

# Heathrow Express

Paul Le Blond

## Famous for 15 Minutes

'In 15 minutes—every 15 minutes' is the slogan of the new *Heathrow Express* rail link between Heathrow Airport, the world's busiest international airport, and central London. This remarkable journey time provides air passengers with a dramatic improvement in choice of access and should enable Heathrow to remain at the top of the league of international airports.

Heathrow has been linked to the London Underground by the Piccadilly Line since 1977, and this line carries more air passengers than any other airport rail link in the world. However, air passengers have to share the train with commuters and the trains are not suitable for people with baggage or in a hurry.

In 1985, the UK government decided that expansion of Heathrow could not continue without a main line rail link. Following studies of alternatives, the route from Heathrow to London's Paddington Station was chosen, 70% of which uses the straight and fast Great Western main

line built by Brunel in the mid-nineteenth century. Paddington is in the heart of London's West End tourist and business centre.

In the mid-1980s, the UK's railways and airports were in the public sector, but by 1987, BAA (the major airport group) had been privatized. The new motivation that this gave to BAA encouraged it to promote a joint venture with British Railways to develop the *Heathrow Express* link. In more recent years, as the UK railway industry was reorganized and privatized, BAA took over more of the project and ended up with 100% ownership.

## Building the Infrastructure

It took 2.5 years to get approval to build the link, and work started in 1993. It then took five years to complete the construction. The route from Paddington is 25-km long, and about 18 km of this was the existing Great Western main line. This was electrified to the 25-kV AC catenary system. A new branch line was built north of the Airport mainly in

tunnel. Special environmental measures were taken. To reduce noise levels by up to 3dB at nearby houses, a green wall made of soil and plants was built next to the railway to blend in with the embankment. To mitigate the loss of some ecologically valuable ponds, new ponds were built and nesting birds relocated. The 7 km of tunnel starts as two single bores to the first Airport station, where there are two platforms serving Terminals 1, 2, and 3. The separate lines then join to form a single track running to the second Airport station that serves Terminal 4. The main tunnels were cut using tunnel boring machines through London Clay, but a section through an old refuse tip was built using cut-and-cover techniques. The Terminal 4 station tunnels were built using sprayed concrete linings. The stations are about 25 metres below ground level and access to the terminals is provided by lifts and escalators, some of which feed directly into the Departures and Arrivals concourses. The train tunnels include an emergency walkway that connects to escape shafts at every kilometer, in some places combined with a ventilation shaft. All the tunnels can be forcibly ventilated by two-way fans to remove smoke.

## Rolling Stock

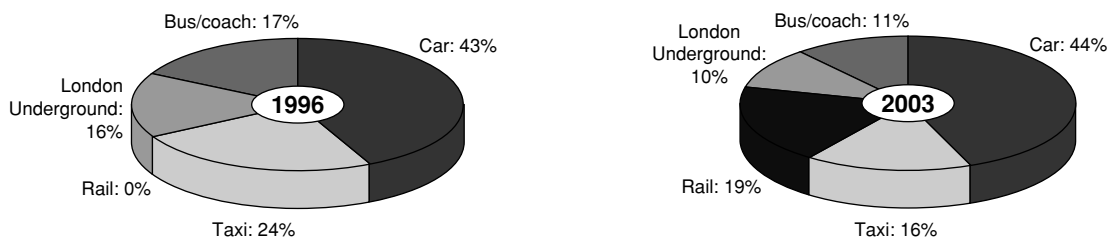
The trains are eight-car EMUs made by Siemens/CAF. Each carriage is 23 metres long, and the train is formed of two four-car units. The air-conditioned trains have about 430 First- and Express-class seats and run at 160 km/h. They are fitted with automatic train protection equipment and have the highest standards of fire protection. These latter two features were required because the trains operate in long tunnels at Heathrow. The rolling-stock fleet is composed of 14 four-car units, enough to run the service with a few back-up units. They are main-



New elevated airport junction with ecologically sensitive area in foreground

(BAA)

**Figure 1 Air Passenger Modal Shares**



tained in a purpose-built service facility next to the main line.

### Service for Air Passengers

The simple fare structure makes buying a ticket easy and simple—a single costs £10, and a return is £20 (£1 = US\$1.60). First class costs £20 one way. The airline ticket may include the train fare but if it does not, tickets can be bought at shops, travel agencies, BAA ticket offices, multilingual ticket machines, and from the Customer Services Representatives who pass through the trains. Payment can be made by credit card and in foreign currencies. Arriving passengers continuing their journey on other public transport can buy through tickets to the London Underground or other railways. Services run every 15 minutes from 05:00 to 23:30, 7 days-a-week with a remarkable journey time of just 15 minutes between Paddington and Terminals 1, 2, and 3. This is the fastest way of getting to Heathrow from central London. By comparison, the Piccadilly Line takes between 45 minutes and 1 hour, and the buses and taxis take about 1 hour and much longer in rush hours.

The excellent baggage facilities eliminate the difficulties air passengers have in

handling bags on public transport.

On-train travel information is provided by Express TV with four screens in each car. In the 15-minute journey, Express TV gives information about the *Heathrow Express* service, directions for onward travel from Paddington Station, and BBC World News and Weather. Announcements about arriving at the end of the journey are triggered by trackside equipment. Each car has a public telephone and mobile telephones can be used throughout the journey even in the stations deep beneath the Airport, thanks to the installation of a leaky feeder aerial. Heathrow is fully accessible to disabled passengers. Level floors and platforms plus extensive provision of lifts make it easy for wheelchairs, and each train has a secure position for a wheelchair as well as a wheelchair-accessible toilet.

Furthermore, passengers who travel infrequently may not be familiar with the London Underground and UK rail networks, so simple signs and information systems make the journey easy and give reassurance. High staffing levels at stations and on the trains provide a human touch through their excellent customer service aptitude.

### Heathrow Transport Hub

The *Heathrow Express* was not designed in isolation from the rest of the transport network serving the airport. Heathrow is the world's largest international airport in terms of the number of passengers. In 1998, there were a total of 53 million international passengers out of a total of 60 million, 70% of whom were not transferring between flights. Figure 1 shows the modal shares in 1996, before the *Heathrow Express* service started, and the projected shares in 2003. In 1996, private cars formed the largest share and most of these journeys were to drop off and pick up air passengers, meaning two car trips for every air journey. Similarly, taxis usually either enter or leave the airport empty. Buses and coaches also carry a significant number of air passengers, particularly on the long-distance coach network that operates successfully throughout the UK. In fact, Heathrow is the largest bus and coach hub in the UK because many coach services and passengers use it as a staging point. London Underground has achieved a significant share of air passengers, despite its shortcomings and also carries many airport staff and visitors.

Initially, we expect the *Heathrow Express*

to capture a market share of about 14%, which will remove 3000 vehicles per day from the roads around the Airport. The target share of public transport is 40% by 2000, rising to 50% in the longer term. Achieving this share requires both a good rail link as well as a whole series of improvements to public transport and, in line with national policies, restraints on use of private cars.

Heathrow transport policies target improvements across the full range of public transport modes. Trains are good for moving large numbers of people between a few key points, but they are less good at distributing smaller numbers. Buses are more economical for these 'thinner' flows and also more flexible in adapting rapidly to changed circumstances. New bus designs can match and sometimes exceed the comfort of trains, and road congestion can be avoided by enforcing bus priority lanes on roads. Our plans for public transport at Heathrow include provision of bus interchanges and encouragement, often by

start-up subsidy, of new or improved services.

Although BAA wants to cut the number of car journeys, the private car will still be the most popular mode for the majority of passengers, so there are still plans to provide spaces for roads and car parking. Airport staff face more difficulties with public transport because their working hours are often outside the hours when public transport is running. The *Heathrow Express* offers a 75% discount on monthly tickets to Airport staff and there are also discounts on many of the bus routes to the Airport. Once at the Airport, the *Heathrow Express* between Terminals 1, 2, 3 and 4 is free, as are Airport buses, so there is no need to drive around the Airport.

---

### Growing Passengers

---

In the few months since operations started on 23 June 1998, the *Heathrow Express* is carrying more than 10,000

passengers a day. On an annual basis, this is over 3.5 million and the forecast for the first full year is 6 million.

A marketing campaign was designed to make people aware of the new service and to get them to try it. Having Prime Minister Tony Blair open the service was marvellous free advertising, but there is also an extensive paid campaign. Much of our advertising is based on the 15-minute journey time, and the catchphrase 'Famous for 15 minutes' first coined by Andy Warhol, fitted perfectly, so the TV advertising and other media campaigns use Warhol-type images of people and *Heathrow Express*.

Other parts of the marketing campaign concentrated on getting people to try the service, hoping they would be so impressed that they would come back again. Many complimentary tickets and upgrades were distributed to regular air travellers (through airline frequent flyer clubs), to shareholders, and others. Coupons were also provided in newspapers. This approach was very successful and our market research shows a high proportion of repeat customers. The main customers are business travellers, which is not surprising because our very fast journey time appeals to business people who will value the extra 30 minutes or 1 hour on a 1-day business trip to London. This shows clearly in the passenger weekly profile; peak days are Mondays and Fridays, while the numbers are much lower on Saturdays and Sundays. There are also daily peaks in the morning flow into London and the evening flow to the Airport. We are now adjusting our campaign to see if we can attract other types of customer. For example, to attract families on holiday trips, we are offering free child tickets when accompanied by an adult during school holidays.

Word of mouth is one of the strongest marketing tools and we are endeavouring to ensure that customers enjoy their



Lifts and escalators in Heathrow Central Station

(BAA)



Heathrow Express train standing at Paddington Station

(BAA)

trip and recommend the *Heathrow Express* to friends and colleagues.

---

### Financing

---

The *Heathrow Express* involved capital spending of more than £450 million. The largest amount was spent on the tunnels at Heathrow, with smaller sums spent on the rolling stock, depot, electrification and Paddington Station. This sum was raised by BAA plc., a private company listed on the London Stock Exchange. Financing came from the company's own cash flow and from loans from the European Investment Bank and the Export-Import Bank of Japan.

The surplus of revenue over operating costs is confidential, but it is expected to give shareholders an appropriate return on capital investment. There is no cross subsidy from other parts of the business and there is no public subsidy.

---

### The Future

---

The massive investment in rail infrastructure at Heathrow was undertaken on the basis of the initial *Heathrow Express* service to Paddington, but it was planned with expansion in mind to accommodate additional services.

The basic infrastructure has a capacity of twice the initial service of four trains each way each hour. With further extensions of passenger terminals at Heathrow, up to 16 trains per hour each way could be accommodated. Studies have been underway for some time to see if there is a demand for additional services and whether they could be viable.

In the next 5 years, there are two prospects that look worthwhile. Central London is by far the dominant destination and a second *Heathrow Express* service to St Pancras, another London railway terminus is planned. St Pancras is east of central London while

Paddington is west, so a second service would serve a different market. In addition, this second service could call at intermediate stations in west and north London. A second prospect is an international service from Paris by *Eurostar* through the Channel Tunnel. We are looking at the technical and commercial issues with the *Eurostar* operators.

---

### International Comparisons

---

BAA believes there are about 60 existing airport rail links around the world with another 100 being planned or built. As most air journeys are international, it is interesting to compare the different experiences of air passengers at each end of a trip.

The *Heathrow Express* is a dedicated airport rail link, in the sense that it is non-stop from the Airport to city centre and is clearly designed for air passengers, with special rolling stock and arrangements for baggage, etc. Other similar examples are the *Airport Express* to the new Hong Kong Airport, the *Gardermobanen* to Oslo's new airport, the *Arlanda Express* in Stockholm, and the *Narita Express* in Tokyo. This type of link seems successful where there is heavy demand between the airport and city and where there are many international passengers.

A more common type of airport rail link is an extension of a city metro or regional rail system to the airport. At Heathrow, the *Piccadilly Line* is a good example. Other examples in Europe are Paris Charles de Gaulle, Frankfurt and Barcelona airports. This is also the most common type of airport rail link in North America, with examples at Chicago O'Hare, Washington National and Boston Logan International. The advantage of these links is that they have excellent through connectivity with the rest of the network, but the disadvantage

is that they are not designed for air passengers who must share trains with other users. Their success in attracting air passengers is more mixed, but they usually attract more airport staff.

A third type of rail link involves high-speed long-distance trains. The TGV station at Charles de Gaulle Airport in Paris and the ICE station being built at Frankfurt Airport are two examples. The main principle here is that some short-haul air services are better by train as long as the journey time is not much longer. We are looking at this possibility at Heathrow too.

Of course, there are many types of hybrid airport rail links and others where rail services are connected to the airport by bus or transit links. Each situation is different and there is no universal right answer. However, there is a lot of expertise and knowledge available from planners, designers, and operators and several have now grouped together as the International Air Rail Organisation (IARO). The objective of this group is to pool knowledge and share good ideas so that members can learn from each other's experience. A best practice guide has been produced which picks out examples from around the world. Members solve common problems through conferences, meetings and newsletters. Membership is open to train operators, airports, airlines, consultants, contractors and others who have a direct involvement in airport rail links. The URL is <http://www.iaro.com>.

**Conclusions**

Aviation has been one of the fastest growing sectors of the transport industry but it is recognized that rail links to airports must be part of the solution to accommodating the growth. *Heathrow Express* is an example of the new thinking that has created a purpose-designed,

dedicated rail link to London's Heathrow Airport. By making the service attractive to this particular group of discerning passengers, a new market has been created for rail.

Finally, if you had started reading this article when you left Heathrow, you would be in central London by the time you reached the end! If you need any more information, visit our website at <http://www.heathrowexpress.co.uk>. ■



**Paul Le Blond**

Mr Le Blond is Rail Strategy Manager with BAA plc. He has worked with BAA for 28 years as an airport planner and manager, and has spent the last 10 years working on the Heathrow Express project. He has a Masters degree in Transportation Engineering from Leeds University, UK, and is a Fellow of the Chartered Institute of Transport.