

WORLDWIDE PROJECTS

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- SYSTRA's French connection
- XRAIL's Middle Eastern breakthrough
- Digital expertise from Omnicom Balfour Beatty
- Making Europe's busiest station even bigger

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Welcome

Brexit will not be far from a great many *RAIL* readers' minds as we rapidly approach the deadline [in March 2019] for the UK's impending withdrawal from the European Union.

Attracting much of that attention is likely to be the terms of our departure and the shape of any future trading relationship, which have yet to be fully agreed despite lengthy negotiation.

Two and a half years have now passed since the narrow majority vote to leave was recorded in the June 2016 referendum, and this uncertainty provides the backdrop to UK exporters in their efforts to secure continued growth abroad.

Frictionless trade with the EU remains a primary objective of the UK government, but many British companies have nevertheless been forced to re-examine the opportunities available to them for increased exposure in markets further afield.

In this 16-page special we have therefore chosen to focus on four leading players in the UK rail industry that have already achieved significant levels of both EU and non-EU overseas market penetration.

This includes Network Rail's international consultancy, which was established in 2012 to provide an ambassadorial role to UK rail

by demonstrating British expertise abroad.

On pages 44-47, Stefanie Foster finds out how the NR subsidiary has won more than £125 million worth of contracts across 60 international projects in just six years while opening permanent offices in Australia, the USA and the Middle East.

Another company rapidly expanding its footprint in the Middle East is engineering services provider XRAIL which, on pages 52-53, lifts the lid on how its hard-won successes were achieved.

Derby-based Omnicom Balfour Beatty then explains (p50-51) how the company is applying its homegrown expertise in the emerging world of railway data analysis to overhaul the maintenance regimes of infrastructure in both the UK and abroad.

Last but not least, *RAIL* turns its attention to Paris, where SYSTRA continues to play an integral role in the development and expansion of one of the world's busiest but most congested metro systems (p48-49).

Richard Clinnick also examines plans to triple the size of Gare du Nord - Europe's busiest station - in time for the 2024 Paris Olympic games (see pages 54-56).

PAUL STEPHEN
Assistant Features Editor, *RAIL*

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NORTH AMERICA

In North America, Network Rail Consulting Inc is a subsidiary of NRC, operating from a strategic hub in Washington DC. The office deploys a mix of people, skills and expertise to deliver projects of varying sizes, complexity and location.

UK HEADQUARTERS

Network Rail Consulting was set up in London in 2012 as a subsidiary of NR, aiming to harness the range of skills and experience within NR to demonstrate British expertise abroad.

MIDDLE EAST

After a number of successful project wins in the Middle East, NRC opened offices in Riyadh and Dubai in 2015 to use the skills and experience within the NR group to showcase British expertise overseas and be an international ambassador for UK rail.

AUSTRALIA AND NEW ZEALAND

Network Rail opened an office in Sydney in 2013 to provide its Australian and New Zealand clients with a range of multidisciplinary services. Australia and the UK both face significant rail infrastructure challenges in terms of developing and modernising their networks, while improving safety and capacity.

EXPORTING SKILLS, IMPORTING EXPERIENCE

If you've ever been to Glasgow, you'll probably have noticed the giant derelict crane that stands next to the bank of the River Clyde. An impressive cantilevered structure, Finnieston Crane was once used for loading steam locomotives onto ships before they were transported around the world.

It hasn't lifted a locomotive for decades, but now the crane stands as a symbol of the UK's proud railway export heritage.

While the UK is no longer known for exporting locomotives, there are still many aspects of the rail industry where our reputation for building great railways encourages other countries to look to us for help. In 2011, Network Rail decided to launch a new business to take advantage of that reputation, appointing a new managing director to head up the challenge.

Nigel Ash came with the perfect background - a combination of a long railway and transport career, around 60% of it as a consultant. He'd worked his way up from being a graduate engineer to leading SYSTRAs UK operations, with experience of running consultancy operations around the world.

NIGEL ASH, managing director of Network Rail Consulting, explains why exporting UK railway expertise to overseas projects is a win-win scenario

For Ash, it was his chance to build a consultancy business for a big company from the ground up. He had the opportunity to develop the processes, the systems and the team the way he'd always wanted to see a consultancy firm... and that's exactly what he's done.

Network Rail Consulting was officially launched in September 2012 at the InnoTrans exhibition in Berlin, when Ash and his PA (who still works with him today) were its only employees. Over the past six years, the business has won just over £125 million worth of business across 60 projects, and now employs 110 people across the world.

"When I came in to set up the business in 2011, I looked at what Network Rail's unique selling point [USP] is," explains Ash.

"To me, when you look at other national railway companies - certainly in Europe - our USP is about getting more out of ageing infrastructure while keeping train services running. We operate in a semi-privatised market where NR works with 30 different operators, both freight and passenger. That is pretty unique when you look at other places around the world, which are still largely vertically integrated operations."

Geography is key to the way the business operates. It has never been Ash's ambition that NRC should take over the world or take on projects in every country. His business model is about making shrewd decisions on the territories that offer long-term prospects, and building healthy relationships with clients in those areas.

"We're not just focusing on one or two big projects and leaving afterwards, we're looking for long-term, sustainable projects where we can base people in those countries. We're relatively small and we have to focus on a small number of countries where we can make a real impact, as opposed to being spread thinly across the world."

As such, NRC focuses on the USA, Canada, the Middle East, Australia and New Zealand. It has subsidiary businesses in Australia and New Zealand, and one in Canada and the USA, as well as separate branches in the Middle East, which are part of the UK company.

Ash says that NRC's reach, in terms of physical size and geography, equates to 20%

25% of the world's land mass and 25% of the population.

He continues: "We have a full back-office function in London where 12 or 13 people are based. The rest of the staff are permanently based overseas. Regional directors run each of the businesses abroad. Some of the other people are based in our permanent offices and others are embedded in client organisations. For example, we have people working with the Boston MTA [Metropolitan Transportation Authority], New York MTA and Long Island Railroad."

The projects that NRC takes on usually come about as part of winning a competitive tender process. In the early days, it was all down to Ash travelling around the world

talking to potential clients about how Network Rail's expertise could help drive their projects forward. The Department for International Trade (having an interest in the success of this new venture) played an important role in the early days of the business.

Says Ash: "DIT was very helpful when I first started doing tours around the regions. For example, in Australia back in 2012, DIT was instrumental in setting up meetings with senior leadership in the rail companies in Sydney, and also with politicians. They also helped us in North America when we were setting up a base there. Once we reached the point where we had a large local workforce, and having developed the capabilities and relationships ourselves, the business was considered to be mature, and our reliance on DIT has reduced."

These days, NRC presents at regional conferences, particularly in Australia and North America, visiting key decision-makers in relevant organisations to make sure that NRC is in the running for relevant projects.

But what kind of projects are we actually talking about? →



“ We take all the knowledge we have in Network Rail of being more efficient at upgrading the UK network and apply it to a client's organisation. ”

Nigel Ash, Managing Director, Network Rail Consulting



→ “The key thing to bear in mind is that we are selling grey matter - brain power - rather than products or services.

“The majority of the projects we do are 12 months in duration. We are also involved in a few other small but high-level projects, such as California High Speed Rail, which is a contract that has been going for two or three years and will be seven years in total. Another, in Saudi Arabia, is a five-year contract that we’ve been working on for three and a half years.”

As an example, for the high-speed project in California, NRC is providing expertise in operations, asset management and maintenance and systems integration as part of an integrated team with the client. NRC staff hold 15 senior roles there, providing support and guidance, as well as technical advice in operations and maintenance.

Ash explains that there are three elements to the work NRC does on projects: interim management and technical assistance; asset management and maintenance; and project and programme management.

The first is about placing skilled individuals in a client organisation to fulfil specific roles and help the operations.

With asset management and maintenance, NRC helps clients to run their maintenance programmes more efficiently - for example, by improving access times for possessions to extract higher productivity out of an individual possession.

Ash explains: “We managed to increase the overnight possessions in the north east of the US by one and a half hours per night, which is a huge improvement on what they were achieving before. We take all the knowledge we have in terms of being more efficient at upgrading the network in the UK and apply



The Massachusetts Bay Transport Authority employed NRC’s services for 13 months from November 2016, in an advisory and strategic planning role. The MBTA has the oldest rail infrastructure in North America and needed help developing and defining processes for work prioritisation and supply chains, and to address a backlog of deferred maintenance. NETWORK RAIL.

it to a client’s organisation so that they can benefit from the experience NR has acquired over the past ten years or so.”

The third area - project and programme management - is about providing expertise or offering services as part of a project delivery team.

“As we come into CP6 [Control Period 6, 2019-24], the level of project work in the UK is falling off in that area, so we have resources becoming available within NR that we are actively looking to deploy overseas. It allows us to keep the skill sets and resources of those individuals within NR, as opposed to letting

them drift off to other organisations while there is no work for them.”

This added people benefit is one of the main reasons NRC was launched in the first place. Before NRC existed, NR employees didn’t have the opportunity to work overseas on other interesting rail projects unless they chose to leave the company - and many did.

Ash discovered that about 1,000 individuals who used to work for NR or its predecessor Railtrack have left in the past ten or 15 years and are now working overseas - just in the countries in which NRC operates.

“That’s a big brain drain for the company,”



he says. “Since we launched, we’ve probably had about 100 people come through to the consultancy business from the wider Network Rail business and, of those, the vast majority have returned to NR afterwards. A number of those individuals mentioned to me that they would have left NR if they had not been given the opportunity to gain some overseas experience to further their careers.”

These opportunities are incredibly transparent within NR. The consultancy arm often requires individuals with specific expertise to travel abroad just for two or three weeks, so all NR employees are able to put themselves on a database for the consultancy. When Ash needs someone, he can look to the database to offer them a short-term opportunity in Sydney or the USA, for example, and then they can return to their day jobs in the UK.

For longer-term opportunities of six months or more, the positions are advertised on NR’s recruitment portal.

Ash explains: “The teams of people we have in the regions on our projects are made up of a mixture of NR secondees who are on a two to three-year rotating basis, and other local appointments, who remain with the business on a more permanent basis.

“We’re trying to achieve a ratio of 50:50 of each and, as we grow, that will switch to more local people.

“There’s a continuous rotation of people in and out of the UK, which means that they come out to one of our offices around the world, do two or three years’ work and come back into the UK business.

“They’ve gained experience, broadened their personal capabilities and therefore been pretty successful at getting promoted to the next level. It’s a good news story in terms of the development of NR capabilities.”

Ash has ambitions for the future of NRC. He wants to see the business turn over £100 million a year and for a big chunk of that to be from the kinds of projects where NRC is providing a team of 50 people or more to deliver a project as part of a client’s team. He feels that the NR business is moving into the

In April 2016, NRC began a 21-month contract with the Washington Area Metropolitan Transit Authority, which operates the second largest subway/metro rapid transit system in the US. The biggest challenge for the Metro is increasing deferred maintenance of a 40-year-old asset base, causing daily system failures and delays. NRC was called in to help implement simple best practices that would help improve the overall safety culture and increase productivity and efficiency. NETWORK RAIL.

perfect place to help him achieve this.

“Thameslink and Reading station teams are becoming available and Crossrail is nearing completion. So, as those people become free, we’re actively trying to see whether they would be interested in working overseas for a time. We’re seeing whether we can put them on the UK bench, so to speak, so that we have a team ready to be deployed to a project in Australia or North America, for example.”

There are countless other projects that Ash is watching in the NR business, identifying expertise that he thinks he can export to the territories in which NRC works.

As a business, NRC is not only providing another source of income to UK plc from an export opportunity, it is also ensuring the sustainable future of the core Network Rail workforce by providing its employees with the chance to broaden their horizons and gain valuable new skills on the world stage. ■



NRC provided a range of services for Sydney Trains over a four-month period in 2013, as the company embarked on a major maintenance improvement programme. It was seeking assistance with a benchmarking exercise to identify best practice in delivering safe and highly reliable rail networks economically. NETWORK RAIL.

NETWORK RAIL CONSULTING GOVERNANCE

NRC is a wholly owned subsidiary of Network Rail, with its own board of directors. It has its own subsidiary companies around the world that then report through to the UK business. NRC is commercially independent of NR and has its own offices, being run with an arms-length relationship to the wider business.

DEEP IMPACT

SYSTRA continues to be deeply involved with the Paris Metro project - in more ways than one, says VINCENT DUGUAY, SYSTRA's Urban Director

Opened in July 1900, the art nouveau-style Paris Metro system is one of the oldest and most iconic in the world. It is also one of the busiest, with its 302 stations handling more than four million passengers a day, and representing 20% of the overall traffic in the French capital.

SYSTRA has been a major player in the development of the 16-line (133-mile) Paris Metro, having designed the city's first automated metro line (Line 14) in the 1990s.

The company is now also at the heart of the Grand Paris Express project, which will add four new lines to the network and further automate the system in order to add capacity for an additional two million passengers each day.

The four new lines include a 47-mile circular line around Paris (Line 15), and three others to serve Charles de Gaulle Airport (Line 16) and other suburban areas (lines 17 and 18).

The project will open in stages between 2024-2030 and consist of 124 route-miles and 68 interconnected stations with 90% of it built underground. New fleets of fully automated rolling stock will provide a service at intervals of less than two minutes at peak times.

Vincent Duguay, SYSTRA's Urban Director, says: "The Grand Paris Express was first announced by former President Nicolas Sarkozy in 2007 as part of the Grand Paris project to turn Greater Paris into a sustainable metropolitan area.

"He considered the size of the existing metro system to be too small compared to other global cities like London or New York and so wanted to add capacity. He also wanted to help create economic growth and new patterns of passenger flows by facilitating greater connectivity between suburbs, and by linking all three Paris airports for the first time.

"What emerged was a project on a huge

scale, costing 35 billion euros (£30.6bn), adding 200km (125 miles) of new track and with a 20-year programme of design and implementation."

The structure of the project means that Société du Grand Paris (SGP) is the overall project owner and contracting authority, while state-owned Régie Autonome des Transports Parisiens (RATP) will maintain the network.

In September 2013 SYSTRA was awarded a project management contract to provide technical expertise on the automatic train control systems and for rolling stock on Lines 15, 16 and 17.

SYSTRA was also awarded a contract by SGP to design infrastructure and supervise

“It was a real challenge, but our full BIM design helped us.”

Vincent Duguay, SYSTRA's Urban Director

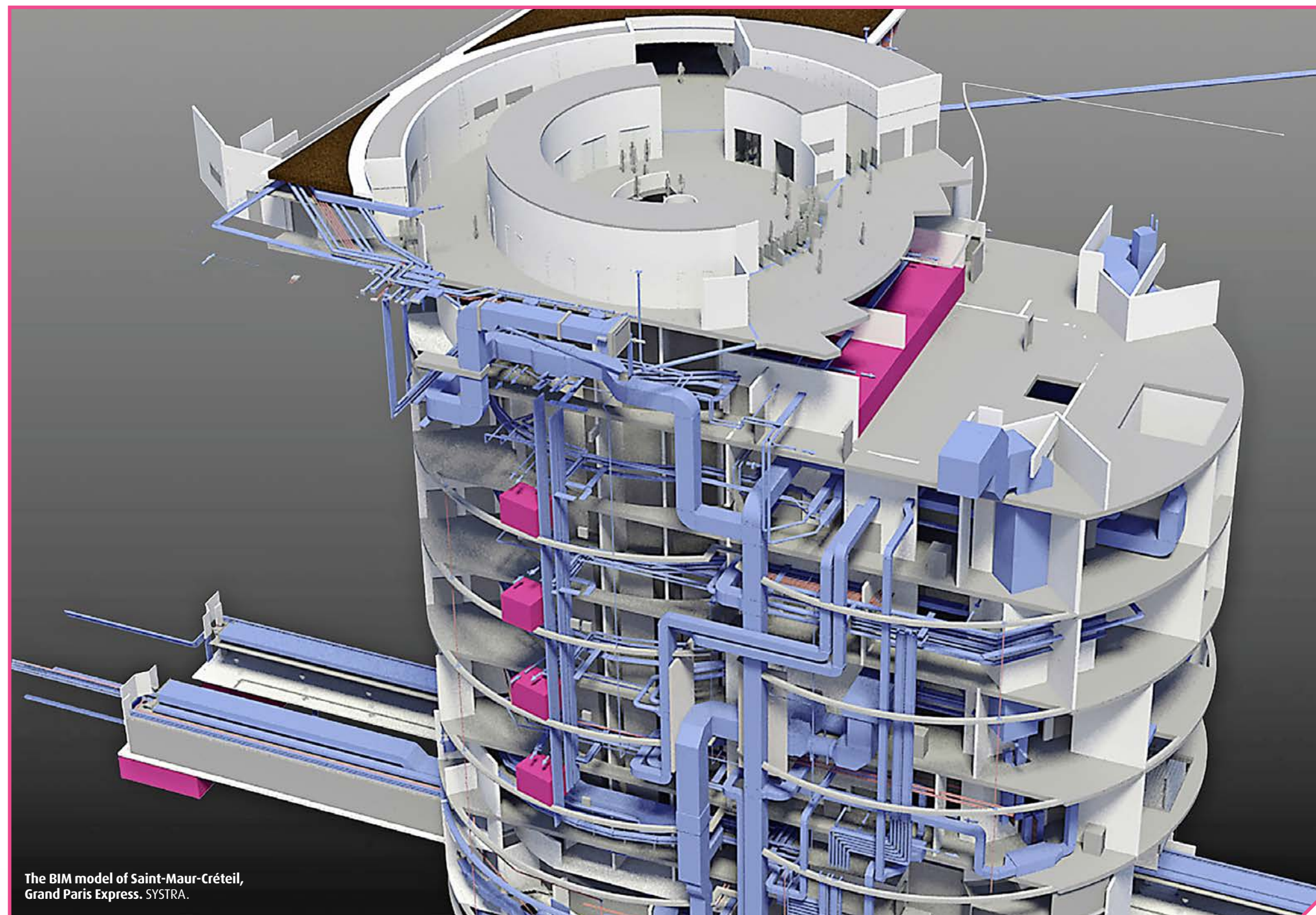
construction of the southern section of Line 15 from Noisy-Champs to Villejuif Louis Aragon which is due to open in 2025, and to design and project manage the construction of a new infrastructure maintenance centre at Vitry.

SYSTRA, in a joint venture with SETEC, was also awarded a project management assignment on the western section of Line 15, from Pont de Sèvres to Les Grésillons.

According to Duguay, this showcases the breadth of SYSTRA's expertise, with more than 200 of the company's engineers and other specialists involved in every phase of the line's construction, from conducting pre-project studies in 2013 to breaking ground in 2017, and eventual commissioning trials and acceptance in 2024.

"We are present at every stage of the project lifecycle on Line 15 South, doing all the work from initial designs to the end of commissioning," he says.

"Our team consists of architects, designers, civil engineers, project managers and contract managers. We can offer clients a large number of functions for projects which, like in Britain,



The BIM model of Saint-Maur-Créteil, Grand Paris Express. SYSTRA.

use Building Information Modelling [BIM] from conception."

The southern section of Line 15 is costing 7.8 billion euros to construct and has already proven particularly complex with 21km of tunnels and eight underground stations being built as deep as 50 metres below some of the most densely populated parts of Paris.

Duguay says that a full BIM design was employed to offer SGP a better view of the station concepts created by SYSTRA, to improve cost control and to enhance the quality of the relationships between architects, construction engineers and ultimately the operator and maintainer.

He explains: "This new metro line will be one of the deepest in the world because

Paris is very densely urbanised and there are lots of utilities buried in the ground. One of the key constraints has been how to design the stations, so we've chosen to install large concrete modular walls for the station boxes. They can be up to 1.8 metres thick and 75 metres deep, which is pretty massive for this type of project - it can take up to 17 hours to pour that much concrete.

"We've also had to freeze the surrounding area to tackle the problem of groundwater. This has meant freezing areas up to 50 metres deep and 30 metres wide. It was a real challenge, but our full BIM design helped us and we were able to bring in equipment used in the petroleum industry to harmonise the ground conditions."

A second key constraint to the construction sequence has been the need to limit disruption to existing transport infrastructure. When the western section of Line 15 is complete it will be intersected by Metro lines 1 and 13, Lines 14, 16 and 17 of the Grand Paris Express, the RER Regional Express Lines A and E, and Tramline T2. Seven of the nine stations will provide interchanges, with lines operated by either the French railway operator SNCF or local transport operator RATP.

Stations and infrastructure have also had to be cleverly designed so that future changes in demand can be easily accommodated and so that new metro systems and technology can be seamlessly integrated as they emerge.

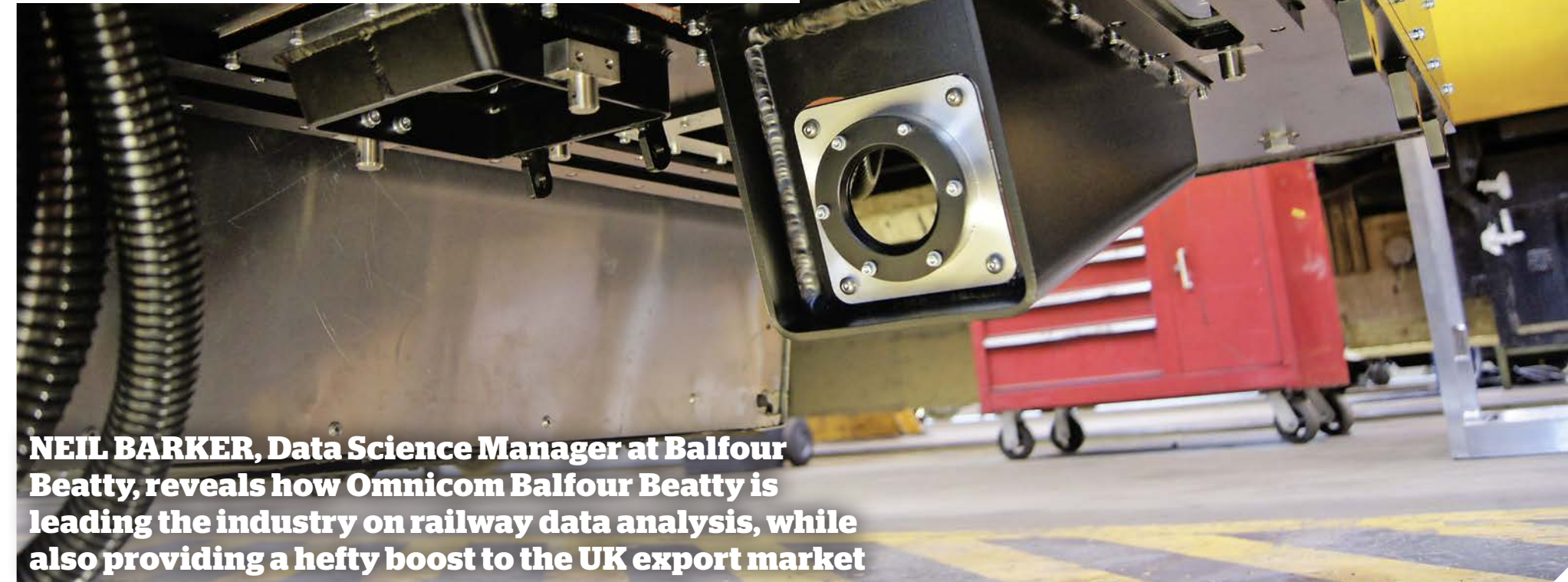
"All of the stations on Line 15 have been

designed as interchanges, so passengers can change very easily between lines. The precautions we take during construction are, therefore, very important, so that existing lines are not damaged or disrupted in any way.

"We also have to ensure that capacity in the stations is suitable for future development because the client in Paris wants to make sure that they not only have a modern metro but one that is fit for the future.

"It can be difficult to plan for future solutions, technical developments and new maintenance regimes when assets like walls and ceilings are quite difficult to modify at a later date, but at SYSTRA we are committed to providing ever more resilient and innovative solutions." ■

BUCKING THE TREND



NEIL BARKER, Data Science Manager at Balfour Beatty, reveals how Omnicom Balfour Beatty is leading the industry on railway data analysis, while also providing a hefty boost to the UK export market

Like it or not, we live in an age of 'big data', where more and more aspects of the physical world around us are being captured electronically.

This includes everything from weather conditions and traffic congestion through to our multimedia preferences and consumer transactions, which can be monitored and turned into raw information for subsequent analysis using data-processing software.

The railway network is no different in this respect. For example, open data feeds on train movement and positioning are now available to software developers, with operators and passengers able to monitor the real-time performance of services against the timetable using bespoke apps.

New digital train control, traffic management and in-cab signalling technologies are also now available for installation in new and existing rolling stock, which is underpinned by the greater use of telecoms and data transfer.

This new stream of accurate performance data and the move away from traditional analogue signalling form a large part of the Digital Railway programme, which aims to transform the way in which the network is managed and operated through increased digitisation.

Not only will a Digital Railway provide Network Rail (NR) with an opportunity to create additional capacity on the network without building expensive new physical infrastructure, it will also achieve cost, time and safety gains in how it maintains its assets.

That is because newly developed remote surveying hardware is able to generate real-time data on the condition and performance of physical assets such as bridges, track, points and crossings.

Gathering this data electronically not only reduces the need for time-consuming manual inspections, it mitigates the potential risks associated by routinely placing engineers and other NR staff in trackside environments.

These benefits can be enhanced further by moving to a predictive maintenance regime where data feeds are comprehensively analysed by human operators and artificial intelligence (AI) software, in order to predict

potential failures and to identify patterns so that the need for interventions can be forecast, and then planned for times that are least disruptive to the network.

Omnicom Balfour Beatty offers a full-system solution to asset managers comprising not just the hardware needed to collect this data, but also the AI software and human resource to make sense of it.

Omnicom Balfour Beatty Data Science Manager Neil Barker explains: "Data exists everywhere, but to get knowledge and maximum value from it you have to combine it with experience, which is where we come in."

"Data analytics and Big Data are buzzwords across the technology industry at the moment. Our unique offering combines expertise in data and computer technology with decades of experience and knowledge gained by Balfour Beatty from working in the rail industry."

He adds: "Omnicom Balfour Beatty has

created a dedicated data science team with expertise in AI and Computer Vision. There are many IT companies, but what separates us is that we have the rail domain experts who know what they're looking at, and they know what questions to ask of the raw data feeds."

Omnicom Balfour Beatty's portfolio of products and services is designed to eliminate the need for costly and time-consuming manual asset inspection while providing an extensive and reliable database that is accessible to clients at the click of a mouse.

These products include OmniVision, which combines high-resolution cameras and AI powered computer vision software and is mounted on trains that collect information at high speed. In the UK this is typically 125mph, but the technology is capable of higher operating speeds.

OmniVision can be combined with survey tools such as OmniCapture3D in order to add laser-scanned point cloud capture, data mapping and asset modelling so that a virtual model can be created of the network which can then be viewed from multiple angles using software programmes such as OmniSurveyor3D.

OmniVision has been adopted by Network Rail to automate Basic Visual Track Inspection by combining high resolution imagery,

Omnicom Balfour Beatty's OmniVision technology is being used by a growing number of clients around the world to achieve a more cost-effective and safer alternative to manual inspection, monitoring and mapping of their networks. BALFOUR BEATTY.

machine vision AI, big data processing and Track Geometry data into an automated workflow. Track inspection is via its use of a new track fault-finding technique known as Plain Line Pattern Recognition (PLPR).

PLPR is live on over 8,000 miles of track and improves asset quality, with a significant reduction in track defects.

Impressed by the scale of benefits offered by OmniVision and its allied products, Omnicom Balfour Beatty reports that more and more potential clients and infrastructure managers from across the globe have visited Balfour Beatty's Rail Innovation Centre in Derby to see the system in operation for themselves.

The Rail Innovation Centre opened in June 2018 as a dedicated research, development and testing facility to showcase the company's expertise in systems engineering, computer science, robotics, data analytics and electrical and mechanical engineering.

It is also a tangible sign of Balfour Beatty's commitment to supporting the UK's global position as a leader in these fields, and as an international centre for skills and innovation.

Barker adds: "The vision is to move to a more predictable railway and to eliminate unplanned maintenance, which then allows you to fully understand what your future costs will be. But to achieve this you need three things: expertise in algorithms; expertise in [railway] domain knowledge; and access to the data."

"Every day we enable the collection of data [with Network Rail] on things such as track geometry, ride comfort, noise and vibration. This is then crunched, so we aggregate this data and map it using Network Rail's geospatial model before using machine learning (artificial intelligence) to analyse and interpret it. We can then identify patterns using bespoke algorithms and send the output

to be post-processed by Network Rail, which then makes predictions from this data. This enables clients to start reprogramming their maintenance schedules.

"Omnicom Balfour Beatty has a growing number of UK clients, but we are an international company with clients in other parts of the world, such as Hong Kong and Singapore. Our products and services have been developed here in the UK and are now being sold abroad, so we very much contribute to the growth of UK plc."

Looking ahead, Barker is confident that Omnicom Balfour Beatty's expertise and technology can continue to provide benefits to the rail industry but also be applied to other sectors too.

In order to continue to innovate and grow into these new markets, the company is actively recruiting new talent with the requisite range of skills.

He concludes: "The railway is essentially a linear asset and there are lots of other linear assets, such as roads, where our solutions could apply, so we are working with colleagues from other parts of the business to explore that."

"We are only scratching the surface at the moment in how we can apply AI to data, compared to what we'll be able to do in the future. It's about getting more constant and higher speed sources of data, which means these systems can spot faults even sooner."

"But to do this we need people who have strong mathematical and programming skills using languages like Python, and who can develop regression models, decision trees and support vector machines. Most importantly, they need curiosity and an ability to solve problems. I'd encourage interested parties to take a look at our website [below] and then register your interest." ■

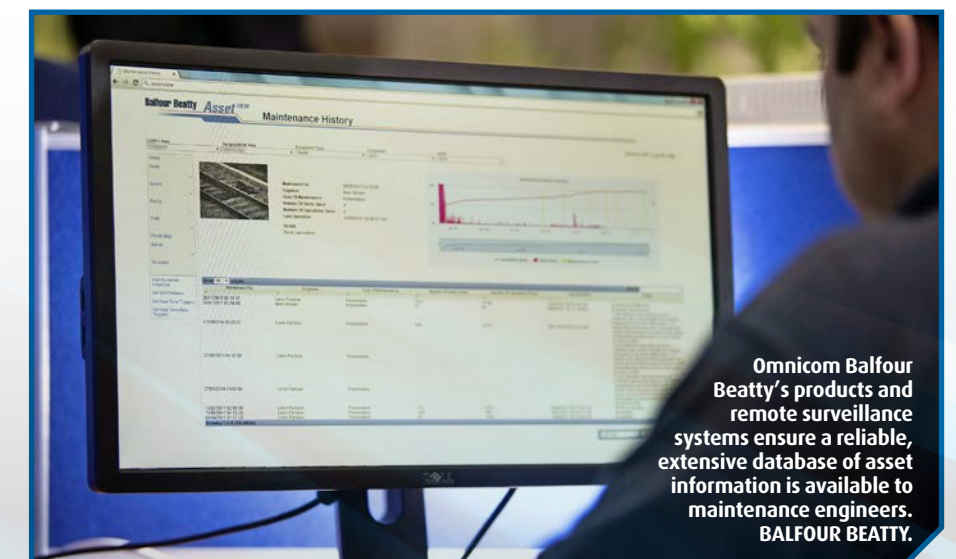
■ Further detail on Omnicom Balfour Beatty can be found at: <https://omnicombalfourbeatty.com>

■ To register interest in working for Balfour Beatty go to: <https://pages.beamery.com/balfourbeatty/form/rail>



“Our products and services have been developed here in the UK and are now being sold abroad, so we very much contribute to the growth of UK plc.”

Neil Barker, Data Science Manager, Omnicom Balfour Beatty



Omnicom Balfour Beatty's products and remote surveillance systems ensure a reliable, extensive database of asset information is available to maintenance engineers. BALFOUR BEATTY.

MIDDLE EASTERN PROMISE

For many decades the national economies of the Middle East have been heavily reliant on the global export of oil and gas.

But faced with the inescapable reality that reserves of these natural resources are finite, concerted efforts are being made by major producers, including Saudi Arabia and the United Arab Emirates, to diversify their economic outputs so that income streams and standards of living can be sustained in a post-oil world.

In order to stimulate growth in non-oil sectors, major national investments are being made in education, alternative energy sources and infrastructure.

Driving growth across much of the Gulf region will be the improved connectivity offered by a new and fully integrated network of roads and railways linking ports, airports, industrial centres and tourist and residential areas.

The largest single regional investment is being made in the Saudi Arabian capital Riyadh, where a £17.5 billion metro system is currently under construction comprising 85 stations located on six lines with a total combined length of 110 miles.

Due to be fully operational in 2021, it will help support the predicted growth of the city's population from six to eight million over the next decade, while also reducing air pollution, congestion and the number of road accidents

in Riyadh caused by a high dependence on private cars.

Another large-scale project is the 46-mile Dubai Metro which - having opened in stages between 2009-11 - was the world's longest automated, driverless network until being more recently surpassed by metro systems in Singapore and Vancouver.

The sheer scale of these construction projects demonstrates the range of opportunities that have been available to British suppliers in the last decade to penetrate the Middle Eastern market, where representation from the UK rail sector has traditionally been low, owing to the previous lack of investment.

One such company to take full advantage of this change in prospects is main line and metro consultancy and engineering services provider XRAIL Group, which has rapidly expanded its international footprint since being formed in London as a rail systems design company in 2011.

Engineers who now work for XRAIL are rail engineers who supported the design, installation, testing, commissioning and assurance of the Thales Transmission Based Train Control (TBTC) moving block signalling system as part of LU's Jubilee and Northern Line Upgrade Project between 2005-10.

Other LU projects include supporting the delivery and assurance of a new Real Time Passenger Information System for the District Line in 2011-12 and providing a design

XRAIL Group Director MUNIR PATEL urges other British suppliers to consider making inroads into the burgeoning Middle Eastern rail market

package for In-Bearer Clamp Lock Points, which were first introduced in the Neasden Depot Upgrade in 2012.

Within the last five years, XRAIL has built on its growing reputation in the UK to score significant successes in overseas markets too, which will account for an estimated 60% of the company's total revenue.

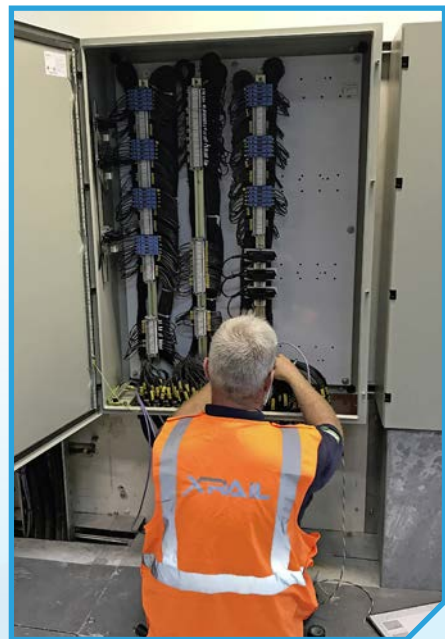
XRAIL Group Director Munir Patel says: "In 2014 we had the first opportunity to properly explore projects in the Middle East when we were approached by UK Trade & Investment (UKTI) to form part of a British contingent exhibiting at the following year's Middle East Rail show [held in Dubai on March 8/9 2015].

"We gave it a go and quickly realised that there was a large potential market out there for us, so we booked a much larger 36m² stand at Middle East Rail in 2016 and have returned every year since. This has given us a lot more exposure and helped us secure a number of contracts on the Dubai and Riyadh metros."

XRAIL was commissioned by AECOM in 2015 to undertake a strategic review of the proposed objectives of a technical study which



XRAIL has secured contracts for the £17.5bn metro system currently under construction in the Saudi Arabian capital Riyadh. RIYADHMETRO.SA



Left: XRAIL Group's expanding Middle Eastern project portfolio includes the design and installation of remote condition monitoring systems in Dubai in 2016. XRAIL. Above: At Middle East Rail 2018, the XRAIL team are pictured with HRH Prince Abdul Aziz bin Faisal Al Saud. XRAIL.

was needed to help prepare the system to meet future transport demands in Dubai.

In 2016 the company was then approached by global technology provider voestalpine to provide assistance in a targeted project it was working on to install remote condition monitoring at 12 stations which had opened some five years earlier.

Patel adds: "They had an underperforming subcontractor. They knew that because of our work on London Underground, in which we'd demonstrated our ability to work on brownfield sites, and not just the greenfield sites that local companies had become more used to."

According to Patel, XRAIL was quickly invited to bid for other work packages in both Dubai and Riyadh for other clients after completing the remote condition monitoring installation for voestalpine 25% faster.

He says the experience proved an important point for potential clients in the Middle East, that although bids from British companies had traditionally been viewed as overpriced compared to much cheaper local labour, there were significant gains to be had in terms of increased efficiency and higher standards of workmanship.

He explains: "We wanted to demonstrate that one of our engineers is as good as ten local labourers they normally employ, and the UK worker is more efficient and more competent. We always knew that they wanted the quality that British companies can provide, but not always the cost and the greater overheads we

have by sending over staff from the UK.

"But we've shattered that myth because we're achieving such huge efficiencies and they are getting much better value for money. I'm trying to tell a story that UK plc is super-efficient if companies can find the right partner and that there are many opportunities here for other British companies like us.

"In the last four years we've increased the number of staff tenfold, and turnover has grown by 120%. We're getting closer to reaching our target of the headcount and turnover by the end of 2019."

With construction now under way on an extension of the Dubai Metro to the exhibition site of the World Exposition 2020, and plans afoot to build a £195 billion, 1,300-mile Gulf Railway to link six nations in the Persian Gulf, Patel is urging other British companies to follow in XRAIL's footsteps.

His advice though is to be patient, as despite the achievements of XRAIL and other British

suppliers there are significant structural challenges that remain.

"You have to invest time, effort and money, and you have to be patient because it could take 18 months to win a contract. You're bidding against cheaper local labour, but you need to be optimistic that something will happen, and remain convinced that you'll start winning contracts.

"Middle Eastern clients don't always want to pay more, but we've built up a good reputation for efficiency and high quality in a short space of time. I'm now looking at projects in Saudi Arabia and elsewhere, of significant value."

Looking ahead, Patel is now considering his options to expand into other overseas markets. The UK will remain a core area of activity for XRAIL, however, with opportunities to repatriate some of the experience and best practice garnered from projects in the Middle East.

He adds: "I'm looking at projects in Taiwan, Indonesia, Ivory Coast and Peru, based not just on our strong reputation but because we can help projects receive private finance for their projects. That's obviously quite an attractive proposition when we don't just provide the services they want but the money to go with it.

"There are still huge growth areas in the UK too, with ongoing metro works and Digital Railway. We have an office in Warrington where we're looking to translate some of the lessons we've learned in Saudi Arabia to the Northern Powerhouse." ■

“I'm trying to tell a story that UK plc is super-efficient if companies can find the right partner.”

Munir Patel, Group Director, XRAIL

OLYMPIC SPRINT

Paris Gare Du Nord is gearing up for the 2024 Paris Olympics. SNCF Project Director STÉPHANE COUGNON outlines the sheer scale of the work



Passengers travelling from London to Paris will notice changes at their French destination from next year. Gare Du Nord, the terminus for Anglo-French Eurostar services, will be transformed over the next five years ahead of the 2024 Paris Olympics.

SNCF operates the station and will start work in autumn 2019 to begin extending the

station. Due for completion in late 2023, the station will be the largest in Europe.

SNCF Project Director Stéphane Cougnon tells RAIL: "With a budget of over 600 million euros [£526m], we'll have the resources we need to deliver on time, and that's the real challenge!"

He says that the task is to "push back the walls" at the station, and to add to its height without distorting its historic architecture. Much like British terminus St Pancras

As part of the station redevelopment, sports facilities will be installed at Gare Du Nord. Sacré-Cœur Basilica can be seen in the background in this artist's impression of how the running facilities will look. SNCF.

International, the station is renowned for its stunning façade. In France, it qualifies as a national heritage site.

The station opened in 1846, and has been renewed four times so far. This fifth expansion

The crowded and cluttered concourse at Gare Du Nord on June 3 2016. Passengers arriving at the Eurostar platforms (to the left) must negotiate this concourse to either exit the station or descend to the Paris Metro and suburban platforms. RICHARD CLINNICK.

will prepare the station for the demands of the next 30 years. Cougnon says it will open new spaces and traffic flows, while also providing more services and shops.

One of the busiest stations in the world, it's used by passengers travelling to international destinations, as well as in France. Below it are the suburban platforms, which increase the number of passengers it deals with to 222 million a year (750,000 per day). This makes it the busiest in Europe, and Cougnon says: "We want to reduce crowding because the station is struggling to cope."

Of those 750,000 daily passengers, some 600,000 are from Transilien commuter lines serving the Paris region. The others use high-speed rail services to and from destinations in France, Eurostar, or Thalys-operated services.

The plans encompass changes to the Eurostar platforms. The departure lounge has only just been refurbished, so will remain unchanged.

Says Cougnon: "We aim to expand the station to two and a half times its current footprint. We'll make changes to the Eurostar Terminal on the west, as well as to the station's east side, which handles most of our commuter traffic."

He says that the plans include keeping passenger arrivals and departures separate, and guiding all main line departures to a new terminal that will be housed in a new building constructed alongside the station's eastern façade.

Cougnon says that local residents will benefit as new amenities are to be included in the plan. The idea is to make the station more



than just somewhere to catch a train - it will be a destination station in the same mould as St Pancras or New York's Grand Central.

"By 2024, Gare Du Nord will include 50,000m² of retail outlets and activities, including sports, recreation, culture and art, plus many co-working spaces.

"Visitors will be able to choose from a wide range of food and beverage options, including two restaurants located on the roof.

"Sports lovers will have a gym, and the roof will also feature tennis and paddle-ball courts, a 1km fitness trail skirting the façade, and over 7,000m² of green space.

"Last, but not least, we're rethinking intermodal mobility in the area around the station, and are building a 1,200-space

bicycle park."

What kind of passengers use the station? The numbers have been rising steadily, says Cougnon. This is attributed to connections with the Paris Metro and RER suburban lines, as well as the recent arrival of lines serving the city's suburbs and European destinations.

"The 750,000 travellers who pass through Gare Du Nord every day are using three metro lines, three regional lines and over 2,130 trains a day, including both high-speed Thalys and Eurostar services, and inter-regional and main line trains."

He says it's this diversity that makes the station unique - and the way it meets a wide range of passenger needs.

"By 2024, Gare Du Nord will handle 800,000 passengers a day, rising to 900,000 by 2030. That's nearly 300 million travellers a year!"

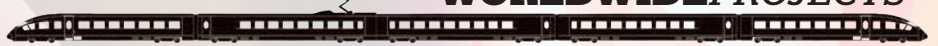
In addition to the features already mentioned, it will be transformed into what Cougnon calls "an intelligent, connected station, as a smart grid city takes shape, with customised digital solutions developed by →

By 2024, Gare Du Nord will handle 800,000 passengers a day, rising to 900,000 by 2030. That's nearly 300 million travellers a year!

Stéphane Cougnon, Project Director Paris Nord 2024, SNCF

An artist's impression of the completed Gare Du Nord. SNCF.





A variety of services at Gare Du Nord on June 3 2016, as regional trains wait to leave the station, many of which are locomotive-hauled. RICHARD CLINNICK.

→ the station's 'digital factory'".

Accessibility will be improved with 55 lifts and 105 escalators - more than double the current number.

SNCF is also rethinking the connections to the city, to include a new eastern façade on rue du Faubourg Saint-Denis, allowing direct access to the departures terminal, which will also be linked to a new bus station.

Cougnon isn't finished: "That's not all - and this is important: the new retail outlets and services inside the station will have a regenerative effect on the neighbourhood around it.

"Plans call for nearly 20% of the new retail and service space to be occupied by food and beverage outlets, with striking, historic

sections of the station reserved for upmarket restaurants overlooking the rooftops of Paris.

"Meanwhile, a European academy of culture will occupy more than 2,000m², and we'll have an auditorium of around 1,600m² for special events and concerts. In response to strong demand from business, we plan to expand the current business space at Gare Du Nord to 5,500m². In all, retail and service space will increase five-fold."

Cougnon says that in keeping with changes in society, SNCF is installing a gym, paddle-ball and basketball courts, and a putting range alongside the rooftop fitness trail.

"We're also making the station a beacon of eco-friendly development. It will have 7,000m² of green space and 3,200m² of solar panels."

He says that Levels 4 and 5 will be a timber construction, and the new station will be built to meet the demanding BREEAM In-Use standard (an environmental assessment methodology) for sustainability.

For Eurostar passengers, Gagnon says that the operator's terminal will remain in the same location, in the historic part of the Gare Du Nord building, but that "the project will improve access significantly, boosting capacity and effectively doubling the size of the terminal.

"Crucially, this will provide more seats for travellers, as well as space for additional shops and services. We'll also increase the number of access points, and add a third boarding bridge to improve passenger flow from the platforms to the trains. We are aiming to deliver these upgrades in 2022. The newly renovated Eurostar business lounge will stay as it is - attractive and comfortable."

There are concerns, admits Cougnon: "We'll be meeting deadlines in a tightly constrained environment while having to keep the impact on rail traffic to a strict minimum."

He points out that in just five years, SNCF must triple the size of Europe's busiest station without closing it, while also continuing to ensure "maximum comfort and minimum inconvenience for our passengers. Achieving all of this without closing the station is a huge technical challenge."

At the same time, SNCF Group will also carry out work on the entire northern corridor ahead of the Olympics.

"We'll need to be extremely efficient - and that's why SNCF is using innovative project planning methods to ensure that Europe's busiest station is ready for 2024."

This will be a tough job, but the benefits could be huge for both passengers (including those from the UK) as well as the local neighbourhood. ■



Passengers disembark from a Thalys TGV on June 3 2016, as a Eurostar Class 374 waits to leave Gare Du Nord. SNCF says some 750,000 passengers per day pass through the station, and that by the end of its rebuild in 2023, that will have increased to 800,000 per day - or 300 million per year. RICHARD CLINNICK.