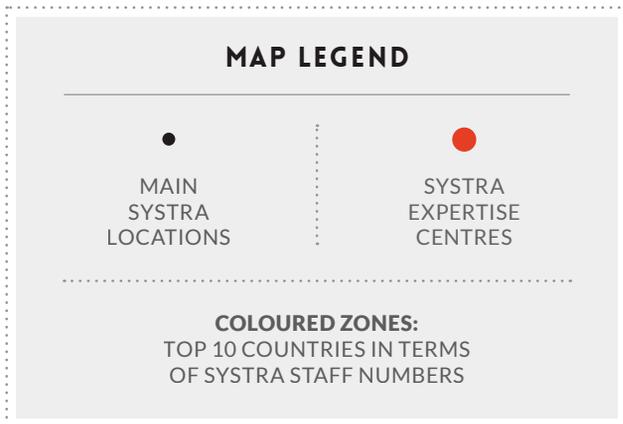


A GLOBAL GROUP WITH FRENCH ROOTS

In 60 years, the expertise of SYSTRA teams has gained the confidence of towns and regional authorities around the world, leveraging sustainability, reliability and safety to meet the challenges raised by mobility: access for all to education, employment and leisure activities, and energy transition.

WORLDWIDE LOCATIONS AND EMPLOYEES

Total:
6,700
EMPLOYEES



The maps shown in this public communications report are meant to reflect SYSTRA's internal operational and economic organization only. There is no intent or willingness to disclose or issue any opinion whatsoever of any kind with respect to geopolitical matters. SYSTRA companies shall in no event be held liable for any interpretation that may be made in respect thereof.

2018 IN NUMBERS

€586m
TURNOVER

OPERATIONAL PRESENCE IN
80 countries

Engineering News-Record (ENR)
2018 rankings*:

#5 IN MASS TRANSIT AND RAIL

#8 IN BRIDGES

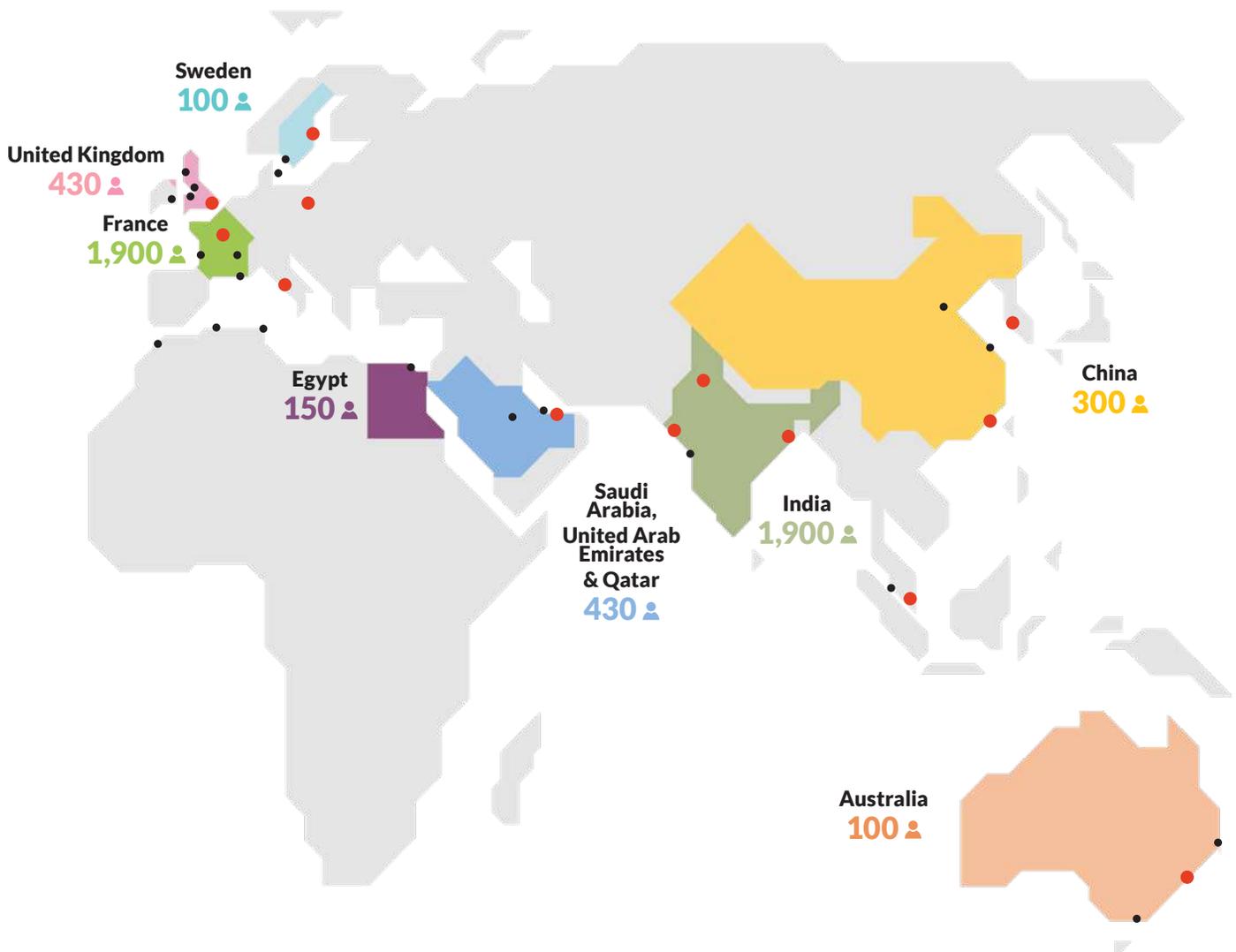
#9 IN TRANSPORTATION

#36 IN INTERNATIONAL DESIGN FIRMS

*Based on 2017 international turnover

2/3
REVENUE FROM
INTERNATIONAL MARKETS

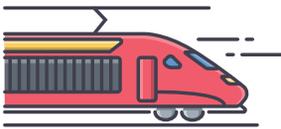
+ 60 years
OF EXPERIENCE
IN TRANSPORT





2018

INAUGURATIONS AND COMMISSIONINGS



RAILWAY LINES

Modernisation of the Avranches-Dol railway line completed
FRANCE 31/03/18

Modernisation of the Cuneo-Ventimiglia railway line completed
FRANCE-ITALY 13/07/18

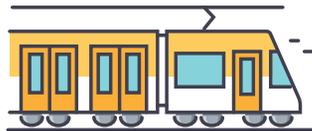
Kenitra-Tanger High-Speed Line (HSL)
MOROCCO 15/11/18

New Bhadan-New Khurja section on the Eastern Dedicated Freight Corridor 1
INDIA 29/11/18

Belfort-Delle railway line
FRANCE 09/12/18

Shenyang-Chengde section of the Beijing-Shenyang HSL
CHINA 29/12/18

First trial run of the Dakar Regional Express Train (TER)
SENEGAL 14/01/19



LIGHT RAIL TRANSIT

Aarhus Letbane (LRT) Lines 1 and 2
DENMARK
21/12/17 and 25/08/18

Ouargla Tram
ALGERIA 20/03/18

Casablanca Tram Line 2
MOROCCO 23/01/19

Bordeaux Tram Line C extension
FRANCE 02/02/19



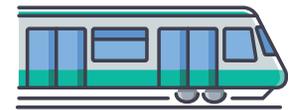
BRIDGES

Signature Bridge in Delhi
INDIA 04/11/18



ROADS

First section of the Delhi-Meerut expressway
INDIA 27/05/18



METROS

Shanghai metro Line 17
CHINA 30/12/17

Xiamen metro Line 1
CHINA 31/12/17

Delhi metro Pink Line
INDIA 14/03/18

Shanghai metro Line 8 - Phase 3
CHINA 31/03/18

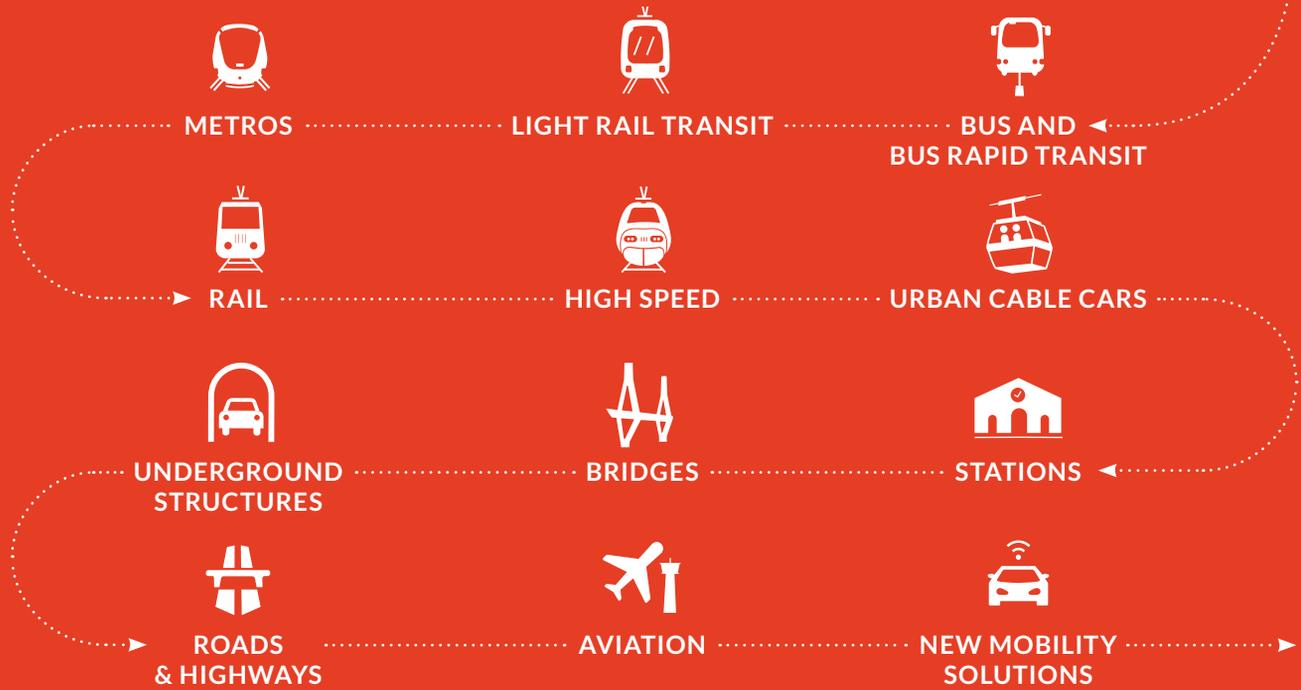
Santiago metro Line 3
CHILE 22/01/19

Noida metro
INDIA 25/01/19

SYSTRA, PRESENT THROUGHOUT
THE **PROJECT LIFECYCLE...**



...FOR ALL
TRANSPORTATION SOLUTIONS





CANADA

IN QUEBEC, PUBLIC TRANSPORT IS DRIVING ENERGY TRANSITION



/01
Quebec's future network structure will comprise a light rail transit line and a bus rapid transit line.

Following ratification by Canada of the Paris Agreement in 2016, initiatives have been emerging throughout Quebec province, turning an energy-hungry sector into the standard bearer for new mobility.

01.
A PROVINCIAL MATTER

In a territory three times the size of France, Quebec is the second most populous region in Canada, home to more than 8.4 million people. In Canada's federal system, it is up to the provinces to determine their own policy in numerous domains, notably the environment. Addressing the issue of greenhouse gas emissions, the Quebec government plans to reduce them by 37.5% by 2030. The transport sector, which alone accounts for over 40% of these emissions, is expected to play a particularly proactive role.

In a prime example of 'think global, act local', the burden for change was quickly shifted to Quebec's municipalities which are better placed to deploy concrete policies that reinvent and decarbonise mobility at their scale. It is in this context so conducive to boldness that SYSTRA Canada, the new name of our Canarail subsidiary since July 2018, found itself in the position of solutions provider to the cities of Quebec and Montreal.

02.
RETHINKING JOURNEYS IN QUEBEC

Over 530,000 people cross paths in Quebec's historic streets. The municipality plans to welcome some 50,000 more by 2031. A legacy of the 1950s, mobility in the regional capital is built around individual cars and a bus network that is now insufficient. Road congestion and saturation of the network even threaten the agglomeration's number one appeal: quality of life. RTC, the transport authority, and the Quebec City have issued a major 10-year strategy plan to build a new mobility network.

Having been selected by tender in mid-2018, SYSTRA Canada, with two people based in the Réseau Structurant (Network structuring) project office, is providing expert advice to the RTC. This programme is already the largest construction project in the history of the capital. By 2027, Quebec's mobility offering will include 23km of light rail transit (LRT) line, with two underground sections of 0.7 and 3km, 17km of electric bus rapid transit line, as well as two other intermediary service levels and interchange hubs.



/02
Romain Taillandier,
Urban Transport Manager
at SYSTRA Canada.



**PROJECT
KEY FIGURES**

QUEBEC

23km
of light rail
transit by 2027

A **5-year**
project

MONTREAL

210
electric buses

25
engineers
involved in each
project with
specialisations
in transport
planning,
electrical
engineering
and industrial
engineering in
operations and
maintenance



/03



“Our expertise in LRT made all the difference,” notes Romain Taillandier, Urban Transport Manager at SYSTRA Canada, who notably worked internationally on projects such as the Aarhus Letbane (LRT) construction in Denmark and on the Rio de Janeiro LRT in Brazil. “And our long presence in Canada makes us a local-international player. That’s important because there is a real need for expert advice, education and structuring which adds to the technical challenges of the project.” Ambition is up to the expectations of the city which intends, within 10 years, to become a benchmark for sustainable mobility on the North American continent.

03. ELECTROMOBILITY IN MONTREAL

Two hundred and fifty kilometres further south, mobility in Quebec’s largest city is also undergoing profound change. STM, the operator in charge of public transport, chose SYSTRA Canada in April 2018 to carry out studies for the electrification of its bus fleet. This requires assessing a broad range of issues from electric engineering to transport planning, via the calculation of building structures, development of transport centres, change management, and so on.

To accomplish its assignment, SYSTRA capitalised on its experience in complex systems integration. To meet all the requirements, we also established a long-term partnership with RATP and developed a specific simulation tool: THES (Transport Hub Electric Simulator), which won the second innovation prize at the Quebec Engineers Awards in March 2019.

“We developed the tool quickly to be able to handle complex calculations, to create dynamic operating scenarios, and to simulate the life of the depot on the basis of recharging algorithms and bus journeys,” explains Christophe Farley-Legault, Transport Planning Engineer at SYSTRA Canada behind the solution. “The success of such a project forms part of a broader ambition: to become a leading player in electric bus transport solutions and thus enlarge our offer beyond other urban transport modes, in which SYSTRA has been well established for many years.” adds Samuel Derosiaux, Vice President of SYSTRA Canada.

“Our capacity to adapt our technical heritage from the world of railways to the challenges of decarbonised mobility is a key factor of our success in Canada. We will seek out every opportunity to leverage our expertise in areas that represent innovation today but will be the norm tomorrow,” concludes Romain Taillandier.



/04

CONNECTED TEAMS

CHRISTOPHE FARLEY-LEGAULT

JUNIOR TRANSPORT PLANNING ENGINEER



“The enthusiasm generated by winning the STM project gradually intensified the more we got into the study. The acquisition of new technical skills has encouraged us to enlarge our ambition and to envision new assignments linked to electric buses with other transport authorities in Canada. Being at the start of my engineering career, I count myself lucky to be part of this emerging expertise and to be growing my skills in such an innovative context as smart mobility.”



/03 Montreal’s electric buses will be recharged slowly at the depot, a system which is progressively replacing the quick recharge at the terminus.

/04 Electric mobility is a key element for the sustainable development of cities.

HIGHLIGHTS

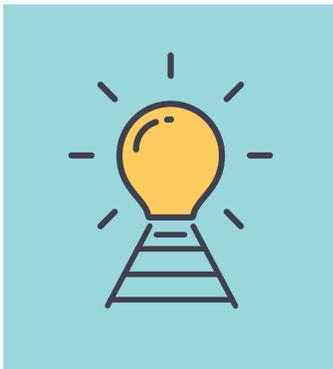
EVENTS, MILESTONES AND MAJOR PROJECTS IN 2018

PERFORMANCES

FRANCE

IDEAS

BY THE KILOMETRE



Bordeaux Métropole authority has appointed SYSTRA to produce a benchmark study on the issue of 'the last mile' in its territory. French and international proposals were put forward to make this final link a strong element of the transportation chain and to ensure fluid multimodal mobility for everyone in the metropolis.



GROUP

APPS TO OPTIMISE MOBILITY

SYSTRA teams are developing tailored digital apps to aid decision-making and provide mobility modelling for public authorities and transport operators. ITSIM is a scenario tool for the reorganisation of urban transport. PARAMICS simulates road traffic flows.

QUETZAL allows modelling of multimodal demand within a territory, and LINEDRAFT assesses traveller traffic and investment costs of a new main line at a strategic level. These tools are also used by the teams on our consulting and engineering assignments.

UNITED STATES

SHAPING AUSTIN'S FUTURE

SYSTRA is a key member of the team selected by Capital Metropolitan Transportation Authority (CapMetro) in Austin, Texas, to advance its comprehensive Project Connect programme. As part of the Program Manager Owner Representative team led by HDR, Inc., SYSTRA is leading the transit technology evaluation component of the programme and will lead systems integration and systems testing and commissioning in later phases of the project. **SYSTRA will be responsible for the technological studies and must determine the best scenarios for future electric bus, light rail, autonomous vehicle and train corridors.**



TUNISIA

SMART MOBILITY 4D

THE INTERACTIVE BENCHMARK

In the context of a strategic and operational survey to develop intelligent systems for sustainable mobility in Tunisia, SYSTRA has created an open and interactive web platform, Smart Mobility 4D, on behalf of the French Development Agency (AFD). Designed to enable those involved with Tunisia's digital and mobility ecosystems to share solutions, projects and current or up-coming initiatives, this platform feeds an ongoing benchmark that is accessible to all, to encourage exchanges on the subject.





HIGHLIGHTS

EVENTS, MILESTONES AND MAJOR PROJECTS IN 2018

PERFORMANCES



SINGAPORE

AUTONOMOUS VEHICLE SAFETY UNDER

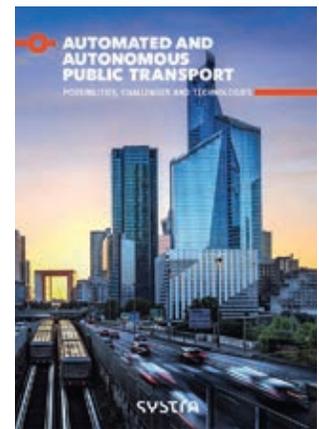
SCRUTINY

SYSTRA is a partner of the ASV (Automated driving Simulation & Validation) project alongside the Institute of Technological Research SystemX and Singapore's Nanyang Technological University.

While alternating digital simulations with real world trials, the project is developing testing protocols and is seeking to establish international standards for checking the safe functioning of autonomous driving systems to safeguard their deployment on a large scale.

GROUP

THINKING AHEAD TO THE FUTURE OF PUBLIC TRANSPORT



With the development of autonomous cars, a new era of personal mobility is emerging. But what about public transport?

Can these developments be transposed? Will the autonomous shift revolutionise our vision of the tram, subway or train? These questions are all addressed by SYSTRA experts in the 2018 white paper, 'Automated and autonomous public transport: possibilities, challenges and technologies.'



FRANCE

IS THE AUTONOMOUS TRAIN COMING SOON?

Hoping to run its first autonomous train prototypes by 2024, SNCF has appointed SYSTRA as Project Management Officer and leader in developing safety procedures for the Autonomous Train Passenger Service project. This project is driven by SNCF, in partnership with Bombardier, Thales, Bosch, Spirops and the Railenium Test & Research Centre.

GROUP

INNOVATION AND INTEROPERABILITY: TOMORROW'S RAILWAY CHALLENGE

The European Railway Agency (ERA) granted SYSTRA the lead in the assistance framework agreement for European Rail Traffic Management System (ERTMS) ground studies. Tomorrow's innovation and interoperability challenge will consist of promoting them both. By introducing radical technological changes in our conventional and high-speed line signalling solutions, initiatives such as the Shift2Rail programme are contributing to shaping a new way of considering mobility to the benefit of the end user. For the assignment it has received, SYSTRA is a key player in offering solutions for the global cost to be reduced, the schedule to be optimised, and the passenger experience to be improved.



FRANCE

INNOVATIVE GUIDED AIR TRANSPORT

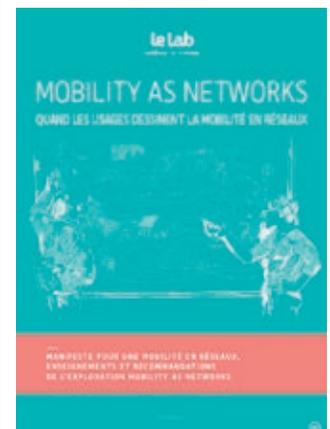
SYSTRA is undertaking a study to assess the feasibility of an innovative mode of transport on the west coast of Reunion Island which has road traffic problems. This Personalised Aerial Transport would notably enable freedom from the constraints imposed by land-use and urban isolation, whether natural or artificial, and offer an autonomous and automated form of transport.

GROUP

A MANIFESTO FOR NETWORK MOBILITY

SYSTRA took part in a think tank on mobility through networks organised by the OuiShare x Chronos Lab. Alongside the state, the regional and local authorities of Lyon, Rouen, Tours and Montpellier, SNCF, Transdev, Mappy and Michelin, our experts from consulting management contributed to the workshops and working groups resulting in the publication of a common manifesto.

Read it here: www.mobilityasnetworks.eu



GROUP

AIRBUS AND FLYING VEHICLES

SYSTRA is accompanying Airbus in the development of its Urban Air Mobility activity by adapting transport system expertise to new Vertical Take-Off and Landing (eVTOL) aircraft. Such vehicles will be around in the very near future and SYSTRA is developing designs for helipads ready to accommodate hybrid helicopters and vertipads for eVTOLs, as well as deployment strategies and potential economic models.

SENEGAL

MOBILE DATA OPENS NEW TERRITORIES FOR TRANSPORT

In partnership with Orange and on behalf of the French Development Agency, SYSTRA took part in a pilot study in Dakar to determine the opportunities presented by mobile data for transport in territories where the low density of networks prevents proper analysis of the demand for mobility. SYSTRA focused on analysis of mobile traces: it involves checking spatial and temporal coherence of the data, then comparing it with the existing base to determine conditions of usage.



FRANCE

THE GRAND PARIS EXPRESS METRO DESIGNS THE 21ST CENTURY METROPOLIS

/01
At the height of the project, as many as 21 tunnel boring machines will be working simultaneously to dig the Grand Paris Express.



/02
On Line 15 south, SYSTRA is the Infrastructure Project manager for the T2 package between Villejuif and Noisy - Champs.

By 2030, in Greater Paris, 68 stations will have risen from the ground, linked by 200km of new lines of a cutting-edge automatic metro. The Grand Paris initiative is more than a mere transport project, it's the networking of a territory looking to the future.

01. THE METRO OF A NEW CENTURY

In 2030, 130 years after the first line was built, the Paris metro will reach a new milestone. Four new lines, planned like bypasses from suburb to suburb, are coming to trace the contours of a new metropolitan territory. Outside the city walls, Paris exists on a regional scale: it's a map combining cultural, sporting and natural sites, large residential housing, business clusters, and places of learning. The Grand Paris project is about Versailles crossing paths with Roissy on the Plateau de Saclay; or Noisy chatting with Suresnes; and the Louvre taking notes at the MacVal.



PROJECT KEY FIGURES

200km
of new lines

68 stations

60km/h
average speed

Over
2 million
passengers
per day in 2030

Over
250
staff
of whom **25%**
are women

Over
10
professions

Where the 'périphérique' ring road created a divide, the Grand Paris is building bridges and tunnels to make real what many have long suspected: that there is life after the 'périph.' Thirty-five billion euros will be invested in the project's construction, a figure in keeping with its magnitude since its reach goes beyond merely designing new routes and stations, but also extends to all the interconnections with existing networks, considering intermodality, services and employment. 90% of Greater Paris residents will be less than 2km from one of the 68 new stations. The Grand Paris is the springboard for a region that's reinventing itself.

This new metro offers the ideal chance for a metropolis that has just emerged from refreshing its legislation to define what mobility should mean here, the importance it places on the individual, and the opportunities it offers them regardless of where they live or work. It's a project of the future that involves a whole country, a train of thought promising unprecedented impact for a region that already produces 30% of the national wealth and that tomorrow will need the capacity to keep pace with its competitors on the international stage.

To undertake this 'worksite of the century,' the French state created the 'Société du Grand Paris' in 2010 and made it the contracting authority of the new network and all related projects. Accelerated by organisation for the 2024 Summer Olympic Games, the timeline for the metro is even more ambitious as it merges with projects already launched for the extension of Lines 4, 11, 12 and 14, as well as the RER E Line, on which SYSTRA is working.



/03
Tunnel boring started in 2018 and will continue at full speed in 2019.



02. MODELLING COMPLEXITY

SYSTRA has been part of the Grand Paris Express project since 2011 and was involved in the preliminary studies before being granted four strategic assignments: Project management assistance (PMA) for Systems, and Project management assignments for Rolling Stock and Unattended Train Operation on three of the four future Lines (15, 16 and 17); Project management assignments on Infrastructure for one of the first sections of Line 15, between Villejuif-Louis Aragon and Noisy-Champs; and a Project management assignment for the Vitry maintenance site. In parallel, SYSTRA is involved as Infrastructure Project manager on the extensions of Lines 4, 11 and 14 on the north and south sections, which will interconnect with the new network. Finally, in a Project management consortium led by SETEC, SYSTRA participated in all the design of Line 15 west, since delivered to the client.

Beneath the surface of the Paris region, so dense with networks, two tunnel boring machines are already working on the southern part of the future Line 15 that will link Pont de Sèvres, the current Line 9 terminus, to the Noisy-Champs station, which users of the RER A line know well. Serving 22 towns and 16 stations, of which 13 connect with existing lines, it will be the first to become operational. On the Noisy-Villejuif section, SYSTRA is active in the construction of 24km of tunnel, 8 stations and 27 ancillary structures.

“These are very complex operations that are unfolding in an urban setting and include under-river crossings, significant interfaces with urban projects and planned transport projects, as well as lines that are currently operating,” comments Antoine Gaudin, Interface Development Manager of Line 15 at SYSTRA. “The risks are numerous and the huge number of players involved makes coordination essential.”

To model these interactions and make data a tool for design and follow-up, SYSTRA chose to carry out these projects using Building Information Modelling (BIM).

This is a first for the Group on this scale, with the use of BIM enabling the 3D modelling of the entire transport solution on a single platform gathering large volumes of data and information for facilitating cooperation between all stakeholders. Used since 2013 on the Noisy-Villejuif section, BIM has given teams the opportunity to optimise their skills and put in place tailored processes for this outstanding project. SYSTRA's BIM team has capitalised on this first experience as Project manager to structure the approach at Group level and to deploy it across the majority of projects undertaken by SYSTRA around the world.

03. GIVING TOP PRIORITY TO RISK CONTROL

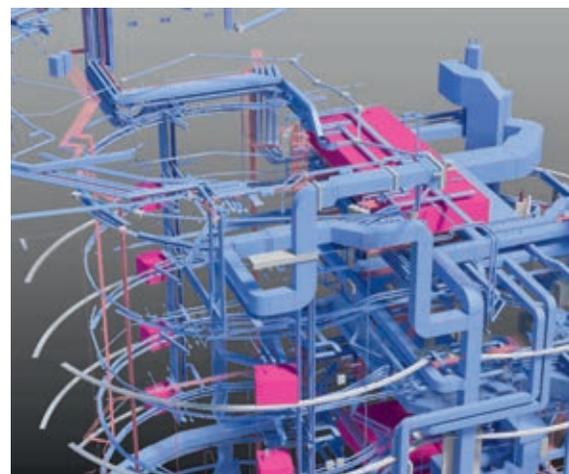
The notion of risk is omnipresent on a project of this calibre. “Each structure is a worksite within the worksite,” explains Élisabeth Demas, Director of Works Line 15 of T2A package at SYSTRA. “We have put in place contractual and technical steering that is innovative, tighter, and more demanding. We often have to master every subject in very complex conditions which pushes us to be extremely rigorous. On this section, we have stations at considerable depth, around 40m on average, including one station built with 73m deep moulded walls and 73m joints for water tightness, a world-beating feat. Two of four stations directly interface with operating SNCF stations: we are sometimes building fifteen metres away from the tracks!”

Risk management is fully embedded in the conduct of SYSTRA assignments, with targeted field supervision, upstream identification of situations, and regular meetings with all parties concerned. “Taking risks into account upstream and from as early as the design stage is not a case of doing less; it's doing more because we are better prepared,” sums up Élisabeth.



/04

/05

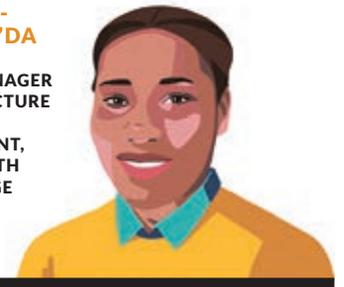




CONNECTED TEAMS

MICHELLE-KARINE N'DA

**WORKS MANAGER
INFRASTRUCTURE
PROJECT
MANAGEMENT,
LINE 15 SOUTH
T2A PACKAGE**



“Being involved in the Grand Paris Express is to take part in a truly iconic and exceptional project. My role is extremely rich, because of the complexity of the stations in terms of interface and geotechnical issues. Working on this project is a unique opportunity to ensure rigorous follow-up of every work phase, in a project setting of wide-ranging dimensions.



/06



/04
Completely automatic, the Grand Paris Express network aims to double the capacity of the Paris metro.

/05
BIM model of the Saint-Maur – Créteil station.

/06
Construction site at Noisy – Champs.



HIGHLIGHTS

EVENTS, MILESTONES AND MAJOR PROJECTS IN 2018

PERFORMANCES

SAUDI ARABIA

FIRST TRAINS FOR THE RIYADH METRO



In April 2018, the first trains for the largest automatic metro in the Middle East began operation, barely five years after the design phase. This gigantic project covering 176km of track, six automatic lines and 85 stations will enable citizens of the Saudi capital to get around without their cars and to free up traffic. SYSTRA was entrusted in August 2013 with the construction supervision of three of the six lines, in a consortium with Parsons and Egis Rail.



UNITED STATES

THREE PROJECTS ON THE NEW YORK CITY SUBWAY

SYSTRA is carrying out three modernisation assignments on the New York City Subway on behalf of New York City Transit. On the 8th Avenue Line, our teams are providing consultancy services for design, procurement and future construction support for CBTC and AWS signalling systems. In the Bronx and Brooklyn, SYSTRA is leading a consortium

in charge of upgrading Bedford Park Boulevard and Greenpoint Avenue stations so that they are compliant with the Americans with Disabilities Act (ADA). The projects include the installation of lifts, stairs and handrails, the improvement of platform edges, communication systems and the implementation of appropriate signalling.

INDONESIA

THE U-SHAPED VIADUCT OF THE GREATER JAKARTA LRT TAKES SHAPE

Thanks to its technical solution of a U-shaped viaduct, SYSTRA won a contract in 2016 to carry out the routing and detailed design for the elevated structure of the Greater Jakarta LRT. Subsequently, SYSTRA was appointed for studies of the rail systems as well as the track. Consisting of three lines with a total length of 43km in a dense urban setting and an opening scheduled for spring 2021, these contracts represent a significant challenge for SYSTRA. In 2018, the project achieved new milestones with the start of the track and rail equipment installation.



FRANCE

3 TIMES LUCKY!

SYSTRA and Arcadis have won the Project Management Assistance (PMA) for systems on the third metro line of the Greater Toulouse metro. This new line of around 27km will transport more than 200,000 people per day serving 21 stations in total. It will interconnect with the two other metro lines, two tram lines, and numerous bus routes, and will improve the link between the airport and the main railway station. SYSTRA has worked on the Toulouse metro since 1985, completing the preliminary draft proposal for the very first line.



AUSTRALIA
IN SYDNEY, AUSTRALIA'S 1ST AUTOMATIC METRO UNVEILED TO ITS PASSENGERS

The Sydney metro is the largest transport project the continent has ever seen. Responsible for the Independent Certification (IC) in a consortium with GHD, SYSTRA has been working since 2014 on the Northwest line. On 14 January 2019, the first driverless train completed a successful trial run along this initial stretch. The first passengers are

expected on part of the line in May 2019, and the whole line should be completely operational by year's end. On the City & Southwest line, SYSTRA won a new contract at the end of 2018 in a consortium with AECOM for an IC assignment, responsible for certification of three lots of brownfield works. Commissioning is planned for 2024.

PERSPECTIVES

FRANCE

28

TRAINS AN HOUR IN EACH DIRECTION



Succeeding in almost doubling the line's capacity, currently at 16 trains per hour, to 28 trains per hour: that's the improvement promised by NExTEO, the operating system for the future section of the Greater Paris RER E line between Rosa Parks and Nanterre-la-Folie. Since 2011, SYSTRA has played a leading role in defining the specifications of the NExTEO system and supported the client in its implementation through to deployment of this new system which will enable Automatic Train Operation, Automatic Train Supervision, and better management of disruptions once it is commissioned in 2023.

INNOVATIONS



COLOMBIA

BIM
AWARD FOR SYSTRA ON THE BOGOTÁ METRO

SYSTRA was among the winners on 17 September at the prize-giving ceremony for the 2018 'BIM d'Or' awards (BIM Gold), organised by trade publications *Le Moniteur* and *les Cahiers Techniques du Bâtiment*. This competition rewards projects executed with digital models, for their exceptional, exemplary or innovative characteristics. Our teams earned a 'BIM d'Argent' (BIM Silver) in the 'International Infrastructure Project' category, in recognition of technical structuring and studies for the first section of the Bogotá metro.



INDIA

FREIGHT
TRANSPORTS INDIA
INTO THE FUTURE

/01
The Eastern Freight Corridor should contribute to India's economic growth.

To support the rapid growth in its economy and energy needs, India has decided to build a massive infrastructure of rail corridors devoted to freight. Once complete, the project should allow the country to reduce CO₂ emissions by 450 million tonnes over 30 years.

01. THE TRAIN, AN INDIAN LEGEND

India is undergoing a demographic as well as an economic boom, with a far younger population than comparable countries and GDP growth rates of around 7% per annum. This growth goes hand in hand with ever greater needs in terms of infrastructure, notably transport and energy, to support both the rise of the tertiary sector and growth in international trade.

Covering 66,000km of railway lines, the Indian rail network is the third largest in the world. Each day it transports 23 million passengers and 3 million tonnes of merchandise. Indian Railways, the state-owned company that runs it, employs 1.3 million people, making it the world's eighth biggest employer.

No other mode of transport contributed so much to a nation's development as did the train in India, yet it has long been a victim of its own success. In the northern half of the country, in the most critical zone within

an area outlined by Delhi, Mumbai, Chennai and Howrah, the rails are used at 150% of capacity and freight represents nearly 60% of traffic. Despite being easily able to withstand speeds of 75km/h on the current network, goods trains, having no dedicated corridor available, are often forced to run at 20km/h to allow passenger trains to run.

02. DIFFERENT ROUTES FOR DIFFERENT NEEDS

Since its inception in 2005, the Dedicated Freight Corridors project has aimed to create a railway system parallel to the one currently in place. Set to be more efficient, safer, better fit for purpose and less energy hungry, it will free up existing lines which will then be reserved for passenger traffic, increase the commercial speed of these lines, and allow the country's capacity for the transport of goods to be multiplied.

Six routes are planned in all, but only two are currently in the advanced stages of finance, execution or delivery: the Western and Eastern Corridors. Totalling more than 3,300km of electrified lines, they serve the north of the country, notably the industrial state of Uttar Pradesh, and link the commercial ports of Mumbai in the west to those of West Bengal, near the border with Bangladesh. Financing, estimated at 12 billion dollars, calls upon government investment and contributions from the World Bank as well as Japanese institutional partners.

Since 2013, SYSTRA has been working on the Eastern Corridor alongside the government body, DFCCIL, via PMC (Project Management Consultancy) mandates on three sections of the project. The Corridor extends for a total of 1,856km in two stretches: one electrified double track of 1,409km between Dankuni in West Bengal and Khurja in Uttar Pradesh; and one electrified single track of 447km between Khurja and Ludhiana in Punjab. The corridor passes through no fewer than six states and will allow future logistical centres to be served, where coal from mines in the east will cross paths with steel and cereals from Rajasthan.



PROJECT KEY FIGURES

1,318km
of lines under
construction,
of which

958km
completed under
PMC by SYSTRA

500
SYSTRA
employees
involved

ON SECTION APL2:
20million
hours without lost
time incident

9,250
trees planted
by February 2019

1st
project in the
history of SYSTRA:

1957
Electrification
of the Indian
Railways network



SYSTRA is working on almost three quarters of the Eastern Corridor's length, as described by Akshay Sharma, SVP-Project Management Railways & Metros for SYSTRA in India: "It's an immense project grouping supervision assignments, civil engineering and systems design, quality control and safety. As well as the railway lines and systems, no fewer than 670 structures have to be designed and executed, including some very significant bridges like the one across the Yamuna, the largest supply river to the Ganges in India and one of the country's seven sacred rivers."

An international team of over 500 staff is working on the construction of these three sections, with particular emphasis on safety. "This project was the opportunity to make attitudes around safety issues evolve," explains Panagiotis Amerikanos, Team Leader for SYSTRA. "It's not top-down logic, it's about working hand in hand with all the project's players to implement a safety culture that's demanding, makes people accountable, and is understood by everybody." SYSTRA was even rewarded by its client, in November 2018, for reaching the threshold of 20 million hours worked without lost time incident.

03. BUILDING FOR TOMORROW

Certainly, the project will help India's overall efforts to fight climate change, but the teams in charge didn't wait for it to be commissioned to make it a driver for sustainable development. A strict principle of ecological balance is applied to all operations: for every tree cut down, two are planted. Specific measures are taken to limit the risk of pollution around rivers and wetlands, which are essential to the ecosystems through which the train line passes. The works also give rise to land rehabilitation operations, making wasteland

useable for agriculture. In this regard, the project won an Environmental Excellence award from the APEX India foundation in February 2019 in recognition of its efforts, and those of its partners, for sustainable management of the project.

A new chapter is being written in the history of India's railways with the Dedicated Freight Corridors. But it notably sets the tone for the way India wants its domestic growth to be: a sustainable approach that is measured, profitable for all and environmentally friendly.

OUR CLIENT'S POINT OF VIEW

| THROUGHOUT THE PROJECT, THE SYSTRA TEAMS DEMONSTRATED OPERATIONAL EXCELLENCE, WHETHER IN MANAGING TECHNICAL PROBLEMS OR MORE GENERAL ISSUES, AND ALWAYS WITH A FLAWLESS ETHICAL APPROACH. |

SUSHIL KUMAR MAURYA
CHIEF GENERAL MANAGER (WEST),
DEDICATED FREIGHT CORRIDOR
CORPORATION OF INDIA LTD.



/02

/03





CONNECTED TEAMS

SUDHANSHU SINGH PATEL

FIELD TRAINING ENGINEER



“This project definitely convinced me that quality work benefits all parties involved. It helps to save time and builds a relationship of trust with the client. Teamwork is good for everyone, and for the project itself. The SYSTRA approach to ethics, quality, technical and management knowledge has certainly lifted my professional level and made me a better engineer.



/04



/02
The line's infrastructure is initially designed to support an axle load of up to 32 tonnes and a train length of 750 metres.

/03
Works train for Eastern Freight Corridor in Allahabad.

/04
SYSTRA India teams, based in Faridabad (Delhi).



HIGHLIGHTS

EVENTS, MILESTONES AND MAJOR PROJECTS IN 2018

PERFORMANCES



Belfort-Delle line

FRANCE

THE RAIL NETWORK GETS A FACELIFT

In a context where priority is given to maintaining the existing network, SYSTRA is involved in several modernisation assignments. In 2018, lines that were notably put back into service included Avranches-Dol, the Cuneo-Ventimiglia 'Train of Wonders' and Belfort-Delle, thus improving daily services. New modernisation contracts were also signed for the Gisors-Serqueux and Beauvais-Le Tréport-Mers-les-Bains lines, and the rail yard at Saint-Jean-de-Maurienne. 2018 also marked the beginning of works to create an extra track at the station of Lyon Part-Dieu, a complex project undertaken while trains are running. In parallel, works are continuing on the Nantes regional network.

SENEGAL

DAKAR'S REGIONAL EXPRESS TRAIN TEST A SUCCESS



CANADA

VIA RAIL AND SYSTRA PREPARE THE FUTURE



Since 2016, SYSTRA Canada has been supporting Via Rail, the country's leading rail operator, on different consulting assignments aimed at preparing the implementation of a programme of high frequency lines. In 2018, SYSTRA brought its expertise to the operator in the choice of future rolling stock, a project that is continuing in 2019 and that will enable our teams to supervise the orders, tests and delivery of the chosen vehicles. In parallel, SYSTRA Canada is assisting the company RailGD in the repair and refurbishment of four premier dining cars for Via Rail.



EGYPT

THE CAIRO-ALEXANDRIA MAKEOVER

As a partner of Egyptian National Railways since 2010, SYSTRA has entered a new stage in its collaboration with the modernisation of the 208km line connecting Cairo and Alexandria, the busiest in the country.

Since 2018, the teams have been providing Project Management Consultancy on worksite operations that are carried out while trains are running, and include modernisation of signalling, telecommunications, electrical supply and buildings for computer management of signalling.

The assignment will last until 2020.

On 14 January 2019, a technical trial took place in the Senegalese capital to inaugurate the new regional train line in the presence of the President of the Republic of Senegal Mr Macky Sall.

On this occasion, he congratulated the Group and declared that "without the exceptional assistance of SYSTRA, we would not be here today." In less than two years, the SYSTRA teams managed to deliver on the President's promise to test run the first train at 60km/h by the beginning of 2019. Our role as Project management assistant covers the entire implementation phase. We are also performing an assignment for supervision of environmental aspects, and monitoring the health and safety coordination.

SWEDEN

SWEDISH TRAINS ARE MOVING TO EUROPEAN STANDARDS



In January 2018, SYSTRA signed a contract with Trafikverket, Sweden's transport administration, for the preliminary design of the implementation of ERTMS along parts of both the Västra Stambanan line and the Södra Stambanan line. We will work on the section between Södertälje and Mjölby. It is the second ERTMS project on the Södra Stambanan line in which SYSTRA has participated.



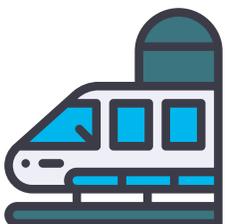
CHILE

SYSTRA'S AUGMENTED ASSET MANAGEMENT APPEALS TO LATIN AMERICA

SYSTRA has won a new Asset Management contract with Gerencia de Ingeniería, the engineering subsidiary of Chile's national railway company EFE (Empresa de los Ferrocarriles del Estado).

This project involves an assessment of the entire network, around 2,000km in length. To accomplish this, SYSTRA is using the Hyper Assist service platform which we have developed over several months. This solution, built into the Group's digital offering, was designed to help our clients better exploit the data from their assets, in order to make more enlightened decisions for managing their railway asset portfolios.

INNOVATIONS



SYSTRA CO-WRITES A NEW PAGE IN THE CHANNEL TUNNEL STORY

To facilitate access to the tunnel and increase the number of passenger and freight trains, Eurotunnel has started a huge railway operation modernisation project and is looking for the best solution for switching its current signalling system to ERTMS standards. For this particularly sensitive operation, Eurotunnel has once again placed its trust in SYSTRA. We are in charge of the project management for handling service providers, allowing the next phase of the programme to be established and the execution phase to be started.



MOROCCO

FIRST HIGH-SPEED LINE FOR THE AFRICAN CONTINENT



/01
The Tangier-Casablanca line is the fastest railway line in Africa.

Inaugurated in November 2018, the continent's very first High-speed Line (HSL) marks the launch of a new high-speed network linking the Kingdom's key locations. Achieved within unprecedented budgetary constraints, it offers Moroccans quality transport with European standards.

01.
A STATE PARTNERSHIP

An initiative keenly desired by King Mohammed VI, this HSL project arose from an intergovernmental agreement signed in 2007 between Morocco and France. Under the partnership terms, an investment of 2.1 billion euros was mobilised to create this new mobility route which fits within a broader programme of renovation of the existing network. The project connects the two countries at the highest level in a venture of over 10 years that will change the face of Morocco as well as the everyday life of its inhabitants.

The ambition is huge: to link Tangier to Casablanca via Rabat with a commercial speed of 320km/h and thereby drastically reduce the current travel time. The inaugurated high-speed section stretches 183km between Tangier and Kenitra.

Working from the start alongside the public authority, the national railway company ONCF, SYSTRA has been involved since the HSL's master plan studies in 2005. This was followed by the preliminary outline project for the Tangier-Kenitra leg between

2008 and 2010, then the civil engineering project management of the 110km south section between Larache and Kenitra, a Project Management Assistance (PMA) contract for the conduct of operations related to railway and electromechanical equipment, and specific expertise assignments covering all infrastructure characteristics. SYSTRA has also worked with the entity in charge of the power supply for the line's traction system.

02.
ADAPTING PROVEN SOLUTIONS

In addition to the cost constraints, the Franco-Moroccan teams had to deal with a complex environment to deliver a quality project, with the highest standards of safety and sustainability. "Starting from the land acquisitions, we met challenges," explains Alain Hocke, Director of project management for design and construction works of the south section. "The extreme fragmentation of plots and the multitude of landowners put a considerable burden on the timeline. But mobilisation of the country's and the ONCF's best resources enabled successful achievement of the project at a cost unthinkable in Europe."



/02
Two high-speed 'Al Boraq' trains at the station of Tangier-Ville.



PROJECT KEY FIGURES

183km
of new high-speed line

2hrs 10min
to travel from Tangier to Casablanca, instead of 4 hrs 45 min previously

320km/h
commercial running speed, the continent's record

13 viaducts

4 stations

€2.1bn
investment

50
SYSTRA staff involved in the project for the MEP contract and 30 for PMA



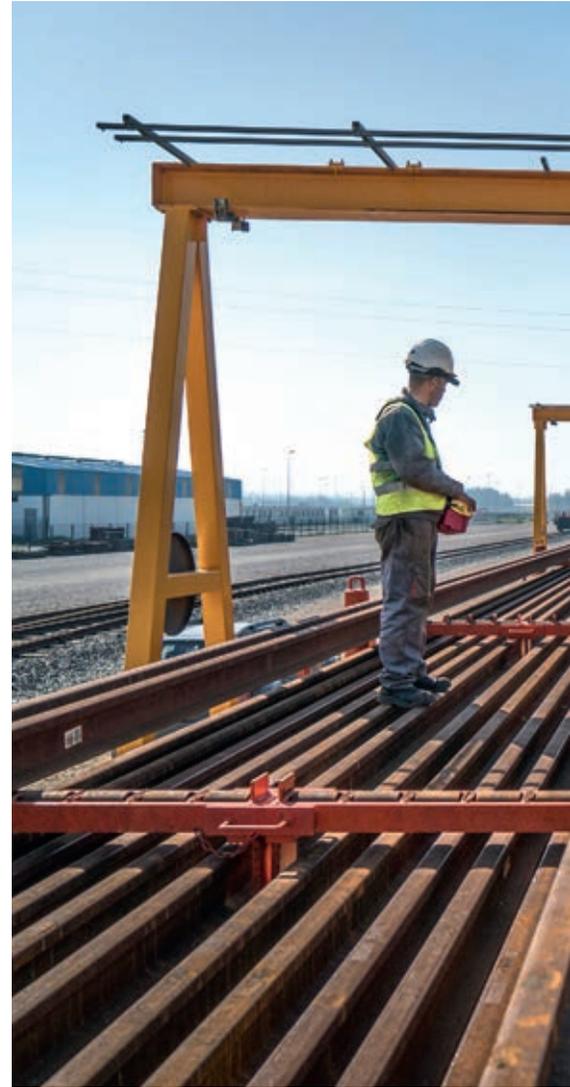
“Hugging the Atlantic coast, the territories crossed present very particular conditions, and the zone is known for its considerable seismic risks,” explains Danièle Tournebœuf, MEP (specific expert assignments) Project Director for the contract at SYSTRA. Construction of the line in fact required installation of a major infrastructure every 700 metres, design and implementation of specific paraseismic devices on large structures, as well as deck support blocking keys to mitigate the risks of rollover due to the combined effects of wind and earthquakes. It’s a climatic context that impacts significantly every component of the project, as outlined by Christophe Debazac, Technical Director of railway equipment: “We had to plan for a lot more crosswind detectors than usual, of which we studied the sizing with Moroccan universities, as well as 18 seismic detectors.”

Where techniques used had already been proven on high-speed lines in Europe, we adapted known solutions to respond to project specifics. “For example, we carried out the integration of the ERTMS Level 2 trackside and on-board equipment delivered by different manufacturers. We also supervised the integration and commissioning of Rabat’s Operation Control Centre, in charge of managing all traffic on the high-speed line,” notes Christophe Debazac. Other choices have even inspired emulation on the other side of the Mediterranean: “On the initiative of the ONCF, we replaced the classic underlay with an asphalt road base to ensure stability of the works, a technique that we have since repeated on the SEA and East Phase 2 high-speed lines in France,” adds Danièle Tournebœuf.

03. LEARNING TOGETHER

From its earliest stages, the project was conceived as a collaboration between teams from both countries with a view to transmitting know-how from French engineers to their Moroccan counterparts. A project unprecedented by its very objective, to create the first high-speed line, the Morocco HSL venture is above all the result of a professional exchange where two cultures have learnt to capitalise on what each does best to progress together. “Since it was about achieving European quality standards, we came not only with our expertise but also our methods and our perceptions, notably concerning safety,” relates Christophe Debazac. “We trained our Moroccan colleagues in Health & Safety procedures and their knowledge of the territory was invaluable for adapting our standards to the Moroccan context. We needed, for example, to call upon the Royal Gendarmerie to secure the sites and prevent inhabitants from crossing the tracks during construction, or when catenary lines were live, or in the case of speed increases. This type of equipment was previously unknown to them, it’s a major change in their everyday life which required support. For the SYSTRA teams, it’s been an experience full of encounters which has given many a taste for continuing their careers on other projects abroad.”

For SYSTRA and all the project’s players, apart from having delivered a project that meets expectations, the challenge to have Moroccans adopt it has also been met, judging by the significantly full trains from the first weeks of service. It’s also a very strong signal that the company has sent to the whole continent, proof of its ability to accomplish highly technical projects while adapting models to its culture.



/03

/04





CONNECTED TEAMS

NICOLAS DENDIEVEL

WORKS ENGINEER FOR CIVIL ENGINEERING PROJECT MANAGEMENT, SOUTH SECTION



“This project turned out to be a real race against the clock. Although our goal could sometimes feel distant, it was thanks to the determination we shared with our Moroccan partners that we managed, through sustained efforts and by remaining true to our values, to accomplish our task: to deliver an HSL in Morocco to European standards.



/05



/03 Construction of the African continent's first high-speed line took seven years.

/04 Some of the team members mobilised by SYSTRA.

/05 The line is similar to French and European high-speed infrastructure in terms of reliability, maintainability and safety.



HIGHLIGHTS

EVENTS, MILESTONES AND MAJOR PROJECTS IN 2018

PERFORMANCES



UNITED KINGDOM BIM ACCELERATES THE BRITISH HIGH-SPEED TRAIN

SYSTRA is using its BIM (Building Information Modelling) expertise at the service of two projects in the United Kingdom (UK). On HS1 (High Speed 1), an existing high-speed line linking the Channel Tunnel to London, SYSTRA is working on the development of digital design and BIM standards for the client HS1 Ltd. The Group's stage 2 BIM expertise, acquired notably on projects such as HS2 (High Speed 2), Crossrail in London or EOLE in France, was a contributing factor in the award of this contract. On the other side of the British capital, SYSTRA is developing infrastructure designs for the N1 and N2 packages of the HS2 phase 1 project, which will link London to Birmingham. These studies

are being carried out for a joint venture in charge of building these sections. Moreover, SYSTRA is a subcontractor for SNCF Réseau in charge of developing a TSI (Technical Specifications for Interoperability) compliant overhead catenary system capable of supporting a speed of 360km/h for the HS2 project. SYSTRA is deploying its engineering, modelling and BIM expertise. To optimise the design process, SYSTRA introduced dynamic, parametric 3D modelling tools and implemented the use of project Common Data Environments to ensure project collaboration and compliant delivery of technical production from the numerous parties involved in the project.

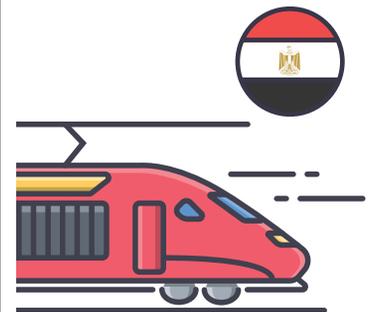


ITALY NAPLES-BARI AT HIGH SPEED

Italian subsidiary SYSTRA SOTECNI, in a joint venture with geotechnical engineering firm Rocksoil, was awarded a Design & Build contract for the Naples-Cancello section of the new Naples-Bari high-speed line, one of the largest railway investment programmes ever implemented in Italy. From the centre of Naples to its outskirts, this double-track section will be 15.6km long. It includes 2.8km of cut and cover tunnel and four viaducts.

EGYPT

THE COUNTRY'S NEW HSL TAKES SHAPE



SYSTRA has won a new contract for consulting services on the new Egyptian HSL that will link the town of El Ain El-Sokhna on the Red Sea coast to the new town of El Alamein on the Mediterranean; 534km of high-speed line for travel at 250km/h. SYSTRA will prepare tender documents and provide assistance during the contract award procedure, through to assignments for design engineering, finance, management of procurement and construction, as well as operation and maintenance contracts.



SWEDEN

HIGH-SPEED PROJECT STUDIES MAKING PROGRESS

Ostlänken (East Link) is an integral part of the future high-speed network project that will connect Stockholm, Gothenburg and Malmö. SYSTRA is carrying out in a consortium the technical studies for the longest section of this very first HSL. In 2018, these studies enabled the land acquisition requirements to be defined. For 2019, the studies will be intensified in order to integrate new requirements related to the reduction of construction costs and to developing a technical solution for environmental preservation along the entire route.

OUTLOOK

FRANCE

THE SOUTH EUROPE ATLANTIC HSL, ONE YEAR LATER



99.1%

of trains ran in 2018 without any delay due to a technical incident



6,322,761km

of passenger journeys in 2018



Over 300km

of track calculated to the nearest millimetre to ensure passenger comfort



190

employees mobilised at the line maintainer MESEA (a VINCI – SYSTRA subsidiary)

AFTER THE SUCCESS OF DESIGN/CONSTRUCTION, OUR OFFER NOW INCLUDES OPERATION/ MAINTENANCE ENGINEERING

INNOVATIONS



THE FUTURE

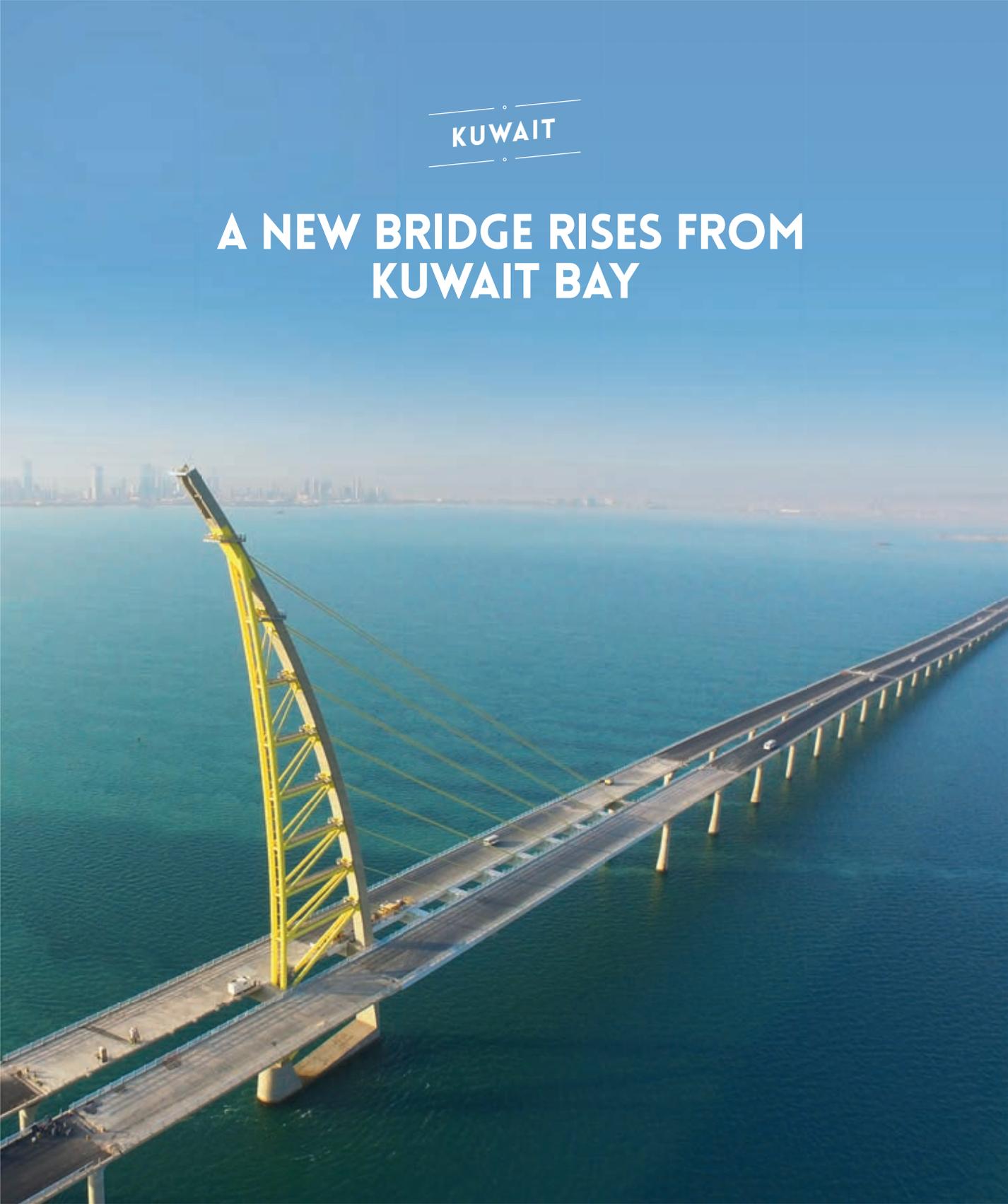
OF RAIL TRAFFIC MANAGEMENT TAKES SHAPE AT SYSTRA

X2Rail-2 is a railway innovation project within the European Shift2Rail programme, the goal of which is to develop the technologies of tomorrow's rail. X2Rail-2 focuses on supervising rail traffic management to integrate future developments in automatic systems. Launched in September 2017, reflection will continue until 2020. On 21 November 2018, a workshop took place at the SYSTRA headquarters in the presence of railway experts, manufacturers such as Thales, Ansaldo, Siemens, Bombardier, Alstom and Indra, and infrastructure managers like Network Rail and Deutsche Bahn.



KUWAIT

A NEW BRIDGE RISES FROM KUWAIT BAY



/01
The Subiyah bridge, one of the world's longest maritime bridges, was inaugurated at the beginning of 2019.

With the Sheikh Jaber Al-Ahmad Al-Sabah Causeway, a maritime bridge that deserves great praise, the Emirate is laying the foundations for a global ambition: to become the central new hub of the Gulf by 2035, a flourishing trade centre linking Asia to Europe.

01.
FROM MIRAGE TO MIRACLE

For centuries, from antiquity to the Middle Ages, the mythical Silk Road trade route positioned the Arab Peninsula at the heart of exchanges between the Asian and European continents. Displaced in the 15th Century by the maritime spice route, it nonetheless lives on in the collective imagination, and in the aspirations of the Gulf's oil monarchies. Few however have done as much as Kuwait to make it a reality again.

At almost 150 metres above the waters of the Persian Gulf, the sun dances at the summit of a metal veil, the highest point of an outsized construction straddling Kuwait Bay like a giant with arms reaching towards the future. That future is Madinat Al-Hareer, the appropriately-named 'Silk City', which is set to rise from the sands at the tip of Subiyah, north of the capital, by 2030. This project is at the core of the nation's plan to transform towards a diversified economy, less dependent on oil.

A historic project, an epic construction: the Subiyah bridge, dubbed Sheikh Jaber Al Ahmad Al Sabah Causeway in tribute to the emir who led the country from 1977 to 2006, connects bustling Kuwait City, at the south of the bay, to its namesake area



**PROJECT
KEY FIGURES**

48.5km

for the maritime crossing of which 36.1km for the main link and 12.4km for the Doha Link

WORLD RECORD:

34.1km

bridge at sea (35.9km with ramps)

2

artificial islands of 30 hectares each

+20

different nationalities in the SYSTRA multi-site team

\$3.6bn

construction cost

5 years

of studies and construction

in the north, in 36.1km of technical feats comprising the Main Link. By adding the 12.4km Doha Link section, connecting the Doha area with the west, the construction is one of the world's longest maritime bridges.

02.
FIVE YEARS TO SEE THE LIGHT OF DAY

Driven by the Public Authority for Roads and Transport (PART), the project was entrusted to a consortium comprised of the South Korean firm Hyundai and Kuwaiti company CGCC in 2010. The tender was won notably thanks to leading edge technical and cost-effective solutions recommended by SYSTRA, which was assigned, via a Design & Build partnership, with the responsibility for all bridge design and associated construction. "By its sheer scale, this unique project is an important reference for SYSTRA," points out Mohamed Akraa, Project Director. "The success of such a project rests on the relationship of trust established over time with the consortium and with our partners every day, notably Artelia Gulf which was in charge of maritime works."

Furthermore, SYSTRA Korea was the Independent Checker Engineer for the Doha Link studies on behalf of the Korean construction company GS E&C, making SYSTRA Group a key player in the project. This Design & Build project is fully in line with SYSTRA's strategy and its ambition to develop its partnerships with contractors and construction companies.



/02
This multi-site project mobilised SYSTRA's Indian teams.



“The accumulation of outstanding aspects and technical challenges to solve in a desert and maritime setting drove us to implement solutions which certainly already existed but had never been used before on such a scale,” observes Cédric Aubazac, Project Coordinator at SYSTRA.

The Kuwaiti climate is indeed far from mild: besides temperatures exceeding 38°C on average from the month of May, the bay regularly experiences winds reaching nearly 130km/h. “The complexity also arises from the multitude of factors to take into account,” adds Élodie Faivre, Deputy Director of the project. “As well as the main span cable-stayed bridge of 177m and 153m pylon, we had to design 36km of bridges and embankments, more than 30 operation and maintenance buildings, two artificial islands of 30 hectares with their marinas, two polders and a panoramic tower for visitors.”

Between 2013 and 2016, 14,650 plans were produced by the 250 SYSTRA employees involved in the project. Among the choices made by the teams, one notably bold option was to recommend monopiles to support the construction which ensured stability in an unfavourable geological context (a seabed of soft clays up to 35 metres thick), while significantly reducing seismic efforts, requirements for natural resources, and the risk of dispersal of concrete in the sea. “By modelling the behaviour of these monopiles via extensive analyses of non-linear calculation and in situ tests, SYSTRA was able to demonstrate the validity of the approach to the client and to suggest a tailored solution to the consortium that had not yet been deployed on such a scale,” explains Cédric Aubazac.

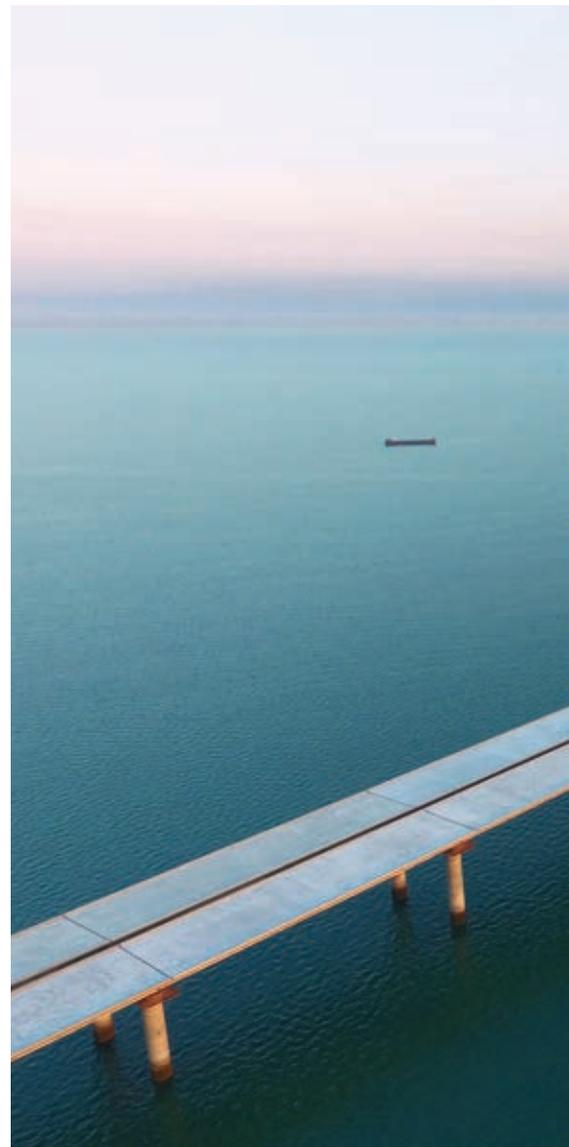
Endowed with a wealth of innovations, the Subiyah bridge gave SYSTRA the opportunity to propose a world first: prefabrication on dry land, in a specially built factory, of entire prestressed spans under pretension in lengths of 40 and 60 metres. A key to the project’s success, this building method enabled the impact on marine ecosystems to be greatly reduced as well as the associated risks of construction at sea. Once constructed, the 1,600 tonne spans were taken by barge then put in place on piers with the help of massive floating cranes or launching beams.

“For construction of the islands, we had to deal with the soft clay structure of Kuwait Bay and devised a process of land consolidation using 30-metre deep vertical drains and progressive pressure applied by the sand embankments to consolidate the clay and limit subsidence after construction,” notes Élodie Faivre. The construction of such an embankment requires very advanced calculation with finite elements taking into account the phasing of works in order to check the embankment’s stability at every phase of construction.

03. CONDUCTING A MULTILINGUAL ORCHESTRA

But perhaps one of the challenges most successfully met by SYSTRA and the consortium was in coordinating multicultural teams spread across the world, with more than twenty nationalities taking part in the project: a contracting authority in Kuwait; assistants to the contracting authority in Kuwait, Beirut, San Francisco and Cairo; a Korean-Kuwaiti consortium; an independent checker engineer in Hong Kong; and design teams in France, India, Dubai and Korea. While this incredible project inaugurates a new stage in the development of an entire country, it is the result of efforts and expertise of engineers without borders.

If its ambition is achieved, the Emirate’s appearance will have radically changed within 15 years, and with it the profile of an entire region. But the traditional sails of Kuwaiti fishermen will be forever immortalised in the silhouette of Subiyah bridge.



/03

/04





**CONNECTED
TEAMS**

**YASHIKA
BALI**

**ARCHITECT,
SENIOR
PROJECT
MANAGER
& DESIGN
MANAGER**



“The Sheikh Jaber Al-Ahmad Al-Sabah Causeway project is the backbone for future urban and economic development in the Subiyah area. As a whole, this project is the coming together of different disciplines such as alignment studies, bridge structure, and architectural or equipment choices, all in a marine setting which makes it extremely interesting. Being in an interface role was a great learning opportunity, and the best way to be involved in very advanced construction methods.



/05



/03
To cross the bay of Subiyah, SYSTRA recommended an unprecedented design to respect the ecosystems.

/04
The bridge will cut travel time between the tip of Subiyah and Kuwait City by up to two thirds.

/05
Part of the SYSTRA design team.



HIGHLIGHTS

EVENTS, MILESTONES AND MAJOR PROJECTS IN 2018

PERFORMANCES

PANAMA

ATLANTIC BRIDGE



The third bridge straddling the Panama Canal is ready to open. The joining operations, consisting of pouring the last element connecting the two parts of the bridge, were carried out in summer 2018 by VINCI Construction Large Projects aided by the SYSTRA IBT teams in charge of designing the cable-stayed bridge. The central span is 530m long, a world record for a concrete span. Begun in 2011, construction of this work of over 3km will link the city of Colón to Costa Abajo de Colón and enable the passage of large container ships in the context of operating a widened canal.



CANADA

ALL HANDS ON DECK FOR THE NEW CHAMPLAIN

Construction of the new Samuel de Champlain Bridge is nearing completion in Montreal.

The very last segment of metal deck was fitted on 9 December 2018 and the teams are waiting for the end of winter to carry out the finishing touches ahead of delivery in June 2019. SYSTRA IBT has been

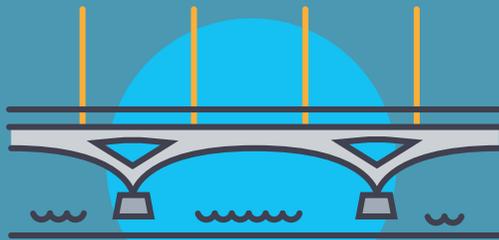
mobilised on this project since 2015 and is in charge of designing the metal decking on the approach spans as well as independent verification of the main span of this 3.4km cable-stayed bridge. Our assignment also extends to supervision and certification of the construction.



GROUP

WITH DISTINCTION

The co-founder of International Bridge Technologies (which became our subsidiary SYSTRA IBT) Daniel Tassin has been recently elected to the National Engineering Academy in the United States. This great honour confirms recognition by his peers for outstanding design and construction of prefabricated and cable-stayed works achieved over a 50-year career rich in firsts and historic projects. He notably worked on the iconic Florida Keys bridges and the Confederation Bridge in Canada's Northumberland Strait.



CANADA

THREE-WAY BRIDGE

The city of Kingston, situated on the banks of Lake Ontario, chose a trio made up of SYSTRA IBT, Kiewit and Hatch to build the third crossing construction of the Cataraqui River that criss-crosses its territory. This bridge will be the first in North America to be achieved using the Integrated Project Delivery (IPD) model, an approach similar to Design & Build but in which all parties share equal responsibility.

KEY FIGURE

**RANKED 8th
FOR BRIDGES BY ENR**



The 2018 edition of the Engineering News-Record (ENR) Global Sourcebook, published in December 2018, ranks SYSTRA in the top 10 for Bridges. This result, which takes into account the acquisition of International Bridge Technologies in 2017, positions SYSTRA as an engineering reference in bridges and heavy construction.

CHILE

LONGEST BRIDGE IN SOUTH AMERICA RISES FROM THE WATER

At the beginning of 2019, the Chilean Ministry of Public Works approved the design produced by SYSTRA for the bridge linking the island of Chiloé to the South American continent by spanning the Chacao canal over more than 2.7km. The suspension bridge of Chacao began its construction phase in a particularly inhospitable setting, subject to tide, wind and seismic risks.





ALGERIA

AT THE GATEWAY TO
THE ALGERIAN SAHARA,
A TRAMWAY DEFIES
THE DESERT



/01
The Ouargla tram entered service on 20 March 2018.

The town of Ouargla, 800km south of Algiers, has inaugurated the Sahara's first tram line. Achieved under extreme climatic conditions, this new mode of transport arrives in time to support the expansion of a town that's growing fast.

01.
268,000 INHABITANTS AND A MILLION PALM TREES

Nobody stumbles upon Ouargla by accident. Surrounded by the red sands of the Northern Sahara, the agglomeration is at the crossroads of millennia-old communication routes, earning it the unofficial title of 'capital of the desert.' This ancient Berber kingdom, whose past is still present in the old town, sits atop a wealth of resources in oil, gas and precious metals which have made the region, despite its desert location, one of the country's economic oases.

The Ouargla agglomeration stretches across 2,887km², which is more than Algiers or Oran, and features an airport and public university, as well as new business zones and residential neighbourhoods. For twenty years, demographic and urban growth have been intensifying the pressure on modes of transport which relied heavily on personal cars and an inadequate bus network.

Air pollution, difficulties in getting around, and ill-adapted services are the common lot for some 268,000 inhabitants, who will soon count 296,000 according to government estimates. In 2009, the Algerian

Ministry of Transport and the Wilaya (province) of Ouargla launched feasibility studies, concluding the need to put in place a new transport network structured around a tram line and a reconsidered bus offering.

"This ambitious project is part of a substantially revitalised urban transport policy," explains Michel Aribi, Director of the project at SYSTRA. "The challenge is to improve access through public transport for a great number of business zones and inhabitants while protecting the town centre from congestion caused by the general flow of traffic. This new network presents an attractive alternative to personal car use while participating in urban renewal and improvement of the quality of life."

OUR CLIENT'S POINT OF VIEW

THE SYSTRA PROJECT MANAGEMENT TEAM DESIGNED A PROJECT ADAPTED TO THE AGGRESSIVE CLIMATE AND THE DIFFICULTIES OF SOUTHERN ALGERIA. BY THE VERY QUALITY OF ITS EXECUTION, THE OUARGLA TRAMWAY IS CONSIDERED A WORLD REFERENCE.

LARBI MOULAY
OUARGLA TRAM PROJECT DIRECTOR, ENTREPRISE METRO D'ALGER COMPANY



PROJECT KEY FIGURES

9.6km
of tram line

16
stations

FORECAST
34 million
passengers per year

43°C
average outside temperature in the month of July

3,500
passengers, peak hour capacity

40
SYSTRA employees involved



CONNECTED TEAMS

SELMA BELMABEDI

INFRASTRUCTURE ENGINEER



“As a young engineer I’m lucky to have had such an early opportunity to put my academic learning into practice, especially on a project that is so important for the development of my town. SYSTRA put their trust in me and continues to support me on a daily basis to help me grow professionally.



02. A TRAM LIKE NO OTHER

Mandated in April 2011 for the design & build project management, the consortium led by SYSTRA had to confront the region’s extreme climatic and geological conditions. Summer temperatures regularly exceed 50°C and this persistent heat is coupled with typical desert sand storms. Underground, the high level of the salty groundwater and numerous gypsum cavities presented very delicate geotechnical conditions. The remoteness of Ouargla in relation to the country’s other big cities also made travelling difficult for the teams.

“We perfected a method for analysing risk linked to gypsum in order to seek out cavities and treat them by filling them,” explains Michel Aribi. “Likewise, every building we designed, including the maintenance centre, has a specific air conditioning system, and the switches and crossings are equipped with a device to evacuate and recover sand. The use of materials impervious to saltwater for the embankments and concrete resistant to sulphates enabled us to solve the challenges posed by the groundwater.” And to withstand the whims of the desert, all external equipment is designed to resist temperatures of 70°C and to meet a protection index against dust of IP65.

Put into service at the beginning of 2018, the first desert tramway serves 16 stations spread over a route of 9.6km linking the Ksar, the historic town centre, to the new town and to residential and central zones. Its design and construction involved around forty SYSTRA employees from the Algiers engineering centre, from the Lyon Tram department, and various expertise services in Paris. And thanks to work by in-house architects, the project blends perfectly into its environment, using tiles, fire bricks and latticework.

The success of the Ouargla Tram project and the challenges met by the teams in extreme conditions writes a new chapter in SYSTRA’s tram adventure in the Maghreb, following in the footsteps of Casablanca, Rabat-Salé, Algiers and before that, Sfax in Tunisia.



/02
The SYSTRA teams gathered together for the tram line service launch.



/03
The tram’s construction presented numerous technical challenges.

HIGHLIGHTS

EVENTS, MILESTONES AND MAJOR PROJECTS IN 2018

PERFORMANCES

FRANCE

GREATER POITIERS REFLECTS ON ITS FUTURE



Mobility and urbanism are at the heart of developing the Poitiers metropolis.

To better link the town centre to the Couronneries district, the city authorities appointed SYSTRA and a team regrouping competencies in cable cars, architecture, urbanism and landscaping, with a feasibility assignment to study the technical solutions possible and their impacts, in line with the urban renewal programme of the district concerned.



FRANCE

TOULOUSE MOVES UP IN THE WORLD

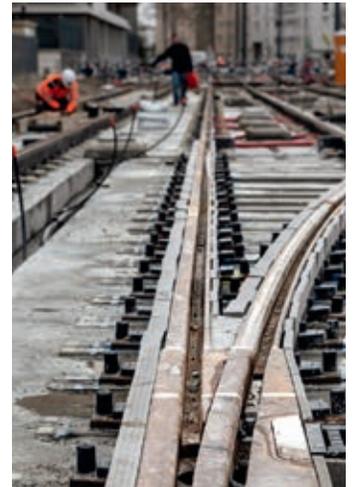
In 2017, SYSTRA won a Design & Build contract in a consortium led by POMA with Bouygues, SETI and SEQUENCES, for the longest urban cable car in France.

Travelling a distance of 3km, it will be able to transport up to 1,500 passengers an hour and in each direction, and will serve

the large medical, scientific and research hubs of the *ville rose* (pink city). The project reached key milestones in 2018 and 2019, notably with progress in public inquiries, construction permits and preliminary submissions which should be completed for construction due to begin in summer 2019.

FRANCE

FINAL STRETCH FOR THE T6 IN LYON



As the main tram project executed by SYSTRAL, the transport authority for the Rhône and Greater Lyon region, the construction of this new tram line bypass across Lyon, Vénissieux and Bron reached several vital stages in 2018. Leading the project management, SYSTRA is responsible for each phase, from the preliminary phases to commissioning. The project is now in its final months with work continuing on several sites, including that of the future terminus, shared with the existing T1 line. A major player in the development of Lyon's tramways, SYSTRA has taken part in the design of almost half the network over the last 15 years.



ITALY

A TRAM TO SUIT EVERYONE

SYSTRA pocketed two contracts in Italy in 2018: the first a Design & Build project in Sardinia for the detailed design of a 2.5km extension to the Cagliari Tram, the second in Bologna for the preliminary design of the town's first line. Called the Red Line, it will total 17km of track from the Borgo Panigale neighbourhood to the CAAB agri-food market and will comprise a catenary-free section of 2km in the city centre.



BRAZIL

THE STATE OF SÃO PAULO IS INVESTING IN ROAD SAFETY



/01
Ensuring fluidity of the São Paulo road network means taking part in reducing Brazil's carbon footprint.

As South America's largest car-manufacturing nation, Brazil has made road safety a national focus. São Paulo, the country's most populous state, has decided to tackle safety improvement throughout its road network.

01.
A NATIONAL PREOCCUPATION

Despite being neither home to the administrative capital nor being an epicentre for tourism, the state of São Paulo accounts for one-third of Brazil's economy and value production. The most populous state out of 26 that make up the Federation, São Paulo holds the national record for kilometres of roadway, over 36,000, and the Latin American record for number of motorways.

"The road is the number one mode of transport in Brazil," explains Flavio Ricardo Andreoli, Contract Coordinator at SYSTRA Brazil. "The rail network is not very developed and the cost of a flight is often prohibitive for most Brazilians. People and goods mainly move around by road."

Major nationwide awareness campaigns have been launched about road risks, notably since 2014 and the Global Road Safety Partnership led by Bloomberg Philanthropies. These factors, in concert with the toughening of traffic regulations and their enforcement, have somewhat helped to reverse the national trend in recent years. But since maintaining and managing road systems is the responsibility of the local state, São Paulo confronted the problem as a whole.



**PROJECT
KEY FIGURES**

**ASSISTANCE
TO MOTORISTS - BAURU**

+ 1,200
interventions
per month of which
3% are road accidents,
41% mechanical
problems and
56% road network
repairs

**WEIGHING HEAVY-GOODS
VEHICLES - SÃO PAULO,
PRESIDENTE PRUDENTE,
BARRETOS**

+ 11,800
vehicles examined
per month
of which 5%
present anomalies

SPECIAL OPERATIONS

+ 200
interventions per month

180
SYSTRA colleagues
involved in all
the contracts

**CONNECTED
TEAMS**

**SANDRO
RUMAO
DOS SANTOS**

**TECHNICAL
ASSISTANT**



"Thanks to this project, I have come to fully appreciate the important stakes involved in road safety. Limiting accidents and keeping traffic flowing will also allow a reduction in pollution, thereby contributing to the challenges of sustainable development. I'm currently in Bauru, heading up a very competent and committed team. I'm very focused on my colleagues and on our motorway users to successfully complete this project simply and efficiently."



02.
ONE PROBLEM, SEVERAL SOLUTIONS

Partnering with DER, the state's road authority, SYSTRA Brazil has, since a first contract in 1983, been intervening at several levels and in numerous locations to improve safety conditions for all users.



In the area of the Bauru municipality, a university town in the centre of the state, SYSTRA Brazil set up a 24/7 roadside assistance service that enables deployment across 650km of roads and in record time, a fleet of seven tow trucks, four service vans and eight light-duty vehicles to help motorists who break down, thus helping keep traffic flowing smoothly.

In three of the fourteen administrative divisions of the state, São Paulo, Presidente Prudente and Barretos, SYSTRA is leading a joint venture with its local partner DIEFRA to operate weighing stations for heavy goods vehicles on the motorways that pass through their territories. “It’s a very important assignment considering the risks to infrastructure in the case of overloading. Every truck that exceeds the authorised weight runs the risk of deteriorating the roadway which puts every user in danger. Overloading also affects the braking and accelerating mechanisms which can lead to safety problems, notably on access ramps,” says Flavio. Eight stations have been set up

across all the zones covered by these three contracts to control not only the weight but also the height and dimensions of every truck. “SYSTRA is also mindful of every opportunity for technological innovation or training of teams to help clients improve safety of all roads we’re involved with,” notes Flavio.

At a state level, the transport authorities also called upon SYSTRA to help them safeguard zones during large-scale special events. A recent major operation was the Brazil stage of the Tour de France bicycle race. It’s one of the 15 races around the world to extend the spirit of the main world cycling event for fans. The Campos do Jordão mountains were chosen as the setting for its fourth edition in September 2018. This popular tourist region in the north of the state already experiences significant levels of traffic under normal conditions. SYSTRA, in consortium with Egis and LBR for this contract, was mobilised by DER to help ensure race site safety for cyclists and spectators, help the motorway police, manage road closures, and reduce the impact on traffic flow near the race.

“The acquisition of VETEC in 2016 strengthened SYSTRA Brazil’s expertise in these fields and allowed us to better position ourselves as a benchmark player in road safety,” comments Flavio. “Although relatively distant from our original core business, SYSTRA has quickly developed new expertise to adapt and respond perfectly to local needs. It’s a vital segment for the development of SYSTRA in the region, considering the importance of road traffic in Brazil and Latin America, and the goals of governments in terms of road safety. For our teams, these are assignments to feel extremely proud of because we’re providing a service that lets people move around more safely.”

/02



/02
Truck weighing operations are essential to ensure safety for all road users.

/03
Some of the SYSTRA team members in São Paulo.

/04
Weighing station in the state of São Paulo.

/03



/04



HIGHLIGHTS

EVENTS, MILESTONES AND MAJOR PROJECTS IN 2018

PERFORMANCES

EGYPT

TWIN-TUBE UNDER THE CANAL



Boring for the two double-lane road tunnels under construction beneath the Suez Canal in Egypt was successfully completed. SYSTRA is at the very heart of making this project happen, having won the project management contract in 2015 for execution and commissioning of the two tunnels. This underground roadway will link two highly populated zones in the Nile River delta and the Sinai Peninsula, and will contribute to the entire region's economic development.



FRANCE

MARSEILLE REBOOT

The Euroméditerranée public development organisation has appointed SYSTRA Foncier for an assignment of assistance to the contracting authority in property services and rehousing. The new zone of 170 hectares, granted for the purpose of being an experimental area of urban development, will mix a tertiary business zone with new public facilities to revitalise the area and encourage inhabitants to return.

FRANCE

PORT OF DUNKIRK UNDER REVIEW

To accommodate the largest ships in the best conditions, the port of Dunkirk is studying the opportunity to create a new container terminal.

This development project entitled CAP 2020 should allow the port to respond to growth in the container sector and to position itself as an alternative to other ports in the Northern Range. In the context of preparing for the public debate, SYSTRA was tasked to determine the project's impact in terms of added value, traffic delays and socioeconomic effects.



SYSTRA has entered a strategic phase of expansion in the market of airport engineering and aviation, to complete its offering of expertise across every mode of transport. To expand its portfolio, SYSTRA is notably getting closer to the Groupe ADP (Paris Airports) with several projects in progress such as the construction work supervision at Orly Airport train station as part of the Grand Paris Express, and assistance to the contracting authority for the CDG Express on which work began in 2018. SYSTRA was also chosen by the technical department of the DGAC (French civil aviation authority) for a framework agreement regarding assignments to develop several air terminals and their surroundings, starting with Nantes-Atlantique Airport.



THE SUPERVISORY BOARD

Made up of executive leaders, experts in the sector and staff representatives, the Supervisory Board assembles several times a year to examine the Group's strategy, performance and commitments.



— **JEAN-YVES LECLERCQ**
Chairman* of SYSTRA's Supervisory Board;
Chief Financial Officer, RATP

— **PASCAL POIROT**
Independent member



— **PIERRE IZARD**
Vice Chairman** of SYSTRA's
Supervisory Board; Chief Technology
& Rail Systems Officer, SNCF

— **ÉVA RUDIN**
Independent member

— **SÉBASTIEN ANDRAUD**
Employee-elected member



— **CATHERINE GUILLOUARD**
Supervisory Board member, Chairwoman
and Chief Executive Officer, RATP

— **FABIENNE FAYARD**
Employee-elected member

— **ÉRIC PRUVOST**
Employee-elected member

— **GWENDOLINE CAZENAVE**
Head of TGV Atlantique,
SNCF Mobilités

— **JOSÉ SIERRA**
Employee-elected member

— **MARIE-CLAUDE DUPUIS**
Senior Vice President Strategy,
Innovation and Development, RATP

— **BRIGITTE VERCHÈRE**
Employee-elected member

— **AGNÈS ROMATET-ESPAGNE**
Head of International Relations,
SNCF Mobilités

— **ALAIN FRYBOURG**
Observer, permanent representative
of Natixis

— **FRANÇOIS DE MONTALIVET**
Permanent representative of
BNP Paribas Participations

— **PHILIPPE DE VULPIAN**
Observer, permanent representative
of Societe Generale



— **RÉGIS MONFRONT**
Permanent representative of
Crédit Agricole CIB

Working session, April 2019.

*Chairman from 28/03/2019 **Chairman until 28/03/2019

THE EXECUTIVE COMMITTEE

The purpose of the SYSTRA Executive Committee is to develop the strategy of the Group and to steer its growth, while ensuring client satisfaction throughout all projects undertaken.



From left to right:

— DIDIER TRAUBE
Senior Vice President, France

— BRUNO SCHMITT
Chief Finance
& Administration Officer,
MEMBER OF THE EXECUTIVE BOARD

— PIERRE VERZAT
Chief Executive Officer,
CHAIRMAN OF THE EXECUTIVE BOARD

— JEAN-CHARLES VOLLERY
Chief International
& Development Officer

— ARNAUD VALRANGES
Senior Vice President,
Development & Strategy

— ANDREW MCNAUGHTON
Chief Operating Officer,
MEMBER OF THE EXECUTIVE BOARD

— PIERRE GOSSET
Chief Technical Officer

— OLIVIER DEZORME
Chief Financial Officer

— STÉPHANE BIRIEN
Chief Human Resources Officer



2018 RESULTS

BALANCE SHEET (at 31 December 2018)

CONSOLIDATED ASSETS (IN € THOUSANDS)	2018	2017
Intangible, tangible assets and goodwill	169,899	171,699
Non-current financial assets and equity method investment	610	1,002
Other non-current assets	30,522	31,952
TOTAL NON-CURRENT ASSETS	201,031	204,652
Other current assets	413,228	424,818
Cash and cash equivalent	57,330	57,983
TOTAL CURRENT ASSETS	470,558	482,801
TOTAL ASSETS	671,590	687,454
CONSOLIDATED EQUITY AND LIABILITIES (IN € THOUSANDS)	2018	2017
Equity attributable to owners	130,663	137,311
Non-controlling interests	2,363	3,165
TOTAL NET EQUITY	133,026	140,476
Long-term provisions	18,330	19,939
Non-current financial liabilities	84,791	86,124
Deferred tax liabilities	4,200	4,774
TOTAL NON-CURRENT LIABILITIES	107,321	110,837
Short-term provisions	7,737	21,443
Current financial liabilities	123,732	90,830
Other current liabilities	299,773	323,868
TOTAL CURRENT LIABILITIES	431,242	436,141
TOTAL EQUITY AND LIABILITIES	671,590	687,454

SYSTRA'S SHAREHOLDER STRUCTURE



42%
RATP

42%
SNCF

15%
Banks

5.4% Crédit Agricole
4.1% BNP Paribas
2.4% Societe Generale
2.1% Natixis
1% FCPE (employee shareholding vehicles)

1%
Employees

FINANCIAL INDICATORS

INCOME STATEMENT (IN € THOUSANDS)	2018	2017
Consolidated revenue	586,200	596,922
TOTAL OPERATING INCOME	586,200	596,922
Operating expenses	-554,596	-565,727
EBITDA	31,604	31,194
Amortisation, depreciation and provisions	-17,027	-23,209
Share of profit (loss) from investments in joint ventures and associates	217	-21
OPERATING PROFIT	14,794	7,964
Net financial income	-237	-28,475
INCOME BEFORE TAX	14,557	-20,510
Income tax expenses	-9,794	-12,199
CONSOLIDATED NET INCOME	4,763	-32,709
NET INCOME – NON-GROUP SHARE	310	-167
NET INCOME – GROUP SHARE	4,453	-32,543

SALES INDICATORS	UNITS	2013	2014	2015	2016	2017	2018
Order intake	€m	487	632	609	542	642	585
Order book as months of revenue	Month	25	23	19	18	18	17

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Design and production: agence Aristophane / La nouvelle

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