

# The Future Development of Air Transport in the United Kingdom

A submission by Eurostar  
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## Introduction

- 1 This submission is provided as a response by Eurostar to the UK government's consultation on the Future Development of Air Transport in the UK.

### **Summary**

- 2 The demand for growth in the short haul air transport market can be substantially met by high speed rail. Over £5 billion has been invested in the UK's high speed rail infrastructure with the network already funded and constructed or nearing completion within the next five years.

Encouraging a passenger switch to high speed rail is preferable for the environment as, unlike airport expansion, no new major construction works are necessary. In addition, the majority of passengers travelling to Eurostar's international terminal at Waterloo already do so by public transport. Also, recent studies have shown that in terms of air pollution, high speed rail is environmentally clearly preferable to short haul air travel.

Eurostar's costs are fixed - therefore an increase in the number of passengers switching from short haul air to rail would enable fares to be decreased.

Passengers choose rail in preference to air because it is the quickest mode of transport from city-centre to city-centre; it is more comfortable; it is perceived to be 'hassle-free'; and the journey can be spent relaxing or working productively via laptop or mobile phone.

Eurostar's routes between London, Paris, Brussels and connecting services to destinations across continental Europe provide a network that can be developed to include airport hubs.

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## About Eurostar

- 4 Eurostar is the high speed passenger rail service which uses the Channel Tunnel. Currently, Eurostar is operated by Eurostar (U.K.) Ltd (a subsidiary of London & Continental Railways) in partnership with SNCF (French railways) and SNCB (Belgian railways).
- 5 Eurostar is the market leader on its core routes of London-Paris and London-Brussels. Currently, Eurostar's share of the travel market for these routes is at least four times as large as its nearest air competitor. With the opening of the two sections of the Channel Tunnel Rail Link (CTRL) in 2003 and 2007, Eurostar's main network will be entirely on high speed lines. In 2007, the journey times will be approximately 2 hours 15 minutes between London and Paris and approximately two hours between London and Brussels. Direct city centre to city centre journeys by Eurostar will compare extremely favourably with the time taken travelling to and from an airport, airline check-in times, the air journey and baggage reclamation.

Moreover Eurostar journeys offer passengers the ability to use their time productively – to work, read, hold meetings or relax – in contrast to short haul flights which are constantly interrupted both before take-off and in flight.

Eurostar reliability is also superior to airlines and will be even more so after completion of both sections of the CTRL with Eurostar operating on a modern, dedicated high-speed rail network.

- 6 Eurostar also operates limited services in niche markets, including a daily service from London to Disneyland® Resort Paris, a weekly summer service from London to Avignon (Provence) and a twice-weekly winter ski train to the French Alps.

In addition, continuously improving connections to other high speed lines, via Eurostar's hubs at Lille, Brussels and Marne-la-Valée and via connecting stations in Paris, mean that over 100 destinations across France, Belgium, the Netherlands and Germany are readily available through the 'Eurostar Plus' network.

## The main markets

- 7 For the business passenger, journey time is important and the linking of cities up to 500km apart by a 300kph rail service enables rail to take the largest market share. Leisure passengers are less concerned about journey time and frequency but destination is a key issue. Destinations up to 1000km can be reached with a journey time of around 6 hours with a 300kph rail service attracting certain niche leisure markets to rail. The map below shows European destinations within 500 and 1000km of London.



The table below shows the total number of passengers between the main London airports (Heathrow, Gatwick, City Airport, Stansted and Luton) and eight principal destinations within the 500-1000km range in 2002. A significant proportion of those passengers travelling for leisure could be persuaded to switch from air travel to high speed rail.<sup>(1)</sup>

Destination	Number of passengers
Bordeaux	196,042
Toulouse (Blagnac)	309,413
Lyon	317,273
Strasbourg	68,516
Cologne (Bonn)	322,058
Frankfurt (Main)	1,855,996
Stuttgart	311,479
Geneva	1,503,561

- 8 When CTRL Section 2 is complete in 2007, Paris will be approximately 2 hours 15 minutes and Brussels approximately 2 hours from London by Eurostar. The completion of the Dutch high speed line, also planned for 2007, will make a rail journey time of around 3 hours 30 minutes between London and Amsterdam possible. London-Paris is the largest city pair air travel market in Europe and London-Brussels/Amsterdam is the second largest. In addition, the expanding high speed rail networks in France and Germany are opening up further attractive leisure destinations/routes, such as St Pancras-Frankfurt or St Pancras-Berlin.

## The infrastructure

- 9 The European Union plan for high speed rail lines is shown in the diagram below. CTRL will be completed by 2007 and will complete the Eurostar high speed rail network which will include the Channel Tunnel, the high speed line in France to Lille and Paris with links to the rest of France, the Belgian high speed lines to and beyond Brussels. The UK part of this infrastructure is already funded through the arrangement with London & Continental Railways to build the CTRL. Much of this infrastructure has already been built or is due for completion within the next five years.

The new UK high speed line is being built to extremely high environmental standards. It is in tunnel on many sensitive sections to eliminate noise pollution. Land take and cut and dislocation are also minimised by tunnelling, cut and cover sections and extensive landscaping and tree planting. The marginal environmental impact of a seat kilometre on Eurostar will be extremely low compared to a short haul flight, in terms of noise, air pollution and energy consumption (see 'ENVIRONMENTAL BENEFITS', sections 14-16 below).



- 10 A new UK terminal will be built for Eurostar services at London St Pancras in time for completion of CTRL Section 2 in 2007. The terminal will become one of Europe's largest rail transport hubs connecting international Eurostar services to the rest of the UK with a quick and simple interchange to the East Coast main line and, via a one-stop journey from the new Underground station, the West Coast main line.

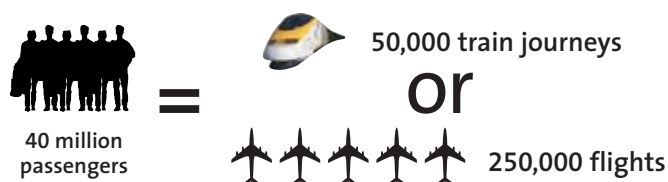
The UK East and West Coast main lines, after currently planned upgrades, will operate at 200 or 225kph. The Strategic Rail Authority is studying the concept of a new North-South high speed line, that, if it goes ahead, could be operating within a 30 year time horizon.

- 11 Rail infrastructure at Heathrow, Gatwick, Stansted and Luton Airports is not currently linked to high speed lines. Eurostar suggests that it should be in order to realise the government’s objective of an integrated transport policy. The development plans for Heathrow safeguard for additional rail connections. On the continent, Paris Charles de Gaulle and Frankfurt Airports have high speed line stations. When the Dutch high speed line is completed, Amsterdam Schiphol will also join the European high speed network.

## Capacity

- 12 CTRL, the Channel Tunnel and the French and Belgian high speed lines have the capacity to accommodate six international trains per hour in each direction, in addition to domestic services. St Pancras can cope with a similar number of terminating international trains. SNCF and SNCB are committed to securing this capacity for Eurostar on their networks and at stations. Currently, Eurostar runs a maximum of three trains per hour during peak hours. This is expected to grow to up to five trains per hour at peak times when CTRL Section 2 is complete.
- 13 The maximum available capacity is made up of the number of paths available and the number of seats per train. Six trains/hour in each direction operating for 12 hours/day means over 50,000 train journeys/year. With the current seating capacity of 750 seats, nearly 40 million seats would be available. If 1000 seat trains are used,<sup>(ii)</sup> 50 million seats would be available. Trains do not operate 100% full at all times. Nevertheless, these figures indicate the massive potential capacity that the existing and currently planned network could accommodate.

Flights between London, Paris, Brussels and Amsterdam are generally operated by smaller aircraft with around 150 seats. Therefore one Eurostar journey is equivalent to five aircraft movements at London’s airports. From 2007, Eurostar services operating at full capacity (with 750 seat trains making over 50,000 train journeys/year) could transport passenger numbers equivalent to that carried by 250,000 short haul flights to near continental Europe.



By way of comparison, Stansted airport’s single runway currently has capacity for 260,000 air transport movements per year. As such, in 2007, the capacity on the high speed rail network would be roughly equivalent to the maximum capacity currently offered by an airport the size of Stansted.<sup>(iii)</sup> The increase in rail capacity offers the possibility of reducing aircraft movements at London airports by a sizeable amount and thus could alleviate a significant proportion of the demand for increased airport capacity.

Section 14 (below) sets out the major environmental benefits that result from encouraging a modal shift from air to rail for short haul travel.

## Environmental benefits

14 One of the key environmental benefits of encouraging a switch from short haul air to high speed rail is that the vast majority of the infrastructure necessary for high speed rail is already in place or is currently under construction and due for completion within five years. In contrast, expanding capacity at London's airports would necessitate embarking on a major construction project from scratch.

15 Another environmental benefit of Eurostar is that the vast majority (70%) of British passengers travelling to Waterloo International to catch Eurostar services already do so by public transport (41% by train, 24% by Underground and 5% by bus/coach) with only a minority arriving by car (11%) or taxi (19%).

Waterloo International offers seamless connections to domestic rail services provided by South West Trains, Wales and Borders and Connex (Waterloo East) and four Underground lines. The new international Eurostar terminal at St Pancras will connect to the East and West coast main lines and six Underground lines.

In contrast to the large numbers of passengers arriving at Waterloo International by public transport, only 35% of passengers travelling to Heathrow do so by public transport (13% Underground, 8% train and 13% bus/coach) with the majority of passengers arriving by car (35%), hire car (3%) or taxi (27%).<sup>(iv)</sup>

16 A number of independent studies have shown high speed rail to have a significantly reduced impact on the environment compared with short-haul aircraft flights operating over the same routes.

1. Aircraft burn a significant amount of fuel during take off and the initial stages of a climb to reach cruising altitude. A recent report from the Royal Commission on Environmental Pollution (RCEP) identifies fuel use per passenger kilometre as an appropriate measure of the relative amounts of fuel used by aircraft. It states that aircraft operating over short haul routes – e.g., London to near continental Europe – use a disproportionately high amount of fuel per passenger kilometre.<sup>(v)</sup>
2. Burning large volumes of fuel emits harmful greenhouse gases directly into the atmosphere. This type of large scale emission of carbon dioxide contributes to global warming.
3. In comparison to an aircraft operating over a short haul route high speed rail has a significantly lower environmental impact. The RCEP report states:

*'For rail travel, carbon dioxide emissions and fuel use per passenger-kilometre are typically at least an order of magnitude lower [than for air travel]. [...] for relatively short journeys such as within the UK or to the nearer parts of continental Europe, the environmental impacts of air travel are disproportionately high.'*<sup>(vi)</sup>

4. As was shown in 'CAPACITY' (points 12 and 13) above, from 2007 Eurostar has the potential to transport 40 million passengers per year to near continental Europe. This is equivalent to 250,000 short haul flights from London airports to the continent. Clearly, any reduction in short haul aircraft movements from London airports would lessen the amount of carbon dioxide released into to environment. The RCEP say of short haul travel:

*'These are precisely the journeys for which efficient rail travel should be available. Promoting air rather than rail for these journeys therefore amounts to a failure to provide a properly integrated transport system.'*<sup>(vii)</sup>



5. If rail begins to replace air services as the principal mode of transport for short haul routes from the UK to continental Europe additional runway capacity will be released at London's airports. This 'spare' capacity could be used to satisfy the growing demand for medium and long-haul services.
6. In addition, as noted in 'THE INFRASTRUCTURE' (point 9), the infrastructure to operate a high speed rail service from London to the continent is already in place or near completion. A telling comparison is to contrast the marginal effect of accommodating growth on Eurostar against the large-scale environmental impact of creating new air transport infrastructure. It must make excellent environmental sense to make fullest use of the capacity created by CTRL and growing European high speed rail networks – all of which are being built to produce very low environmental impacts in operation.

It is clear that encouraging a modal switch from air to high speed rail for short haul trips from the UK to near continental Europe will have a positive impact on the environment.

As the RCEP comment:

'Rail transport is demonstrably more sustainable than air transport [...] while it is not a viable alternative to long- or medium-haul air journeys, it ought to be a serious competitor to short haul flights.'<sup>(viii)</sup>

## Voluntary modal switching

17 The consultation document indicates that previous studies of substitution concluded that there would be little voluntary switching of modes.<sup>(k.)</sup> However, the expansion of the high speed rail network in Europe proves that when people are offered a high speed rail connection between two city-pairs voluntary modal switching from air to rail will occur.

In just eight years of operation, Eurostar has gained a 65% share of the air/rail market on the London-Paris route and over 40% on the London-Brussels route. The Thalys high speed rail service has almost completely replaced air on the Paris-Brussels route. Air France no longer operate any air services connecting these cities. The route is now only served by 2 daily flights operated by Belgian carrier SN Brussels. On the Paris-Lyon route high speed TGV services have taken significant passenger traffic off the airlines serving the city-pair.

It is to be noted that the consultation document covered only domestic UK routes without 300kph operations and also did not consider integrated hubs at airports.

## Cliffe

18 A special mention is necessary of the option for a new airport at Cliffe, from the single viewpoint of the proposed rail connection. The consultation document suggests that a link could be made to the CTRL and that airport express services would use this route to central London. The consultation document says that: 'Choices may have to be made between different uses of the line, altering the balance between international, Kent domestics and airport services.'<sup>(k.)</sup>

Airport express services for an airport of this size and location would need to be at least eight trains per hour, and the CTRL is designed to accommodate eight Eurostar and eight domestic services. If CTRL is used for airport express services, then either or both Eurostar or high speed domestic services would need to be severely restricted or abandoned altogether.

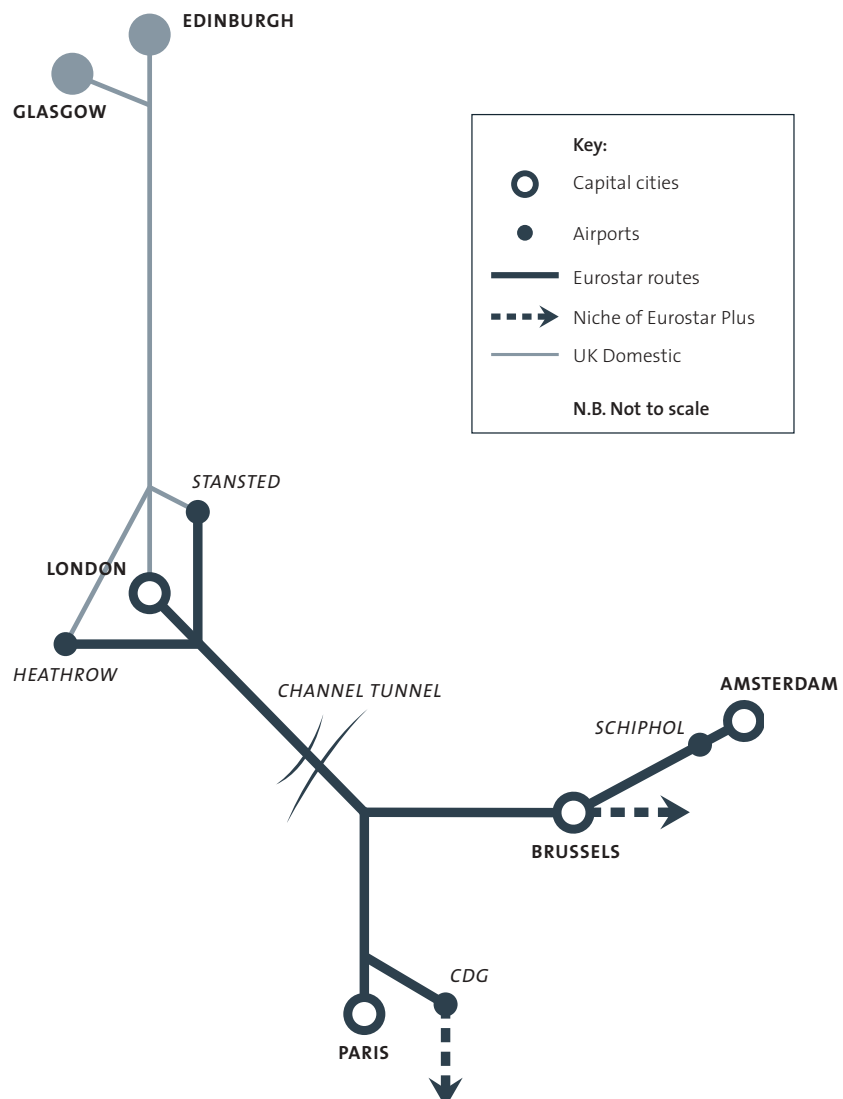
Clearly Eurostar would not wish to give up any of its paths, but the use of a short section of CTRL by airport express services would mean that it would be highly congested between the junction for Cliffe and London and significantly under-utilised for the remainder. The conclusion is that CTRL should not be used for a rail connection to a new airport at Cliffe.

## Airport hubs

19 Airports are transport interchanges with a high level of connectivity between modes. As such they are able to cope well with interchange. Significant air transport demand arises through flight connections but there may be scope for one leg of the journey to be by rail. In addition, airports serve their immediate region, where there may be significant demand from non city centre origins and destinations.

## The concept

20 The concept put forward is therefore a network of high speed services between city centres and hub airports, as follows:



21 On this network between London and the continent, the following could be the pattern of services:

Network	Route	Frequency
Core	Capital – capital	Half hourly
Airport	Airport – capital	4-6 per day

This pattern would be well within the capacity noted earlier. Half hourly services between the capitals would be highly attractive to all types of passengers and are likely to attract a high market share. Thalys rail services between Paris and Brussels operate every half hour with a journey time of 1 hour 30 minutes.

22 One of the advantages of rail services over air transport is that they can serve intermediate points with only a limited effect on end to end journey time. Thus, in the network shown above, intermediate points at Stratford, Ebbsfleet, Ashford, Calais, Lille, Antwerp and Rotterdam enable a much wider market to be served.

23 The Airport-capitals services would supplement the air services and would attract some flight connection traffic as well as passengers who would find the airport destination more attractive than the city centre. With airports increasingly serving as multi-modal hubs, onward connections would also attract passengers. An alternative to direct Eurostar services to airports would be high frequency services between airports and Eurostar services with a seamless interchange. Eurostar services on the airport network would be further enhanced by joint ticketing arrangements with airlines. Eurostar is currently developing joint ticketing arrangements with airlines serving the US to offer American passengers the opportunity to purchase an air ticket to the UK and an onward Eurostar ticket to Paris or Brussels in one single transaction.

24 Niche leisure services could operate from London to continental European destinations at a frequency ranging from weekly seasonal to daily. In addition, by changing at Eurostar's key hubs (Lille, Marne-la-Valée, Brussels and the Paris stations), over 100 destinations throughout Europe are accessible at higher frequencies. These rail services would provide an alternative to 'low cost' air routes which currently operate from smaller airports.

25 The UK domestic part of this proposal is not for Eurostar to promote, and so it is indicated only for the sake of completeness. It is clear, however, that rail services could only have a significant impact on the demand for domestic air services if there were a new North-South high speed line.

26 The share of passengers on the core and airport networks in 2002 and, as part of an integrated transport policy, a possible target for 2030 could be as follows:

Route market share %	2002		2030 target	
	Rail	Air	Rail	Air
London – Paris	65	35	85	15
London – Brussels	45	55	75	25
London – Amsterdam	5	95	50	50
<b>Total:</b>	<b>50</b>	<b>50</b>	<b>70</b>	<b>30</b>



As Eurostar is already the clear market leader on the London-Paris route and has the largest share of the London-Brussels market, any attempts to increase these market shares will involve building on the substantial base that has already exists rather than attempting to develop a new market from a 'standing start'.

Growth from the current level of passengers at around 3.5% pa (at the lower end of the Department for Transport forecast model) would give the following passenger numbers, with two scenarios for 2030, the first assuming no change in share and the second with the target share.

Passengers (millions)	2002		2030 existing share		2030 target share	
	Rail	Air	Rail	Air	Rail	Air
London – Paris	5	2	12	6	16	2
London – Brussels	2	2	5	5	8	2
London – Amsterdam	0	3	1	7	4	4
<b>Total:</b>	<b>7</b>	<b>7</b>	<b>18</b>	<b>18</b>	<b>28</b>	<b>8</b>

Note that in the target share scenario Paris and Brussels air passenger numbers are the same as currently. In other words passengers would still be able to choose to fly. With the target market share the numbers would represent a switch of about 10 million passengers using rail instead of air by 2030. The numbers attracted to the niche leisure network would be small, but could represent a further 2 million choosing rail instead of air.

Although Eurostar operates in a competitive environment - it is its objective to achieve this increase in market share on a normal commercial competitive basis without government subsidy.

The advantages of high speed rail over short-haul air travel are laid out elsewhere in this submission, however, it should be noted that Eurostar is also competitively priced. Recent Eurostar research compared Eurostar's prices to those offered by the 'low cost' airlines over three busy holiday weekends (11-13 April 2003, 17-22 April 2003, 25-27 April 2003). Of a total of 45 possible permutations of travel times and air carriers, the Eurostar fare was cheaper on 40.

27 In terms of infrastructure, London-Paris-Brussels-Amsterdam high speed lines are either in place or under construction, including access to Paris Charles de Gaulle and Amsterdam Schiphol Airports. Access to Heathrow by Eurostar trains is possible via routes either north or south of London and there is safeguarding for additional connections in the planning of Terminal 5. At Stansted, the major development of the airport would require significant additional rail infrastructure which could be provided as a new high speed route from Stratford, perhaps as part of the proposed North-South high speed line.

28 These numbers of passengers using rail would be well within the capacities noted earlier and therefore no further investment would be needed in the CTRL.

## Conclusion

29 The vast majority of the high-speed rail network connecting the UK to the continent is already in place or under construction. Greater use of this infrastructure and the creation of new links and connections at airports would reduce demand for short haul air travel.

Eurostar alone could accommodate a significant share of this demand by offering capacity equivalent to 250,000 short-haul aircraft flights – roughly equivalent to the maximum capacity currently offered by Stansted.

As the high speed rail infrastructure is already in place a significant modal switch from air to rail does not require any large scale construction work that would have a negative impact on the environment. Moreover, high-speed rail has a demonstrably lesser impact on the environment than short haul aircraft operating over the same routes in terms of emissions of harmful greenhouse gases.

**Eurostar has the potential to make significant material contributions to meeting changes in demand for short haul travel. Instead of creating new air transport infrastructure to meet unconstrained demand, the preferred option should be to meet this demand by the use of already available capacity on Eurostar.**

## References

- i. Civil Aviation Authority Airport Statistics. Passengers include revenue and non-revenue traffic. Including passengers who are interlining at the reporting airport.
- ii. This is perfectly feasible post-2020 when existing Eurostar sets are likely to be replaced by double-decker 'Duplex' sets enabled by CTRL's gauge.
- iii. Department for Transport, The Future Development of Air Transport in the United Kingdom: South East, Second Edition February 2003, table 9.1: Forecasts of demand for Stansted, p.81
- iv. Civil Aviation Authority, 2001 survey.
- v. Royal Commission on Environmental Pollution – 'The Environmental Effects of Civil Aircraft in Flight' (Special Report), section 4.11, p.23
- vi. Ibid., section 4.39, p.30
- vii. Ibid., section 4.39, p.30
- viii. Ibid., section 5.19, p.33
- ix. Department for Transport, The Future Development of Air Transport in the United Kingdom: South East, Second Edition February 2003, section 17.10, p. 151
- x. Ibid., section 11.10, p.102