

Worldwide Special

Welcome

Having published a Worldwide supplement at almost exactly the same time last year, it seems incredible that the UK's international affairs are still being dominated by the looming prospect of Brexit.

Twelve months ago, the Government's policy was to withdraw from the European Union by March 31 2019. The subsequent failure by Parliament to ratify a Withdrawal Agreement means that the deadline has now been extended until January 31 2020.

Whether the UK leaves by this new date remains to be seen, and will largely depend upon the result of the General Election on December 12.

A range of options is now seemingly available to the electorate, with the major parties all making competing promises to leave, stay, or to offer a second referendum.

Should Prime Minister Boris Johnson and the Conservative party be re-elected to form a government, we are told that the UK will leave on January 31 and that a transition period will apply until the end of 2020, to enable a new trade agreement to be negotiated.

EU rules on free movement of goods,

services and people will continue to apply, while discussions take place for a new deal that keeps trade as frictionless as possible.

Playing a key physical part in the UK's historical, current and future relationship with continental Europe is Eurostar which, having been launched in November 1994, remains Britain's only international train operating company.

In this nine-page special, Richard Clinnick looks back at the 25-year story of the train operator and offers a glimpse at what its next chapter might look like.

Elsewhere, the continued strength of the UK rail market in attracting foreign companies and investment is demonstrated by Talgo's plans to build a new factory at Longannet in Scotland, and a UK headquarters in Chesterfield.

SYSTRA also tells *RAIL* how it has expanded its UK footprint via its project delivery partnership with Crossrail, and how its leading role in the Grand Paris Express mega-project could be put to use elsewhere.

PAUL STEPHEN Features Editor, *RAIL*

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Managing Editor: Nigel Harris

Head of News: Richard Clinnick

Contributing Writer: Paul Stephen

Production Editor: Mike Wright

Art Editor: Charles Wrigley

Managing Director: Tim Lucas

ADVERTISING

Account Director: Julie Howard



TALGO BUILDS ON UK PLANS

Spanish manufacturer Talgo is so much more than merely a builder of passenger trains.

As it continues to lay down foundations in the UK - with a recent announcement that its UK headquarters will be in Chesterfield, while there is also hope that the first contracts for its planned factory at Longannet (Fife) are not too far away - the company continues to innovate, just as it has done since its creation in 1942.

When Talgo says it is bringing innovation, you need only look at its history.

In 1968, it created the world's first train with automatic variable gauge.

Five years later, the first naturally tilting train was debuted by Talgo. Coaches automatically adapt to curves, compensating cant deficiency and enhancing passenger comfort. Journey times are also cut by 25% - all without the need to invest in infrastructure.

In 1989, the company expanded with its first international operations, when it started running trains in Germany, followed by America. Then in the late 1990s, it developed its first Very High Speed Train (VHST), designed to compete with established manufacturers.

In 2010, the world's first interoperable train was developed by Talgo, while it has also created the first wide-bodyshell VHST that can offer 3+2 seating under the current UIC (International Union of Railways) standard loading gauge.

However, Talgo is involved in more than

Spanish company is bringing its innovation techniques to the UK

just designing and building trains. It also has a rich heritage in the maintenance sector, with innovation again a theme.

For more than 45 years, the company has designed and manufactured maintenance equipment for operators across the globe.

More than 400 maintenance units are in use across 44 countries, including in the UK where wheel lathes are used at Chiltern Railways' Aylesbury depot.

Its equipment is classified into three main groups: underfloor wheel lathes, measuring equipment, and shunting cars.

The lathes are designed to reshape wheel profiles without the need to remove the train's bogies or wheelsets, and are adaptable to any client's requirements and facilities.

Talgo also supplies both automatic equipment and manual devices that are designed to detect any flaw or defect in the wheels without stopping the train to perform these measurements.

As for the shunting cars, these are designed to move trains in a simple and effective manner without any type of coupling, allowing them to be used for all fleets. This comes in handy in the UK, where there are

eight types of coupling across the various new trains being delivered.

Perhaps Talgo's most well-known innovation is Rodal, its independent rotating and self-guiding wheels. The system works by enabling each wheel on an axle (left and right) to rotate at different speeds. This enables lightweight structures, reduced track wear and tear, lower energy consumption, passive tilting, and automatic track gauge-change.

On curves, a Talgo coach swings like a pendulum because its centre of gravity is located below its rotational centre. The passive tilting this creates balances the centrifugal force.

In its native Spain, there are two different track gauges, with Talgo trains able to run on both. They can adapt to the gauge change while moving and not stopping.

Over the past ten years, this operation has been carried out more than 3.5 million times. The technology has been used on trains built for 170mph, but is also being included in the Avril ES design, which has a maximum speed of 205mph.

Rodal technology has yet to be used in the UK, but the company is bringing it here as part of a programme to explain new technologies, to transfer knowledge, and to boost domestic research and development capabilities.

As part of the programme, Talgo has donated a Rodal to the National College for Advanced Transport & Infrastructure in Birmingham. NCATI Chief Executive Clair Mowbray said at the unveiling of the



Talgo's Rodal system works by enabling each wheel on an axle to rotate at different speeds, which helps to reduce track wear and tear and lower energy consumption. One has been donated to the National College for Advanced Transport & Infrastructure. TALGO.

equipment on November 11: "It will provide our learners with the opportunity to learn about technologies being used throughout the world."

Talgo President Carlos de Palacio said: "This is part of Talgo's plan to generate better understanding of up-to-date technologies that are being used around the world, but which have so far eluded the UK."

"Talgo's strategy of 'true manufacturing' - and not relying on brainpower or kits of parts from elsewhere - requires that innovation and Research and Development takes place in the host country."

Due to the vehicles' innovative design, Talgo claims to be the only manufacturer in the world that can offer full accessibility for persons of reduced mobility (PRM). This is because the floor of the train is the same height as the platform along the whole train, with no interior steps or ramps. The company says this means "you do not board a Talgo train, you just step into it".

The wide bodyshell of the coach is possible



A Talgo Very High Speed AVE Class 102 built for Spanish operator RENFE stands at Madrid Atocha station. RICHARD CLINNICK.

as they all have a quadrangular shape. In curves, longer coaches invade the exterior (ends) and interior (middle), whereas the shorter Talgo coaches can adapt better to curves and therefore can be wider without invading curve exteriors or interiors up to

3,200mm.

Typically, their design means that Talgo coaches are able to increase speeds of the train by 20% through curves without any infrastructure modifications, while remaining 30% lighter than conventional designs. ■

AWARD-WINNING ENGINEER ELENA

It's not just in innovation where Talgo is leading the way. One of its female engineers is trailblazing a path for her work in the Middle East.

Elena Moral, Project Director for the Saudi Arabian Haramain Project, has been named the 'Innovation Leader' in Spain. This follows her recent European Women In Construction & Engineering Awards (WICE) success, where she beat 400 candidates to be named WICE European Rail Engineer of the Year 2019.

Her career started 17 years ago, when she was involved in testing the first high-speed trains at the age of 25. Then, in 2005, she was involved in the AVE engineering in Spain, and in 2015 Talgo determined that she would lead the Saudi Arabian project that would introduce Very

High Speed Trains between Medina and Mecca.

In an interview in her home country, Elena explained that the business needed to look outside the industry for ideas, to combat the hostile conditions the trains would operate in. She said the Spanish army assisted with technology from helicopters.

She added that she was drawn to engineering because "she liked to build things," and was attracted to most technical subjects.

As for getting more women involved, she said: "We have to tell what we do. It happens to me sometimes that I only work and I don't explain what I am doing. And in engineering we do things that really help us to have a better and better world."



UNDER THE SEA WITH EUROSTAR



International operator Eurostar has just celebrated 25 years of carrying rail passengers through the Channel Tunnel. RICHARD CLINNICK looks back at the past 25 years and looks forward to what Eurostar is planning next

Two Siemens Class 374 e320 Velaros wait to leave Paris Gare Du Nord on November 14, the day Eurostar celebrated its 25th anniversary. ANTONY GUPPY.

Early on November 14, the only original Class 373 Trans-Marche Eurostar train left St Pancras International for Paris Gare Du Nord. It was the first departure on a celebratory day for the company.

The set (one of those ordered by Belgian operator SNCB) still retains its original interior, first seen by cross-Channel passengers some 25 years ago.

But much else has changed in the intervening years, with the building of Britain's first high-speed line, the changing of international terminals in the UK, the introduction of new destinations and new trains, the possibility of competition, and now the UK's eventual departure from the European Union.

In RAIL 238 (October 1994), it was reported that European Passenger Services (EPS) planned to launch its 'Discovery' service on November 14 1994, which had been made possible following the awarding of the Anglo-French Intergovernmental commission licence to Eurotunnel, to allow the operation of the London-Paris/Brussels service.

That decision had been made on October 12 1994. Five days later, press conferences were held simultaneously in London, Paris and Brussels by the three companies involved



in Eurostar at the time (EPS, French operator SNCF and SNCB).

The initial launch was for two trains per weekday in each direction between London and Paris Gare Du Nord, and the same number between London and Brussels Midi. There was also one return per day between London and Lille.

In those days, Eurostar trains would serve Waterloo International (which was especially constructed on redundant railway land), with the '373s' running along the third-rail system to the Tunnel, rather than on HS1 as today.

Incredibly, engineering works disrupted the trains before they even launched, when it was confirmed that initially trains would not run on Saturdays owing to work in the Tunnel. The Sunday service was limited to one train in each direction to each of the destinations, apart from Lille.

Much like today's plan for HS2, this was only an initial service - the plan was to build up the service to hourly to Brussels and Paris. The full service was launched from May 28 1995. The following year Eurostar began serving Ashford International.

OWNERSHIP

From its inception until 2010, Eurostar was operated by French state operator SNCF, Belgian state operator SNCB, and London and Continental Railways (LCR).

On September 1 2010, Eurostar was incorporated as a single corporate entity - Eurostar International Limited (EIL). This was 55% owned by SNCF, 30% by Caisse de dépôt et placement du Québec, 10% by Hermes Infrastructure, and 5% by SNCB.

The UK shareholding in EIL was transferred from LCR to the Treasury, and it was confirmed that the Government wished to raise £300 million by selling the stake. This was completed in May 2015.

TICKETS

At the time of the launch, Standard Class tickets had to be booked two weeks in advance. The cheapest was the Discovery Special, which cost £47.50 single to Paris/Brussels or £95 return. To Lille it was £40 single, £80 return.

The Discovery, which allowed changes to the reservations, were £77.50 single or £155 return to Brussels and Paris; £66 to Lille or £132 return.

The Discovery Gold, which were First Class tickets allowing a change along with an at-seat meal, was £97.50 single or £195 return; and £83 to Lille, £166 return. All tickets are priced from London.

Today, tickets can be booked up to the day in advance, and Eurostar regularly offers prices as low as £29 each way to the capital cities, although these tend to sell quickly and do have restrictions.

planned Regional Eurostar to Manchester Piccadilly and Edinburgh using 14-coach Class 373s never ran. High Speed Trains were used initially on these services, running from Waterloo, but low passenger numbers meant they ceased in January 1997.

The Department for Transport refused to subsidise the trains, and this - combined with the rise in low-cost airlines - led to the project being abandoned. A depot had been constructed at Longsight (Manchester) for the '373s', but this is now used by CAF for TransPennine Express trains.

September 16 2003 was a big day for Eurostar, when then-Prime Minister Tony Blair officially opened Channel Tunnel Rail Link (CTRL) Section 1. This was the first part of what is now High Speed 1.

Construction had started some five years earlier, and it meant the '373s' could now run at their designed 300kph (186mph) speed in the UK. Journey times were cut by 20 minutes following the introduction of the 46-mile line from Fawkham Junction to the Tunnel.

At the opening, Blair said of HS1, which

had been at risk due to spiralling cost: "We don't associate these phrases [on time and on budget] with civil engineering or railway projects in this country. This project gives optimism as to what we can do in the future."

Fast forward four years, and the rest of HS1 opened. Overnight on November 13/14 2007, operations transferred from Waterloo to St Pancras International, which had been rebuilt in an £800 million project, while maintenance transferred from North Pole to a new depot at Temple Mills.

The final train from the original terminus was the 1812 to Brussels, and the first from St Pancras was the 1101 to Paris using 373107/108.

The next major change was unveiled in October 2010, when Eurostar unveiled its plans for what became the e320, built by Siemens (RAIL 655).

An initial order was placed for ten trains (two pairs per train), with delivery

The launch did not go well, with the first train failing just two minutes before its scheduled departure from Waterloo International. Up to 30 television crews and 400 media representatives were on hand to witness the embarrassment. The problem was a software issue on set 373003, and a replacement had to be summoned from North Pole depot (which Eurostar used until 2007).

The managing director of EPS at the time was Richard Edgley. He explained on the day that a back-up set was supposed to be at Waterloo, in a copy of the inaugural trip in May 1994 when Her Majesty The Queen travelled under the Channel.

But the mood was still mostly jolly. Graham Hill, from the BBC's World Service, said after the arrival of the launch service: "The rest of the world must have been wondering why we didn't do this years ago. It reminds me of flying - tremendously exciting. We are an island no more."

Over the years, more destinations were added - Lyon, Marseille and Marne-la-Vallée (near Paris, for Euro Disney), as well as winter trains to the Alps. However, the



On April 29, Eurostar 373218 passes Stratford International with the 1209 Paris Gare Du Nord-St Pancras International. This set had yet to be refurbished, and was passing a station that could yet finally be served by the operator as it seeks to optimise use of its network. MARK PIKE.



The view from the cab of 374034, running at 300kph (186mph) on the LGV Nord in France on November 14, on the 1024 St Pancras International-Paris Gare Du Nord. ANTONY GUPPY.

WHAT ELSE WAS HAPPENING IN NOVEMBER 1994?

- The first episode of *The Vicar of Dibley* is broadcast on BBC1.
- The first National Lottery draw is held. A £1 ticket offers a one-in-14 million chance of winning.
- The *Daily Telegraph* is the first national newspaper to launch an online edition in November 1994.
- Pato Banton (with Robin and Ali Campbell) tops the UK singles chart with *Baby Come Back*, while the number one album is Nirvana's *Unplugged in New York*.
- Big at the box office is Disney's *The Lion King*.



Her Majesty The Queen boards the inaugural cross-Channel train at Waterloo International in May 1994. Commercial services started six months later. EUROSTAR.



Eurostar Chief Executive Mike Cooper (left) and Roger van Boxtel (Chief Executive Officer of NS, Dutch Railways) welcome the first commercial passenger train from St Pancras International at Amsterdam. EUROSTAR.

planned for 2014. At the same time, it was confirmed that the Class 373s would be refurbished, with the rest scrapped.

Then-Eurostar Chief Executive Nicolas Petrovic said: "This is the opening of a new chapter. It is a new era for rail. By 2014 we will have the best fleet of high-speed trains in Europe."

At the launch event on October 7 2010, Secretary of State for Transport Philip Hammond said he hoped Eurostar would run from other UK cities, but this has not materialised.

Immediately after the announcement of the e320s, the French government raised concerns over safety, due to the train's distributed power. This was eventually resolved, and the first e320s (classified Class 374s) were delivered for testing in 2013.

The first moved to the UK the following year and was unveiled to the press in November 2014, at which time it was confirmed that a

further seven trains had been ordered. They entered passenger traffic from November 2015, and are used on the London-Paris/Brussels/Amsterdam routes. They offer a 20%

increase in capacity against the '373s'.

On April 4 2018, the first commercial trains began running between London and Amsterdam. Current Eurostar Chief

EUROSTAR TIMELINE

- **May 6 1994:** Her Majesty The Queen officially opens Waterloo International
- **November 14 1994:** Eurostar services launched
- **September 28 2003:** Passengers services begin running on first completed section of HS1
- **September 4 2007:** Eurostar completes first journey between Paris and St Pancras in record-breaking 123 minutes
- **November 14 2007:** Eurostar moves to St Pancras International
- **December 31 2009:** Eurostar (UK) Ltd changes its name to Eurostar International Ltd
- **September 1 2010:** New corporate structure for Eurostar launched
- **October 7 2010:** Eurostar announces £700 million fleet investment, including new trains
- **November 2014:** First e320 unveiled at St Pancras International
- **November 2015:** First e320 enters passenger traffic
- **April 4 2018:** First commercial service between London and Amsterdam
- **September 27 2019:** Planned merger with Thalys announced

Initial Eurostar timetable (November 14 1994)

Monday to Friday				
Waterloo International	0823	1023	1553	1623
Lille Europe	-	-	-	1933
Brussels Midi	-	1438	-	2047
Paris Gare Du Nord	1223	-	1953	-
Paris Gare Du Nord	0807	-	1709	-
Brussels Midi	-	0828	-	1826
Lille Europe	-	0941	-	-
Waterloo International	1013	1043	1909	2043
Saturday No service				
Sunday				
Waterloo International	-	-	-	1723
Brussels Midi	-	-	-	2047
Paris Gare Du Nord	-	-	-	2133
Paris Gare Du Nord	-	-	-	1742
Brussels Midi	-	-	-	1822
Waterloo International	-	-	-	1943
Waterloo International	-	-	-	2043

Note: All times are local time (UK one hour behind mainland Europe).

Source: RAIL 238.



Executive Mike Cooper said: "The departure of our first commercial service to Amsterdam represents a historic milestone for Eurostar and the growth of international high-speed rail."

On the 25th anniversary of Eurostar on November 14 2019, Cooper was open and honest in his views on the business. Speaking at a celebratory event at Paris Gare du Nord, he explains: "We thought about the 25 years. Do we mark what's gone on, or do we mark the future? We transformed travel and, looking forward, high-speed rail offers a viable alternative to flying."

Cooper says the business could yet offer more trains between London and Paris, and that it is also looking at using the existing fleet and how that can be improved.

"It's one hour and 20 minutes to turn a train around here in Paris, and 70 minutes in London. If we can speed that up, we get more

utilisation.

"Passenger reaction has been that they like the e320s and Siemens are pretty good, too, but the reliability is not where it needs to be."

Cooper also says he expects to see competition on the route. Deutsche Bahn had been keen to run on HS1, and even brought an ICE3 set to St Pancras, but no progress has been made with this. "The industry changes," says Cooper. "Five or six years ago is very different to now."

He also spoke about Stratford International, which is currently only served by the Javelin

Eurostar traction through the years on November 14. 373205 (centre) and 373229 (right) have just arrived at St Pancras International with the 0843 from Paris Gare du Nord and the 0852 from Brussels Midi respectively, alongside Eurostar 374010. Thirty-one Class 373 sets (two nine-coach pairs) were ordered for Eurostar services (16 for SNCF, four for SNCB and 11 for European Passenger Services), with a further seven (two seven-car sets) ordered for Regional services. Following the introduction of the Velaros, there are eight e300 trains left in service, and 17 e320s. ANTONY GUPPY.

service on HS1. Other than a two-week period during the Olympic Games in 2012, the station has never been served by Eurostar. Could that change, due to the growth of the north London location and its transport links to the City?

"Stratford can be thrown into the mix. It's about understanding the network and what is needed, as well as looking at the optimum use of the network and the trains."

The cross-Channel operator has been through plenty of changes. And the uncertainty surrounding Brexit, along with the planned merger with Thalys (see *Network News*, page 21) as part of the Green Speed Project, means there are plenty of interesting times ahead for a revolutionary service. ■

ONLINE CONTENT

- Inside the refurbishment of a Class 373: <https://bit.ly/2XMKf2Z>
- Class 374 wins 2018 National Rail Awards Train of the Year: <https://bit.ly/2sbh10D>