

Airport Operational Models

The Mayor of London's response: the Evidence Base

July 2013

1. Purpose of paper

- 1.1. This paper accompanies the Mayor's submission to the Airports Commission Discussion Paper 04 on Airport Operating Models. It provides additional evidence and detail to support points made in the submission. The letters correspond to the evidence references in that document.

2. The Value of a Hub

A. In the UK, only London and the southeast have the catchment to support a hub airport

- 2.1. Air-intensive industry sectors – including banking and finance, insurance and pension funds and market research and management consultancy – boast both a high proportion of their transport spend on aviation – and a high proportion of total UK industry spend on aviation. There is a strong correlation between such air-intensive industry sectors and those with industry sectors with a high concentration in London.
- 2.2. Moreover, foreign direct investment (FDI) – underpinned by excellent global connectivity – plays a particularly important role in London. FDI contributed £52bn to London's economy in 2008 and foreign-owned firms created 42 per cent of London's economic growth between 1998 and 2004.
- 2.3. London's economy remains more export-oriented – with the city's exports of goods and services totalling £66.4bn in 2008. These business and trade links are underpinned by a workforce which requires regular air travel for work – and expects access to air travel for leisure. This gives rise to the combination of population and economic profile that ensures the critical mass required to support a hub airport.
- 2.4. More analysis of this is provided in the report 'A New Airport for London: Part 2' (Chapter 1) published by the Mayor of London in November 2011.

B. Why a successful hub needs capacity

- 2.5. It is essential that the hub has sufficient capacity. Without this the virtuous circle of connectivity is not allowed to develop; instead, trade-offs are made between

destinations and many new routes are not even started. This is precisely the scenario that has unfolded at Heathrow, operating at 98% capacity – while European rivals have seen substantial growth in destinations served – as can be seen in the table below.

Table 1: Total Number of Destinations, Summer Season (Apr-Oct)

| | 1991 | 2011 |
|------------------------|------------|------------|
| Amsterdam | 162 | 269 |
| Paris CDG | 162 | 260 |
| Frankfurt | 187 | 284 |
| London Heathrow | 183 | 170 |

Source: OAG data

- 2.6. No less important is providing capacity headroom – spare unutilised runway capacity; this allows the hub carriers to organise their flights in connecting banks: waves of incoming flights, followed shortly after by waves of outgoing flights – which enables transferring passengers to reach the greatest number of destinations following the shortest wait. This directly enhances the attractiveness of the hub to transfer passengers; for example, Paris CDG boasts that every week its anchor carrier (Air France) and its partners offers 25,000 connection opportunities of less than 2 hours between shorthaul and longhaul flights – compared to just under 6,500 at Heathrow¹.
- 2.7. Spare capacity also ensures the hub’s resilience in the event of delays. Moreover, it helps minimise disruption following a major incident as the spare capacity enables airlines to recover their schedules. The lack of such capacity is very evident at Heathrow; when on 24 May 2013, one runway was shut for a few hours, British Airways responded by shutting down its entire shorthaul operation until 4pm.
- 2.8. Spare capacity can also enable the operation of freighter flights to support hub freight volumes including transshipment to/from bellyhold capacity.

C. Why a successful hub needs optimised facilities for airlines, passengers and freight

- 2.9. Optimised facilities include a terminal/satellite configuration that maximises efficiency of operations, minimising costs and turnaround times for airlines and processing times for passengers (including minimum connection times). This is also about providing the quality of experience passengers expect, with a seamless passage through the airport and luxury facilities, particularly for premium passengers; sufficient space is an important enabler in this regard.
- 2.10. The need for well-configured facilities, with sufficient space, equally applies to supporting the hub’s freight proposition to customers. Hong Kong’s new hub, offers four ‘1st tier’ cargo handling facilities with a combined footprint of 40 hectares; this has helped the airport become the world’s busiest by cargo traffic.

D. Why a successful hub needs night flying

2.11. Firstly, it is essential to understand what we mean by night flights. The standard 8 hour night period applied for different types of noise (including road and rail traffic) is 2300-0700; this is in line with World Health Organisation guidelines and the EU Environmental Noise Directive and, as such, is used for most official purposes in the UK. It is only aviation, where, in response to strong lobbying by the aviation industry some decades ago, a compromise night quota count period of 2330-0600 was determined by Government. The figure below sets out what this means in practice at Heathrow:

Figure 1: Heathrow noise regime in context of different night periods

| Time | Night period: Standard | Night quota count period: UK aviation | Quasi-curfew period: LHR | Movements at Heathrow |
|------|------------------------------------|---------------------------------------|--------------------------|--|
| 2230 | 2300-0700 | 2330-0600 | 2330-0430 | No movements scheduled as per voluntary agreement (in practice some flights do arrive and depart during this period) |
| 2300 | | | | |
| 2330 | | | | |
| 0000 | | | | |
| 0030 | | | | |
| 0100 | | | | |
| 0130 | | | | |
| 0200 | | | | |
| 0230 | | | | |
| 0300 | | | | |
| 0330 | | | | |
| 0400 | | | | |
| 0430 | | | | |
| 0500 | | | | |
| 0530 | | | | |
| 0600 | 60+ movements per night on average | | | |
| 0630 | | | | |
| 0700 | | | | |

2.12. Redefining the night period in this way does not change the fact that people sleep at certain times; UK data from the Office for National Statistics suggests that 90% of people are sleeping at 0600 and around two-thirds are still asleep at 0700.

2.13. It can be seen from Figure 1 above that a substantial number of flights arrive during the night, specifically between 0430 and 0700; all of those between 0430 and 0600 – and the overwhelming majority of those between 0600 and 0700 are from longhaul destinations around the globe, including routes from major established and emerging trading partners. Table 2 below sets out the arrivals on a typical Heathrow early weekday morning. Such longhaul routes are fundamental to underpin the connectivity offering of the hub; a hub that could not maintain and grow capacity in the night period would find its effectiveness and connectivity seriously undermined.

Table 2: Scheduled early morning movements at Heathrow, 4 April 2013

| Destination/Origin | Depart/Arrive | Time | Airline |
|----------------------|---------------|-------|--------------------|
| Hong Kong | Arrive | 04:50 | British Airways |
| Singapore | Arrive | 05:00 | British Airways |
| Johannesburg | Arrive | 05:15 | British Airways |
| Sydney via Hong Kong | Arrive | 05:25 | Virgin Atlantic |
| Lagos | Arrive | 05:25 | British Airways |
| Sydney via Singapore | Arrive | 05:30 | British Airways |
| Sydney via Dubai | Arrive | 05:30 | Qantas |
| Hong Kong | Arrive | 05:40 | British Airways |
| Hong Kong | Arrive | 05:40 | Cathay Pacific |
| Riyadh | Arrive | 05:40 | British Airways |
| Kuala Lumpur | Arrive | 05:50 | Malaysia Airlines |
| Nairobi | Arrive | 05:55 | British Airways |
| Singapore | Arrive | 05:55 | Singapore Airlines |

Source: flightstats.com

- 2.14. Moreover, consideration of example of the Hong Kong-London Heathrow route demonstrates the particular value of longhaul night arrivals, as per Table 3 below.

Table 3: Hong Kong-London Heathrow schedule, Summer 2013

| Airline | Flight Number | Depart HKG | Arrive LHR |
|-----------------|---------------|------------|------------|
| British Airways | BA 026 | 23:15 | 04:50 |
| Virgin Atlantic | VS 201 | 23:25 | 05:25 |
| British Airways | BA 028 | 23:45 | 05:40 |
| Cathay Pacific | CX 521 | 23:55 | 05:40 |
| Cathay Pacific | CX 255 | 00:35 | 06:20 |
| Cathay Pacific | CX 257 | 10:05 | 16:00 |
| Cathay Pacific | CX 253 | 14:40 | 20:30 |

Source: heathrowairport.com

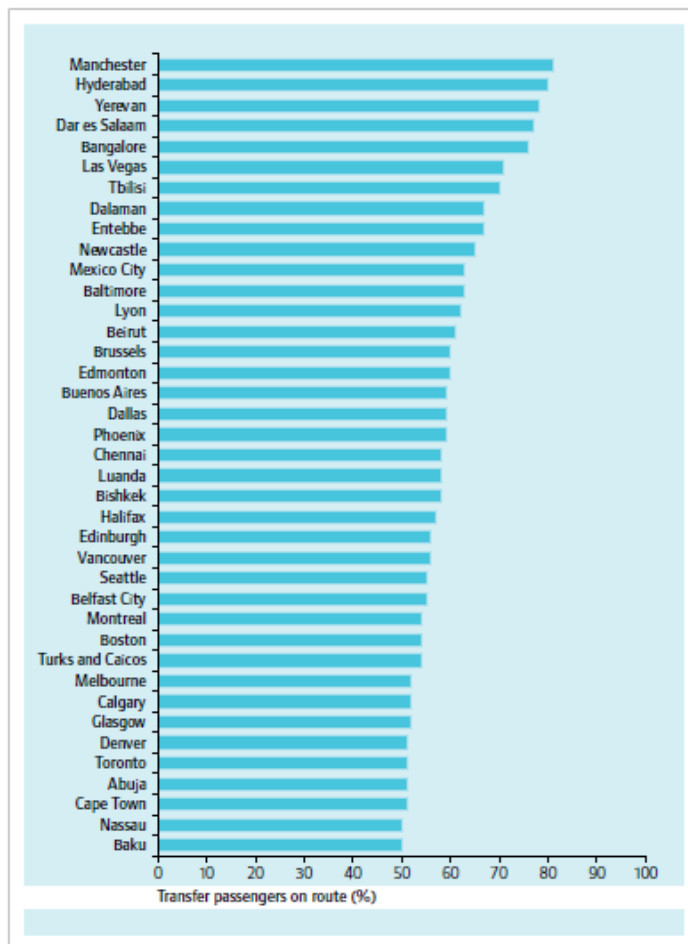
- 2.15. It is striking that of the 7 flights a day from Hong Kong to Heathrow, five flights arrive between 0430 and 0630. The main carrier on the route, Cathay Pacific is the only airline with flights arriving at Heathrow outside this window; but it operates as many arrivals in those 2 hours as it does during the rest of the day. On a highly competitive route such as this, the evidence points to a very strong passenger preference to fly at this time.
- 2.16. Night flying is also invaluable for freight activity at the hub. Several elements of the freight market rely on overnight movements, including just-in-time deliveries of high-value goods. Freighter flights, operating at night, support this key market segment, but also benefit from transshipment opportunities to/from bellyhold freight capacity in passenger flights. When Lufthansa was forced to move its night freighter services to Cologne – away from its hub at Frankfurt – it described this as a ‘flop’ precisely because it prevented easy transfers between its freighter and bellyhold capacity².
- 2.17. Night flying is essential to the effectiveness of the hub airport; this issue is dealt with

in further detail in the Mayor of London’s Response to the Department of Transport ‘Night Flying Restrictions at Heathrow, Gatwick and Stansted: Stage I Consultation’ in April 2013.

E. O/D and transfer traffic makes routes viable, especially longhaul

2.18. The combination of O/D and transfer traffic also means new routes can be offered that might otherwise not be viable. As shown in the figure below, in 2010, on 39 routes served from Heathrow, more than half the passengers were connecting at Heathrow; these included a wide range of routes, both in established markets (Dallas, Toronto) and emerging economies (Mexico City, Cape Town) – and cities such as Phoenix and Hyderabad that are not served from any other European airport.

Figure 2: Routes at Heathrow with 50%+ transfer traffic in 2010

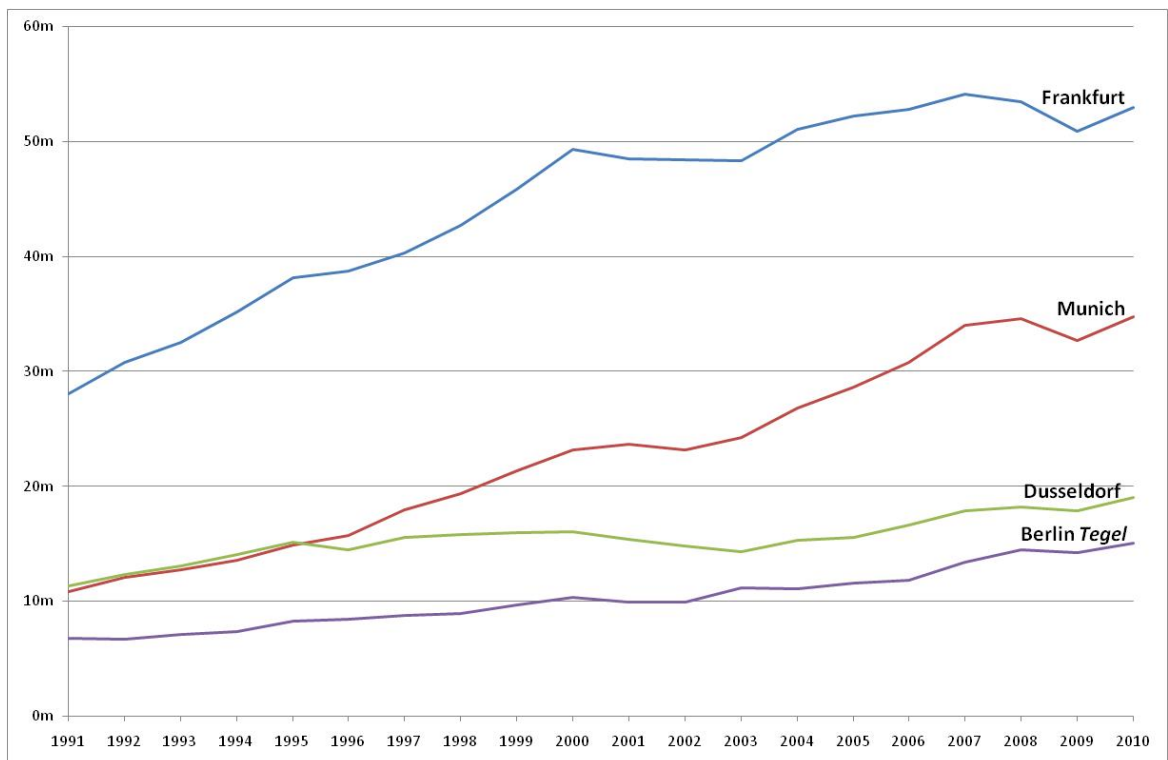


2.19. There were a further 92 routes carrying between 25% and 50% transfer traffic³. This highlights that transfer traffic can be particularly key to the viability of longhaul routes, which constitute the vast majority of the routes identified (and given most of these operate daily or less often).

F. The hub is transformative in terms of connectivity offered

- 2.20. The impact on connectivity of developing hub operations can be quite substantial. The example of Munich is instructive as the most notable example of a significant new hub airport in Europe, one that has been developed 'from scratch' over the last twenty years.
- 2.21. Munich's old capacity constrained airport closed in 1992 and was replaced by a new location some distance from the city, which Lufthansa developed as a hub airport. The result, as can be seen in the figure below, was that Munich traffic grew 222% - compared to just 68% at Dusseldorf, a non-hub airport which started at a similar traffic level. Even factoring in possible differences in growth rates of their respective regional economies, only the hub dynamic can explain that quantum of difference in growth between the two airports.

Figure 3: Annual passengers for Germany's four leading airports 1991-2010



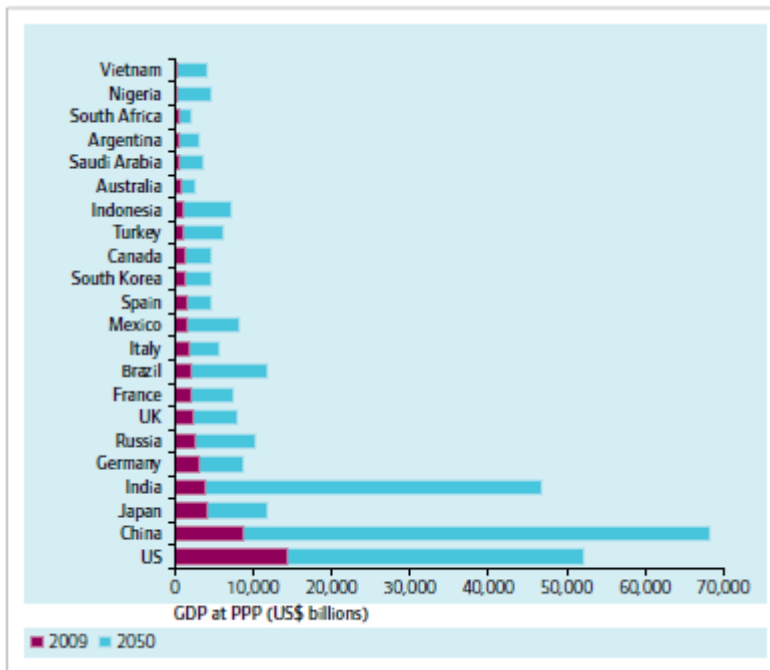
- 2.22. The range of longhaul destinations served by Munich tells a similar story. A comparison of those served from Munich in 2001 and 2011 (longhaul scheduled routes, frequency ≥ 3 /week) shows that the number of longhaul destinations has almost doubled in a decade (from 18 to 34), including 15 new destinations in Asia.

G. A more multi-polar world economy increases need for greater connectivity

- 2.23. The world economy is evolving – it is one where established major economies such as the EU, US and Japan will continue to play a major role – but with emerging economies such as the 'BRICS' and 'CIVET' countries increasingly important

alongside. The figures below illustrate the shift towards the emerging economies between now and 2050.

Figure 4: Growth in GDP of leading economies, 2009-2050



Source: *The accelerating shift of global economic power: challenges and opportunities*, PwC, 2011

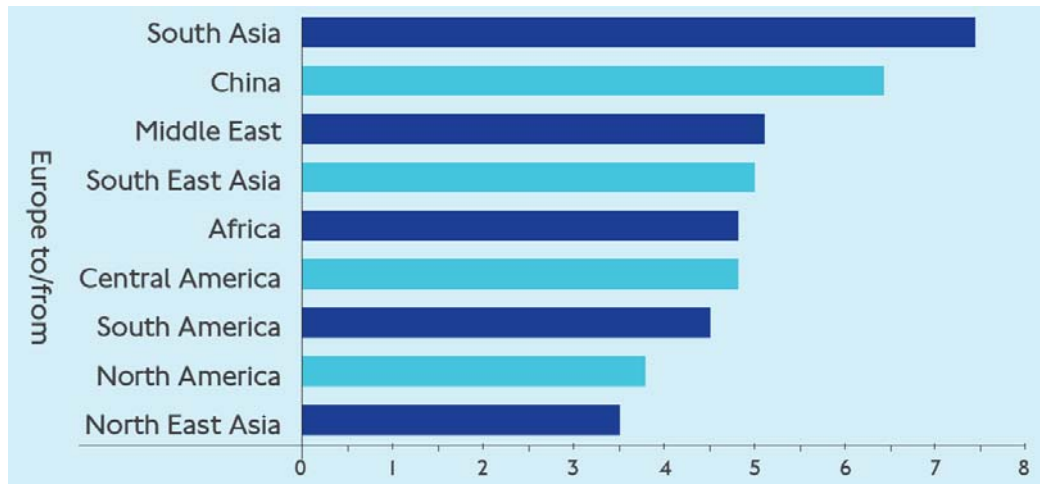
Figure 5: Fastest growing cities in terms of total GDP growth, 2007-2025



Source: *Urban world: mapping the economic power of cities*, McKinsey Global Institute, 2011

2.24. This shift in economic power is reflected in future projections for air traffic growth. The figure below shows that while routes from Europe to emerging markets such as China will show the greatest average annual traffic growth, traffic to established markets such as North America will also continue to grow.

Figure 6: Forecast annual traffic growth to/from Europe (%), 2011-31



Source: Current Market Outlook, Boeing, 2012

- 2.25. As such, the need for greater connectivity will increase – much of which can only be catered for by an effective hub airport. More analysis of global growth trends is provided in the report ‘A New Airport for London: Part 2’ (Chapter 6) published by the Mayor of London in November 2011.

H. Direct connectivity is key

- 2.26. The benefits of direct connectivity can be examined in the case of Hartford airport, Connecticut, which received its first transatlantic route in 2007. It is a secondary airport but nonetheless serving an important catchment area with a number of major US businesses as well as important universities. Its first transatlantic route was launched, not to London or Paris, but Amsterdam. In starting the route, it is unlikely that the main driver for Northwest Airlines was local Dutch traffic to and from Hartford, but rather that it saw an opportunity to link Hartford to Europe and beyond via partner KLM’s hub at Schiphol.
- 2.27. It opened up opportunities across Europe for businesses in the Hartford area. Inevitably, the closest attention was paid to links with Amsterdam and areas around it. Local businesses have said that some business links with the Netherlands and Belgium were developed as a direct result⁴ with the flight “helping Greater Hartford establish itself as a practical option for European companies looking to expand in the United States”. Though the route did not survive the wider economic downturn, it achieved good load factors and demonstrated the potential for an (unconstrained) hub to support new routes, and thus new economic opportunities that would not be viable without the hub connectivity.

3. The Future Shape of Aviation

I. Airline consolidation could lead to consolidation of hubs

- 3.1. The evidence from the US is that as the airline industry consolidated, hub services were rationalised – and in many instances, hubs closed entirely. For example, not long after the takeover of TWA by American Airlines, the TWA hub in St. Louis was phased out, as traffic was rerouted via its established, larger hub at Chicago O’Hare. While low-cost airline, Southwest, has partially filled the vacuum left, the longhaul routes TWA once operated from St. Louis have not returned.
- 3.2. While national sensitivities will complicate such manoeuvres in Europe, the trend is nonetheless visible. Recently IAG-owned Iberia has launched new routes to West Africa, destinations without a large O/D market from Madrid; it is reasonably likely that these would rather have been started from London Heathrow by IAG-owned British Airways, had the capacity been available. The emerging multi-hub airline groupings will increasingly configure their networks to maximise revenue and reduce costs, and they will not hesitate to downgrade their hub operations in a particular location if necessary to achieve this.

J. Low-cost airlines use hubs too

- 3.3. Section 3.28 of the Discussion paper states that the non-aligned low-cost carriers, “tend to prefer non-focal airports with lower charges”. Yet low-cost airlines have no principled opposition to hubs; they will use any airport if it can:
 - provide access to substantial passenger markets
 - offer sufficient runway and terminal capacity
 - enable reliable operations that keep turnaround times low, ensuring high levels of fleet utilisation
 - maintain a competitive charging regime
- 3.4. As a result, easyJet flies from several hub airports with a significant presence at hubs such as Paris CDG, Madrid and Amsterdam; Ryanair also serves some hubs, such as Madrid where it has a base.
- 3.5. By contrast, low-cost carriers tend to steer clear of London’s imperfect hub at Heathrow; its severe capacity and space constraints limit their (affordable) access to slots and also hamper reliability, making fast turnarounds all but impossible.

K. Low-cost longhaul routes do not add significant connectivity

- 3.6. There have been very few examples of low-cost longhaul carriers. In recent times, there has been Oasis, operating Hong Kong to London and Vancouver, while Asia X flew routes including Kuala Lumpur to London and Paris. In Summer 2013, Norwegian is launching flights from Stockholm and Oslo to New York and Bangkok. In almost every instance, the route is an existing route, popular with leisure travellers, but that does little to expand connectivity to secondary longhaul destinations.

L. Self-connecting is limited in its potential to sustain connectivity

- 3.7. The most notable example of self-connecting being actively encouraged is Milan Malpensa, where their 'ViaMilano' programme (elements of which Gatwick are looking to copy) reduces the inconvenience of a missed connection by providing free insurance in the instance that the passenger's incoming flight is significantly delayed. But it cannot be compared to hubbing with a mainline carrier on a single ticket; under ViaMilano, though there would be financial assistance, the burden of sorting out new arrangements in the event of a delay lies squarely with the passenger. While this may appeal to some budget leisure travellers, it will mostly not attract the premium travellers who underpin a hub.
- 3.8. So, while there is some self-connecting at Malpensa, this does not make it a hub (or any sort of approximation of one) – and this is reflected in its connectivity. The city's O/D traffic ensures a fair selection of longhaul routes, but with the exception of a few leisure destinations, the majority are primary destinations focused on hubbing at the other end of the route (such as Singapore and Dubai).

M. The two distinct trends in European aviation

- 3.9. In shorthaul, there is a definite shift towards point-to-point services, driven by the low cost airlines. Though initially focused on leisure travellers, improved product offerings and an increasing array of direct services have attracted business passengers who in the past would have flown via first- and second-tier hubs. The mainline carriers have responded; Lufthansa is transferring its extensive non-hub network (i.e. flights not serving Frankfurt or Munich) to its low-cost subsidiary, Germanwings, while Air France has launched a new low-cost strategy for its main regional bases, as well as a new low-cost airline, Hop.
- 3.10. In longhaul, by contrast there has been a consolidation of routes around major hub airports – most notably London Heathrow, Paris CDG, Frankfurt and Amsterdam. Each has been able to build a critical mass of demand to support truly global route networks, serving both primary and secondary destinations. At the same time, a number of regional airports have benefitted from new longhaul services; but almost all of these have been feeding hubs outside Europe (in particular the rapidly expanding hub airports of the Persian Gulf) and this has had the effect of eroding the traffic

connecting through European hubs.

- 3.11. Caught between these two trends, a number of smaller mainline carriers – and their second-tier hub airports – have been left in a precarious position. They find themselves increasingly squeezed out of the market for hub traffic as the major hubs (in Europe and beyond) take up a greater share of longhaul traffic. At the same time, these airlines' legacy structures and cost base leave them poorly equipped for the increasingly competitive shorthaul point-to-point market. Some continue to thrive by operating in a niche – for example Finnair's Helsinki hub providing extensive access to East Asia or Brussels Airlines' hub serving Francophone Africa. But others are struggling, whether CSA Czech Airlines at Prague, Aer Lingus at Dublin or SAS in Copenhagen. Budapest's Malev collapsed in 2012. In each case, a steady erosion of their longhaul networks is evident over time.

4. The Options for Delivering Hub Connectivity

Competition and Choice

N. Choice not best served by competition between infrastructure providers

- 4.1. When there are high fixed infrastructure costs, consumer choice is best served by competition between service providers rather than infrastructure providers.
- 4.2. That is why the competitive market for telecommunications in the UK is underpinned by a regulated 'local loop', dominated by one provider (Openreach) – and the competitive market for UK rail services is underpinned by a regulated monopoly of track and stations (Network Rail).
- 4.3. Indeed, this approach is also applied to airports in many cities and countries round the world; in places diverse as Paris, Milan, New York, Osaka, Norway, Sweden and Spain, a single operator runs most if not at all the airports.

Connectivity

O. Forecast connectivity: methodology and results

- 4.4. York Aviation were invited to devise a systematic methodology for estimating the potential passenger route networks in 2050 under the three scenarios:
 - 'Maximum use' of existing infrastructure (i.e. no expansion)
 - Dispersed Expansion '2-2-2' (i.e. a new runway at each of Gatwick and Stansted)
 - a 4-runway hub (whether at or replacing Heathrow)
- 4.5. The approach was agnostic on the location of a 4-runway hub; that is, assuming excellent surface access providing easy access to key catchment areas, the exact location of the 4-runway hub would not change the level of connectivity available.
- 4.6. The analysis considered future connectivity at: Heathrow/new hub, Gatwick, Stansted, Luton and London City.

Methodology

- 4.7. Here is set out an overview of the process followed:
 - Frequencies to existing markets identified and uplifted for 2050 using growth projections, including DfT 2013 forecasts (adjusted for aircraft size growth)
 - New destinations identified based on market size and high growth cities data with frequencies calculated accordingly

- Frequencies to other hubs reduced in proportion to frequencies added to new destinations (assuming that these people previously hubbing are now fly direct)
- This enables calculation of unconstrained (4-runway hub) route network
- Cascade process applied, based on value of service to airlines, first from Heathrow to Gatwick then from Gatwick to Stansted, until constrained cap; the cascade factors in any loss of traffic on a route when it moves from the hub.
- This enables calculation of the 'no expansion' and '2-2-2' route networks

Results

- 4.8. The results are set out below – both destinations and frequencies – for the hub airport and the whole London airports system.

Table 4: Number of destinations served from Heathrow/new hub in scenarios

| HUB airport | Existing 2013 | Existing 2050 | 2-2-2 2050 | 4-runway hub 2050 |
|-------------------------------|--------------------------|--------------------------|-----------------------|------------------------------|
| North America | 30 | 30 | 30 | 42 |
| Caribbean | 1 | 0 | 0 | 6 |
| Central America | 1 | 1 | 1 | 6 |
| South America | 3 | 5 | 5 | 13 |
| Oceania | 3 | 5 | 5 | 5 |
| South East Asia | 4 | 4 | 4 | 11 |
| North East Asia | 12 | 14 | 14 | 31 |
| South and Central Asia | 13 | 10 | 10 | 28 |
| Middle East | 12 | 12 | 12 | 15 |
| Sub-Saharan Africa | 12 | 8 | 8 | 20 |
| North Africa | 8 | 2 | 2 | 12 |
| Central and Eastern Europe | 12 | 7 | 7 | 24 |
| Western Europe | 53 | 36 | 36 | 70 |
| UK Domestic | 7 | 6 | 6 | 16 |
| Worldwide | 171 | 140 | 140 | 299 |

- 4.9. Without additional capacity, it can be seen that the range of destinations available from London's hub airport shrinks, as airlines concentrate on the most profitable high-yield routes, making best use of the available slots. Many routes are lost altogether. As Table 5 below shows, there is an increase in frequencies to some regions, but this is limited by capacity constraints.
- 4.10. By contrast, a 4-runway hub provides the capacity to ensure a step-change in both routes and frequencies – to established longhaul markets such as North America, emerging markets such as South East Asia and key shorthaul destinations in the UK and continental Europe.

Table 5: Frequencies served from Heathrow/new hub in scenarios

| HUB airport | Existing 2013 | Existing 2050 | 2-2-2 2050 | 4-runway hub 2050 |
|-------------------------------|--------------------------|--------------------------|-----------------------|------------------------------|
| North America | 802 | 1,165 | 1,165 | 1,436 |
| Caribbean | 5 | 0 | 0 | 45 |
| Central America | 8 | 11 | 11 | 46 |
| South America | 31 | 57 | 57 | 143 |
| Oceania | 35 | 79 | 79 | 92 |
| South East Asia | 90 | 128 | 128 | 191 |
| North East Asia | 218 | 302 | 302 | 514 |
| South and Central Asia | 136 | 254 | 254 | 422 |
| Middle East | 279 | 363 | 363 | 422 |
| Sub-Saharan Africa | 120 | 182 | 182 | 292 |
| North Africa | 48 | 32 | 32 | 109 |
| Central and Eastern Europe | 179 | 203 | 203 | 568 |
| Western Europe | 2,289 | 1,758 | 1,758 | 4,055 |
| UK Domestic | 474 | 316 | 316 | 891 |
| Worldwide | 4,714 | 4,850 | 4,850 | 9,226 |

- 4.11. Moreover, when comparing this to the destinations offered by the London airports system as a whole, as per Table 6 below, it is clear that under 2-2-2 the majority of longhaul routes that cannot be served from the hub will not be viable from the other airports.

Table 6: Number of destinations served from London airports system in scenarios

| London airports | Existing 2013 | Existing 2050 | 2-2-2 2050 | 4-runway hub 2050 |
|-------------------------------|--------------------------|--------------------------|-----------------------|------------------------------|
| North America | 33 | 33 | 33 | 45 |
| Caribbean | 14 | 7 | 12 | 16 |
| Central America | 2 | 2 | 2 | 7 |
| South America | 3 | 5 | 5 | 13 |
| Oceania | 3 | 5 | 5 | 5 |
| South East Asia | 6 | 4 | 4 | 11 |
| North East Asia | 12 | 16 | 16 | 31 |
| South and Central Asia | 14 | 16 | 17 | 28 |
| Middle East | 12 | 12 | 12 | 15 |
| Sub-Saharan Africa | 16 | 11 | 11 | 22 |
| North Africa | 17 | 12 | 14 | 14 |
| Central and Eastern Europe | 51 | 43 | 46 | 52 |
| Western Europe | 187 | 143 | 167 | 159 |
| UK Domestic | 15 | 13 | 14 | 17 |
| Worldwide | 385 | 322 | 358 | 435 |

- 4.12. As such, with the exception of some outbound leisure and VFR routes – notably in the Caribbean and South Asia – under 2-2-2, the other London airports are adding very few new longhaul destinations. To key world regions such as Central and South America and North East and South East Asia, a 4-runway hub offers twice the number of destinations from London that dispersed expansion can muster.
- 4.13. Table 7 below shows how 2-2-2 offers similar total runway capacity to a single 4-runway hub scenario – and so a similar number of frequencies to/from London. It shows that a number of destinations in Europe can be served from outside the hub, mostly low-cost routes underpinned by sufficient O/D traffic; but the majority of longhaul routes will only be viable for airlines if operated from the hub, with its higher yields and critical mass of O/D and transfer traffic.

Table 7: Frequencies served from London airports system in scenarios

| London airports | Existing 2013 | Existing 2050 | 2-2-2 2050 | 4-runway hub 2050 |
|-------------------------------|------------------|------------------|---------------|----------------------|
| North America | 882 | 1,336 | 1,345 | 1,560 |
| Caribbean | 62 | 53 | 81 | 126 |
| Central America | 21 | 29 | 30 | 65 |
| South America | 31 | 57 | 57 | 143 |
| Oceania | 35 | 79 | 79 | 92 |
| South East Asia | 94 | 135 | 135 | 195 |
| North East Asia | 239 | 383 | 412 | 547 |
| South and Central Asia | 140 | 304 | 312 | 435 |
| Middle East | 323 | 447 | 449 | 477 |
| Sub-Saharan Africa | 132 | 213 | 218 | 319 |
| North Africa | 150 | 224 | 262 | 274 |
| Central and Eastern Europe | 720 | 1,298 | 1,689 | 1,710 |
| Western Europe | 6,095 | 6,750 | 9,029 | 9,067 |
| UK Domestic | 1,209 | 893 | 1,500 | 1,566 |
| Worldwide | 10,133 | 12,201 | 15,598 | 16,576 |

- 4.14. The key conclusions to be drawn are as follows:

- If we do nothing, the number of destinations served by Heathrow will shrink.
- A new 4-runway hub will offer a dramatic improvement in connectivity, vital for supporting future growth and prosperity.
- The connectivity offered by 2-2-2 dispersed expansion will be inadequate to meet our economic needs – and is substantially less than a 4-runway hub.

P. Regional longhaul connectivity is limited

Table 8 below shows the longhaul routes operating from Manchester, Birmingham and Glasgow – the only UK regional airports with more than three longhaul destinations. Almost without exception, these 22 routes can be categorised either as outbound leisure, VFR (visiting friends and relatives) and feeder connections to foreign hubs. It clearly demonstrates that regional airports cannot be relied on for the global connectivity required to support the UK economy.

Table 8: Longhaul destinations from Manchester, Birmingham and Glasgow (2011)

| | | Birmingham | Glasgow | Manchester |
|--------------|-----------------|------------|---------|------------|
| Bangladesh | Dhaka | | | + |
| Barbados | Bridgetown | | | + |
| Canada | Calgary | | + | + |
| | Toronto | + | + | + |
| | Vancouver | | + | + |
| Iran | Tehran | + | | |
| Israel | Tel Aviv | | | + |
| Pakistan | Islamabad | + | | + |
| | Karachi | | | + |
| | Lahore | | + | + |
| Qatar | Doha | | | + |
| Singapore | Singapore | | | + |
| Turkmenistan | Ashgabat | + | | |
| UAE | Abu Dhabi | | | + |
| | Dubai | + | + | + |
| USA | Atlanta | | | + |
| | Chicago | | | + |
| | Las Vegas | | | + |
| | New York JFK | | | + |
| | New York Newark | + | + | + |
| | Orlando | | + | + |
| | Philadelphia | | + | + |
| Total | | 6 | 8 | 20 |

Case study: Birmingham-New Delhi route launch

4.15. It has been announced that Air India is to launch direct flights from Birmingham to its New Delhi hub⁵. This example is worth examining to understand both the potential opportunities for – but also limitations of – regional connectivity.

- Air India last served Birmingham in 2008 but pulled out when more slots became available at Heathrow;
- The Midlands is home to 218,000 people of Indian origin – second only to London in the UK – and underpins a strong VFR market to India;
- Some of this market travelled from London airports; of those flying from

Birmingham, 73% hubbed via Dubai on Emirates in 2012;

- Air India will use its new 787s to operate 4 weekly flights from Birmingham to New Delhi, with onward connections to its Indian domestic route network.

4.16. This new route demonstrates the potential for longhaul routes from regional airports such as Birmingham, but also the preference for the airline to connect into a hub at the other end and how often such regional longhaul routes are underpinned by VFR.

Airlines needs

Q. Gatwick struggles to attract airlines over Heathrow

4.17. Vietnam Airlines had been looking for slots at Heathrow since 1998 until “booming demand” finally pushed it to settle for Gatwick in 2011, with two flights weekly to each of Hanoi and Ho Chi Minh City⁶. By contrast, Vietnam Airlines has operated at least one flight a day to both Frankfurt and Paris CDG for a number of years.

R. The presumption of passengers switching alliances is flawed

- 4.18. The CAA analysis presented in Figure 4.13 of Discussion Paper 04 presents a significant number of inter-alliance transfers as switchable, presuming that where a passenger is changing alliance, and one alliance serves both routes, they would in future undertake the whole journey within that alliance. To connect within an alliance is often more seamless and more keenly priced, so if a passenger is currently choosing not to, it will often be a deliberate choice.
- 4.19. Alliances are not homogeneous, nor are their service standards – and the passenger’s preferred airlines might cut across alliance boundaries. Equally it could be a function of schedule (shortest layover) or available route network. If a passenger flying Virgin Atlantic from Tokyo to London connects to a British Airways flight to Newcastle (a route not served by Virgin), it is not at all clear that they would automatically switch to British Airways for the longhaul sector from Tokyo in the future. The very significant risk is that if their preferred transfer option at the London hub was removed, they would just as easily switch to a rival hub abroad.
- 4.20. It should also be noted that a feature of the way the data is calculated risks double-counting the value of many passengers switching. This is because the CAA’s analysis is based on feed traffic for a flight – i.e. that if a passenger flying from Heathrow flew into the airport on a different alliance, if possible, they would switch the first leg to same alliance as that flown in the second leg. If a passenger is travelling between Gothenburg and Heathrow with SAS (Star Alliance) and then to/from Chicago on British Airways (Oneworld), even though each alliance flies each route, it is highly unlikely that the passenger would switch to Oneworld for the outward journey and switch to Star Alliance for the return trip (as the analysis assumes).

S. The impact on transfer traffic of moving alliances is underplayed

- 4.21. By including the direct passengers, Figure 4.13 in Discussion Paper 04 underplays the extent to which a significant proportion of transfer traffic will be risked; Table 9 below shows the same data, but as a proportion of the transfer traffic only. It can be clearly seen that, except for Oneworld, a very significant proportion of transfer passengers are connecting from a different alliance at Heathrow (for Star Alliance, this includes the allegedly switchable). With Oneworld accounting for the majority of passengers at Heathrow, the low share connecting from a different carrier (whether ‘switchable’ or not) still represents a substantial number of passengers.

Table 9: Transfer flows at Heathrow by alliance and demand segment, 2011

| | Connecting within a group | Connecting from a different carrier but ‘switchable’ | Connecting from a different carrier |
|-----------------|---------------------------|--|-------------------------------------|
| Other unaligned | 13% | 10% | 77% |
| Virgin Atlantic | 26% | 18% | 57% |
| SkyTeam | 11% | 10% | 79% |
| Star Alliance | 54% | 16% | 30% |
| Oneworld | 89% | 7% | 4% |

Source: CAA data as per Discussion Paper 04

- 4.22. It should also be noted that Bmi (British Midland International), the largest Star Alliance carrier at Heathrow, was acquired by Oneworld-member British Airways in April 2012, and as such this is not reflected in the 2011 data presented by the CAA; this suggests the Star Alliance figures for connections within an alliance (and the allegedly switchable) are in fact significantly lower today.

T. The use of fifth freedom rights – and their limitations

- 4.23. Fifth freedom rights allow an airline to carry traffic between foreign countries as part of a continuation of a flight to/from its home country. European examples include Singapore-Frankfurt-New York JFK on Singapore Airlines and Emirates securing Dubai-Milan-New York JFK. Qatar Airways was granted the right to fly Doha-Athens-New York JFK – it would have been the only year-round transatlantic service from Athens but was pulled before launch.
- 4.24. The most notable example in Europe is the Jet Airways operation at Brussels, which operated flights from its Indian bases at Delhi, Mumbai and Bangalore, which after allowing time for transfers between the flights, continued on to New York JFK, New York Newark and Toronto. However, the recession has since forced the withdrawal of the Brussels-Bangalore and Brussels-New York JFK sectors. Moreover, in May 2013, Etihad Airways, which holds a 24% stake in Jet Airways and has recently entered into a partnership with KLM, announced that Jet Airways would relocate its transatlantic operation from Brussels to Amsterdam.

- 4.25. While fifth freedom carrier can potentially provide useful additional connectivity, it is difficult to see it being relied upon to provide a counterweight to a hub airport, albeit severely constrained, at Heathrow.

U. To enable a new hub, Heathrow must shrink substantially

- 4.26. If a new hub is not to be undermined by Heathrow's existing position and brand, a significant reduction in Heathrow's scale and scope will be required. This could include a combination of options including:
- Tight restrictions on operating hours
 - Strict cap on movements
 - Limit on aircraft sizes/capacities
 - Reduction in runway capacity/length
 - Ban on services to non-EEA destinations (i.e. shorthaul flights only)
- 4.27. These are all approaches employed at other airports around the world. The result would in effect be a new, niche London airport at Heathrow, serving some local O/D traffic, perhaps not dissimilar to London City Airport's role in the Docklands.
- 4.28. Alternatively, a full closure of Heathrow airport could be implemented; this would have the benefit of maximising the land available for redevelopment and simplify some of the legal and regulatory considerations.
- 4.29. The net impact of these options would be to ensure that Heathrow could not serve as a competitor – and thus undermine the new hub – and that airlines currently based at Heathrow may be persuaded to move to the new hub.

V. Foreign ownership restrictions would not prevent a non-EU hub anchor carrier

- 4.30. Most aviation markets in the world apply restrictions on the nationality of ownership of airlines to maintain their international traffic rights; these vary in their severity, with the US and India having amongst the most restrictive regulations.
- 4.31. By contrast, the rules in the EU, though requiring majority EU ownership of EU carriers, allow for effective control of an EU airline by non-EU interests. For example, control of Hungary's national airline was secured by an expanding Russian airline (underpinned by a 49% stake) when the former was privatised. More recently, Korean Air bought a significant stake in CSA Czech Airlines, while Turkish Airlines is said to be considering a bid for LOT Polish Airlines.
- 4.32. With Government blessing, it is possible for a non-EU airline to take control of an EU carrier, structured to comply with ownership rules and maintain traffic rights – a legal

contortion that is a function of the archaic rules that govern airline ownership.

- 4.33. This reinforces the conclusion that, should a British carrier not wish to anchor the new London hub airport, it is highly likely that a foreign carrier could instead underpin the new airport.

Infrastructure delivery

W. Both Gatwick and Stansted face severe rail capacity challenges

- 4.34. There are a number of published documents highlighting the rail capacity challenges in the southeast, the most important of which is the Network Rail London & Southeast Route Utilisation Strategy⁷.
- 4.35. Rail access to Gatwick airport is a particular challenge: the airport is sited on the Brighton mainline, identified by Network Rail as one of the greatest capacity constraints in the southeast rail network. Moreover, they have been unable to identify cost effective options to resolve the capacity gap. As such, even to maintain existing mode share while expanding Gatwick will require a new rail link to central London, with most of it needing to be in tunnel.
- 4.36. Stansted also faces rail capacity challenges and as a minimum will require implementing the proposed 4-tracking of the West Anglia mainline. An expanded Stansted will need to address is notably weaker connectivity, particularly from areas to the south and west of London; proposals for Crossrail 2, a new line from southwest to northeast London – would be essential in meeting this need (though it can be assumed the scheme is funded separately, underpinned by the strength of its own business case).

The lessons from elsewhere

X. The Government tried – and failed – to make Gatwick a ‘second force’

- 4.37. Starting in the seventies, the Government’s Second Force policy sought to build Gatwick as a viable competitor to Heathrow, underpinned by its anchor carrier, British Caledonian. Traffic distribution rules were used to prevent newer entrants from accessing Heathrow, including Cathay Pacific, Air New Zealand and Emirates. The UK-US Bermuda II treaty forced all but two US carriers to use Gatwick and prevented direct flights to Heathrow from several US cities. Such rules would be impossible to implement today in light of the EU single aviation market, the EU-US open skies treaty and various bilateral treaties governing routes between the UK and other markets.
- 4.38. Ultimately, British Caledonian could not overcome the competitive disadvantage of being excluded from Heathrow and was bought by British Airways in 1988. In the

1990s, British Airways sought to develop a dual hub strategy across Heathrow and Gatwick, with the latter promoted as the 'hub without the hubbub' – but this too failed, with key Gatwick routes, primarily longhaul, subsequently transferred to Heathrow.

Y. Why the New York airport system is not a model of dispersed expansion

4.39. New York is most often cited as the exemplar of a multi-hub system in a single city, with its three major airports but the picture is far from straightforward:

- La Guardia is focused exclusively on domestic (and Canadian) connections, as stipulated by law. The airport is the most conveniently located for the city centre but is heavily regulated, in terms of its capacity and destinations.
- JFK has established itself as the main transatlantic gateway to the US but without strong anchor carriers is effectively a large point-to-point airport. The proportion of transfer traffic is just 17% and its two largest international carriers, Delta and American, together account for fewer than half the longhaul destinations from the airport and less than a third of international passenger traffic; moreover, both continue to focus their transfer traffic elsewhere, at their respective hubs at Atlanta and Chicago, among others. JetBlue, the largest airline at JFK, operates a primarily low-cost model and does not operate longhaul services⁸. The absence of a strong anchor carrier and very severe capacity constraints means the airport and the majority of its connections are simply not optimised for transfer traffic.
- Newark comes closest to a hub in the New York area, with 40% transfer traffic, underpinned by anchor airline, United. It has a strong domestic focus, but also suffers capacity constraints; this limits its ability to operate as an effective hub.

Endnotes

¹ *Hub 2012: Committed to being travellers' preferred hub*, AdP and Air France, 2012

² "Lufthansa hit as Frankfurt night flight ban upheld", Reuters, 4 April 2012

³ York Aviation, extracted from CAA data, 2010

⁴ "Dutch Retreat", Hartfordbusiness.com, 6 October 2008 and "Bradley Airport officials hopeful over Europe routes" projo.com, 23 July 2008

⁵ "Air India opens reservations for return to Birmingham", RoutesOnline, 21 June 2013

⁶ "Vietnam Airlines begins Gatwick flights", Business Traveller, 9 December 2011

⁷ *London and South East Route Utilisation Strategy*, Network Rail, July 2011

⁸ In July 2013, JetBlue launches a 3-flights-a-week service to Cartagena, Colombia from JFK, using a narrowbody Airbus A320