

# UK air freight study report

## Contents

<b>1. Introduction .....</b>	<b>2</b>
<b>2. Description of structure of UK air freight industry .....</b>	<b>5</b>
<b>3 The demand for airfreight .....</b>	<b>33</b>
<b>4 Airports and their facilities .....</b>	<b>48</b>
<b>5 Air freight charging structure.....</b>	<b>63</b>
<b>6 Characteristics of air freight demand .....</b>	<b>68</b>
<b>7 Shipper requirements .....</b>	<b>70</b>
<b>8 The value to the UK economy of the air freight industry .....</b>	<b>73</b>
<b>9 Summary and conclusions .....</b>	<b>93</b>

## **1. Introduction**

### **1.1 Study aims and objectives**

Following publication of the Integrated Transport White Paper and a commitment to prepare a National Airports Policy and potential future policies on the air freight industry, the Government has commissioned a series of research projects. This report represents the first part of an exercise to examine the structure of the air freight industry and its economic, environmental and social significance, leading to recommendations for potential future government policy to capitalise upon the benefits which the air freight sector can offer.

The overall objective of this report is to assemble a set of data to describe the current state of the airfreight industry in the UK. This was to be set alongside views on market trends and developments in order to analyse the way in which the UK air cargo industry currently functions and contributes to the UK economy both directly and indirectly. Trends in the industry itself and in the industries that influence the performance of the sector were to be identified to help form a view on the future prospects for the industry and its position within the global air cargo market.

This report is designed to summarise the state of the industry through the presentation of data and information; as such it represents a snapshot. It brings together descriptions and views of the airfreight industry from different perspectives. It does not follow through any argument for changes in government policy or the regulatory framework as this debate will be the subject of a second stage of research.

### **1.2 Study approach and methodology**

In the initial approach to the study it was determined that an attempt should be made to explore the collection of primary data where that would add to the existing body of knowledge on the air freight industry. In particular, in order to be able to make an estimate of the value of the industry and to then quantify the significance of the sector to the UK economy, it would be useful to collect financial information on sectors of the industry for which little published information was available.

Information was sought from a variety of source:

- an interview programme collected information from shippers, airlines, freight forwarders, road hauliers, express service operators including the integrators transit shed operators, general sales agents and aircraft manufacturers
- collection and analysis of statistics from a wide variety of sources, including Customs and Excise Trade Statistics, UK Airport Traffic statistics, CAA statistics and data from the Cargo Account Settlement System (CASS)
- extensive questionnaire survey of organisations in the air freight industry which were not included in the interview programme. Responses to the questionnaires were poor from some sectors of the industry which restricted the scope of the analysis of some primary data.

In addition to the above, three seminars were held in Glasgow, London and Manchester, the objectives were to:

- describe the surveys aims and its progress,
- seek affirmation of the approach and the statistical base which was being used and
- canvass views and opinions across the broadest cross section of the air freight industry to validate the findings from other sources and to ensure an informed debate on any issues of concern to the industry.

Accordingly, the report structure reflects the broad aims of the project in:

- describing the industry's structure and identifying the principal players;
- quantifying the volumes and types of air freight;
- factors affecting supply and demand;
- estimating the value of the industry to the UK economy in monetary and employment terms and outlining the environmental issues that will have an impact upon the future development of the airfreight sector.

### **1.3 Air freight industry structure**

The industry consists of a number of different commercial organisations who provide shippers with through freight services. These organisations, mainly within the private sector, operate in a highly competitive environment.

**Airports:** generally the airports act as landlords and infrastructure providers charging landing fees and stand rentals or parking fees to airlines (their main customers) and charging rent to service companies for passenger reception terminals, retail and catering outlets offices, cargo transit sheds, air craft maintenance work shops etc.

**Airlines:** the suppliers of air cargo capacity into and out of the UK are either scheduled operators, charter operators, freighter operators or integrated carriers. Scheduled operators provide air cargo capacity principally in the belly holds of passenger or combi aircraft, though some also operate freight only capacity. Charter operators operating on holiday routes also offer freight capacity, which in line with their passenger business is seasonal. Freighter operators are the operators of freight only aircraft. Integrated carriers operate their own aircraft (and use belly hold capacity) to carry their own cargo, as part of a door-to-door express service for shippers and importers of goods.

**Air freight forwarders:** provide a service to shippers and importers which originally involved receiving a consignment of freight from a shipper, arranging its routing, transportation handling and documentation to either the final receiver or to a foreign airport. The role of the forwarders has developed over the years with the largest forwarders describing themselves as logistics providers.

**General sales agents:** appointed by some airlines (both scheduled and charter) to sell air freight capacity on their behalf, thereby allowing the airlines to avoid the potentially high fixed costs of sales and marketing.

**Integrators:** provide a door-to-door service, usually using their own road transport, handling, transit warehousing facilities and aircraft. Normally integrators contract directly with the shipper. They started principally as express operators, but are now competing more directly with freight forwarders and the airlines.

**Transit shed operators:** provide a transit handling service for airlines and sometimes forwarders. Their function is to receive cargo from the aircraft, de-palletise and deliver to truck or vice versa via a transit shed where customs clearance is required.

**Specialist air trucking companies:** provide road transport between the UK regions and the London airports, or continental airports, as well as intra-European services, where trucks substitute for aircraft, usually to a schedule. Most companies work on behalf of the airlines in servicing the forwarders requirements.

**Express operators:** provide services for the movement of mail and small packages, where the timescales for transit are measured in hours by contrast to air forwarders whose service transit times are generally managed in days.

**Wholesalers:** buy capacity from airlines and sell this on to small and medium-sized forwarders. This enables the latter to buy freight space more economically than they might otherwise by contracting directly with the airline.

## UK air freight study report

Couriers: these services are often provided by express services operators, using the services of passenger airlines and on many occasions courier bags are delivered to airlines across passenger check in desks and carried provisionally by a passenger. Courier parcels are therefore carried on passenger tags and not classified as cargo. The advantage of these services to the shippers or importer is the more rapid transfer at the airport, of origin and destination. At London-Heathrow a purpose built courier reception facility has been built thus avoiding the need for courier bags to be handled across the passenger baggage desks.

## 2. Description of structure of UK air freight industry

### 2.1 Introduction

The air freight industry can broadly be defined as encompassing all those activities related to movement of goods by air. There are various activities which are inter-related but which are also industries in themselves. The principal activities are:

- airport control and management
- airlines, whether passenger or freighter operators, scheduled or charter
- freight forwarders and wholesalers
- express operators and integrators, couriers
- truck operators x
- transit shed operators

In addition to the above there are numerous related activities supporting these primary providers - ground support services, IT support companies, charter brokers, packing companies, security organisations, dangerous goods specialists, government departments, and control agencies such as HM Customs and Excise.

### 2.2 Historical Development of the air freight industry

#### 2.2.1 Global development

Globally air freight grew very rapidly during the 1960s, faster than passenger growth over the same period. This rate of growth slowed considerably in the early 1980s though it was still around 9% per annum. The early dominance of the European and North American airlines in the carriage of international freight up to the mid 1970s has since been eroded by the rapid development of the East Asian and Pacific region airlines. Recent IATA statistics covering their members shows Korean Air Lines, Singapore Airlines, Cathay Pacific and Japan Airlines are all in the top 10 of the top 50 IATA freight airlines in 1998. Tables 2.1 and 2.2 rank the top 20 airlines by international, domestic and total freight tonnes and tonne-kilometres flown for 1998. The ranking for 1997 is shown in brackets.

**Table 2.1 Air Freight worldwide by main carriers by tonnes carried**

	IATA FREIGHT AIRLINES IN 1998		Scheduled Freight Tonnes Carried (thousands)			
	International		Domestic		Total	
	AIRLINE	Thousands	AIRLINE	Thousands	AIRLINE	Thousands
<b>1</b>	Federal Express(1)	1,131	Federal Express(1)	3,520	Federal Express(1)	4,651
<b>2</b>	Lufthansa(3)	1,004	United Parcel Service (2)	2,483	United Parcel Service(2)	2,845
<b>3</b>	Air France(2)	907	All Nippon Airways(3)	392	Lufthansa(3)	1,062
<b>4</b>	Korean Air Lines	795	Japan Airlines (4)	327	Korean Airlines	1,033

UK air freight study report

5	Singapore Airlines(5)	753	United Airlines (6)	313	Air France(4)	943
6	British Airways (7)	656	Delta Airlines (5)	290	Japan Airlines (6)	870
7	Cathay Pacific(6)	580	Korean Airlines (8)	239	Singapore Airlines(7)	753
8	Japan Airlines(9)	543	China Southern Airlines (10)	236	United Airlines	668
9	KLM(8)	537	Northwest Airlines (7)	219	British Airways(11)	662
10	EAT(12)	424	American Airlines (9)	218	Cathay Pacific(9)	580
11	Thai Airways (11)	377	Varig (11)	156	Northwest Airlines(8)	577
12	United Parcel Service(16)	362	China Eastern Airways (17)	143	American Airways(12)	561
13	Northwest Airlines(10)	357	Japan Air System(13)	133	All Nippon Airways(14)	543
14	United Airlines (13)	356	Ansell Australia(15)	93	KLM(13)	537
15	American Airlines (14)	343	Continental Airlines(20)	85	Delta Airlines(15)	493
16	Swiss Air (15)	307	Qantas(22)	80	EAT(17)	424
17	Cargolux(18)	264	Air Canada(16)	76	Thai Airways(16)	423
18	Nippon Cargo (17)	241	Malaysia Airline System(14)	72	Swiss Air(20)	315
19	Qantas (20)	218	China Southwest Airlines(21)	72	Qantas(21)	298
20	Malaysia Airline System(19)	214	Iberia(24)	71	Varig(19)	297

Source: IATA Air Cargo Annual 1998

**Table 2.2 Air Freight worldwide by main carriers by tonne kilometres**

	IATA Freight Airlines in 1998		Scheduled Freight Tonne- Kilometres Flown (millions)			
	International		Domestic		Total	
	AIRLINE	Millions	AIRLINE	Millions	AIRLINE	Millions
1	Lufthansa (1)	6,201	Federal Express (1)	5,783	Federal Express (1)	9,615

UK air freight study report

2	Korean Air Lines (2)	5,041	United Parcel Service (2)	4,094	Lufthansa (2)	6,221
3	Singapore Airlines (4)	4,828	United Airlines (4)	937	United Parcel Service(4)	5,516
4	Air France (3)	4,575	Northwest Airlines (3)	720	Korean Air Lines (3)	5,125
5	British Airways (5)	4,040	American Airlines (5)	589	Singapore Airlines (6)	4,828
6	Federal Express (9)	3,832	Delta Air Lines (6)	558	Air France (5)	4,596
7	Japan Airlines (6)	3,778	All Nippon Airways (7)	380	Japan Airlines (7)	4,050
8	KLM (7)	3,709	China Southern Airlines(10)	323	British Airways (8)	4,047
9	Cathay Pacific (8)	3,297	Varig (8)	282	KLM (9)	3,709
10	United Airlines (10)	2,485	Japan Airlines (9)	272	United Airlines (11)	3,422
11	Cargolux (11)	2,245	Air Canada (11)	160	Cathay Pacific (10)	3,297
12	Swissair (13)	1,893	Continental Airlines (17)	134	Northwest Airlines (12)	2,480
13	Nippon Cargo (14)	1,860	Qantas (13)	133	American Airlines (13)	2,320
14	Northwest Airlines (12)	1,761	China Eastern Airlines (33)	116	Cargolux (14)	2,245
15	American Airlines (15)	1,732	Ansell Australia (15)	114	Delta Air Lines (17)	1,922
16	Qantas (17)	1,497	Canadian Airlines Intl (12)	113	Swissair (15)	1,895
17	Thai Airways (16)	1,493	Japan Air System (18)	111	Nippon Cargo (16)	1,860
18	Alitalia (18)	1,453	Air China (20)	110	Qantas (18)	1,630
19	United Parcel Service (21)	1,422	ADM French Airlines (19)	109	Thai Airways (19)	1,522
20	Delta Air Lines (20)	1,364	China Southwest Airlines(21)	101	Alitalia (20)	1,473

Source: IATA Air Cargo Annual 1998

Before the 1960s, air freight was considered as a way of filling up spare capacity on what were essentially narrow bodied passenger aircraft. However the high rate of growth in the 1960s coupled to wider bodied passenger aircraft provided the opportunity for many airlines to recognise the income value of air cargo and in the case of routes which developed cargo volumes greater than might be carried in passenger aircraft, the inducement to introduce scheduled all-cargo services. When introduced on the dense freight routes which could sustain them, they had the effect of stimulating demand. All-cargo aircraft enabled more unit loads and consignments to be carried and the increased

use of specialised handling equipment speeded up the movement of freight and the turn around of aircraft. All-cargo aircraft were also able to fly at night to schedules which would not be appropriate for passengers. This again led to shorter freight transit times as well as adding considerably more capacity.

Although the growth of cargo charter airlines was quite rapid from the mid 1970s due to freedom to operate outside bilateral agreements and growing deregulation of freight operations to and from the USA, UK and some other European countries, fuel price increases and economic recession in the mid to late 1970s hit these airlines particularly badly. At the same time, the scheduled airlines began to take cargo more seriously with more flexible and competitive pricing. The latter were able to offer considerably more freight capacity as they introduced wide-bodied passenger aircraft on more and more routes. Added to this was the restriction of charter operations by developing countries aiming to protect the interest of their own national airlines in the freight market.

Probably the most significant revolution in the air freight business in the last 25 years has been the rapid development of the express sector. Express parcel services, were pioneered by Federal Express (FedEx) in the USA. Fedex identified some key product features hitherto unrecognised by the traditional air cargo industry: the requirement for door-to-door and overnight transport which was not normal practice in the air freight industry for urgent/important small parcels often documents. Instead of selling on the basis of weight and price, convenience, speed and reliability became the principal product features. The express parcels sector in the USA boomed during the 1980s with courier and express parcels companies following Federal Express example and setting up their own airline operations. By the 1990s an international sector dubbed the integrators had emerged including United Parcel Service, Emery Worldwide and Airborne Express in the USA and DHL and TNT who were stronger in Europe.

### 2.2.2 Development in the UK

Increasingly, the integrators accepted larger consignments and thereby entered the traditional air freight forwarders industry. The air freight market in the UK has developed a concentration around Heathrow because that is where the mass of carrying long-haul bellyhold capacity is offered. This is reflected in Table 2.3 which summarises freight throughput for UK airports.

**Table 2.3 UK Air Freight by Airport**

Freight handled	tonnes	tonnes	Market share	Market share
	1996	1997	1996	1997
Total London Airports	1434399	1574984	80	81
Heathrow	1040486	1156104	58	59
Gatwick	267320	265297	15	14
Stansted	104570	126425	6	6
East Midlands	104702	126309	6	6
Manchester	78784	94334	4	5
Prestwick	21778	33878	1	2
Liverpool	28441	25919	2	1
Luton	18580	23754	1	1

## UK air freight study report

Birmingham	19427	19845	1	1
Glasgow	11560	11069	1	1
Southend	3439	404	0	0
Newcastle	1226	1217	0	0
Leeds/Bradford	343	438	0	0
Humberside	123	156	0	0
Blackpool	140	98	0	0
Teesside	77	43	0	0
London City	4	0	0	0
Total Reporting UK Airports	1783356	1955571		

This concentration in and around Heathrow airport, has encouraged forwarders to invest in warehousing and handling facilities at their own consolidation centres. Cargo is collected from all over the UK and trucked to the consolidation centre where it is then aggregated by destination into unit loads which attract an advantageous freight rate from the airline. The concentration of activity in volume terms at the Heathrow bases enabled the forwarders to negotiate keen rates with the airlines and effectively now allows them to influence the supply of capacity. Many forwarders have branch offices in the regions, however the focus of their business remains centred on the London hubs.

Scheduled airlines are driven by the passenger demand for a given route. It has been advantageous to airlines to see concentration of activities through a principal airport such as Heathrow. This has given them increased flexibility for routing passengers and exploiting economies of scale in handling the volume of passengers through a major terminal. The cargo departments have then to work with the scheduling, turnaround times and size of aircraft on the route without having much influence over the behaviour of the airline.

### 2.3 Categorisation of air freight

There are various ways of categorising the goods requiring movement by air whether by weight or by the need for transportation within a defined period of time. For simplicity, we have generally distinguished between general air freight and express air freight. The former will tend to be carried by forwarders and airlines, though by no means always; and the latter by the couriers, express operators and especially the integrators.

Traditionally, general air freight would expect to have a transit time measured in days whereas the express services offer a guaranteed delivery time often measured in hours, typically an overnight transit. The distinction between time-critical and time-definite products blurs with the increasing interest of the integrators in carrying general freight and the forwarders in providing a total logistics solution, including express services. There are also a great many crossovers in relation to the role and function of many of the actors involved in air freight, as will become evident.

### 2.4 Physical freight movement

The following flow chart describes the movement of an export consignment of freight in the choice the shipper makes and the way in which that freight is handled by the various actors in the transport chain. Essentially this would work in the reverse order for imports. The diagram shows the complexity that is involved in defining the air freight industry exemplified by the choice facing the shipper and the number of different parties involved in the transport chain.

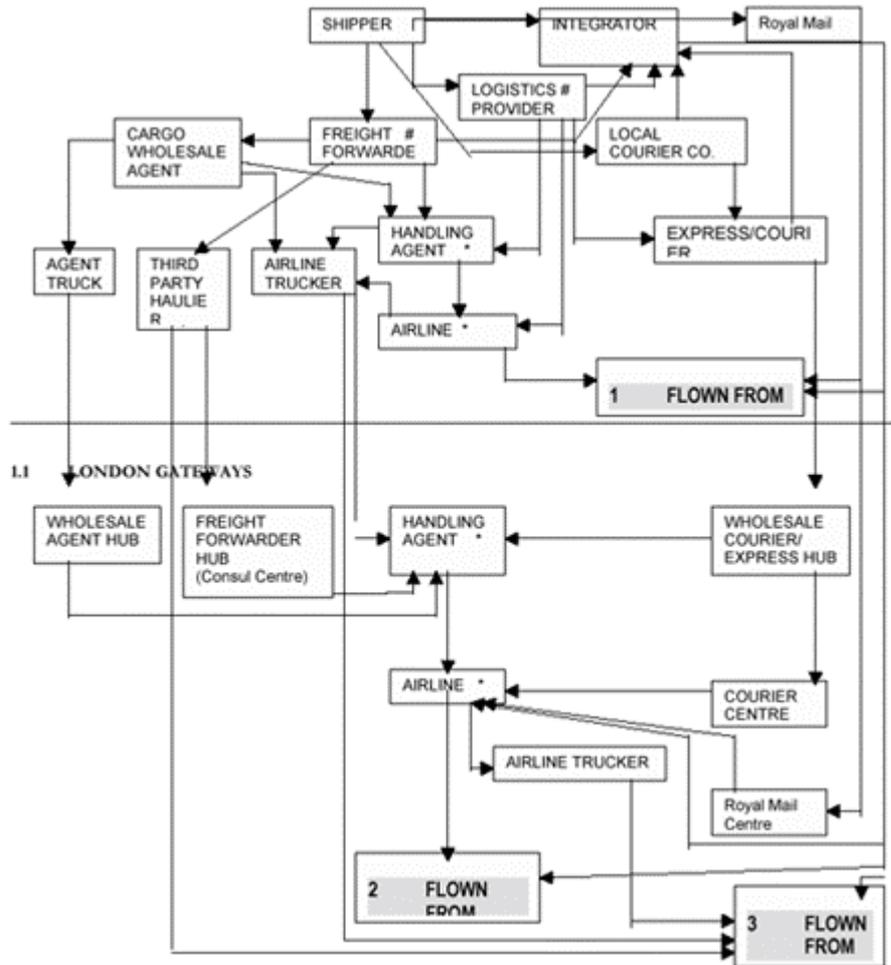
The shipper (exporter in the case of the diagram) starts with a requirement to ship a piece of cargo. The first decision is whether to pay a premium for rapid delivery and hand the consignment over to an integrator, or to use an air freight forwarder. There may also be a third option involving value added services if the company is using a logistics provider (usually one of the larger forwarders). In these cases, the logistics provider would be offering a wider service involving, for example, order processing, storage, pick and pack, labelling etc. The logistics company can have a part to play in the manufacturing process by customising the product subject to orders made and then distributing the goods from the logistics providers warehouse. Increasingly, integrators also offer logistics services. Again, the definitions of these companies are somewhat blurred with the larger forwarders describing themselves as logistics providers and indeed managing the entire movement of the shippers goods in some cases, yet offering traditional forwarding services to others. Forwarders and logistics providers may well use the services of an integrator where that is appropriate. The integrators are interested in filling their aircraft and will take forwarders traffic where they are able. Where the shipper wishes to move a small package or documents there are further choices of international couriers or Royal Mail.

The integrator will receive the freight as a consignment into its system and, depending on the final destination, fly it from its regional sub-hub or from a London gateway. One of the marketing features of the integrators is that they collect the goods and deliver them to the final destination, providing all the links in the transport chain, controlling the change of mode etc. and offering a comprehensive information flow along with the physical transport of the goods. Sophisticated information systems are required to do this. On the other hand, whether a logistics provider or a forwarder is used, there are more links in the chain. Sometimes the goods will be consigned to an airline, handled through a transit shed (which may be within the airlines control or a separate company) and if not flown from that airport, taken by an airline trucking company to fly from a London or a European gateway airport. Cargo may be moved via a cargo wholesale agent through that companys hub before being handled through a transit shed and then carried by the airline. A large proportion of air freight is, however, moved by the forwarder through its consolidation centre (at or near the London gateway airports), before being given to the handling agent and then carried by the airline.

It is known that a significant proportion of freight is trucked from the regions into the London gateway airports both by forwarders moving freight to their consolidation hubs and by airlines as a direct substitute for flying out of a regional airport. In the case of the main European carriers, it is common for freight to be trucked directly to their main hub on the Continent where it would then be loaded for onward movement on one of their long haul flights. The reverse will happen for imports into the UK. In the same fashion, British Airways will truck cargo inwards from the Continent to help fill its long haul flights from Heathrow.

Equally this is also practised inbound for traffics destined for mainland Europe. A later section in the report will examine this process in more detail. Another important source of business are Transfer Traffics carried between countries, where direct connections are limited, through a third countrys hub, where the latter offers regular connections, for instance, New York to Tel Aviv through Heathrow.

### **EXPORT FREIGHT AND MAIL MOVEMENT FLOW CHART (all types)**



\* - Handling agent/airline could be one and the same. Integrators may also carry general cargo for freight forwarders Courier companies may also have express cargo delivered into airlines

# - normally large companies

"star" - integrators carry general freight, as well as express cargo and act as an airline in this respect

### 2.5 Roles of key sectors in the traditional air freight structure

There are three main types of air cargo capacity suppliers excluding integrators operating into and out of the UK:

- scheduled operators (national carriers and privately owned airlines)
- charter operators (eg Britannia Airways, Air 2000, Airtours,)
- freighter operators

Table 2.4 UK air freight tonnes carried by type of airline and type of aircraft 1998

Type	Passenger aircraft	Cargo only aircraft	Total
Scheduled	1524206	315224	1839430
Charter	27983	351721	379704

## UK air freight study report

<b>Other</b>	20	8	28
<b>Total</b>	1552209	666953	2219162
<b>Share</b>	70%	30%	100%

*Source: CAA 1998*

The above market share information is derived from CAA statistics by reporting airport (i.e. not Customs & Excise data). As a consequence, it is the final destination of the aircraft by which the tonnes carried are accounted for rather than the actual country of origin or destination of the cargo. Intermediate calls at foreign airports for discharging or loading freight are also not recorded. Care is therefore required when interpreting the statistics. HM Customs & Excise statistics are a more reliable means of determining the volume of air trade by country. However, it is not possible to identify carrier market shares from these data.

Scheduled operators provide air cargo capacity principally in the belly holds of passenger aircraft, although some also operate freight-only aircraft. They principally contract with freight forwarders and express operators (including integrators).

It is widely recognised that most of the world's air cargo is carried in the bellies of passenger aircraft on scheduled services. Boeing calculates that 70% of cargo is flown in passenger aircraft while the remaining 30% is carried by all cargo aircraft.

### 2.5.1 Charter operators

The charter operators as defined in this study such as Britannia Airways, Air 2000 and Airtours do not figure in the main summary table of freight tonnes. They are clearly presently minor players as cargo carriers. Britannia Airways carried just under 8,000 tonnes in 1998, followed by Airtours International Airways with just under 6,000 tonnes.

Charter operators primarily operating on holiday routes also offer freight capacity principally to forwarders, usually through General Sales Agents (GSAs).

Charter airlines generally use airports outside of London Heathrow. They are now offering the capacity to carry large quantities of cargo. In the main, General Sales Agents offer the cargo space for sale on behalf of the charter airlines. The operations are based on leisure travel and cargo has a very low priority for loading. The services are unstable as schedules are dropped or reduced in the winter months; or services are re-routed or combined depending on demand. In addition, the routes are often not main cargo routes. Generally the charter airlines view the cargo revenue as supplementary to their main passenger business and there is therefore little long term investment in air freight.

2.5.2 Freighter operators are operators of freight-only aircraft who do not offer any passenger capacity. This is to distinguish them from scheduled operators who operate freight-only aircraft in addition to their passenger capacity. Such companies offer a range of services from operating their own freight-only aircraft on charter and scheduled routes to chartering out aircraft to other operators. Freighter operators are able to operate on key air freight routes at times that satisfy customer demand. They are able to offer services and facilities that give priority to the demands of the air cargo business. Freighter operators may decide to take advantage of customer airlines who only wish to buy in capacity at peak times which will minimise their risk by selling all the capacity to one single carrier for a specified period of time. Some freighter operators choose to purchase the aircraft and establish long term lease agreements with other airlines. These can be on the basis of a dry lease (aircraft only) or wet lease (crewed, maintained etc). The companies derive their income from the leasing agreement as opposed to the cargo revenue. There are therefore a number of different types of relationship prevalent between freighter operators and their customers.

The UK flag carriers within the scheduled airline category are British Airways (BA), Virgin Atlantic, British Midlands, Jersey European and Logan Air.

The three main scheduled carriers together account for 41% of the total in 1998 with BA alone having 34% of scheduled airline traffic.

**Table 2.5 Scheduled UK Airline freight traffic by main carriers**

Carrier	Volume	Share of total freight and mail
British Airways	617018	34%
Virgin Atlantic	109425	6%
British Midland	18313	1%

**British Airways:** British Airways has a global network, is one of the worlds major airlines and is part of the One World Alliance. According to IATA statistics, British Airways was ranked eighth in scheduled freight tonne-kilometres flown in 1998. The airlines main hub is Heathrow, where most of its activity is concentrated. In terms of UK air freight, Heathrow handles 75% of British Airways tonnes lifted with the next most significant airport being Gatwick (18%) followed by Stansted (4%). Together the three main London airports handle 97% of British Airways UK-related cargo. These figures include transshipment activity that is estimated to be around 17% of total tonnes carried. Belly capacity is supplemented with wet leased freighters on key freight routes to the Far East, Africa, and Israel. British Airways has committed significant investment in cargo facilities with the establishment of the British Airways World Cargo Centre and the cool store at Heathrow.

The US market is the most important for British Airways, accounting for more than 30% of the total freight carried.

**Virgin Atlantic:** Virgin is a major carrier to the USA accounting for about 85% of its air freight tonnage, but it also operates scheduled services to South Africa, Japan and Hong Kong. The main hub operation is at Heathrow, though services also operate out of Gatwick and Manchester.

**British Midland:** a predominantly short haul operator with an emphasis on domestic and European routes. About 60% of its activity is through Heathrow. Allowing for domestic traffic being counted twice (by each reporting airport), we believe that freight tonnes lifted in 1998 were about 18,500 tonnes, of which 39% is with international origins/destinations.

The company has aspirations to return to long haul transatlantic flights and has applied to the CAA for route licenses to operate scheduled services to ten US destinations from Heathrow. In early 1999, the airline applied to the CAA to serve some US destinations from Manchester.

The largest non-UK flag carriers of UK cargo are North American with American Airlines, United Airlines and Air Canada accounting for 10% of total traffic.

**American Airlines:** concentrates its activities on Heathrow (where 70% of its cargo is handled) with smaller volumes handled through Gatwick (20%). The airline also carries cargo to or from Manchester, Birmingham and Glasgow. All origins/destinations are in the USA.

United Airlines only uses Heathrow and whilst most cargo is moved to or from the USA, the airline also reports traffic with Hong Kong, Brussels and Amsterdam.

Continental Airlines flies a much more limited number of routes between the UK and USA. Gatwick is the principal UK airport handling about 80% of cargo with the remaining volume split between Manchester, Birmingham and Glasgow.

Air Canadas activities are concentrated on Heathrow. There is some freight moved through Manchester, Glasgow and Stansted, though this is a very small proportion of the total.

Lufthansa is one of the next most significant scheduled carriers with 2% of total UK volume. The principal route for this airline is Heathrow to/from Frankfurt-am-Main, which accounts for 54% of the total freight lifted through UK airports. Frankfurt is Lufthansas main hub airport, as Heathrow is for British Airways. Much smaller volumes are handled through Prestwick, East Midlands, Manchester, Stansted and Birmingham. The airline has taken the cargo sector increasingly seriously in recent years, and has formed an independent company Lufthansa Cargo. The IATA rankings show Lufthansa as second in 1998 in scheduled freight tonne kilometres flown throughout the world. Far Eastern airlines accounted for 4% of tonnes lifted in 1999.

Singapore Airlines main airport is Heathrow, however the airline handles some cargo through Manchester.

Cathay Pacific Airways has Hong Kong as its origin/destination and handles most of its cargo through Heathrow, some is handled through Manchester.

Japan Airlines is concentrated on Heathrow with a tiny amount in 1998 moving through Stansted (less than 2 %)

Table 2.6 below shows the volumes of air cargo carried by freighter operators, including integrators, through UK.

The largest carrier of UK cargo, after British Airways, is European Air Transport (EAT). This is now a subsidiary of DHL and effectively forms its air-contracting arm and has been assumed to be integrator traffic. East Midlands is the primary focus of EATs services carrying 63% of its traffic, followed by Luton with 16%. The other UK airports are Edinburgh, Belfast, Heathrow, Coventry, and Aberdeen. The most important European origin/destinations are Brussels (18%), Dublin (10%), Copenhagen (9%) and Cologne (5%).

Federal Express one of the integrators carried the next highest tonnage, mostly to the USA. FedEx European traffic is carried by Channel Express (wet lessor) and would appear in the statistics relating to that airline.

United Parcel Service, the other principal American integrator, carried almost 35,000 tonnes or 5% of cargo-only tonnes. Just under half of this was flown via the UPS hub in Cologne. Again, there will be further tonnage attributable to UPS that is carried by other airlines such as Channel Express.

Channel Express is the next highest ranking freighter operator, carrying 33,000 tonnes (5%). This company is a contract carrier primarily providing aircraft for a variety of integrators, British Airways and a series of ad hoc charter customers. Channel Express also have their own traffic based on transporting Channel Islands produce. Channel Express flies from a range of UK airports with Stansted being the most important 22%, followed by Edinburgh, Bournemouth, Guernsey, East Midlands, Gatwick and Liverpool. The airline has a particular niche market in moving produce and other goods between the UK mainland and the Channel Islands, with Bournemouth being a centre of activity. Analysis of UK and foreign airport statistics leads us to conclude that Channel Express probably accounts for a further 12,500 tonnes of integrator traffic and 10,000 of Post Office traffic. It should also be noted, however, that Channel Express also provide capacity for British Airways, DHL (via European Air Transport) and Lufthansa amongst others. Those tonnages will appear within the totals for those airlines.

The next in the ranking is Air Foyle, another of the wet lessors which flies for the integrator, in this case TNT as well as operating ad hoc charters. According to the statistics it would appear that as much as 63% of Air Foyles traffic could be for TNT. The rest of the freight carried relates to ad hoc charters.

Air Hong Kong is the first of the freighter operators in the list that carries its own traffic and is again exceptional in flying solely in and out of Manchester. With 27,000 tonnes 4% of freighter tonnes carried, Air Hong Kong is a significant carrier of UK air freight.

## UK air freight study report

British Airways appears in the cargo only list but is primarily a scheduled passenger airline that supplements freight capacity on routes by wet leasing aircraft. It has already been demonstrated that Channel Express and Atlas Air for example fly several freight routes on behalf of British Airways.

Emerald Airways carries domestic tonnage, consisting of mail on behalf of the Post Office and newspapers to Ireland.

A number of airlines in the list are foreign owned and are a mixture of scheduled passenger airlines flying freighter capacity and cargo only airlines. Altogether some 78% of freight carried in cargo aircraft is uplifted by the top 20 airlines, much of which is traffic carried by or on behalf of the integrators.

We believe the amount of freight accounted for by the integrators to be as follows (accepting that a good proportion of long haul business is sent via the scheduled passenger airlines).

Table 2.6 UK air freight tonnes carried by freighter operation 1998	
Integrators	
EAT (DHL)	102,091
FedEx	54,038
UPS	34,986
Channel Express (for integrators)	12,591
Air Foyle (for TNT)	20,782
Sterling (for TNT)	10,648
DHL Worldwide	8,939
Star (for UPS)	5,267
Total integrators	249,342
Total freight in freighters	666,952
Proportion by integrators	37%
Total all freight	2,219,162
Proportion of integrators	11%

*Source: CAA 1998; consultants estimates*

If we retain the same definition for the integrators then the growth of integrator traffic over the period between 1992 and 1998 is as follows:

Table 2.7 Share of total air freight by integrators
-----------------------------------------------------

## UK air freight study report

1992	6%
1994	8%
1996	10%
1998	11%

Source: consultants estimates

### 2.6 Developments and key issues for the airline industry

According to the questionnaire responses the industry trend of greatest importance to the airlines is falling yields due to increased freight capacity on passenger airlines. This is followed closely by concern for an overall slowing in market growth.

Some airlines have reported rising costs, but not above the inflation rate whilst others have refused to accept rising costs from their service providers. Trends in technology and the importance of measuring common standards are considered to be as important as the threat of rising costs.

Respondents claimed that the freighter market needs a reciprocal open skies agreement between the USA and the UK and that due to the increase in belly capacity on passenger aircraft, freighters are becoming uneconomical as rates fall. Integrators are expected to continue increasing their market share and are viewed by some airlines as a vehicle for growth where they co-operate as business partners with integrators and as a threat by others.

Opinions varied widely on other issues. For instance, key airport slot congestion and a lack of airport infrastructure are of high importance for those airlines operating to and from Heathrow and the main European hubs, while those operating from the larger regional airports consider these issues to be much less important.

Many respondents were sceptical of the benefit offered to freight operations by airline alliances and partnerships. This industry trend was ranked lowest in importance to the airline industry. Other factors that were mentioned as having some importance include the lack of sufficiently skilled and trained staff, lack of supervision of staff, lack of staff discipline and a tendency not to enforce quality standards. All of the aforementioned are expected to affect quality in the long term.

#### 2.5.3 General Sales Agents (GSAs)

General Sales Agents represents the cargo sales interests of cargo carrying airlines on an agency basis. Their principals may be scheduled passenger operators with belly hold capacity, charter passenger operators, scheduled freighter operators or charter freighter operators. The GSAs function is normally as a substitute for the airlines own cargo marketing and sales department, selling freight space and achieving the optimum utilisation of the aircrafts hold space. Revenue is normally earned as a commission on freight sales, usually a percentage of airline freight yield. Examples of GSAs operating in the UK include:

Air Logistics Ltd

Air Marketing Associates Ltd

Air Cargo Partners Ltd

Bridges Worldwide

PACE Airline Services Ltd

Appointment of GSAs by airlines is increasingly being seen as a more flexible and cost effective solution to air cargo marketing and sales representation. Passenger airlines often achieve a relatively poor return on their investment in maintaining cargo marketing and sales departments where they

regard cargo as secondary to their core business. By comparison, appointment of a GSA will cost the airline little and requires minimum commitment. With capacity growing and yields declining, airlines find the use of GSAs attractive.

Given that revenue is based on commission, the GSA is highly motivated to achieve freight sales. The GSA will increasingly add value to the services provided to their airline customers in the form of revenue accounting, track and trace capabilities through extensive IT investment and sometimes the supervision of cargo loading.

An airline may use a GSA to supplement its own cargo sales activities or to represent them in smaller countries where a direct presence from the airline is not justifiable.

Leading airlines such as Delta Airlines and American Airlines are reported to be advocates of GSAs to promote certain brands of service such as express. Delta have, for example, appointed Bridges Worldwide to market the carriers International Priority Service out of London to the USA.

Successful GSAs have a mixed portfolio of agencies where, if carefully selected, there will often be synergies between their principal airlines activities. For example, a GSA based in the UK representing a Scandinavian and a Trans-Atlantic airline will probably be able to attract export cargo from Scandinavia destined for the US on a routing through a London airport. This is to the benefit of the two airlines, as well as the agent. Such advantages are less likely to be achievable through the airlines own sales departments except in the case of the larger carriers operating cargo interline agreements or cargo alliances.

#### 2.5.4 Air freight forwarders

Air freight forwarders provide a service to freight generators and consumers (i.e. shippers), and importers. Initially, forwarding involved receiving a consignment of freight on behalf of the shipper, arranging its routing, transportation, handling and documentation to final receiver in some cases or to a foreign airport in others. The role of the forwarders has developed over the years with the largest forwarders now describing themselves as logistics providers.

Air freight forwarding has been a very fragmented industry. The cost of entry into the business was low, requiring no more than a simple investment in office space and the recruitment of a suitable number of support staff to assist the owner or manager of the business. This led to a large number of small enterprises, some of which specialised in niche markets, perhaps with only one or two principal customers. The necessary services such as road haulage and warehousing to enable the forwarder to deliver the requisite service to the shipper could readily be purchased from third parties. Freight rates could be negotiated with several different airlines or through air cargo wholesalers.

Not all the forwarders originated in this way, however, and there are many larger companies concentrating on the provision of third party distribution services including both surface and air freight forwarding such as Geologistics (formerly the LEP Group). Others have developed as adjuncts to large commodity trading companies and evolved into servicing third party clients. One example is MSAS Logistics.

Nowadays, air freight forwarders range in size from large companies with multi-national networks offering global coverage either directly or through agents, to the small specialist forwarder handling a particular type of shipment.

The following table summarises the freight spend on airline capacity by the principal agents in 1998 and shows the concentration of activity amongst the largest companies.

Table 2.8 Air Freight Forwarders by expenditure on freight capacity	
Air Freight Forwarders	Ranked on 1998 air freight spent with airlines

## UK air freight study report

		£		
		Freight spend	% total	Cum. %
1	AEI	35,863,134	9.19	9.19
2	MSAS Global	31,362,381	8.04	17.23
3	Geologistics	15,547,474	3.98	21.21
4	Emery Worldwide	14,804,495	3.79	25.00
5	Bax Global	14,345,961	3.68	28.68
6	Circle International	14,182,457	3.63	32.31
7	Air Menzies	14,157,945	3.63	35.94
8	Nippon Express	13,054,435	3.35	39.29
9	Kuehne & Nagel	9,778,915	2.51	41.79
10	Expeditors	9,437,401	2.42	44.21
11	Fritz Companies	8,598,781	2.20	46.41
12	Panalpina	7,813,954	2.00	48.42
13	Union Air Transport	7,120,730	1.82	50.24
14	Higgs	6,596,380	1.69	51.93
15	Trans Global	6,394,850	1.64	53.57
16	Activair	6,193,786	1.59	55.16
17	Davis Turner	5,521,104	1.41	56.57
18	Hellmann	5,462,521	1.40	57.97
19	ASG	5,270,166	1.35	59.32
20	Schenker	4,752,715	1.22	60.54

*Source: IATA*

The larger forwarders operate a different strategy of co-operation with their overseas group companies than that witnessed within the several integrator groups. Even where the larger air freight forwarders have comprehensive nation-wide and international operational networks they often rely upon the provision of third party services. This might be for any or all of the following: regional collection and delivery, trunk haulage to and from airports, use of common user transit sheds, common ramp operators and principally the use of scheduled airline cargo space. Forwarders also charter or part charter freighter aircraft space if they have sufficient volume on given routes to warrant it.

Forwarders have tended not to seek partnerships with airlines but rather to exercise their buying power gained through establishing critical cargo masses at consolidation centres under their control and then contracting with the airline for the most competitive freight rate. It would appear that this is changing slightly with the more sophisticated shippers being involved in tripartite relationships with

their forwarder and an airline. The air freight forwarders are striving to make their services more seamless in order to mirror the integrators approach and satisfy shippers increasing demands for time-definite deliveries, rapid and accurate tracking and traceability of their goods etc. Some airlines, Lufthansa for example, are actively encouraging partnerships with forwarders. This is seen by a number of the larger forwarders as an opportunity to expand their business.

Whilst acknowledging the rapid growth and success of the integrators, forwarders would argue that they still have a distinct role to play, particularly in being able to handle the complete range of consignments that a shipper might require to be air freighted. Integrators they would argue, are not able to handle out of gauge loads in the same way as forwarders. In particular, forwarders aim to match certain aspects of the integrators and differentiate themselves in offering the following:

Time definite services by direct collaboration with scheduled carriers, which can come close to matching integrators transit times, trace and tracking systems standards

Direct airline services

Consolidated services where the forwarder creates the critical cargo mass to buy airline space at reduced rates; the shipper benefits from a correspondingly lower freight rate, but despatch may be delayed.

Sea/Air services: particularly the larger forwarders represented through global networks have the ability to provide intermodal services: combined sea freight services to strategic points, from which point onwards, goods are flown for the balance of the distance.

The concentration of purchasing power in the hands of the top largest forwarders has led to the development of closer alliances between airlines and the leading forwarders in order to combat the competition from the integrators. Scheduled airlines, either by providing direct services to shippers or to forwarders, have introduced time-definite services guaranteeing the availability of goods for collection at some destination airports. This stops short of the integrators ability to guarantee goods delivery to consignees addresses in most cases, although some airlines, such as Lufthansa, claim to offer a guaranteed door-to-door service.

Integrators have up to now specialised in the transportation of documents and urgent goods, offering a flow of information along with the physical movement of the consignment. The integrators charge as much as four times the price per kilo for moving a consignment through their integrated system that a forwarder might charge based on a consolidation rate. In a market for belly hold space where, price remains the principal determinant the freight forwarders in conjunction with the scheduled airlines should be able to continue to succeed. Where level of service is the key issue, air freight forwarders (in conjunction with scheduled airlines), will have to do much more to match the integrators performance if they are to hold market share.

In volume terms, the air freight transport market is primarily driven by the major freight forwarders who in turn are dependent upon large volumes of traffic supplied from shippers. London Heathrow has grown to be the principal focus of airline activity in the UK, initially owing to its proximity to London, the centre of commercial activity in the UK. Heathrow is a world league airport and therefore offers a large range of carriers and destinations with a high frequency of services. Consequently the major forwarders have focused their activities and investment at or near to Heathrow. The high volume moving through their consolidation facilities has provided volume purchasing power and has effectively allowed the forwarders to dictate both rates charged and airport used. To a great extent, the forwarder has little interest in fragmenting its activities and using other airports. Indeed, forwarders have evolved to provide nightly truck services between their regional branch offices (often around a regional airport) and Heathrow. Even the smaller forwarders share space in trucks operated by third party trucking companies in order to compete.

The natural focus of forwarder activity at Heathrow is further reinforced by proximity to other forwarders. The resultant critical mass encourages co-operation to enable purchase of even more competitive freight space aboard aircraft. It follows that the regional offices require much less

investment. In many cases, forwarders only have office accommodation in the regions and sub-contract any trucking and warehouse requirements with investments designed to feeding London Heathrow. Forwarders based in the regions will take advantage of airline-provided trucking services which service their flights into and out of the south east or continental gateways. Equally they will take advantage of airline cargo handling services within the airport. Medium and small forwarders will use the services of wholesalers in order to buy freight space more competitively. (see section 2.5.6 below)

The market for forwarding services remains very competitive with shippers easily able to substitute another forwarder where they are dissatisfied with the service. Forwarders, in turn, recognise the increasing sophistication of their customers and are endeavouring to provide more value-added services which in some cases amounts to integration within the customers company to manage the total logistics chain.

### 2.5.5 Developments and key issues for freight forwarders

Responses from freight forwarders showed the greatest consistency in views of all the air freight industry trends. The level of service provided by airlines standards and airline accountability for this service were rated the most important issues by freight forwarders, given customer expectations for goods to arrive on time and for tracking technology. Only one respondent felt strongly that airlines had no accountability for the level of service they provide.

The freight forwarders have experienced an increased demand for logistic services as shippers continue to outsource their logistics functions and require more pre-and post-shipping value-added services. This trend is forecast to continue with more and more shippers demanding single source solutions. Technology is also ranked at a high level of importance given the need for tracking, tracing bar-coding and the increase in information technology that this entails.

Delays and congestion at transit sheds have been identified as major non-recoverable costs given that air transport is seen as an express product. It is generally felt that air cargo spends too much time on the ground. Resultant falling margins would result in less IT investment and hence less efficient services.

Integrator strategies to penetrate the higher weight markets through acquisition are seen as less of a threat in comparison to the above while it is felt that mergers and acquisitions will change the nature of competition and the services provided by the integrators and forwarders.

Direct contracts between airlines and shippers are seen as a relatively unimportant threat as the core competencies and objectives of each sector are too far apart. However, integrators are bridging the gap between the two.

### 2.5.6 Wholesalers

Wholesalers buy capacity from airlines and sell this on to small and medium forwarders. This enables them to buy freight space more economically than they might otherwise through contracting directly with the airline. The main wholesalers are located around Heathrow. Though some have regional offices, they principally collect goods in the regions and truck to their consolidation facilities around London Heathrow. Where practical, some consolidations of cargo are flown from regional airports.

AMI is the only pure wholesaler (selling both general cargo and express) operating in the UK. However Activair and Hellman forwarders also sell wholesale and retail. Linex wholesale general cargo space although their principal activity is in express cargo.

## 2.6 Integrators

### 2.6.1. Nature of the integrators services

The category of integrators covers the operations of companies such as Fedex, UPS, DHL, and TNT. As the name implies, these operators provide a door to door service for shippers or importers, usually

providing their own road transport (local and trunking), handling, transit warehousing facilities often through an airport terminal dedicated to their use, and aircraft (whether owned or chartered). Normally the integrators contract directly with the shipper though their customer could be a forwarder in certain circumstances. They integrate many of the functions described separately in section 2.5 above.

Integrators offer services based essentially on the use of their own resources: goods are collected by their own road vehicles, pass through their own regional distribution centres and hubs and are flown in aircraft dedicated to their use whether owned or wet leased/dry leased. The belly hold space of scheduled aircraft is also used. This may be at a higher freight rate than a forwarder would pay in order to ensure space on a scheduled aircraft and therefore guarantee timely delivery at the destination airport, for which the shipper pays a higher price. Integrators operate a vertically integrated structure.

Integrators often describe their services as the sale of information. Cargo from the moment of booking space with the operator, cargo data is keyed into an EDI network which provides a track and trace system throughout the goods transit, enabling the operator to inform both suppliers and receivers about the status of their goods during transit. EDI networks also provide the process of documentation, from the documentary evidence of the supply and sale of the goods, the issuance of transport receipts, the preparation of customs entries and the raising of service invoices against which the client pays for services rendered.

Air freight forwarders generally do not provide the same degree of information as the integrator or the same level of service. If goods are flown direct (non consolidated), it is usual to ensure space on a specific flight against the flight and waybill numbers but this does no more than certify flight departure and gives no assurance as to the time of delivery at the consignees premises. Recently, scheduled airlines have commenced a service guaranteeing availability at the destination airport (post customs clearance) for time definite shipments but this does not offer the same degree of service providing by integrators guaranteeing delivery to the consignees address.

### 2.6.2 Integrators historical development

Integrators started principally as express operators, carrying documents and small parcels. However, they are now targeting larger packages and competing directly with freight forwarders and airlines.

They work through a hub and spoke goods distribution system. The choice of airport has to be in line with their operation in that there has to be sufficient time for the aircraft to land, for cargo to be sorted and for the aircraft to depart within a given time window, often during the night. The integrators require unrestricted flying, ground handling facilities on the ramp and sufficient warehouse space to accommodate the sorting and distribution of the cargo. Location, infrastructure, slots, facilities, road networks and cost all determine the choice of airport.

The four principal operators in this sector are Federal Express (Fedex), United Parcels (UPS) DHL and TNT. Emery and Burlington operate integrated operations in the US, but are, effectively, freight forwarders in Europe.

Fedex and UPS remain US companies. DHL has a mix of American Japanese and European (25% Deutsche Post 25% Lufthansa) share capital interests and TNT is owned by the Dutch Post Office. Within the air freight industry, the first two companies are perceived as American and the latter two as European.

Fedex, UPS and DHL developed their business bases in the North American market, primarily within the USA, through the distribution of documents and emergency parts by air transport. The long distances in the US meant that surface transit times could be improved upon enormously by air transportation. These services became known as international air express (IAE) services and expanded rapidly during the 1980s. Fedex, UPS, Emery and Burlington concentrated on the domestic US market. Of the four companies, the first two concentrated on carrying packages of up to 30 kilos, the second two of packages weighing in excess of 30 kilos.

In 1980, the integrators were reported to have 6.5% of the integrated express market in the USA; by 1996 this had reportedly grown to 60.3% of the US Freight Tonne Kilometres (FTKs).

The creation of critical business mass in the USA provided the springboard from which to develop global business on primarily Trans-Atlantic and Trans-Pacific routes. This has been achieved through setting up distribution networks in key markets such as Europe, operational air freight networks and transit shed hubs at a number of key airports. These are in turn linked through road transport networks to regional distribution centres specialising in customer collection and delivery services within the region. This is known as a hub and spoke system.

The American integrators have benefited from a deregulated air transport market within the USA, allowing open skies competition between service providers. They derive a further benefit from the protectionist transport policies of the United States Government, which precludes foreign owned operators from setting up in competition or even by chartering aircraft to American operators. The American internal air transport market may be described as highly regulated with barriers to entry for foreign operators.

### 2.6.3 Developments and key issues for integrators

Views on industry trends were obtained from two of the four integrators. For through transport service providers, access to the airports is the most important consideration, followed by airport noise constraints. The availability and opportunity for expansion at airports is also given a relatively high importance rating and of all trends, the issue of liberalisation has the least relevance to these integrators.

## 2.7 Express operators and couriers

In addition to the integrators as previously described, there are other express operators who provide services based on scheduled carriers rather than on their own aircraft and either use their own tailor-made products or sell the services of airlines own express products. Some express operators specialise in wholesale selling to the industry while others retail to shippers. Example of such operators are Linehaul Express, Jupiter, Bridges Worldwide, Asia Pacific

The express operators also provide courier services using the services of passenger airlines and in many cases the courier bags are delivered across the passenger check-in desks and carried physically by a passenger. The courier parcels therefore travel on passenger baggage tags and are not classed as cargo. The advantage of these services to the shipper is more rapid transfer at point of origin and destination.

## 2.8 The role of key sectors: postal services

The British Post Office handles some 75 million letters per annum, for international distribution, with only 6% or 4.5 million letters carried by air. In 1997/98, 860,000 tonnes of mail and 11,000 tonnes of parcels were carried. In 1998/99, the total for mail and parcels was 974,000 tonnes.

Post Office mail and parcel distribution services are broadly categorised by the following:

- Royal Mail services for 1st, 2nd class and foreign postal distribution.
- Parcelforce for the domestic and foreign distribution of parcels.
- Express Mail Services (EMS) and Datapost

In 1998 Parcelforce reviewed the use of air freight services as part of a cost rationalisation exercise, and reduced its reliance on air freight services by 50%.

Priority, 1st class mail, EMS and Datapost must fly by the first scheduled flight in order to guarantee a next day service. Standard parcels are flown at the scheduled airlines discretion which on occasions leads to delays.

### 2.8.1 National mail and parcels distribution

The national distribution of mail and parcels with individual revenue of £1 or less per item is currently a monopoly held by the Post Office but will soon change. National first class mail and parcels are distributed through a next day delivery service and the distance involved determines the mode of transport.

Road transport is generally used up to 500 miles; over 500 kilometres, rail transport is generally used and only if the next day criteria cannot be met by these modes is air freight substituted.

National mail and parcel distribution is arranged on a rotation basis between major centres such as Edinburgh with Bristol. There are 1200 rotations allied to 2000 sectors. The latter are intermediate stops on rotations and an example for Edinburgh Bristol would be Carlisle.

### 2.8.2 International mail and parcels

International mail and parcels are largely handled jointly with foreign corresponding post offices. Most European post offices have agreements with each other concerning the sharing of revenue, which are known as Remuneration for International Mail Services (REIMS). Agreement on the levels of revenue is linked to the cost of delivering first class mail in the receiving country; some agreements entail the accreditation of between 50 and 80% of the stamp revenue to the receiving post office.

Some foreign Post Offices such as the German, French and Swiss Post Offices have a presence in the United Kingdom for the receipt of magazines and hybrid mail. These Post Offices receive, for example, magazines in bulk from a UK publishing house for distribution in their countries. They despatch the freight by air to a destination airport in their own country. Following sorting, mail and parcels pass into their own postal networks for delivery to consignees. They provide this service to their customers at a more competitive rate, geared to their own national revenue requirements, avoiding the need to share revenue with the British Post Office. On this basis, they may perhaps charge a postal rate of 20p, rather than 30p per item were they to share income under the REIMS agreement.

### 2.8.3 Buying air freight capacity

The Post Office both wet leases complete aircraft and purchases space on scheduled and non-scheduled flights using different airlines, including integrators. Scheduled flights normally involve the belly hold of passenger aircraft and this is likely to be a continuing practice rather than greater use of freighters.

When using integrators flights, the Post Office tends to purchase space on a per kilo basis to the airport hub or spoke, at which point, the mail will be fed into the recipient post offices network.

Mail and parcels are generally despatched in loose bags but there is a growing tendency to consolidate bags into ULDs (Unit Load Devices) wherever practical.

Airlines are invited to quote for the Post Offices freight space requirements through invitations to tender appearing in the European Journal. Competitive tenders are sought on a single leg basis or for a round trip; airlines are sometimes invited to include ground handling services as a part of their tender. They have reciprocal arrangements with some foreign post offices, such as the Irish Republics Post Office, for the return loading of chartered aircraft.

The Post Office commit themselves to moving fixed quantities on different routes and any excess capacity is not normally sold to third parties.

### 2.8.4 Airports used

Heathrow Airport is the principal airport used, serviced by the Post Offices hub at Langley. Coventry is a key regional airport for Parcelforce. Other airports are used on a regional basis, include Gatwick for the Channel Islands and Liverpool for Ireland.

Scheduled airlines can place substantial restriction on the air cargo carried per aircraft, due to their preference for passenger revenue and in consequence baggage carriage.

There are a number of key issues which are of concern to the Post Office:-

The fair allocation of airport slots, preferably with a system not always favouring passenger aircraft through the related revenue for airports in the form of higher landing fees and other commercial income.

An improved policy on deregulation opening up the airline and therefore the cargo markets to increased competition.

Scheduled carriers and air freight forwarders are judged as not wishing to encourage deregulation, which would expose both to increased competition.

#### 2.8.5 Extent of regulation of European Post Office

National post offices in Europe operate at different levels of regulation or deregulation. The Italian post office remains highly regulated having a monopoly on the distribution of all packages up to 350 grams in weight. By comparison, other European post offices are at various states of deregulation. The most deregulated are those of Holland and Germany. Both post offices are allowed to purchase other businesses; each has made substantial investments in competitor or companies offering services complementary to those of post offices. The Dutch Post Office purchased TNT, one of the four integrators. Deutsche Post already own 25% of the share capital of DHL, reportedly the worlds leading international integrator. More recently, they have acquired the total share capital of Danzas, reputed to be the worlds largest freight forwarder, with substantial surface and air transport activities. They have also acquired AB Svenska Godscentraler (ASG), one of Swedens largest third party transport operators. Deutsche Post, through Danzas, has acquired the major air freight forwarder AEI. Following these major acquisitions of forwarders, Fedex is seeking a hearing at the European Court of Justice on grounds of unfair competition as Deutsche Post has a monopoly on postal services in Germany.

The British Government has recently relaxed the regulation of the Post Office to allow it to broaden its services. In consequence, the Post Office has invested in the US and Canada, with the formation of Royal Mail Inc., which is already the fourth largest distributor of mail in the US. In Europe, the Post Office has purchased German Parcel and is developing other relationships.

The post offices are clearly seeking to widen the base of their trade spectrum and will emerge as greater forces particularly in the express mail and parcels sector, providing greater competition for the integrators. The acquisition by Deutsche Post of freight forwarding interests will increase its penetration in that market.

In the express mail and parcels sector they have certain regulatory advantages including a monopoly in the distribution of mail in their home countries. Further, mail and parcels moving between postal administrations use documentation which absolved them from national customs clearance requirements. This may be viewed by the integrators in particular as further unfair competition.

#### 2.8.6 The evolution and future role of national Post Offices

Several European national post offices are breaking away from the tradition of providing global services through total reliance on trading with national counterparts in corresponding countries. This was initially done by the establishment of their own facilities in other countries. This has included the opening of a number of European post offices in London and the establishment of a major postal service in the USA by the British Post Office etc..

More recently, some post offices have recently established themselves as major logistics service providers across a much broader spread of business activity by acquiring share interests from total to part ownership in integrators, large freight forwarding and parcels operators, who provide complementary services to those already offered by post offices.

Most post offices remain state owned by their country of origin and continue to have monopoly rights over certain post categories in their home countries. Their right to acquire other third party distribution interests both in their home and other countries has evolved as a consequence of the national liberalisation of post office operating rights in each country. Some national governments have more liberal policies than others. Germany and the Netherlands may be said to be at the forefront of liberalisation policies as demonstrated by the degree of recent part or total acquisitions of several third party distribution companies. The British Post Office is a later entrant to a more liberalised market, due to Government policy.

While post offices remain state owned and retain their national monopoly over certain categories of post, many in the private sector view this as unfair competition, as evidenced by Fedex's intention of appealing to the European Court.

If post offices are allowed to proceed with current policies, they are destined to become major operators across a wide sector of third party goods distribution both by surface and air transport. Their greatest growth is likely to come from air related services, probably representing major competition for the express industry, in particular, the integrators.

## 2.9 The role of Transit Shed Operators

Transit shed operators provide a transit handling service for airlines and sometimes forwarders. They usually lease or rent transit sheds from the airport authority. Their function is to receive cargo from the aircraft, de-palletise and deliver to truck or vice versa. Some airlines have their own dedicated facilities, others share the services of a third party operator. Goods can be held for a short time pending customs clearance, but the transit sheds do not generally store goods. Cargo is moved through the shed and into a warehouse for storage pending onward distribution. Some airports manage their own transit shed service. Larger airports tend to have competing transit shed operators.

### 2.9.1 Main operators

Amongst the largest of independent transit shed operators is Servisair which has 24 air cargo warehouses. They have recently been purchased by Penauille a major French airport service provider. The Menzies group is a large operator which owns Concorde Express, an airfreight haulier, and, with Lufthansa, owns the London Cargo Centre (LCC). Menzies have also recently acquired BOC Handling and effectively doubled their shed capacity. The other two significant players are Cargo Service Center, a subsidiary of KLM and Plane Handling jointly owned by Virgin Atlantic Airways and Gatwick Handling. They have been consolidating their position following major expansion during 1997/1998.

Airlines as well as having share participation in transit shed companies, others, operate facilities in their own right, for instance British Airways and Air Canada, the former having the single largest resource at Heathrow.

Total shed capacity of the major players at LHR is about 307,281 square metres with significantly smaller capacity at the other London airports.

### 2.9.2 Transit shed capacity

A summary of UK transit shed facilities, by airport is provided in Table 2.9

Airport	Operator	Type		Floor Area (m <sup>2</sup> )
Heathrow	Cargo Service Centre	Bonded		15100

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	Plane Handling	Bonded		12500
	Plane Handling	Bonded		5200
	Plane Handling	Bonded		4000
	BOC	Mixed		9000
	BOC	Mixed		5100
	Ogden	Bonded		9000
	British Airways	Mixed		82,605
		Cold store		6,410
Gatwick	Servisair		)	
	British Airways		)	
	Gatwick Handling		) 270,000 sq ft	
	British Midland		) 25,110 m 2	
Stansted	Servisair			2673
	Gatwick Handling			3001
	Federal Express			5809
	TNT International			4911
	Royal Mail			2003
West Midlands	Parcelforce			5000
International	Lynx Express			1250
	Target Express			5000
	AEI Goodrem			2000
	DHL			1250
Birmingham	British Airways//Servisair			6000
	BOC			4000
East Midlands	DHL			30,000
	UPS		)	
	Servisair (erts)		)10,700	
	Derwent (erts)		)1,600	

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	Dunwoody		)	
	EMA (bip)			375
Leeds/Brandford	Servisair			--
Manchester	British Airways			7905
	Menzies			4836
	CSC			1302
	Servisair			4836
	Plane Handling			4000
	MCC			3813
Liverpool	TNT			1570
	Servisair			2620
Newcastle	North East Aircargo			1000
	Servisair			1000
	Wyng Road Flight			210
Prestwick	GLA/Pik Bond			4000
	Northwest			2000
	Fedex			700
Glasgow	Servisair			1400
	Air Canada			400
	British Airways			1800
Edinburgh	Servisair			3283
	North East			469
Aberdeen	Ogden	Bonded		500
TOTAL				307,281m2 (3.306,344 Square feet)

The details contained in this table are in accordance with the information provided by those companies who completed questionnaires. It is not a totally comprehensive listing as not all companies responded.

2.9.3 Developments and key issues for transit shed operators

The respondents attached the most importance to trends in IT and the development of systems automation. Airline alliances and competition from off-airport operators were cited as being the least relevant to transit shed operators. Other topics which gave cause for concern are levels of pilferage and security at airports.

In general, the contribution of IT to shed operators activities has served to speed up processes, especially for customs and reduced administration, allowing the companies to concentrate on their core activities. They also reported increased reliability and consistency. However, heavy investment in this area has increased costs and caused rates to rise in some cases. These factors have also allowed the operators to keep pace with increased demands from service delivery standards.

Three of the five respondents have web-sites which are used for advertising and marketing only. However, in the future, the internet will be used to track goods, to submit airway bills and for activity logging. These developments will reduce the margin of administration error and speed up processing by smoothing activity flows.

The key issues for the transit shed operators have been covered in the text above. The table below summarises the scores recorded on the questionnaires.

## **2.10 Specialist air trucking companies**

### Nature of service

The air freight trucking companies provide road haulage between the regions and the London airports or continental airports, usually to timed schedules. They have roller-bedded trailers to enable rapid and easy transfer of air cargo pallets and ULDs between the transit shed, warehouses and consolidation facilities. Most companies work on behalf of the airlines in servicing the forwarders requirements. The truck companies usually contract with the airline, although they can also be contracted to transit shed operator and freight forwarders.

Integrators trunk haulage and local collection and delivery services are organised and managed in a different way. They tend to own their transport vehicles or use those of dedicated contractors, which work around their own regional network and provide links with central hubs. These are not those normally used by airlines and freight forwarders, which tend to use other dedicated or common user airport based transit sheds. Integrators tend to use airports mainly dedicated to freighter operations, where as scheduled airlines and freight forwarders are more orientated to the use of main airports and belly hold capacity on passenger aircraft. In consequence, there is little common usage of haulage services by Integrators on the one hand and airlines/forwarders on the other.

The use of road transport in the movement of air cargo is part of the integrated process of moving goods on a door to door basis between suppliers and recipients premises. Road transport is used as a means of local collection and delivery of air cargo, principally by air freight forwarders who funnel the traffic through regional distribution centres or hubs. Some of these are in turn connected to trunk haulage links through regional airports, from which points the goods are either flown or transferred by road to major cargo consolidation points within or round the periphery of key hub airports such as London-Heathrow, Amsterdam, Frankfurt and Paris. Air cargo flows may also bypass regional airports, moving directly from and to regional air freight forwarders, or road hauliers distribution centres. Forwarders tend to contract with the same hauliers to provide trunk links between their own regional distribution centres and cargo consolidation centres. The latter are generally either located on or within the periphery of the hub airport.

Many airlines provide road haulage services to meet their own airline service operations. Some are based on dedicated scheduled trailer departures, others operate on a shared user basis, where one haulier may carry for a mix of airlines, transit shed operators and freight forwarders. Many larger freight forwarders organise their own road haulage for both local delivery, collection and trunk haulage, either by use of their own transport fleets or by sub-contracting to chosen hauliers.

The road trailer is often substituted for aircraft for a trunk haul for the following reasons:

Due to a lack of space on predominantly narrow bodied aircraft plying the main Intra -European air routes,

the recognition that short haul air freight services often suffer from disproportionately long pre and post shipment delays at airport transit sheds, while awaiting handling and customs formalities.

\* substituting trailers for aircraft on short haul routes can often be a more economic solution for the airline by direct cost saving, the use of road transport maybe cheaper than flying goods and in indirect terms, reduce cargo handling costs.

#### 2.10.1 Key issues for trucking companies

Fuel costs were cited as the most important trend affecting their business operations, followed by vehicle excise duty (VED) increases and transit shed delays. The first two make UK road haulage companies less competitive when compared to operators on the continent.

Rates have fallen, which has reduced the scope for re-investment in equipment by the trucking companies. This is due in part to mergers and alliances between airlines which has increased their buying power and they have also refused to accept price increases. Surprisingly, road congestion is ranked as having only medium level importance, although this factor is a greater issue for operators serving key airports such as Heathrow. Inconsistent information from the airlines causes poor load utilisation for truck operators.

Finally, increased use of regional airports ranks as having least importance for truckers and they believe this may only affect larger operators who transport for integrators. The majority of truckers customers are the airlines and freight forwarders.

#### 2.10.2 Road haulage equipment

About 95% of trunk haulage by weight is based on the use of standard 13.6 metre long semi-trailers with the balance carried in rigid vehicles of six/seven metres in length. The latter are primarily used for the regional collection and delivery of goods and short trunk hauls. Each vehicle has to be fitted with roller bed bases to facilitate the handling of air cargo pallets or ULDs. Both types of unit are constructed of light-weight metal and generally have insufficient structural strength to support the cargo payload. It is therefore critical that both forms of unit load are fully supported by using specialist pallet transporters as they pass to/from road vehicles, transit sheds and aircraft.

Trailers built with roller beds tend to be dedicated to the carriage of unitised air cargo or other specialist transport purposes, as roller beds are rarely required when road vehicles are transporting general goods. Standard industrial and Euro pallets have sufficient strength not to need support when being transferred by forklift. The road haulage of air cargo is therefore a niche market worked by specialist hauliers using roller bed equipped trailers.

It is estimated that the major operators have between 200 and 300 trailers specifically built for the dedicated movement of air cargo. Each trailer is able to carry four aircraft pallets or units, which equates with an average of 1,000 pallet/unit positions per working shift. A typical tractor and 13.6 metres long trailer rig cost of the order of £80,000 each, representing a total investment by the road haulage industry largely for the carriage of air cargo of between £20 and £24 million.

#### 2.10.3 Market structure and commercial relationships

As in the general road haulage market there have been a large number of companies operating in the market due to the relatively low barriers to entry. Increased costs (such as rises in fuel duty and vehicle excise duty) and continuing fierce competition has resulted in some consolidation in this sector of the industry.

There are now about four major UKbased air cargo hauliers which have nationwide coverage, and several others concentrate their activities in particular regions such as the East Midlands/North East and Scotland.

In the future it is likely that the hauliers best-equipped to survive in the current fiercely competitive environment will be those with interests in commercially more attractive sectors of the industry, such as air cargo handling or other complementary road haulage.

#### 2.10.4 Road transport economics

This section provides an estimate of costs for road haulage of air freight and provides a comparison with general road haulage.

We have assumed an average payload for an air cargo truck of 8 tonnes, equating to four airline pallets, each holding 2,000 kilos. Four pallets occupy the floor space of a 13.6 metre trailer and 2,000 kilos has been taken as an average weight per airline pallet. No reliable statistics were available from road hauliers, but several airlines have verified that this is a reasonable approach. If the trailer were loose-laden with general cargo then it could carry appreciably more. Experience in the general haulage market would suggest that a payload would be about 14 tonnes, although for certain commodities it could be over 20 tonnes.

Road haulage rates for a full trailer load of air cargo may be no more than £500 for the 688 kilometres between Glasgow and Heathrow airports. A typical rate between Manchester and Heathrow Airports would be £275 for a distance of about 320 kilometres. These rates are no greater than a haulier might be paid for hauling maritime containers over an equivalent distance on a regular contract basis with a major deep sea shipping line.

The following example gives some indication of the proportion of cost of road haulage of an entire international movement of a pallet of cargo between Glasgow Airport and Hong Kong Airport, with the cargo being flown from Heathrow.

Table 2.10 Proportion of through transport cost attributable to road haulage		
	£/airline pallet£/kilo @ 2000	
Airport handling at Glasgow	75	0.04
Road haulage between Glasgow and Heathrow	125	0.06
Handling costs at Heathrow Airport	50	0.03
Air Freight costs between Heathrow and Hong Kong airports	1,500	0.75
Total cost	1,750	0.88
The road haulage element accounts for 7% of the total cost.		

source: MDS Transmodal Limited

The following table provides a comparison of typical rates earned by road hauliers for the movement of air cargo and general cargo between the United Kingdom and Germany for a typical driver accompanied 13.6 metre semi-trailer.

Table 2.11 Comparison of road haulage costs to continental airport		
	Air Cargo	General Cargo

## UK air freight study report

Manchester to Frankfurt	£1,000/1,100	£835
East Midlands to Frankfurt	£950	£760
Birmingham to Frankfurt	£900	£760
London to Frankfurt	£850	£640

source:MDSTransmodalLimited

### 2.10.5 Air cargo volumes carried by road

Very little data was available from the air cargo hauliers and therefore it was necessary to rely on regional estimates available for the amounts of cargo hauled with regions and hub airports provided generally by airports and transit shed operators. This data is largely collected through the goodwill of transit shed operators who supply the information to airport management for collation.

Table 2.12 provides an estimate of the tonnage per annum and truck movements per day between regional airports and Heathrow Airport.

Table 2.12 Sample of Trucked air freight between UK regional airports and Heathrow		
to/from	tonnes per annum	trailers per day
Scotland	106,000	44
Newcastle	10,740	4.5
Manchester	65,720	27
Birmingham	25,573	11

Source: MDS Transmodal Limited

It is not unusual for airlines and air freight forwarders to truck cargo to and from mainland Europe either for the transfer of cargo to continental hub airports for Inter-Continental movements, or even for Intra-European movements. In the latter case, this means that road is being used as a substitute for air transport.

It is extremely difficult to obtain data on flows of this type but limited information was available from three major airlines on truck flows from the UK to three major continental air cargo airports. The figures provide an indication only of the truck movements and it was not possible to distinguish between those carrying out Intra-European air distribution and those carrying cargo for inter-continental air transit.

The following estimates of traffic flows between the UK and three key mainland European air cargo airports, which service scheduled passenger and freighter services, are based on information received from three major airlines.

Table 2.13 Sample of truck movements between UK and key continental airports	
to/from	Number of trailers moved per annum
Amsterdam	7,300

Charles De Gaulle	6,000
Frankfurt	1,600

source: three major airlines

### **2.11 The role of international rail transport in the distribution of air cargo**

There is currently no distribution of air cargo by air due to:

the difficulty in consolidating sufficient volumes of air cargo to make rail economic

lack of intermodal rail facilities at airports, contributing to making rail uneconomic

the flexibility, convenience and low cost of road haulage

This does not mean that rail could not be used in the future and the potential for increased use of rail will be considered in more detail in Phase 2 of the research.

### 3 The demand for airfreight

#### 3.1 Methodology

One of the primary objectives of the study has been to gather together sources of air freight statistical data in order to provide a detailed analysis of the industry in terms of:

Market Size

Market Growth

Market Sectors.

The data presented here comes from two main sources:

UK HM Customs & Excise (HMC&E) Trade Data 1994-1998

Civil Aviation Authority Air Freight Data; 1992-1998

It has been necessary to combine these sources in order to provide a complete view of the industry, including details of the trade flows underlying the airport to airport movements of freight.

There were two major issues to resolve:

The difference in coverage between the two data sets, and

The presence of significant errors in the HMC&E data

#### 3.2 Difference in coverage

The CAA data is a record of all the freight and mail handled at the major UK airports. It includes domestic and international flows, as well as transshipments of non-UK trade tonnes at UK airports.

The HMC&E data is a record of all the imports and exports into and out of the UK by air, for which customs documentation is required. Since the introduction of the Single European Market in 1992, the data collection system changed, resulting in different customs regimes for trade within the European Community (EU) (the Intra-Stat system) and external trade with countries outside the EC.

The extra EC documentation produces more detailed data, including UK port and mode, allowing air trade to be identified with particular UK airports. The intra EC documentation is administered via the VAT system, and it involves estimation of the smaller consignments. The UK airports are not identified within Intra-Stat, but modes are, allowing air trade to be analysed by product and country or origin and destination.

The main differences between the CAA and HMC&E data are summarised below:

Table 3.1 Differences between CAA and HMC & E data sources		
Data	CAA	HMC&E
UK Domestic Freight	Included and double counted	Not included
Mail	Included but Separately Identifiable	Likely to be grossly underestimated
Transshipments	Included	Not Included

## UK air freight study report

Intra EU Trade	Included, but not separately Identifiable	Included, but without airport details
Extra EU Trade	Included, but not separately Identifiable	Included
Trucks with Flight No.s	Not included	Not included

Taking these factors into consideration, it was to be expected that the HMC&E data would report lower volumes than the CAA data, and this proved to be the case. In 1998, the two sources reported:

Table 3.2 UK Air Freight, 1998				
Sector	Direction	Freight	Mail	Total
Domestic	Landed	54,203	71,123	125,326
	Lifted	58,931	73,179	132,109
Extra	Landed	822,151	26,212	848,363
	Lifted	748,249	40,745	788,994
Intra	Landed	210,020	13,172	223,192
	Lifted	209,054	22,490	231,544
Total CAA		2,102,607	246,921	2,349,528
Domestic	Landed			
	Lifted			
Extra	Landed	796,201		796,201
	Lifted	528,605		528,605
Intra	Landed	90,547		90,547
	Lifted	128,419		128,419
Total HMCE		1,543,772		1,543,772

The overall difference (2.35 million tonnes against 1.54 million tonnes) is considerable, but this can be explained to an extent by eliminating mail and domestic freight from the CAA statistics, amounting to 360,055 tonnes. This brings the gap between CAA data and HMC&E data down to 445,701 tonnes.

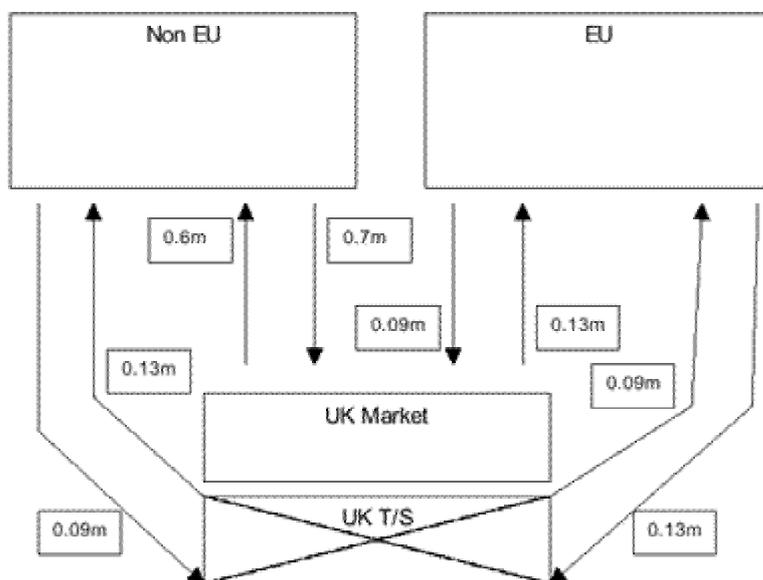
Looking at the sectors that should correspond quite closely (i.e. extra EC freight), tonnes landed (imports) are very close (796,201 and 822,151), but there is a difference of 219,644 tonnes for tonnes lifted (exports). It is well documented that the UK has an imbalance in trade, so it would appear to be consistent that tonnes landed should exceed tonnes lifted. This suggests that the discrepancy is be the result of operators loading non-UK cargo on flights from the US for example which would be

transhipped for other destinations i.e. elsewhere in the EC. In other words, the discrepancy is due to transshipment traffic handled at UK airports, which is recorded in CAA data, but not HMC&E data as it does not represent a UK import or export.

Due to data errors within the Customs data (see below) where weight (but not value) or port has not been accurately recorded, it is difficult to be precise, but considering the full six-year time series it is likely that the 1998 HMC&E figures overstate the gap between UK extra-EU imports and exports. Over the six year period being considered, imports are on average 118% of exports, and by considering 1996 volumes (0.6m imports, 0.5m exports) plus two years of 10% growth, it is likely that the genuine trade volumes are in the region of 0.7m imports and 0.6m exports.

Comparing these volumes with CAA data, it appears that there is approximately 90,000 -120,000 tonnes of freight coming into UK airports from non EC countries, not consumed in the UK, and 130,000-150,000 tonnes moving in the other direction. These volumes would account for the difference between HMC&E figures for UK-EC traffic and those reported by the CAA. Taking all of these factors into account, it is likely that the real picture is as follows<sup>2</sup>

### Reconciling HMC&E and CAA Data



Under these circumstances, total UK trade by air would amount to 1.52 million tonnes, total transshipment would be 0.44 million tonnes, and total international freight would be 1.96 million tonnes

### 3.3 Data errors

In order to use the results obtained from the UK Customs data, it is necessary to identify and remove errors. Air trade analysis is particularly prone to errors as it forms a small subset of total UK trade. If one shipment of coal or grain is wrongly classified as air trade, the change in total tonnes by air can be dramatically altered.

In general, the Customs system collects financial information, regarding the value of imports and exports from the UK. Volume information is not subjected to the same level of scrutiny, so therefore it is likely that volume errors will not be identified or removed from the published databases.

Various techniques have been applied as part of this study to improve the data quality. First, the detailed time series of country-commodity flows have been examined in order to identify shipments that lie outside the normal range of values. Second, normal value per kilogram figures have been calculated, on the basis that if value figures are correct and volume figures are wrong, then extreme fluctuations in this ratio ought to indicate incorrect tonnages. Finally, the results have been compared,

where possible, against CAA figures to make sure that the market shares of the main UK airports are broadly in agreement.

Simple errors have been edited out of the tables, or amended manually so as to produce sensible value per kilogram ratios.

### **3.4 Definitions**

Certain broad definitions have been used in order to allow both databases to be analysed.

**Countries:** Over time, national borders and their coding are redefined either for political reasons or for statistical reasons. It can therefore be difficult to examine trends in trade by country if the given country codes change from year to year. Therefore a set of static codes have been defined, and the data has been mapped with this.

**Airport Locations:** The CAA data is based upon airport to airport combinations, whereas the HMC&E data is based upon airport to country pairs. Therefore, all the CAA overseas airport codes have been mapped to the static set of country codes.

**World Regions:** It can be misleading to analyse world markets by national boundaries. The UK transatlantic market essentially covers UK trade with two countries (USA and Canada). By contrast, the UK-Far East market covers a number of much smaller countries such as Hong Kong, Taiwan, Japan, Korea, Singapore, Malaysia, Thailand and so on. Therefore, in order to provide a more realistic picture of world markets, a set of eight continental regions have been defined, based upon the definitions used by IATA.

**Coverage:** There are numerous ways to define the total quantity of UK air freight, and as explained, the CAA and HMC&E provide different coverage. The main points to note are:

Neither source claims to include freight that is trucked either between UK airports or to Ireland and the Continent.

The CAA data reveals the destination of the aircraft carrying the freight, whereas the HMC&E data reveals the importing or exporting country.

The CAA data contains freight and mail, whereas the HMC&E data is believed to be mainly freight.

The CAA data contains domestic traffic, transshipment (and interlining) to other aircraft, and domestic traffic. The HMC&E data contains UK overseas trade only.

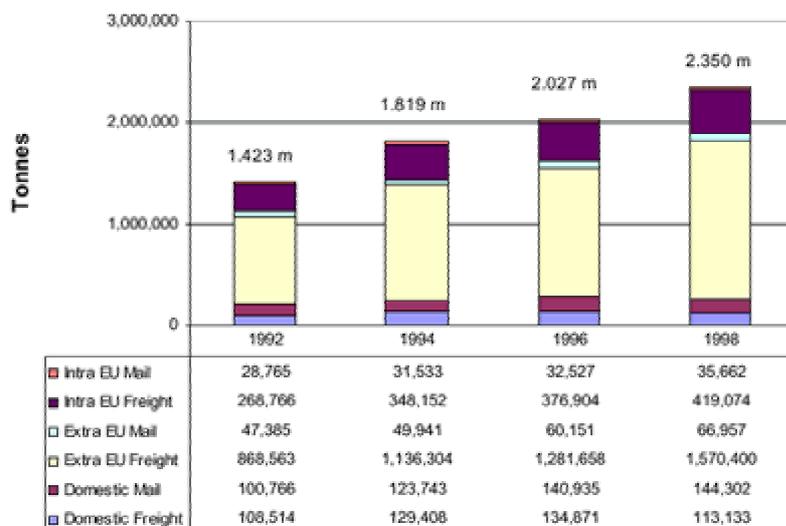
Domestic traffic in the CAA database will be double counted, as by definition it must be loaded at one UK airport and unloaded at another. Both movements will be recorded.

### **3.5 Market size, market growth and market share**

In 1998, the total UK airfreight market was 2.353 million tonnes, including domestic (double counted), international freight and mail tonnes, as calculated by the CAA, as shown in Table 3.3

**Table 3.3: UK Airfreight 1992-1998**

## UK air freight study report



Source: CAA

The market has grown by an average of 8.72% per annum over the period 1992-98, but this has been generated by the largest sector, extra EC freight which makes up two thirds of the market. Growth within extra EC freight alone has been 10.4%. Intra European freight, which makes up 18% of the total market, has also grown, but at a lower rate of 7.7% per annum. The remaining, smaller segments, constituting 15% of the market have grown at approximately 6% per annum.

Table 3.4 shows the volume and value of the UK's trade which has been carried by air between 1992-1998

Table 3.4 AIR TRADE'S SHARE OF TOTAL TRADE							
UK Imports							
Year	Mode	Tonnes	Share By Volume	£'000s	£000's (less diamonds etc)	Share by Value	Share by Volume less diamonds etc
1992	Total Trade	183,862,319		116,080,263	•		•
	Airtrade	472,536	0.25%	28,336,893	•	24%	•
1994	Total Trade	184,562,688		124,771,536	•		•
	Airtrade	518,506	0.28%	34,385,332	•	28%	•
1996	Total Trade	171,062,466		168,078,649	•		•
	Airtrade	672,477	0.39%	47,956,129	•	29%	•
1998	Total	177,195,876		172,454,490	•		•

## UK air freight study report

	Trade						
	Airtrade	886,748	0.50%	53,632,304	37,450,304	31%	22%
UK Exports							
Year	Mode	Tonnes	Share By Volume	£'000s	£000's (less diamonds etc)	Share by Value	Share by Volume less diamonds etc
1992	Total Trade	118,883,925		93,316,138	•		•
	Airtrade	398,931	0.33%	24,694,880	•	26%	•
1994	Total Trade	136,768,985		105,649,917	•		•
	Airtrade	642,313	0.46%	32,373,725	•	31%	•
1996	Total Trade	110,416,108		141,275,975	•		•
	Airtrade	665,788	0.60%	46,104,006	•	33%	•
1998	Total Trade	169,055,258		147,465,143	•		•
	Airtrade	657,024	0.39%	46,593,985	30,411,985	32%	21%

Source: CAA/HMC&E

The Table shows the increasing proportion of total UK trade that is transported by air. In volume terms it is still an insignificant amount, but by value air transport accounts for at least one fifth of UK trade even if the coin and diamonds are discounted.

### 3.6 Origins and destinations of UK air trade

The following tables summarise the pattern of UK air trade by broad world region corresponding to IATA regions as far as possible. For imports, (table 3.5) Asia and North America together accounted for 70% in 1998 and after Europe (14%) the other world areas represent relatively insignificant shares.

Table 3.5 UK Imports by Air, 1992-1998, tonnes					
	1992	1994	1996	1998	98 Share
Asia	131,284	144,363	179,202	313,799	35%
North America	171,452	200,713	255,626	313,489	35%
Europe	85,050	77,121	117,997	120,539	14%
Africa	32,833	41,881	57,704	69,245	8%
Middle East	19,642	21,365	24,635	25,075	3%

## UK air freight study report

S. America	19,845	18,492	20,300	22,509	3%
C. America	7,304	7,643	8,960	11,217	1%
S. W. Pacific	5,125	6,929	8,022	10,874	1%
Total	472,536	518,506	672,447	886,748	•

Source: CAA/HMC&E

Exports of UK air trade (table 3.6) in tonnes show Asia dropping down the rankings and highlight the imbalance in the trade flows to this world region with 300,000 tonnes of freight imported but only 100,000 tonnes exported. Exports to North America exhibit the same market share as imports but again the flows are not balanced, though the difference between exports and imports is not as marked as for the Asia world region.

Table 3.6 UK Exports by Air, 1992-1998, tonnes					
	1992	1994	1996	1998	98 Share
North America	101,380	180,121	170,034	227,151	35%
Europe	122,086	151,753	157,564	163,288	25%
Asia	69,449	135,258	170,996	124,079	19%
Middle East	44,405	69,019	64,285	56,620	9%
Africa	34,328	55,807	52,515	43,635	7%
S. W. Pacific	14,412	27,039	26,848	20,943	3%
S. America	7,147	14,020	16,065	12,508	2%
C. America	5,724	9,295	7,479	8,799	1%
Total	398,931	642,313	665,788	657,024	

Source: HMC&E

For air freight, the UK is a net importing country with a ratio of imports to exports in 1998 of 57:43 when total trade is considered North America is the principal market for UK air freight followed by Asia, then Europe.

Given that air freight makes up a small proportion of total freight, it is useful to consider the value of goods that are transported by air. This demonstrates the role and significance of the air transport mode.

In value terms for imports, North America is slightly more important than it was in volume terms and Europe has approached the share of the Asian market, as shown in Table 3.7 below.

Table 3.7 UK Imports by Air, 1992-1998, (£'000s)					
	1992	1994	1996	1998	98 Share

## UK air freight study report

North America	9,435,347	12,535,318	18,200,939	20,685,749	39%
Asia	5,430,049	7,814,958	11,526,313	13,617,077	25%
Europe	9,261,248	9,977,958	11,506,993	12,514,029	23%
Africa	2,345,020	1,705,153	3,317,405	2,656,082	5%
Middle East	1,089,163	1,197,614	1,677,312	1,874,588	3%
S. W. Pacific	447,295	504,338	624,157	1,335,591	2%
S. America	240,807	502,554	889,993	572,817	1%
C. America	87,964	147,439	213,017	376,441	1%
Total	28,336,893	34,385,332	47,956,129	53,632,304	•

Source: HMC&E

Europe dominates the export trade by value, followed by North America.

Table 3.8 UK Exports by Air, 1992-1998, (£'000s)					
	1992	1994	1996	1998	98 Share
Europe	9,929,545	11,667,969	18,697,899	17,497,710	38%
North America	6,406,043	8,700,171	10,709,711	13,199,609	28%
Asia	4,339,587	6,647,631	9,448,195	8,545,753	18%
Middle East	2,088,606	2,497,090	3,745,957	3,814,459	8%
Africa	913,939	1,300,437	1,536,802	1,535,673	3%
S. W. Pacific	562,573	860,022	1,205,188	1,034,750	2%
S. America	286,451	451,980	535,738	646,268	1%
C. America	168,136	248,425	224,516	319,763	1%
Total	24,694,880	32,373,725	46,104,006	46,593,985	•

Source: HMC&E

UK total trade in value terms in 1998 amounted to £100 billion divided roughly into 54% imports and 46% exports.

Table 3.9 UK Total Trade by Air, 1992-1998, (£'000s)					
	1992	1994	1996	1998	98 Share
North America	15,841,390	21,235,489	28,910,650	33,885,358	34%

UK air freight study report

Europe	19,190,793	21,645,927	30,204,892	30,011,739	30%
Asia	9,769,636	14,462,589	20,974,508	22,162,760	22%
Middle East	3,177,769	3,694,704	5,423,629	5,689,047	6%
Africa	3,258,959	3,005,590	4,854,207	4,191,755	4%
S. W. Pacific	1,009,868	1,364,360	1,829,345	2,370,341	2%
S. America	527,258	954,534	1,425,731	1,219,085	1%
C. America	256,100	395,864	437,533	696,204	1%
Total	53,031,773	66,759,057	94,060,135	100,226,289	•

Source: HMC&E

Air trade with individual countries is shown in Tables 3.10 and 3.11. The USA is the clear leader by far both in volume and value, though the second position in value terms is taken by Switzerland, which does not appear in the volume table. This clearly reflects the high value cargoes transported to and from that country. The top 20 countries account for 77% of the volume of air freight and 83% of the value.

		Imports	Exports	Total	Share
1	USA	295,138	210,156	505,294	33%
2	Japan	69,347	27,980	97,327	6%
3	Hong Kong	58,711	29,444	88,155	6%
4	Germany	22,473	24,348	46,821	3%
5	Taiwan	30,147	7,532	37,679	2%
6	India	24,658	12,352	37,010	2%
7	Netherlands	19,157	15,602	34,760	2%
8	Canada	17,412	16,432	33,844	2%
9	Kenya	28,925	4,615	33,539	2%
10	Singapore	15,707	14,798	30,504	2%
11	France	11,892	18,418	30,310	2%
12	Australia	8,675	17,537	26,211	2%
13	China	19,998	5,251	25,249	2%
14	South Africa	11,145	13,188	24,333	2%

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15	Ireland	8,517	14,443	22,960	1%
16	Thailand	17,954	4,958	22,912	1%
17	South Korea	17,158	5,360	22,518	1%
18	Malaysia	17,198	5,007	22,204	1%
19	Israel	13,178	7,949	21,127	1%
20	Saudi Arabia	2,420	17,064	19,485	1%
	Other Countries	176,938	184,590	361,528	23%
	Total	886,748	657,024	1,543,772	•

Source: HMC&E

Table 3.11 Top 20 Trading Partner Countries by Value, (£'000s) 1998					
		Imports	Exports	Total	Share
1	USA	18,949,466	11,789,892	30,739,358	31%
2	Japan	3,721,587	4,201,520	7,923,107	8%
3	Hong Kong	3,613,942	1,856,218	5,470,160	5%
4	Germany	1,535,729	2,658,941	4,194,670	4%
5	Taiwan	1,899,671	1,743,468	3,643,139	4%
6	India	1,182,965	2,057,285	3,240,250	3%
7	Netherlands	2,108,524	898,822	3,007,346	3%
8	Canada	1,593,279	1,154,490	2,747,769	3%
9	Kenya	672,050	1,638,936	2,310,986	2%
10	Singapore	1,054,872	1,190,154	2,245,026	2%
11	France	469,121	1,770,244	2,239,365	2%
12	Australia	1,874,022	294,228	2,168,250	2%
13	China	1,262,557	894,273	2,156,830	2%
14	South Africa	1,355,819	733,217	2,089,036	2%
15	Ireland	1,148,714	876,705	2,025,419	2%

## UK air freight study report

16	Thailand	448,071	1,229,294	1,677,365	2%
17	South Korea	792,174	737,027	1,529,201	2%
18	Malaysia	1,140,828	380,051	1,520,879	2%
19	Israel	981,710	437,776	1,419,486	1%
20	Saudi Arabia	520,417	707,392	1,227,809	1%
	Other Countries	7,306,786	9,334,052	16,650,838	17%
	Total	53,632,304	46,593,985	100,226,289	•

Source: HMC&E

### 3.7 Commodities carried by air

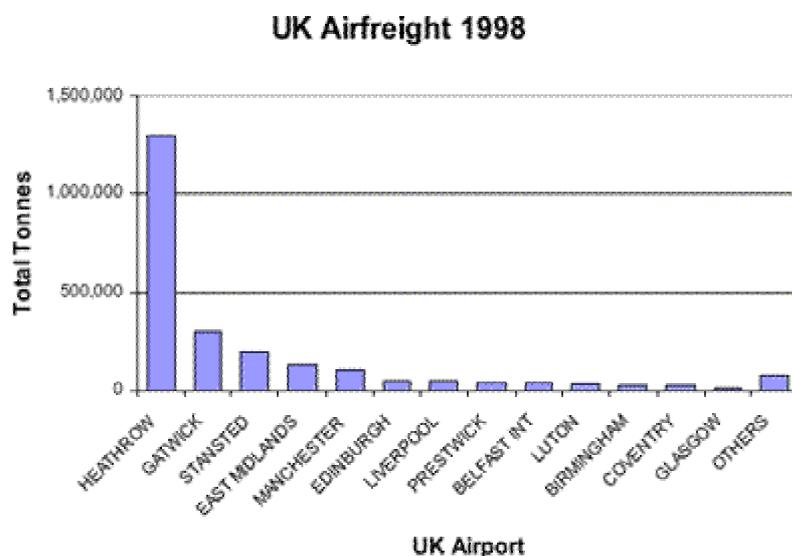
The commodities that make up the majority of air freight transported comprise specialist machinery (especially electronic goods), telecommunications equipment, medical and pharmaceutical products, textiles, foodstuffs and photographic equipment.

In weight terms, the largest export commodity categories are miscellaneous manufactures (15%); other electrical machinery (15%). For imports the most important categories by weight are fruit and vegetables (13%), photographic equipment (11%), travel goods (8%), telecommunications and audio equipment (9%), office machinery (5%), general industrial machinery (10%) and metal working machinery (5%).

### 3.8 Major UK Airports Handling Freight

It is clear that the air freight industry is dominated by the London airports, and by Heathrow Airport in particular. Heathrow handles more than four times more freight than its nearest rival, Gatwick, and has a 55% per cent market share. Volumes through airports are shown in Table 3.12 below.

**Table 3.12 UK Airfreight 1998**



## UK air freight study report

Table 3.13 shows the trend in freight handled by the top ten UK airports over the period from 1992 to 1998. The table summarises airport activity and therefore the domestic portion of freight is double counted.

The top ten airports have all experienced growth over the period to varying degrees as the following analysis shows:

Table 3.13					
Total Traffic via UK Airports, Mail and Freight Tonnes, 1992-1998					
	1992	1994	1996	1998	1992-1998 % diff
HEATHROW	830,665	1,043,320	1,128,692	1,300,108	+57
GATWICK	200,490	237,339	284,323	293,717	+46
STANSTED	56,119	92,589	114,089	193,820	+245
EAST MIDLANDS	20,490	66,315	116,004	136,074	+564
MANCHESTER	79,548	94,467	82,636	105,581	+33
EDINBURGH	17,686	32,842	37,906	42,412	+140
LIVERPOOL	22,723	40,374	44,895	41,416	+82
PRESTWICK	16,323	13,819	21,614	39,752	+143
BELFAST INTERNATIONAL	30,149	36,567	39,235	38,760	+29
LUTON	26,712	11,490	18,471	28,839	+8
TOTAL	1,300,905	1,669,122	1,887,865	2,220,479	•
% OF TOTAL AIRPORT TONNES	91%	92%	93%	95%	•
Total London airports	1,087,274	1,373,248	1,527,104	1,787,645	•
% of total airport tonnes	76%	75%	75%	76%	•

Source: CAA

It would appear from the above analysis that the top ten are gradually increasing their dominance over the total UK airport freight activity and that the three London airports of Heathrow, Gatwick and Stansted are maintaining a broadly stable share of 76% of the total.

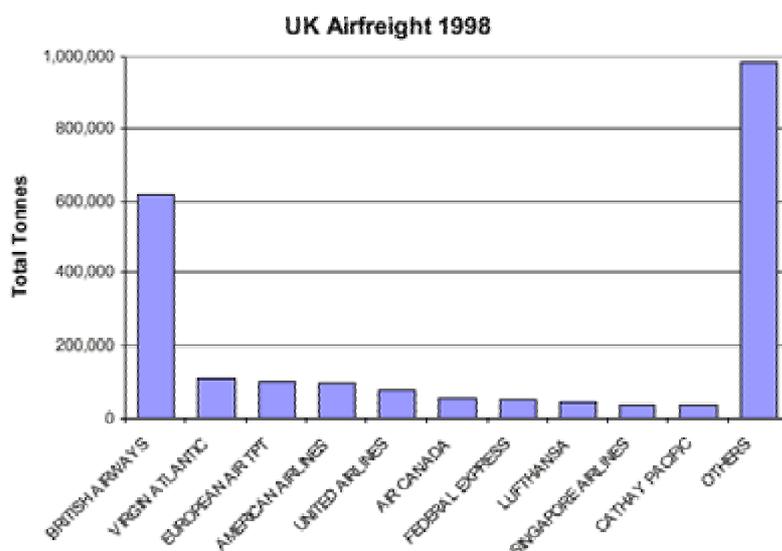
### 3.9 Main carriers of UK air freight

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Information on volumes carried by airlines are obtained from the CAA, which is airport based, which double counts domestic traffic. These figures contained in this section have been adjusted to remove the double counting, which tends to exaggerate the importance of domestic carriers relative to international carriers.

The market is less concentrated with respect to carriers as the top ten airlines only account for 56% of the total market as shown in Table 3.14. However, British Airways is by far the largest company, with over five times as much traffic as its nearest rival. British Airways' market share was 28% in 1998.

Table 3.14 UK Airfreight 1998



The following table summarises the recent trend in freight and mail carried by airline, showing the tonnes carried over the period 1992-1998.

		1992	1994	1996	1998	Growth
*1	BRITISH AIRWAYS	392,924	486,824	506,251	617,419	7.8%
*2	VIRGIN ATLANTIC AIRWAYS	41,647	63,556	81,116	109,425	17.5%
3	EUROPEAN AIR TRANSPORT	5,915	44,130	65,352	102,091	60.8%
4	AMERICAN AIRLINES	54,302	94,854	93,907	97,747	10.3%
5	UNITED AIRLINES	26,729	32,609	60,507	78,543	19.7%
6	AIR CANADA	35,016	46,711	48,434	58,457	8.9%
7	FEDERAL EXPRESS CORP	37,183	37,547	53,696	54,038	6.4%
8	LUFTHANSA	36,339	43,672	47,095	43,486	3.0%

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9	SINGAPORE AIRLINES	20,143	27,249	29,119	37,623	11.0%
10	CATHAY PACIFIC AIRWAYS	33,236	37,289	37,026	36,097	1.4%
11	UNITED PARCEL SERVICE CO	13,537	18,713	25,899	34,986	17.1%
*12	CHANNEL EXPRESS (AIR SVS)	21,239	29,498	32,085	33,446	7.9%
*13	AIR FOYLE	24,687	35,124	30,345	32,839	4.9%
14	CONTINENTAL AIRLINES	15,439	14,701	20,017	31,535	12.6%
15	JAPAN AIRLINES	21,204	27,038	30,530	31,271	6.7%
16	EMIRATES	10,311	17,234	21,200	28,375	18.4%
17	AIR HONG KONG	10,257	17,212	16,818	26,931	17.5%
18	DELTA AIRLINES	11,485	17,903	17,659	26,756	15.1%
*19	EMERALD AIRWAYS LIMITED	•	10,473	15,492	24,787	n/a
20	MALAYSIAN AIRLINES SYSTEM-MAS	13,020	9,275	19,681	24,236	10.9%
21	GULF AIR	15,041	20,529	18,220	24,140	8.2%
22	KLM	11,535	14,619	16,568	24,091	13.1%
23	MK AIRLINES LTD	291	1,889	13,425	23,562	108.0%
*24	BRITISH MIDLAND	11,418	18,403	19,208	18,458	8.3%
25	DAS AIR CARGO(DAIRO AIR SVCS)	12,808	17,753	17,907	17,802	5.6%
26	CARGOLUX AIRLINES INTERNAT'L	413	2,815	8,603	17,784	87.2%
27	EL AL	17,264	18,807	18,088	17,536	0.3%
28	SAS	9,478	13,733	14,440	16,033	9.2%
29	CANADIAN AIRLINES INT/L	12,639	12,868	10,130	15,746	3.7%
30	QANTAS	14,875	16,059	17,194	15,141	0.3%
31	ALL NIPPON AIRWAYS	4,916	7,600	11,019	14,430	19.7%
32	AIR FRANCE	16,722	17,881	11,518	14,177	-2.7%
33	KOREAN AIR	3,459	9,157	9,796	13,300	25.2%

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34	EVA AIR	3	6,002	9,720	13,072	306.9%
35	AER LINGUS	19,275	19,671	11,665	12,545	-6.9%
*36	BRITISH AIRWAYS (EURO OPS) LGW	5,378	9,199	12,740	12,511	15.1%
*37	BAC EXPRESS AIRLINES LTD	93	2,701	5,884	12,435	126.3%
38	SWISSAIR	17,937	18,043	10,148	12,129	-6.3%
39	HUNTING CARGO AIRLINES (EIRE)	•	•	24,982	11,971	n/a
40	SOUTH AFRICAN AIRWAYS	8,044	11,456	10,933	11,715	6.5%
	Other Airlines	311,402	344,020	365,800	370,497	2.9%
	Total	1,317,602	1,694,817	1,890,217	2,219,162	9.1%

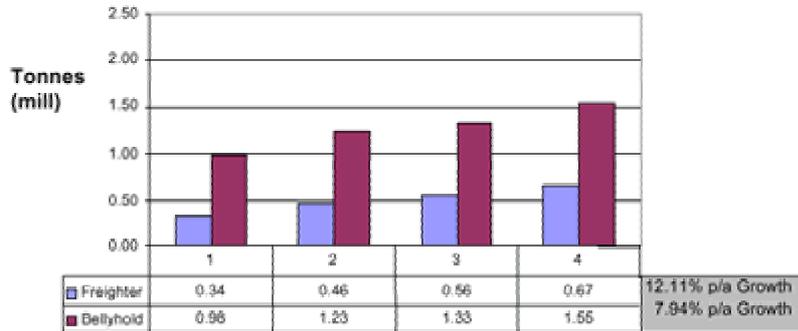
Source: CAA

If the airlines are analysed by flag, some 39% of UK freight in terms of airport activity is carried by British carriers. This is not the same as actual tonnes of UK freight carried, in that the transshipment activity of British Airways and others through Heathrow and Gatwick will be recorded in the CAA statistics. However, it gives a guide to the market share of the British airlines.

3.10 Type of aircraft used

The relationship between the amount of freight carried in the bellies of passenger aircraft and that carried in freighters is of interest in terms of the likely development of the industry. The following graph shows the volumes carried by each type between 1992 and 1998. The growth of freighters is significantly higher than for passenger aircraft.

Table 3.16 Market Evolution - Freighter Excluding Domestic Goods Lifted



## 4 Airports and their facilities

### 4.1 Introduction

This section of the report concentrates on the ground infrastructure relating to the airport freight industry. It begins with an overview of the UK airport network and identifies the major locations for air freight traffic. The major airports are then profiled individually. There follows an analysis of a survey undertaken to establish the industry's views on the major factors influencing the predicted growth in the sector.

### 4.2 Overview of Airport Traffic

Table 4.1 shows air freight traffic at all UK airports handling more than 2000 tonnes in 1998 in descending order by volume. An analysis of freighter and belly hold volume is also provided. The volume and spread of freight traffic across the UK airport network is shown in Figure 4.1.

As the majority of air freight in the UK is carried as belly hold traffic on scheduled passenger routes, it is not surprising that the busier airports for scheduled passenger traffic also feature highly in the freight rankings. Consequently, Heathrow and Gatwick are the busiest freight airports, with Manchester in third place. These airports also have the advantage of being able to offer a large range of destinations, usually not available anywhere else in the UK.

There are also a number of airports, notably East Midlands and Stansted airports, that handling a growing number of freighter flights. Stansted Airport is benefiting from capacity constraints at Heathrow and Gatwick airports and integrators growth whilst East Midlands Airport has become a popular with the freight integrator sector, due to its central location and unrestricted flying hours. For similar reasons the Royal Mail has used Liverpool and Edinburgh airports for a larger number of freighter flights.

There has been a 65% growth rate of UK air freight over the period 1992 - 1998. The majority of the airports are registering nominal growth, far fewer are growing faster than the national rate. Indeed higher than average growth is concentrated at those airports that are not suffering from capacity constraints: East Midlands and Stansted and Prestwick. The fact that over half of the airports in Table 4.1 are actually registering a decline in growth against the national rate implies that air freight is being concentrated on fewer airports.

Traffic which enters airport transit sheds, but leaves by road rather than air is not included within the CAA statistics. This air freight, which does not actually leave the airport by air, can be a significant proportion of the freight which passes through air cargo transit sheds. While there are no national statistics for this kind of traffic, information was provided for this study from airports which suggested that about 85% of total air cargo passing through a major Scottish airport left the airport by truck rather than air; about 62% of air cargo passing through a major airport in the North West left by truck rather than air and about 55% of air cargo passing through a major Midlands airport, left by truck rather than air.

#### **Figure 4.1 Location of Major Air Freight Airports (1998)**

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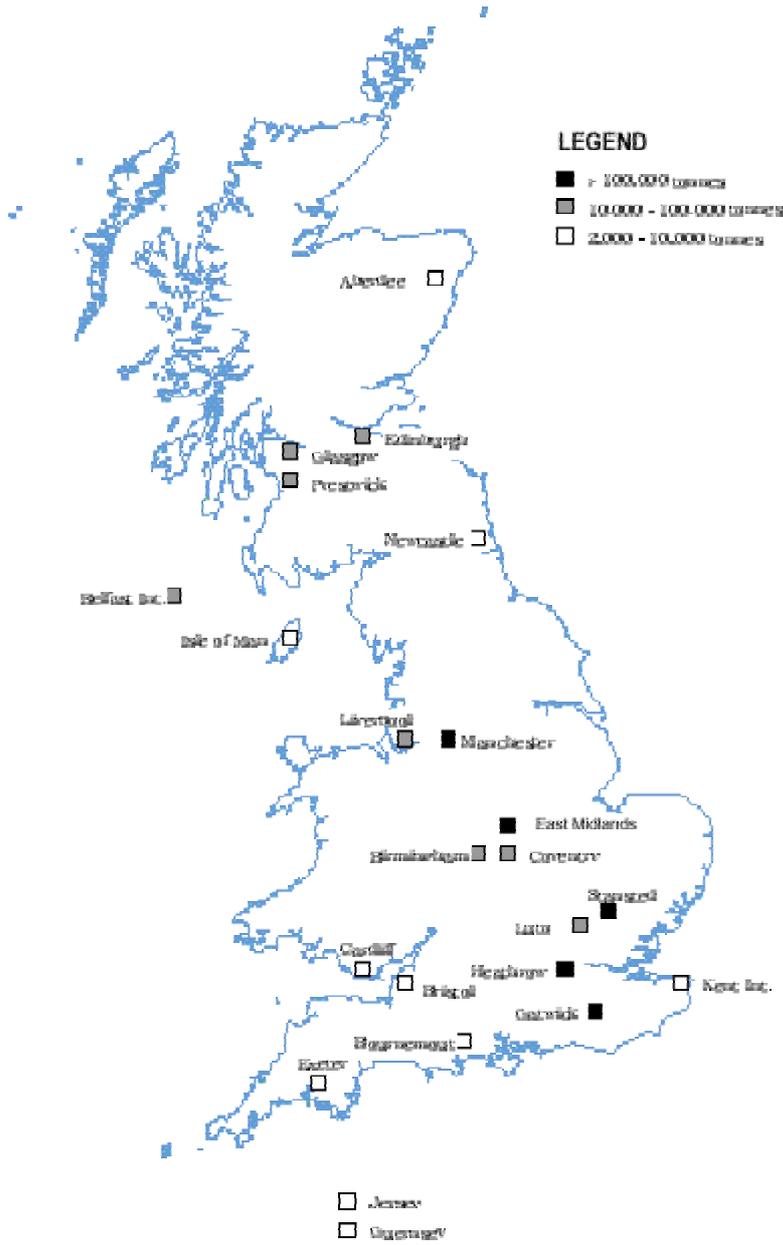


Table 4.1. Freight Traffic Statistics for UK Airports - Growth trend 1992- 98

Freight(tonnes)							Growth Trend 1992- ATMs				
Airport	Belly hold			Freighter			Total	Nomin al	v. Natio nal	Passen ger	Freigh t
	Freight	Mail	Total	Freight	Mail	Total					
HEATHROW	1,102,056	86,830	1,188,886	105,981	5,240	111,222	1,300,108	Rising	Static	439,100	3,217
GATWICK	255,080	11,44	266,528	19,649	7,540	27,189	293,717	Rising	Static	238,80	3,731

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		7								5	
STANSTED	3,410	153	3,563	177,034	13,222	190,256	193,820	Rising	Rising	91,857	13,015
EAST MIDLANDS	284	111	395	123,122	12,557	135,679	136,074	Rising	Rising	27,413	15,616
MANCHESTER	63,302	4,596	67,898	37,683	0	37,683	105,581	Rising	Falling	161,451	1,417
EDINBURGH	1,125	1,444	2,569	13,648	26,195	39,843	42,412	Rising	Rising	67,066	8,896
LIVERPOOL	227	0	227	24,847	16,342	41,188	41,416	Rising	Static	17,230	11,320
PRESTWICK	19	0	19	39,733	0	39,733	39,752	Rising	Rising	7,916	2,331
BELFAST INT.	4,222	967	5,189	21,207	12,364	33,571	38,760	Rising	Falling	30,834	7,987
LUTON	858	0	858	27,969	12	27,981	28,839	Static	Falling	42,137	5,554
BIRMINGHAM	9,194	1,741	10,935	9,127	0	9,127	20,062	Static	Falling	86,869	1,460
COVENTRY	0	0	0	11,103	7,602	18,705	18,705	Rising	Falling	265	6,057
GLASGOW	8,196	2,912	11,108	649	736	1,385	12,493	Falling	Falling	85,210	767
BOURNEMOUTH	0	0	0	5,067	4,190	9,258	9,258	Rising	Falling	3,745	2,763
JERSEY	2,245	652	2,896	3,821	1,779	5,601	8,497	Rising	Static	47,294	1,907
BRISTOL	22	0	22	135	7,914	8,049	8,071	Rising	Static	29,695	3,927
GUERNSEY	1,834	625	2,459	3,289	2,059	5,348	7,807	Static	Falling	37,997	2,088
ABERDEEN	3,552	240	3,792	1,736	1,219	2,956	6,747	Static	Falling	87,909	3,486
ISLE OF MAN	939	2	941	3,561	2,171	5,733	6,673	Rising	Falling	21,744	2,230
KENT INT.	0	0	0	5,620	0	5,620	5,620	Rising	Rising	46	221
NEWCASTLE	497	39	536	163	3,577	3,739	4,275	Rising	Falling	41,389	1,595
EXETER	0	0	0	0	3,682	3,682	3,682	Rising	Rising	6,586	1,757
CARDIFF WALES	52	3	55	195	2,415	2,610	2,664	Rising	Static	16,372	1,164
NORWICH	132	1	132	27	1,468	1,495	1,628	Rising	Falling	13,730	1,386
TEESSIDE	28	1	28	1,453	14	1,467	1,495	Rising	Rising	11,698	299

## UK air freight study report

SOUTHEND	0	0	0	1,456	4	1,459	1,459	Falling	Falling	142	1,092
STORNOWAY	261	58	319	519	522	1,041	1,360	Rising	Static	4,078	916
SUMBURGH	416	25	441	418	499	917	1,357	Static	Falling	14,327	1,134
BELFAST CITY	1,147	0	1,147	0	0	0	1,147	Rising	Rising	34,560	0
BENBECULA	300	42	342	269	467	736	1,078	Rising	Rising	2,574	601
INVERNESS	251	82	333	352	192	543	876	Static	Falling	8,460	577
KIRKWALL	111	22	132	323	271	593	726	Static	Falling	7,715	1,000
ALDERNEY	547	166	712	3	2	5	717	Rising	Falling	7,941	7
SOUTHAMPTON	686	0	686	13	0	13	700	Falling	Falling	26,829	62
LEEDS BRADFORD	438	0	438	22	0	22	460	Falling	Falling	25,594	21
BIGGIN HILL	0	0	0	0	371	371	371	n/a	n/a	1,275	99
SCATSTA	268	0	268	0	0	0	268	n/a	n/a	4,724	13
ISLAY	169	40	209	0	0	0	209	Static	Falling	1,602	2
LYDD	0	0	0	202	0	202	202	Rising	Rising	318	239
HUMBERSIDE	119	0	119	32	0	151	151	Falling	Falling	10,385	298

(Source: CAA Data 1999 Note: no data available for Plymouth, Penzance and Isles of Scilly, St Marys)

### 4.3 Airport Infrastructure

The freight market is of secondary importance to most airports as airport capacity is generally a by-product of passenger traffic. There are, however, necessary provisions for an airport to cater for freight traffic, and the infrastructure features shown in Table 4.3 are amongst those that will encourage freight traffic at a particular location. Given the shared nature of some facilities, it is difficult to determine their influence. The major International Gateway airports aside, the historical over-provision of airport capacity in the UK means that freight operators rarely have restrictions placed on them due to a lack of slot availability, a restriction on the type of aircraft or on night flying.

Whilst comparative figures give an overview of the provision of infrastructure and activity at the UK airports, the sector is continually changing and developing. Examining current and recent freight sector projects at individual airports can better assess this.

Whilst there are many airports throughout the length and breadth of the country, many serve limited regional requirements (e.g. helicopter services from Penzance to the Sicilly Isles) Others are better endowed with runway lengths to accommodate larger aircraft but are geographically poorly placed in relation to centres of population and commerce, for example Kent International and Teeside. Others could be regarded as too close to key centres of population, (for example Birmingham) and as a

consequence are constrained by regional government noise requirements, particularly for night flying, an important requirement for general freighter operators and integrators.

Relatively few airports are currently well placed to meet freight requirements. The six which are key in terms of offering sufficient passenger belly hold capacity and/or freighter services are: Heathrow, Gatwick, Stansted, East Midlands, Manchester and Prestwick airports.

Table 4.2 provides a list of airports with a description of their key infrastructure for the receipt and dispatch of aircraft. Table 4.3 described cargo volumes handled in 1998 and the degrees of investment being made at some airports for increased cargo handling. Many are restricted from receiving larger aircraft by limited runway lengths.

Table 4.2 Airport Physical Infrastructure relating to Air Freight (1998)

Airport	Number of Runways	Max. Runway Length(m)	Total Number of Apron Stands	Number of All Freighter Stands	Direct access from Cargo Terminal to Apron?	Distance from Major Road (Miles)	Road Designation
Heathrow	3	3,902				1	M4/M25
Gatwick	1	3,258				1	M23
Stansted	1	3,048				0	M11
East Midlands	1	2,280	34	15	No	1	M1
Manchester	2	3,040	40	0	No	1	M56
Edinburgh	3	2,560	41	19	Yes	2	M9
Liverpool	1	2,286				5	M62
Prestwick	2	2,987	3	3	Yes	1	A77
Belfast int.	2	2,777				6	M2
London Luton	1	2,160				2	M1
Birmingham	2	2,600	45		Yes	1	M42/M6
Coventry	2	1,615				2	M45
Glasgow	2	2,658	31		Yes	1	M8

Source:MDS Transmodal Survey 1999

**Table 4.3 Physical Infrastructure details relating to most Civil Airports active in facilitating passenger services and to variable degrees Air Freight (1998)**

AIRPORT	Number of Runway	Max. Runway Length	Total Number of Apron	Number of All Freighter	Direct access from Cargo	Distance from Major Road	Road Designatio
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	s	(m)	Stands	Stands	Terminal to Apron?	(Miles)	n
HEATHROW	3	3,902				1	M4/M25
GATWICK	1	3,258				1	M23
STANSTED	1	3,048				0	M11
EAST MIDLANDS	1	2,280	34	15	No	1	M1
MANCHESTER	2	3,040	40	0	No	1	M56
EDINBURGH	3	2,560	41	19	Yes	2	M9
LIVERPOOL	1	2,286				5	M62
PRESTWICK	2	2,987	3	3	Yes	1	A77
BELFAST INT.	2	2,777				6	M2
LONDON LUTON	1	2,160				2	M1
BIRMINGHAM	2	2,600	45		Yes	1	M42/M6
COVENTRY	2	1,615				2	M45
GLASGOW	2	2,658	31		Yes	1	M8
BOURNEMOUTH	2	2,271				15	M27
BRISTOL	1	2,011				6	M5
ABERDEEN	1	1,829	14		Yes	8	A94
ISLE OF MAN	2	1,753	3	2	Yes		
KENT INT.	1	2,752				20	M2
NEWCASTLE	1	2,332	20		Yes	3	A1
EXETER	2	2,083				1	M5
CARDIFF	2	2,354				10	M4
NORWICH	1	1,842				0	A140
TEESIDE	1	2,291	13		No	6	MA66
SOUTHEND	2	1,605				2	A127
STORNOWAY	1	2,200					
SUMBURGH	2	1,426	2		No		

## UK air freight study report

BENBECULA	2	1,651					
INVERNESS	2	1,887	1		Yes	1	A96
KIRKWALL	3	1,423	1		No		
SOUTHAMPTON	1	1,723				3	M3
ST. MARYS	2	600					
LEEDS BRADFORD	2	2,250	5		Yes	14	M62
PLYMOUTH	1	1,190				1	A38
PENZANCE HELIPORT	1	380				0	A30
ISLAY	3	1,405					
HUMBERSIDE	2	2,230				2	M18
BLACKPOOL	2	1,869				2	M55
LONDON CITY	1	1,100				0	A13

The information contained in the table is as provided by the airport operators through the completion of questionnaires provided by the consultants. Where information is absent, this is due to the correspondents' decision not to supply the requested detail.

(Source: MDS Transmodal Survey 1999)

### 4.4 Recent and future developments at major airports

#### 4.4.1 London Heathrow

Heathrow is the largest air freight facility in the UK, handling 55% of all UK import and export air cargo in 1998. Of all traffic through the airport in 1998, 47% was to and from non-EU locations. The airport is currently operating at close to design capacity and BAA believes that on balance the construction of Terminal 5 should proceed. The first phase of Terminal 5 is now planned to open in around spring 2007, if approved by the Government. The project would potentially increase the airport's capacity to 80 million passengers per annum. BAA are seeking to accelerate additional terminal and airfield facilities at Gatwick and Stansted due to the delay in a decision being reached on Terminal 5.

BAA Lynton, as property developer, has completed three major building developments at Heathrow in 1998 amounting to a total of about 18,000 square metres. The Company has facilitated a new £7 million perishable goods centre for British Airways at Hatton Cross. BAA have purchased British Airways' existing cargo ground lease and granted a new ground lease for BA to construct a new cargo terminal at a cost of £20.6 million. The terminal is already in service.

The introduction of the New Generation of Large Aircraft (NGLA) could have a significant impact on Heathrow as the major international gateway for the UK, leading to less frequent flights with greater numbers of passenger embarking and disembarking, as well as increased volumes of baggage and cargo to and from each flight.

The introduction of NGLAs would result in modifications to existing airport infrastructure, including taxi ways, passenger piers and terminals and procedures to regulate increased volumes of passengers

embarking or disembarking from aircraft. Some cargo transit shed space may have to be demolished in order to accommodate improved taxi ways, which may lead to more cargo being handled outside the Airport's boundary

Other investment programmes relevant to cargo include current plans to construct a £15m new cargo shed and the resurfacing of runways 27R and 27L in 2002.

### 4.4.2 London Gatwick

In 1998, Gatwick airport handled 293,717 tonnes or 12.5% of the UK air freight market. Of this, 13.3% was to and from non-EU airports and the remainder to Europe. The main non-EU commodities are manufacturing components (21%), fruit and vegetables (13.8%) and general industrial machinery (9.5%). BAA forecasts that cargo throughput at Gatwick will increase to between 500,000 and 550,000 tonnes by 2008, representing an increase of between 70% and 87% on 1998 figures. BAA forecasts passenger volumes through Gatwick will increase by over one third in the next ten years. BAA plans to invest around £100 million per year in new facilities. Plans include terminal airfield expansion projects and the provision of additional stands and satellite piers to the west of the existing apron areas.

In 1979 Gatwick Airport entered into a legal agreement preventing it from building a new runway for 40 years. Up until 2019 under current assumptions, therefore, any capacity increase will come from greater utilisation of the existing runway. As in slot terms, the airport is tantamount to full, this will depend on technological innovation and increase in average aircraft size and passenger and cargo load factors.

The cargo facilities are operating at close to capacity and BAA are considering substantial investment in a new cargo centre of approximately 17 hectares. This would be capable of handling the forecast throughput of 550,000 tonnes per annum. Outline plans are for a single level cargo centre with a total depth of around 180 metres on the air side and land side axes. The airport authority is reviewing whether it should be on land to the north west of the airport or be on a split cargo between the current site and one in the southern area. The cost of developing the new cargo centre it is estimated would cost £36 million over 10 years.

### 4.4.3 London Stansted

Air cargo throughput at Stansted has more than doubled since 1994 to 194,676 tonnes in 1998, accounting for 8.3% of total UK air freight in that year. A good proportion of this is as a result of scheduled and non scheduled freighter operators moving from Heathrow and Gatwick due to a lack of slot availability and the rapid growth of integrators' business in the South East of England, for which, Stansted Airport is viewed as key.

Approximately half of all cargo through the airport is to or from non-EU countries. The airport has experienced a 35% increase in passenger levels in 1998 which also served to provide additional air cargo capacity during the year. Scheduled destinations grew from 31 to 52 during 1998, operated by 20 airlines and was due to reach 62 by August 1999.

BAA plans to invest more than £350 million at Stansted to increase capacity to 15 million passengers. The development includes the provision of additional taxi ways, aprons and air side infrastructure, while safeguarding the airports ability to accommodate NGLAs. The airport has received regulatory approval to lift the current passenger Air Traffic Movement limit of 120,000 to 185,000 to meet forecast passenger demand.

### 4.4.4 London - Luton

In the financial year ending the 31st March 2000 Luton Airport handled approximately 33,000 tonnes.

As a part of the Airport's £130 million investment programme, the taxi way parallel to the runway has been widened and strengthened and new aircraft stands have been built to accommodate the equivalent of six B767 type aircraft.

In 1993 the Airport opened a new cargo terminal measuring circa 2,323 square metres, laying additional foundations to allow the facility to double in size.

The largest freight client base is serving the express operators including, DHL and Night Express. The former is the single largest cargo customer, accounting for approximately 40% of the Airport's total cargo throughput. They operate direct services to the main hub in Brussels, also to Paris, Cologne and Vitoria.

The airport handles livestock and is one of two UK airports equipped with a Border Inspection Post (BIP), having veterinary and physical resources for the handling livestock.

Luton is the operating centre for Streamline (a freighter operator), using Short 330 aircraft to serve the integrators and Air Cavrel. The Airport receives ad hoc freighter charter flights and can accommodate the B747, the largest freighter aircraft currently in service.

### 4.4.5 East Midlands

Since privatisation in 1993 East Midlands airport has actively promoted its potential for freight traffic, offering a central location, few flying restrictions and minimal congestion. The approach has paid off with a more than ten-fold increase in freighter traffic over six years, particularly due to its success in attracting integrators to the airport.

A large proportion of the £80 million invested in the airport since privatisation has been spent on developing freight infrastructure. A 4 hectare air cargo village is being developed and planning permission has been received for three further cargo terminals, which will be serviced by an additional 50,000 m<sup>2</sup> of cargo apron.

The runway is currently being extended from 2280 x 46 metres to 2890 x 60 metres, which will reduce any departure payload or range restrictions currently placed on cargo operators. An application to extend the runway further to 3,080 metres has been submitted.

National Express the airport owners and DHL an integrator and a major user are investing almost £70 million in a 23 hectare site to provide a new parcel sorting and administration building. The development will be completed in early 2000.

### 4.4.6 Manchester

Manchester airport is currently completing the construction of a second runway measuring 3040 metres and other investments include a further five warehousing units totalling 9,000 m<sup>2</sup>.

The new runway will allow an increase of ATMs from the current maximum of 48 per hour based on one runway to a maximum of 63/65 per hour, thus facilitating a substantial increase in throughput for both passenger and freighter aircraft.

Some 70% of all current air cargo movements to and from the Airport rely on belly hold capacity with the balance dependant on freighter services. Manchester is already the largest regional passenger handling airport, being third in order after London Heathrow and Gatwick airports. More belly hold capacity is therefore available than from any other regional airport.

A proportion of future passenger flights are likely to be based on wide bodied aircraft of which a number are likely to operate on main cargo routes, thus enhancing the opportunity for increased cargo throughput.

Manchester Airport advise they have a policy of not only promoting passenger growth but also one of seeking to provide the Region's industry with suitable air cargo services and thus wish to promote the Airport as a key location for handling freighter aircraft, for which it already has a growing base of operators, including Air Hong Kong, KLM, Cargolux and in the coming months Air Freight Express.

### 4.4.7 Edinburgh

The decision by Royal Mail and several integrators to use Edinburgh as their Scottish hubs has contributed to steady growth of freight at the airport. It has also benefited from recent investments in dedicated warehousing for integrators. The new cargo terminal is now operational, providing two transit sheds and dedicated agents buildings and the airport plans to invest in an additional specialised integrator facility in the year 2000. There are also plans to convert the former RAF site adjacent to the cargo terminal for cargo related activities

### 4.4.8 Liverpool

Both the Post Office and TNT are established users of the airport. There are two transit sheds managed by Servisair and TNT with respective floor areas of 2620 and 1570 square metres.

### 4.4.9 Prestwick

Prestwick has focused on the freight sector, receiving "wide body" freighters to develop intercontinental freight services. The airport opened a new 11,500 m<sup>2</sup> freight centre in early 1999. Future developments include a new BIP to provide efficient and timely service for the import and export of live animals, coming into operation during the summer of 1999. The airport also plans to double the existing lorry park capacity from 20 vehicles to 40.

### 4.4.10 Belfast International

An additional space 2,600 m<sup>2</sup> cargo agents building was completed in July 1999.

### 4.4.11 Coventry

A new Post Office distribution centre is currently being constructed at Coventry airport and is due to commence operation in May 2000. Planned investments of over £1.75 million include a new terminal building, an apron extension and new taxi ways, with approximately half of the investment in aprons and taxi ways being directly related to freight activities.

### 4.4.12 Birmingham International

Birmingham airport has recently been granted an increase in the number of air transport movements allowed between 11pm and 6am for the next two years to 5,500 per annum. Although this excludes Chapter 2 aircraft, this could nevertheless be of benefit to air freight operators.

### 4.4.13 Glasgow

BAA have invested in a new 4250 m<sup>2</sup> cargo warehouse at Glasgow and a second phase of the development has received planning permission and will consist of a 10000 m<sup>2</sup> multi-user warehouse and office complex. There are also plans for four 500 m<sup>2</sup> multi-user offices and warehouses. The airport has plans to expand the area designated for HGV parking by 1000 m<sup>2</sup> in the near future, almost doubling its capacity, and to improve road access to the cargo area for larger vehicles including HGVs.

## 4.5 Environmental Issues

The airports most likely to be faced with the increasing environmental constraints imposed through regulations are those that have a higher number of freighter aircraft operations. This is due to the fact that many freighter aircraft tend to be of chapter 2 category, often being converted passenger aircraft and generally older than those used for passenger services from UK airports.

Inspection of Table 4.1 shows that these airports are East Midlands, Heathrow, Stansted, Liverpool, Edinburgh, Belfast International, Coventry and Luton. In order to understand the degree of constraint which could be imposed upon the air freight industry within these airports, the consultancy team have undertaken a comprehensive review of airport facilities.

The review has been based upon relevant planning and land use policy documents including structure plans and local plans. The review has sought to identify the present general environmental and policy

constraints to both the existing and future operation of the airports. Due to the nature of the plans the constraints have generally been considered up to the airport boundary as the fundamental objective of these policies is to protect the surrounding land uses from the impact of airports' activities. There were few specific policies covering the operation of the airport within its own boundaries. Additional information has been obtained from responses to the questionnaires circulated to all UK airport operators. The information is summarised in Table 4.5 (available as a download in Word format).

\* This improvement is not within the Airport Boundary

The policy and land use review of UK airports has revealed that those airports located away from major settlements and relatively well serviced by connections to the major highway networks have few environmental constraints to further growth. The clearest examples are East Midlands, Teesside and Prestwick. At the other extreme, airports such as Liverpool and Belfast City appear to be both constrained by proximity to major conurbations and relatively poor access to the major highway networks.

This conclusion is qualified by the review of data and information provided by airport operators. One particular aspect is the local imposition of noise thresholds or quotas. These quotas have been forced upon some airport operators or been introduced on a voluntary basis. The effect has been to limit the flights of some noisier aircraft but also, and possibly more importantly, significantly limit night flights. Consequently airports such as East Midlands, which do not have any inherently sensitive adjacent land uses, possess good highway infrastructure and have the possibility of rail connections, could be significantly constrained through the imposition of noise thresholds or quotas.

Both these latter aspects provide considerable concern to both the airport operators and users. The introduction and use of noise thresholds could have a significant constraining effect over the available capacity at airports for air freight particularly when carried in freight-only aircraft. In addition, there is some evidence to suggest that some airports, which are concentrating on passenger activities, are using noise thresholds or quotas as a deterrent to freighter activity, by setting charges for noisier aircraft at a level which makes operation of these aircraft uneconomic.

#### **4.6 Survey of Key Airport Issues**

As part of the MDS Transmodal survey, airports were requested to attach a value of importance to various issues which they foresaw as affecting their role in the air freight sector. The results are shown in Table 4.6 with airports ranked by level of traffic and the issues by level of importance (Table 4.6 available as a download in word format).

The overall averages for the importance of the issues relative to each other tend to reflect little difference accorded by the airports between the issues. This suggests that all the issues are relevant albeit to differing degrees at different airports. The busier airports view all of the issues as more crucial, in particular liberalisation, making it their greatest concern along with environmental constraints. Obviously the smaller airports serving local markets are not going to be similarly affected by such concerns.

#### **4.7 Aircraft capacity at airports**

One of the important issues for the government and the air cargo industry is whether airport capacity is sufficient and appropriately located to meet the future demand for air freight services.

We have attempted to explore the possibility of identifying where surplus belly capacity exists at an airport level. Any attempt to model aircraft utilisation is fraught with difficulties because aircraft configuration on the day will change etc. We have therefore only undertaken a crude analysis of aircraft movements by airport, matched with freight carried, in order to highlight the significance of the wide-bodied aircraft and the level of aircraft utilisation at the principal freight airports.

The following table summarises the freight carried (excluding mail) by principal aircraft type.

Aircraft Type(Grouped)	Passenger Aircraft		Cargo Aircraft	
	Freight carried	% share	Freight carried	% share
Airbus A300 - A340	176,378	12%	33,079	5%
Boeing 727	553	-	118,360	19%
Boeing 737	51,597	4%	11,604	2%
Boeing 747	564,137	39%	169,870	27%
Boeing 767-777	319,030	22%	26,556	4%
McDonald Douglas MD11-88	44,581	3%	70,882	11%
All above	•	80%	•	685
Total all aircraft	1,438,518	100%	626,920	100%

Source: CAA

#### 4.8 Continental European Airports

This section describes the position of the major UK cargo airports in a European context. It also provides profiles for the main continental European competitors to the three London airports and East Midlands Airport in the air cargo market.

The table below illustrates the freight throughput at the top 16 European airports, along with their European and world rankings.

Table 4.8 European airport cargo throughput and world ranking, 1998

	Airport	World Ranking	Total Cargo*
1	Frankfurt	7	1,465,151
2	London Heathrow	13	1,301,254
3	Amsterdam	14	1,218,847
4	Paris (CDG)	16	1,014,476
5	Brussels	27	596,917
6	Cologne	42	375,325
7	Zurich	49	350,666
8	London Gatwick	52	294,009
9	Rome	58	262,832

## UK air freight study report

10	Madrid	59	261,923
11	Paris (Orly)	68	217,392
12	London Stansted	71	192,076
13	Milan	76	170,435
14	Liege	78	163,807
15	Stockholm	85	139,432
16	East Midlands	86	136,375

\*Total Cargo is loaded and unloaded freight and mail in metric tonnes

### 4.8.1 Frankfurt

Frankfurt airport is the global hub for Lufthansa German Airlines and is also a key hub for members of the Star Alliance which is the largest group of international carriers. Lufthansa's holiday carrier, Condor, and Lufthansa Cargo are also based at the airport along with some 80 charter carriers and six US scheduled operators. According to the airport's 1997/8 schedule, the airport caters for 104 scheduled airlines which link the airport to 252 cities world wide.

Frankfurt has been a pioneer of intermodal rail transportation for air and commenced operating the Cargo Sprinter train in October 1997 serving the Rail Cargo Terminal at Cargo City South. The purpose built train is operated by DB Cargo for two air freight forwarders on a daily basis between the airport and northern Germany.

There were 57,500 people employed directly by Frankfurt Airport in 1997 and it is estimated that one in five jobs at Frankfurt are dependent on the air cargo business. The airport company finances all investment. In 1997, this rose by 33% on the previous year to reach DM594 million. However, the decline in traffic during 1998 for both passengers and freight could be indicative of a trend away from Frankfurt to Munich in Lufthansa's route network.

### 4.8.2 Amsterdam

Amsterdam is the third largest European air freight hub after Frankfurt and Heathrow and ranks 14 th in global terms. The airport has a capacity of 36 million passengers and 420,000 aircraft movements per annum.

The airport handled 1,171,256 tonnes of air freight and 47,490 tonnes of mail in 1998 which equates to increases of 0.9% and 3.1% respectively on the previous year. In the same year passenger volumes increased by 9.0% to 34.4 million. The rate of increase is lower than previous years due to the imposition of noise restrictions, the introduction of a formal slot co-ordination policy during the year and the consequences of the Asian economic crisis. The latter affected freight in particular, causing Schiphol's share of traffic for the top ten European air freight hubs to fall marginally to 15.8%.

### 4.8.3 Paris Charles De Gaulle (CDG)

Both CDG and Orly airports are managed by Aeroports de Paris (ADP). The Paris region handles 88% of French air freight and of this amount, CDG handles 74%. CDG airport experienced a decline of 1.4% in cargo volumes during 1998 to 1,014,476 tonnes.

The French Government and ADP are developing CDG as France's main international airport, while Orly will handle short-haul European traffic only. CDG is the only French airport with a fast passenger rail TGV service which has begun to attract long-haul airlines, such as American Airlines, away from Orly Airport.

The airport has been constructing two additional runways each of 2,700 metre length in parallel to both existing runways each of 3,600 metres and the first was completed in early 1999 while the second should be in service by the end of 2000. This will increase the airport's capacity from 82 flights per hour to 120 during 2000. Due to the increase in traffic, aircraft noise restrictions have become more stringent and an independent body has been set up monitor them. Engine testing at night has been banned, as have night movements of noisier aircraft and an offenders penalty system has been introduced. The local community has also been offered compensation for noise interference and building sound-proofing.

France Handling provide cargo services at CDG airport, including storage, handling, loading, information processing and since 1996, they have also handled perishable goods. The company also operates a fleet of trucks to transport pallets and aircraft containers between cargo handling centres. The cargo zone covers approximately 10 % of the airport's site or approximately 300 hectares.

Air France Cargo, the fourth largest freight airline in the world, is based in CDG and recently opened a new cargo hub (G1XL) at the airport at a cost of US\$65 million. It serves over 200 cities in 90 countries. At 931000m<sup>2</sup>, the facility is one of the largest in Europe and is forecast to handle one million tonnes of cargo with 40,000 truck movements per annum, providing employment for 1,200 people. Import and export operations at the airport are separate at present, but the new centre will combine both and also have a separate facility for express shipments.

The airport acts as a hub for the French Post Office and was originally founded to serve domestic postal services to 19 destinations in France using ten airlines. It has developed over the years as a hub for main European routes as well.

#### 4.8.4 Brussels

Brussels airport handled almost 596,917 tonnes of air freight in 1998. Brussels is one of the few airports which remained unaffected by the Asian crisis with cargo volumes growing in this period. At present there are 100 cargo handling agencies located at Brussels airport and the cargo generated by them actually exceeds the capacity offered by carriers.

Brussels is located near the most densely populated consumer belt in Europe, giving it a wide hinterland. Carriers operating from the airport offer connections to about 70 airports in 35 countries.

#### 4.8.5 Cologne

Cologne airport is situated 15 kilometres from the city centre, occupying an area of some 1,000 hectares, with three runways, employing just over 7,500 people. Air freight throughput reduced by 5.8% during 1998 to 375,325 tonnes. The airport is the sixth largest air freight hub in Europe and ranks 42 nd in the world. The decline in freight volumes is believed to be due to Dusseldorf Airport recovering some of the traffic diverted away from the Airport in 1997 following a severe fire.

The air freight centre comprises seven cargo warehouses and 140,000 square metres of cargo apron. A new cargo apron of 45,000 square metres was opened in December 1998 with another following, opening in October 1999 providing an additional 42,000 m<sup>2</sup> of apron space.

TNT-Express World Wide transferred its operations from Cologne to Liege in early 1999. Other freight operators work from the airport including: UPS, Lufthansa Cargo and DHL. All three operators have upgraded to quieter aircraft and utilise Boeing B767 and Airbus A300 freighters.

Night operations at Cologne will be significantly affected by new regulations passed by the Federal state of North Rhine-Westfalen. From November 1999, Chapter 2 aircraft cannot operate at night, only Chapter 3 aircraft which have been approved by the Federal Transport Ministry will be allowed to operate at night.

#### 4.8.6 Liege

Liege airport is the fourteenth largest European airport in freight terms and 78 th in the world. The airport is situated between the largest mainland European air freight hubs - Frankfurt, Charles de Gaulle, Amsterdam and Heathrow - which is advantageous for attracting trucked cargo. The airport handled 163,807 tonnes in 1998 and the largest customers at the airport are as follows:

Israeli agricultural produce exporter, Agrexco Group, and Cargo Air Lines (CAL) use Liege as their European distribution hub and operate more than 200 B-747 freighter flights in and out of the airport each year.

TNT Express Worldwide have built a transit shed measuring 52,000 square metres facility at which they employ some 850 staff. They operate 26 aircraft from Liege and have announced plans to establish and operate their own airline company, TNT Airways, which will utilise the existing fleet of aircraft from Liege. The move is aimed at reducing costs and increasing efficiency by rationalising and centralising operations. TNT also plan to acquire 14 Airbus A300 type aircraft over the next three years.

Liege airport also handles livestock and perishable goods and has almost 35,000 square metres of warehouse floor space, all of which has ramp access. The airport plans to develop a further 3,500 square metres of warehousing.

## 5 Air freight charging structure

### Belly Hold Capacity

Most air freight capacity is provided by passenger airlines in the bellies of passenger or by use of combi aircraft on major passenger routes. The capacity available on an individual flight varies according to the number of passengers (and their luggage being carried). The sale of freight capacity is essentially at a low marginal cost to passenger airlines.

Air freighter capacity is, as a general rule, required on major intercontinental freight routes where passenger aircraft have insufficient cargo capacity, additionally to carry hazardous goods, 'out of gauge' consignments which cannot be accommodated in the bellies of passenger or combi aircraft.

### Pricing of Air Freight

IATA continues to provide an "Official Rates Policy" which are published in "The Air Cargo Tariff" (TACT) along with the IATA rules governing transportation. These rates are generally derived from meetings of the IATA Regional Tariff Committees and are subject to international inter-governmental agreements on rate levels by route or country. Airlines wishing to introduce or apply new rates require the permission of IATA and the rates can be subject to the relevant country's government approval but as earlier recorded this are now generally used as guide lines and no attempt is made by either IATA or governments to enforce their use.

IATA tariffs are increasingly ignored on many of the major routes due to competition but are still relevant for many lesser developed markets and continue to provide a general guide line. For most commodities a charge per kilo of cargo is applied (subject to a minimum charge) with discounts for volumes over 100 and 500 currently as follows:

Minimum IATA Charge in	GBP
Normal Rate (pence per Kilo)	GBP
Quantity Rate ( over say 100 kilos)	GBP
Quantity Rate ( over say 500 kilos)	GBP

'Specific commodity rates' are exceptions to and lower than 'normal rates' and are designed to encourage certain types of cargo to be airfreighted on specific trade routes.

A given commodity and its rate would be filed by the airline to IATA who in turn would obtain permission to apply that commodity rate on a given route to the relevant countries' governments.

An example for electrical products between Heathrow and Johannesburg is as follows:

Specific Commodity Rates for Electricals  
No. 12345

LHR to JNB	up to 100 kilos	GBP
	up to 500 kilos	GBP
	up to 1000 kilos	GBP

## UK air freight study report

In addition to Specific Commodity Rates, "Class Rates" are also published. For commodities such as Human Remains, Live Animals and Perishable cargo there are specific rules for calculating the charges for each type. In general the rules are based on the country of origin, country of destination, and the product type.

The majority of air cargo from the UK uses "Net" airline buying rates, which are confidential market rates. The formula for these rates follows a similar structure to the IATA rates in that there is a rate per kilo (subject to a minimum charge).

DESTINATION							
MIN	-100K	+100K	+250K	+500K	+1000K	+2000K	+3000K

The type of market rates airlines apply can vary, depending on the route and country, the customers, type of aircraft, type of equipment used on the aircraft etc. Some air freight forwarders may enjoy a rate which applies "across the board" to a given destination. A minimum charge would be applied and then be a flat rate would be applied for consignments over say +100 kilos.

Rates are also applied for pallet loads. A total fixed charge would be made for the pallet with for instance, a loading up to 5,000 kilos. Sometimes there is a fixed charge for say the first 2,000 kilos with a charge per kilo for the balance of the weight up to the maximum weight of 5000 kilos. The same principles are applied where unit load devices (U.L.D.s) are employed.

Handling charges are based on weight for non unit load traffic and per unit for unit loads. The rates which could be charged used to be set by IATA, but they now vary between handling terminals.

Typical handling charges would be based on the chargeable weight as follows

Export Charges £	Minimum	Per Kilo Up to 3000kgs	Per kilo Over 3000kgs	ULD
	15.50			
Processing Handling		0.06	0.02	
ULD Type1				75.00
ULD Type 2-7				40.00
ULD Type 8-9				25.0
Import Charges £	Minimum	Per Kilo Up to 3000kgs	Per kilo Over 3000kgs	ULD
	22.50			
Processing Handling		0.065	0.045	
ULD Type1				75.00
ULD Type 2-7				40.0

## UK air freight study report

				0
ULD Type 8-9				25.00
Storage Charges. Free period 72hrs Per 100 kilos or part	10.00	0.04		

### 5.2 Additional charges

There are many other optional charges for both import and export handling. Examples include; aviation security, airway bill amendments, dangerous goods checking, preparing customs forms, labelling, special handling of certain categories of cargo, payment of duty and VAT.

The handling charges are shown on the master airway bill as a separate cost to that of the freight charge, and are paid direct to the carrier. Also on the master airway bill there is provision for the forwarding agent to show their costs.

When the shipment is processed through the IATA accounting system, known as Cargo Accounts Settlement Systems (CASS), information from the master airway bill is recorded to produce the accounts for the airlines. Each airline will reconcile the master airway bill for each forwarding agent with the net rate to be charged. CASS will then prepare a collective invoice schedule for each airline and submit the account to the forwarding agent. Only the amounts shown on the airway bill as "due carrier" will be collected from the forwarder. Anything shown in the "due agent" columns will be for the forwarding agents to collect from their shipper.

Apart from the rates accounting function, marketing information from the airway bill is also used by CASS, placed into reports and sold to the airlines and agents who are members of IATA. This information is sensitive and is controlled by CASS to prevent commercial advantages being gained by any individual company.

The forwarder uses a house airway bill as required by contractual requirement, which is kept "in house" and not passed to the airlines. The amount of freight charges shown on the house airway bill is between the forwarder and the shipper. Some forwarders will choose to show the actual rate charged as agreed with their shipper plus any ancillary charges, such as collection, handling etc., others will show "as per agreement" not identifying any of the charges, collecting the debt from the shipper by raising a commercial invoice.

### 5.3 Charging structure by integrators and express operators

By contrast the Integrator and Express companies have a completely different system for charging. Shipments move on a docket or consignment note and the prices quoted are "door to door" which includes all handling and processing charges. There is no central accounting system such as CASS. Each company is responsible for their own credit control, invoicing and settlement of account by the shipper.

Shipments are generally priced on the actual weight. However, charges for volume could apply. Below is an example of an integrator tariff for a shipment of kilos from London to New York.

DEST NEW YORK			
Weight	Dimensions	Expected delivery time	Cost
50 kilos	10 x 15 x 12	1 day	174.29

Frequent user discounts			
1- 3 shipments			174.29
4-6 shipments			171.29
7-10 shipments			170.29
11-15 shipments			167.29
16-25 shipments			166.29
26-40 shipments			165.29
41-60 shipments			164.29
60+ shipments on request			

#### 5.4 The impact of bilateral agreements on airline capacity

There are a host of national, bilateral and multilateral regulations that place limitations upon the activities of airlines and limit their ability to increase, or reduce their incentive to reduce passenger and freight capacity. Some are obviously safety-related, others relate to the way in which national governments view the aviation sector and seek to process the interests of the 'national' carrier(s) for political or economic reasons. The exchange of air traffic rights or freedoms of the air is subject to bilateral agreements between states, except in the EU where there are no restrictions for intra-EU traffic. The first freedom allows over flying; the second freedom is the right to land for technical reasons; the third and fourth freedoms confer rights to carry traffic to/from the home state; the fifth freedom is the right to carry traffic to/from third countries en route.

There are supplementary rights. The sixth freedom allows, for instance, the airline of country A two sets of third and fourth freedom rights to carry traffic between two other countries but using its hub in country A as a transit point. For example, Royal Jordanian Airlines carries sixth freedom rights between London and a number of Middle Eastern points through its base at Amman, even though it has not been granted fifth freedom rights between London and these points. Sixth freedom rights are not normally recognised in air service agreements, though, confidential memoranda of understanding make reference to them when dealing with capacity issues. Cabotage rights, allowing the airline of country A to fly between two points in country B are sometimes but rarely allowed, but this has now been relaxed between EU member states.

Bilateral agreements specify a schedule of routes listing the points to be served in each country or generally stating just 'points in the country'.

Routes from UK airports to non-EU countries are therefore subject to bilateral agreements which specify the maximum number of slots at airports for each airline. Airlines can only increase capacity by increasing the size of aircraft used. Airlines are not inclined to reduce capacity by not using the available slots, as they risk losing them to other operators. In the case of over capacity on a route, airlines may re-allocate those slots at an airport to other routes to avoid their loss.

In the negotiation of traffic rights, all governments are concerned about the market shares of their own national carriers and they have taken different views upon whether genuine airline competition should be allowed to determine market share. Many bilateral agreements insist on prior agreement on capacity and even that the capacity be shared between the designated carriers. These restrictions on capacity have often controlled the allocation of fifth freedom rights.

The way in which the bilateral agreements have worked is that only airlines registered in the states involved are licensed to enter the routes. As a result national airlines have tended to operate the majority of their international routes to and from their home country, usually in and out of their main hub. London Heathrow is the main hub for British Airways, Paris for Air France, Frankfurt for Lufthansa and so forth.

### **5.5 Economics of supply - airport capacity**

Fundamentally, however, the issue of airport capacity relates to its physical infrastructure and the number and type of air traffic movements that can be accommodated. Pressure on some existing airport capacities has led to slots being rationed. The allocation of slots at the three London airports is governed by Regulation 95/98 on slot allocation regulations, supplemented by traffic distribution rules where government authorities only allow certain categories of aircraft to use Heathrow at peak times. This could discriminate against freighters as airports may prefer to handle passenger aircraft which usually provide greater overall revenues through passenger tolls and spend within the airport. The subsidiary way of allocating slots is by airlines bargaining with each other for use of particular slots through the medium of scheduling committees. EC Regulation 95/93 states that 50% of slots in the pool should be for new entrants. The reality is that very few slots at the key congested airports become available for any new entrants because incumbent airlines hold onto their allocation by use and through having 'grandfather rights' etc. Where an airport has 'unserved' destinations then the new entrant rule does not serve the airport best either.

There are also constraints upon capacity that relate to environmental controls such as noise quotas and night flight bans. Such controls inevitably restrict the capacity of an airport, particularly for freighter flights. The latter are often the noisier Chapter 2 aircraft and certainly for integrator schedules for example, the ability to fly in and out of airports during the night is very important. For that reason, integrators tend to purchase new or newer aircraft which meet Chapter 3 regulations.

There are concerns within the industry that airports are beginning to set arbitrary restrictions to placate local residents and that this could have long-term detrimental effects on the ability of the freighter operators to compete effectively.

A potential further constraint upon airport activity is the increasing congestion of air space. There had been some debate recently that the growing number of passenger flights, particularly the growing popularity of low-cost airlines, may limit the potential for increased freighter flights at strategic airports such as Stansted.

## 6 Characteristics of air freight demand

### 6.1 Commodities carried

Traditionally, air freight has always been used for high value commodities, fragile goods and emergency items whether in the case of accidents or disasters or simply commercial necessity such as legal documents, medical records, financial papers, computer disks and tapes and spare parts for production line breakdowns etc. However with increases in capacity and declining freight rates the range of goods carried by air has widened. Now, perishable commodities such as luxury foods, exotic fruits, chilled meat, fish and flowers, newspapers and fashion garments are growth areas for air transport.

In the case of perishables, their commercial life is short and only freighting by air can move the goods from producer to consumer in a sufficiently short time for the product to be sold. The freighting costs are often quite high in relation to the price of the product but can be justified if the final consumers will pay the premium.

Routine non-perishable freight is shipped by air because the savings in other costs such as lower inventory costs can offset the higher transportation costs. The cost of working capital has encouraged companies to explore ways of reducing their stockholding to a minimum. Such pressures on logistics chains led to the concept of JIT (just in time). This is where materials and other inventory are required to move through the manufacturing supply chain in the correct quantity to arrive at their point of consumption at precisely the time they are needed. Air freighting is particularly suitable for these shipments because of its speed and reliability. The difference is most marked on long haul routes when compared with a land or sea option.

### 6.2 Consignment types

As well as the numerous commodities involved, freight appears in a wide variety of consignment sizes, shapes and weights. Freight density is crucial to the economics of air freight because cargo payload on an aircraft is limited by volumetric capacity as well as by weight. Tariffs are based on weight generally but airlines need to balance the requirement to carry low density shipments. The difficulties of handling large numbers of disparate consignments naturally led to the pressure for unitisation. Most air freight now moves in a variety of unit loads, of which there are two commonly used types: built up pallets (with netting over the top or shrink wrapped) and rigid containers in a variety of standard sizes to fit wide-bodied aircraft holds. In this way, the shipper or forwarder can present a unit load to the airline which in many cases attracts a lower tariff per kilo from the airline reflecting the easier handling.

A further characteristic of freight demand, which poses problems for the airlines, is the imbalance in directional flows. On major freight routes it is common for the heaviest flow in one direction to be double the flow in the other direction. This is easier for the passenger airlines to absorb than the freighter airlines where the latter has no revenue from passengers to compensate for the lack of freight. The off-setting of freight imbalances is often addressed by airlines selling freight services in third countries and road hauliers moving cargo to or from air lines' hub airports.

There are a series of factors influencing the overall growth in air freight:

- Growth in world trade generally as well as opening up of new markets
- Reduction in air freight rates due to competition between airlines
- Globalisation with attendant needs to move component parts around the world ever faster and more reliably
- Changes in manufacturing process with time compression of the supply chain and widespread adoption of JIT working practices

- Centralisation of warehousing and distribution facilities
- Increasing value densities in particular industrial sectors which has led to an improved cost benefit ratio for air express compared to conventional carriers, eg electronics, healthcare and medical products

The 1991 DETR survey of the Origin and Destination of International Goods has been used to estimate the volume of imports by air with destinations in the different broad regions and of exports by air with origins in the different regions. The 1991 survey is the latest reliable source of origins and destinations of international freight for the UK.

Table 6.1 Origin and destinations, by region, of UK international air freight 1991						
Estimated Import tonnes			Estimated Export tonnes		Total tonnes	
	Total	% share	Total	% share	Total	% share
S East	22,5379	52.91	146,404	45.64	371,783	49.79
E Anglia	9763	2.29	10,338	3.22	20,101	2.69
E Midlands	2,3197	5.45	19,957	6.22	43,154	5.78
S West	18,812	4.42	17,757	5.54	36,569	4.90
Wales	10,348	2.43	7,502	2.34	17,850	2.39
W Midlands	21,971	5.16	20,381	6.35	42,352	5.67
Yorks&Humb	17,315	4.06	13,619	4.25	30,934	4.14
N West	32,844	7.71	33,826	10.55	66,670	8.93
North	7,879	1.85	7,400	2.31	15,279	2.05
Scotland	32,082	7.53	34,313	10.70	66,395	8.89
N Ireland	4,523	1.06	4,231	1.32	8,754	1.17
Unkn UK	21,874	5.13	5,022	1.57	26,896	3.60
TOTAL	425,987	100.00	320,750	100.00	746,737	100.00

Source: DETR Survey of the Origin and Destination of International Goods 1991

The data indicates that the South East region generates and consumes around half of all UK air freight. The difficulty lies in drawing conclusions from this pattern of activity eight years on, given the potential structural changes in the regional economies and the overall growth in air freight.

## 7 Shipper requirements

The consumers of air freight services - the shippers and receivers - were also consulted as to their market requirements. The methodology adopted involved selecting and contacting a broad range of companies who use air freight services. Some of the companies contacted use air transport as a primary means of world wide goods distribution, whereas others only become users when surface transport fails to meet customer requirements for particular consignments.

Contact was made with some twenty-five companies, both exporters and importers, whether manufacturers or export and import traders. The companies are involved in transporting a wide range of commodities: electronics, electrical goods, photographic equipment, pharmaceuticals and pharmaceutical chemicals, machinery, fresh produce etc. The Air Freight Group of the Freight Transport Association was also contacted.

Two key issues emerged from the consultation: reliability of the service, and the price of the service. Some shippers suggested the former is more important than the latter and they expressed a willingness to pay for high standards of service. Others view price as key, arguing that the prices charged should warrant a first class service.

### 7.1 Service Standards

Most shippers took the view that the majority of scheduled airlines providing passenger services on the main deck of the aircraft and freight capacity in the belly hold are passenger orientated and see the carriage of air cargo as a secondary consideration. It is suggested that this corporate policy is reflected throughout the scheduled airline industry in terms of the levels of attention given to air cargo management.

Shippers also suggested that most scheduled airlines prefer not to contract directly with shippers but would rather have the air freight forwarder working as an intermediary. Most scheduled airlines are not equipped to trade directly with shippers as they lack both the human and physical resources to provide the ancillary services necessary outside the confines of airports; for instance they often are not able to deliver and collect goods to and from the customers' premises; they often lack the transit shed resource to consolidate goods; and they are insufficiently staffed to offer comprehensive documentary services. The airlines tend to see these ancillary services as the natural function of the air freight forwarder. However, increasingly, some shippers - particularly in the perishables market - are dealing with the airlines directly, in conjunction with their freight forwarder, to assure better service and price standards.

The shipper therefore views the air freight forwarder as the air transport provider with whom they contract and as such, the forwarders are expected to firstly serve the best interest of their customer, the shipper. Given that air freight forwarders were initially acting as agents for the scheduled airlines, it was argued by shippers that the air freight forwarder may have divided loyalties.

Most shippers expect continuing growth of demand for air freight services based on the ongoing refinement of supply chain management and the continued pressure to reduce the amounts of goods inventory held. This should lead to the extension across more business sectors of just-in-time requirements.

There is a suggestion from shippers that air freight service providers are at least in part to blame for the loss of product earnings and job employment opportunities in the United Kingdom in that some airlines are more concerned to handle strategic transfer cargoes from abroad than UK exports. While not denying the carrier the right to be selective in the cargo they choose to carry, there is a belief among shippers that the liberalisation of the trade would provide shippers with more competitive price and service opportunities.

Most shippers have a preference for the greater frequency of service offered by the belly hold capacity of scheduled passenger aircraft and believe that the continuing expansion of passenger aircraft

services will assure them of adequate air cargo capacity. They believe that the replacement of older aircraft with smaller aircraft on Intercontinental routes will not reduce capacity because services will be more frequent.

Some shippers are specific about how their cargo is despatched (i.e. whether it can be consolidated at a major hub airport or whether a direct flight to the nearest regional airport is more appropriate). At the opposite end of the scale, there are many shippers who state no preference for the way in which their cargo travels providing it arrives at a destination within a pre-agreed or acceptable lead time. In the process of seeking to rationalise their own shipping administrative overheads, some shippers have sought to reduce the number of forwarders with whom they deal. One shipper decided to try to contract directly with scheduled air lines. However the two airlines selected for the trial apparently gave a poor service and failed to meet timed distribution requirements. As a consequence, they retained the services of an air freight forwarder to handle all their air freight transactions on an annual contract basis with the proviso of the right to audit their work on demand.

## **7.2 Price of air freight services**

Shippers have suggested that airlines concentrate on serving passengers and the carriage of their baggage and hence passenger fares are viewed as their key income. As a consequence, air freight space in the bellies of passenger aircraft is often arbitrarily sold to air freight forwarders at different levels subject to the latter's buying power on any given day without any true consideration to the cost of the carriage of freight.

Shippers expressed the view that as rates are often negotiated in this fashion between scheduled airlines and forwarders, the forwarder will quote different rates to the shipper at different times, reflecting the current agreement with the airline. This does not allow the shipper to quote consistent prices to and plan business with their customers. This reflects poorly on both companies and the national approach to export goods marketing and sales.

Some shippers identified that the integrators' pricing for general cargo is coming more into line with that of freight forwarders and scheduled airlines. Integrators' freight pricing for mail and small packages is about three times the price per kilo charged by an average air freight forwarder but as integrators seek to compete with air freight forwarders and scheduled carriers for general air freight, their rate differential can be as little as 20%. Shippers believe that paying an additional 20% for a fully integrated service can be good value for money.

Some shippers complain of poor cargo handling by scheduled airlines. While cargo is within their airport transit sheds, goods may be lost or damaged. Levels of compensation in these cases do not always reflect the true value of goods nor do they take into consideration the consequent loss of shippers' market opportunity.

Many shippers felt that the air freight industry was in many ways behind the rest of industry and commerce in their approach to modern supply/demand chain management techniques. However, it was accepted that some scheduled airlines recognise the dated approach and are seeking to provide modern logistics solutions to meet Global Supply Chain Management requirements. A number of air freight forwarders are also responding by promoting total logistics services and adding value to the standard air transport services.

In keeping with modern supply/demand chain techniques many shippers are keen to have a fully integrated service, as provided by the integrators. Airlines and forwarders are beginning to respond with door to door services, with the application of EDI for information transfer including tracking and tracing systems and express services.

## **7.3 Views on integrators**

While recognising the merits of the timed service provided by the integrator, some shippers claim that the lack of flexibility in the operation of integrated transport systems fails to meet their requirements

as there are often circumstances leading to goods not being ready at the appointed hour for collection. These may include production problems, the late availability of documentary information etc..

#### **7.4 General views on the air freight industry**

Some shippers felt that there should be

More air cargo service competition, through Government policies leading to deregulation and liberalisation of the air passenger and cargo markets.

Reform of IATA. IATA is seen by some as an anachronism, supporting old regulatory standards particularly in relation to air freight service standards and pricing. In their opinion the Government should take an international initiative recommending some reform of the Association.

Regulation of the air freight forwarding industry. Some shippers are of the opinion that there are too many air freight forwarders, some operating with few professional standards from unsuitable premises without suitably qualified personnel. Allied to this is a belief amongst some that air freight forwarders should be licensed as a means of bringing more professionalism to the industry. There was a suggestion that the industry could be regulated through BIFA by a Government department.

## 8 The value to the UK economy of the air freight industry

This section sets out our estimate of the value of the air cargo industry to the UK economy. The terms of reference for this aspect of the study were narrow: our task has been to estimate the sector's contribution to national gross domestic product and to employment. As with much else in the air cargo sector, national data sources are of only limited value; neither the output nor the employment produced by air cargo activity is separately identified in published or otherwise available statistics on air service and freight activity. Thus, by necessity, we have had to estimate both measures. Although the focus of this section is on the output and employment estimates generated directly by the airfreight industry, we set out in the final part of this chapter a very brief statement of the sector's importance as a service to the rest of the economy.

### 8.1 Air Cargo under the Standard Industrial Classification

Air cargo activity straddles several sectors as classified under the 1992 Standard Industrial Classification:

i. Air transport (Division 62) includes the transport of both passengers and freight by air or via space. Division 62 is in turn divided into three sub-categories, two of which include air freight (the third is space transport):

scheduled air transport (SIC 62.1) covering the transport of passengers and freight by air over regular routes and on regular schedules; and

non-scheduled air transport (SIC 62.2) covering the non-scheduled transport of passengers by air, regular passenger charter flights, non-scheduled transport of freight by air and regular freight charter flights.

ii. Supporting and Auxiliary Transport Activities (Division 63) which is divided into three sub categories, of which two contain sub-groups which include air freight activity:

Other supporting air transport activities (SIC 63.23) which is a sub-group of SIC 63.2 and covers activities related to the air transport of passenger, animals and freight including the operation of terminals, ground surface activities on airfields and activities of flying schools for commercial pilots; and

Activities of other transport agencies (SIC 63.40) and includes the forwarding of freight or otherwise arranging or carrying out of transport operations by road, sea or air; receipt of consignments; issue and procurement of transport documents and way-bills; activities of customs agents; activities of sea and air freight forwarders; and goods handling operations.

iii. Post and telecommunications (Division 64) which has two sub-categories, of which one is divided into two sub-groups. One includes air freight activity:

Courier activities other than national post (SIC 64.1) which covers the pick-up, transport and delivery of letters and mail-type parcels and packages by any kind of transport.

Given the aggregations, the very limited data which is published for sub-categories and groups within sub-categories and the fact that confidentiality constraints prevent the passing of relevant information to third parties, it is not possible to isolate the particular contribution of air freight.

The closest SIC Division, in that it is predominantly air transport only, is SIC 62; while space transport is included, common sense suggests that air transport accounts for the vast bulk of activity in SIC Division 62. Because, however, the statistics make no distinction between passenger and freight activity, there exists no effective mechanism from which to identify the value of the air-freight sector using official figures. Nevertheless, it is possible to gain some insight into the nature of sector activity through the analysis of the input-output accounts.

## 8.2 The Estimated Value of the Air Cargo Sector from the Input-Output Accounts

The total output for any industry can be measured through the input-output tables. Input-output tables display the flow of all goods and services in the economy, showing the relationship between producers and consumers and the interdependence between different industries measured at a given point in time. The output of any industry is measured by the amounts purchased by other industries (intermediate demand) and the amounts sold to final customers (final demand).

In the UK, full input-output accounts are constructed according to a five-year cycle with the accounts for 1995 due to be published in 2000. In addition, what are known as input-output Balance Tables are produced annually (1996 was the most recent published at the time this analysis was carried out) as a mechanism for reconciling different estimates of Gross Domestic Product. The balance tables are very similar to the formal accounts but do not separate domestic and import activity and do not adjust for distribution costs.

Table 8.1 details the information provided by the 1996 Balance Tables and shows the value of the air transport services purchased by each of the 123 industry sectors identified within the Tables. The definition of air transport is consistent with the SIC structure and therefore includes both freight and passenger services.

The first and second columns of Table 8.1 identify the industry sector code and name. The third column provides the value of purchases of air transport services by each industry sector (intermediate demand). The fourth column shows the share of each industry purchase relative to the total purchase value by other industry sectors of air transport.

Table 8.1: Industry Purchases of Air Transport Services (Source: 1996 Balance Tables)

Sector Code	Sector	Purchase £m 1996 basic prices	%
1	Agriculture	5.61	0.133
2	Forestry	1.51	0.036
3	Fishing	0.00	0.000
4	Coal extraction etc	5.88	0.139
5	Extraction oil and gas	75.68	1.792
6	Extraction metal ores	0.05	0.001
7	Other mining and quarrying	11.05	0.262
8	Meat processing	5.35	0.127
9	Fish and fruit processing	1.95	0.046
10	Oils and fats	1.72	0.041
11	Dairy products	10.04	0.238
12	Grain milling and starch	4.31	0.102
13	Animal feeding stuffs	0.19	0.004

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14	Bread, biscuits, etc	2.34	0.055
15	Sugar	3.00	0.071
16	Confectionery	1.15	0.027
17	Miscellaneous foods	2.28	0.054
18	Alcoholic drink	10.48	0.248
19	Soft drinks	0.05	0.001
20	Tobacco	6.08	0.144
21	Textile fibres	1.96	0.046
22	Textile weaving	0.94	0.022
23	Textile finishing	2.41	0.057
24	Made-up textiles	1.18	0.028
25	Carpets and rugs	1.09	0.026
26	Other textiles	3.67	0.087
27	Knitted goods	3.46	0.082
28	Wearing apparel	8.78	0.208
29	Leather tanning	1.65	0.039
30	Footwear	0.47	0.011
31	Timber and wood products	0.72	0.017
32	Pulp, paper and board	6.14	0.145
33	Paper and board products	7.95	0.188
34	Printing and publishing	96.32	2.281
35	Coke ovens, oil proc, nuclear fuel	35.24	0.834
36	Industrial gases	5.30	0.126
37	Inorganic chemicals	3.56	0.084
38	Organic chemicals	11.25	0.266
39	Fertilisers	2.66	0.063
40	Synthetic resins etc	4.97	0.118
41	Pesticides	2.15	0.051
42	Paints, dyes, printing ink etc	1.59	0.038

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43	Pharmaceuticals	6.42	0.152
44	Soap and toilet preparations	2.30	0.054
45	Chemical products nes	12.34	0.292
46	Man-made fibres	0.06	0.001
47	Rubber products	1.12	0.027
48	Plastic products	13.22	0.313
49	Glass and glass products	3.33	0.079
50	Ceramic goods	6.52	0.154
51	Structural clay products	1.65	0.039
52	Cement, lime and plaster	5.68	0.134
53	Articles of concrete etc	15.74	0.373
54	Iron and steel	65.75	1.557
55	Non-ferrous metals	5.10	0.121
56	Metal castings	6.10	0.144
57	Structural metal products	0.82	0.019
58	Metal containers, etc	1.24	0.029
59	Metal forging, pressing, etc	13.16	0.312
60	Cutlery and tools	2.40	0.057
61	Metal goods nes	10.29	0.244
62	Mechanical power transmission equipment	7.67	0.182
63	General purpose machinery	5.74	0.136
64	Agricultural machinery	1.77	0.042
65	Machine tools	2.48	0.059
66	Special purpose machinery	5.65	0.134
67	Weapons and ammunition	1.43	0.034
68	Domestic appliances nes	1.45	0.034
69	Office machinery	11.56	0.274
70	Electric motors and generators	9.51	0.225

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71	Insulated wire and cable	1.40	0.033
72	Electrical equipment nes	7.92	0.188
73	Electronic components	5.92	0.140
74	Transmitters for TV, radio and phone	3.94	0.093
75	Receivers for TV and radio	1.69	0.040
76	Medical and precision instruments	22.88	0.542
77	Motor vehicles	49.08	1.162
78	Shipbuilding and repair	2.86	0.068
79	Other transport equipment	7.46	0.177
80	Aircraft and spacecraft	82.46	1.952
81	Furniture	4.34	0.103
82	Jewellery and related products	1.18	0.028
83	Sports goods and toys	1.22	0.029
84	Miscellaneous manufacturing nes	13.78	0.326
85	Electricity production and distribution	1.75	0.042
86	Gas distribution	0.96	0.023
87	Water supply	0.10	0.002
88	Construction	32.24	0.763
89	Motor vehicle distribution & repair	91.12	2.158
90	Wholesale distribution	153.68	3.639
91	Retail distribution	45.32	1.073
92	Hotels, catering, pubs etc	66.33	1.571
93	Railways	12.86	0.304
94	Other land transport	38.91	0.921
95	Water transport	22.31	0.528
96	Air transport	501.01	11.863
97	Transport services	218.55	5.175

UK air freight study report

98	Postal services	189.82	4.495
99	Telecommunications	50.08	1.186
100	Banking and finance	661.63	15.666
101	Insurance and pension funds	472.40	11.185
102	Auxiliary financial services	18.34	0.434
103	Owning and dealing in real estate	16.46	0.390
104	Letting of dwellings	25.62	0.607
105	Estate agent activities	4.40	0.104
106	Renting of machinery	38.63	0.915
107	Computing services	39.80	0.942
108	Research and development	7.33	0.174
109	Legal activities	37.44	0.887
110	Accountancy services	35.77	0.847
111	Market research	75.95	1.798
112	Architectural etc activities	31.62	0.749
113	Advertising	71.15	1.685
114	Other business services	223.24	5.286
115	Public administration	52.00	1.231
116	Education	8.80	0.208
117	Health and veterinary services	19.40	0.459
118	Social work	15.63	0.370
119	Sanitary services	2.66	0.063
120	Membership organisations	16.47	0.390
121	Recreational services	126.21	2.988
122	Other service activities	18.63	0.441
123	Domestic services	0.00	0.000

The figures in Table 8.1 show that three sectors - all services - make up almost 40% of total air transport purchases. The banking and finance sector accounts for close to 16%; purchases from within the air transport sector itself come close to 12%; while insurance and pension funds account for just over 11%.

Two other service sectors - transport services and other business services - are the only two other sectors to account for between 5% and 10% of total purchases and together these five sectors account for 50% of all air transport services.

All of the manufacturing sectors together account for no more than about 15% of air-transport service provision.

As Table 8.1 shows, the sum of intermediate demand for all air services, passenger and freight, totalled in 1996 £4.2 billion in 1996 prices. However the total output of any industry is not determined solely by intermediate demand: it is a sum of intermediate demand and final demand. Final demand for goods refers to the amounts sold to final consumers - household consumption, government expenditure, fixed capital formation and exports.

Scrutiny of the 1996 Balance Tables indicates that while the intermediate demand for air-transport services was some £4.2 billion, final demand accounted for another £11.3 billion. Thus total demand in 1996 for air transport services (i.e. total gross output), passenger and freight, amounted to £15.5 billion in 1996 basic prices or, inflating to 1998 prices using the GVA Index at basic prices, £16.4 billion.

### **8.3 The Airfreight Share of Total Gross Output**

Although identifying intermediate and final demand for air transport is useful, it does not distinguish the contribution of the airfreight sector as separate from passenger services. In order to estimate the output value of the airfreight sector only, it is necessary to make some crude assumptions. As far as industry transactions are concerned, the basic difficulty is that of defining the likely distribution of air-transport purchases between passenger and freight. It is clear that most industry sectors will to some extent purchase passenger services for the purpose of enabling overseas marketing and sales activities. Similarly, we may presume that sectors concerned with the production or manufacture of goods are more likely to require freight services than sectors that supply direct service support activities, although banking and finance, insurance and pension funds and other business services are likely to generate substantial demand for air freighted documents and non-Royal Mail.

On the basis that 90% of air-transport services relate to freight for basic foodstuffs and manufacturing goods (input-output sector codes 1-84); and 10% of air-transport services relate to freight for energy (codes 85-87), hotels and other forms of transport (input-output sector codes 92-95 & 97) and all primary service industries (codes 100-123), intermediate output for air freight is valued at £1.89 billion. The final demand tables in the input-output tables show that household consumption accounts for 58% of final demand with exports accounting for virtually all of the remaining 42%. £6.5 billion spending of households on air-transport services comes from spending £6.1 billion on travel and £0.5 billion on such services while abroad. All of the fixed capital formation spending on air-transport services was undertaken by the oil and gas extraction sector.

Given that household consumption accounts for 58% of final demand and that households spend £6.6 bn on air-transport services (comprised of £6.1 bn on travel and £0.5 bn on such services while abroad) it can be assumed that virtually all household final demand takes the form of demand for passenger services. In addition, as all of the fixed capital formation spending on air-transport services was undertaken by the oil and gas extraction sector, it is also unlikely that any fixed capital formation expenditure is spent on air-freight. Accordingly, we make no substantial change to the total output figure as a result of these two elements.

In contrast, 42% of final demand was accounted for exports where it can be assumed that the bulk of final demand on air-transport services from exporters is likely to result in freight passage. If we add this £4.75 billion final demand to the £1.89 billion intermediate demand, we derive an estimated total gross output figure for freight activity of some £6.64 billion, equivalent to 0.4% of national gross output.

However, these figures also include imports purchased as part of business activity as well as net product taxes, which must be excluded before an estimate of domestic gross output can be derived.

In the case of air transport, the 1996 Balance Tables indicate that the value of imported goods and services used by the sector in that year amounted to £4.08 billion, with net product taxes accounting for another £0.4 billion. Allowance for these values produces an overall domestic gross output for the sector of some £11.02 billion, some 29% lower than the total gross output figure. Again, however, we have no basis on which to separate the relative values for passenger as opposed to freight activities.

Reducing the previous total gross output estimate of £6.64 billion by this general value produces a figure for 1996 domestic gross output of some £4.71 billion for the air freight sector. Inflating to 1998 prices using a GVA index at basic prices gives an estimate in 1998 prices of £4.99 billion for 1996 - equivalent to 30% of domestic gross output in air services as a whole and 0.6% of 1996 GDP.

#### **8.4 Estimated Value-Added by the Air Freight Industry**

The estimate of domestic gross output by the air freight sector does not correspond to value-added, the evaluation of which requires a series of further adjustments. In particular, it is necessary to establish the scale of intermediate demands for goods and services by the air freight sector from other sectors in the economy. Again, there exists no formal basis on which to evaluate this pattern from official statistics. However, if we assume that such purchases are broadly similar in proportion to that for all air transport services as a whole, our analysis suggests a figure for value added (including wages and salaries paid to employees) in 1996 in the region of £2.04 billion in 1996 prices, or £2.16 billion in 1998 prices.

Producing an estimate of value-added excluding wages and salaries, or something more akin to gross operating surplus, requires that the size of wages and salaries for the freight sector be identified. In the absence of more appropriate information we assume that the relative size of the latter is again broadly similar to that for the air transport sector as a whole. This suggests an amended figure of some £0.86bn in 1996 (£0.91 billion in 1998 prices).

The Oxford Economic Forecasting (OEF) report "The Contribution of the Aviation Industry to the UK Economy" reports that value-added by the UK aviation industry in 1998 was £9.4 billion in 1995 prices and £10.2 billion in 1998 prices. Their estimate is the sum of value-added by airlines (SIC 62), air transport supporting activities (SIC 63.23) and the "rest of the aviation industry" which is calculated with reference to estimated value added by employees in retail, catering and hotel activities on airports. The OEF estimates exclude air cargo activity classified under the other headings - SICs 63.4 and 64.1 - both of which are significant in accounting for air cargo activity. Both of us exclude activity under SIC 64.2 which accounts for the national post, and to this extent we both underestimate air cargo activity insofar as we exclude that part of national post carriage which is by air (i.e. only part of the activity accounted under SIC 64.2).

OEF arrive at the estimate of value added by airlines (SIC 62) in 1998 by multiplying GDP for 1995 (£712 billion) by the gross value added weight for air transport (6.6) for 1995. This gives the value-added of air transport as £4.7 billion for 1995 in 1995 prices. Multiplying by the transport and storage index number of GVA at basic prices for 1998 (112.3 with 1995 as base year) gives an overall value-added figure of £5.3 billion in 1995 prices (£5.8 billion in 1998 prices).

Value-added by air transport supporting activities (SIC 63.23) is estimated at £2.8 billion (£3.04 billion in 1998 prices) using a similar method, and assuming in addition that value-added in the sub-sector grew by the same rate as the rest of transport services between 1995 and 1998. The sum of value-added by SIC62 and SIC 63.23 together in 1998 is, on the OEF estimate, £8.8 billion in 1998 prices. Also included in the OEF estimate of value-added for the industry is the estimated value-added by employees in other activities on airports - principally retailing, catering and hotels - which is estimated at £1.3 billion in 1998 (£1.41 billion in 1998 prices).

Recent data (for 1996 and 1997) on value-added generated by the service sectors of the economy published by ONS in the autumn of 1999 (Sector Review; Service Trades) provides estimates of value-added under SIC 62 and the relevant four-digit SICs which include air cargo activity. With a couple of exceptions - one being SIC62 - this data source is used (together with other sources) to

compile the estimates of value-added by the services sectors in national accounts. The data for SIC 62 is not yet refined to the point where income earned on UK soil can be distinguished from total income, and CAA data is therefore used instead to compile the national account estimates for scheduled and non-scheduled air services. The services trade data for SICs 63 and 64 however is considered reliable, and it is used by the National Accounts office to compile the national accounts estimates of value-added in these sectors. Table 8.2 sets out the value-added estimates for SICs 63.23, 63.4 and 64.12. The National Accounts show value-added by SIC62 in 1997 to be £4,812 million (£4,926 million in 1998 prices).

Table 8.2. Value-added by the AIR Cargo Sectors (excluding Scheduled and Non-scheduled Air Services) Current Prices		
Sector by SIC:	Value-added 1996	Value-added 1997
	£m	£m
63.23 Other supporting air transport activities	1,275	1,810
63.40 Activities of other transport agencies including the forwarding of freight	1,920	2,080
64.12 Couriers other than national post	993	1,180

Source: ONS Sector Review - Service Trades, 1999

As this discussion briefly illustrates, the slight difference in the activities embraced in defining air services, coupled with the different data sources used and the different years for which estimates are calculated, make it difficult to make any direct comparison between the OEF work on all air service activity and that we have undertaken for air cargo only. Nonetheless, our estimates of output and value-added by the air cargo sector are broadly consistent with the OEF estimates of value-added by all air services activity.

### **8.5 Summary of the Estimated Output and Value-added Contribution of the Airfreight Sector to the UK Economy**

Our best estimate, on the data available to us, of the contribution of airfreight to the UK economy, measured by gross domestic output and value-added, is for 1996 in 1998 prices:

£4.99 billion in gross domestic output, which suggests

£2.16 billion in value-added including employment costs or

£0.91 billion in value-added excluding employment costs

We estimate that airfreight activity accounts for about 30% - 32% of gross domestic output and value-added (which includes the value of exports earned by the sector) by the air services industry as a whole.

## 8.6 Direct Employment in the Air Freight Industry

Employment in the air freight industry encompasses employment in all activities related to the movement of goods (as distinct from passengers) by air. These activities may include: airport control and management; airlines, whether scheduled or charter, dedicated freight or passenger; freight forwarders and wholesalers; integrators; express operators; couriers; specialist air trucking companies and transit shed operators.

The Annual Employment Survey (AES) carried out by the ONS collects employment data for all industry sectors as defined by the Standard Industrial Classification. The AES began in 1995 and replaced the Census of Employment which was last carried out in 1993. The AES uses a smaller sample size than the Census with data being collected on an annual basis by sampling workplaces and then estimating the whole business population.

Tables 8.3-8.5, overleaf, provide full details of employment (employees) for 1991, 1996 and 1997 within the several SICs which include airfreight amongst the activities they cover, broken down by standard statistical region. As with the output and value-added measure, we have no reliable basis for estimating what share of the totals within each SIC are accounted by airfreight activity. We can however make the following observations on the basis of the AES data shown:

Between 1991 and 1997, employment in the relevant sectors together increased by 22.5% against employment growth in the economy as a whole of 3%

Employment in these sectors together grew faster at 37.8% in the South East over the 1991-97 period than it did in any other region (including London); indeed job growth in the South East accounted for more than four out of every ten jobs created by these sectors over these six years. The South East's share of total employment in these sectors increased over this period from 24.5% of the total to 27.6%, and London's fell from 27.6% to 24.7%. The regions with airports which grew significantly over this period, including in the volumes of flown freight, also increased their share of total employment. The North West's share rose to 10% from 9.2%; the West Midlands' share increased to 6.2% from 5.9%; the South West's to 5% from 4.5%; and Scotland's to 6.8% from 6.5%. East Midlands' share stayed broadly the same at 6.1%, and the shares accounted by the North, Yorkshire & Humberside, East Anglia and Wales fell.

The single largest source of job growth 1991-1997, accounting for over a third of the total gain by these sectors together, was in SIC 63.4 - which includes the activities of freight forwarders, consolidators and customs agents (all modes). Of the gain of 18,871 jobs in SIC 63.4, 22% were created in the North West, 24% in London and 21% in the Rest of the South East. Over this period, employment in SIC 63.4 increased its share of total employment in the sectors together from 19% to 22% in Britain as a whole, but in the North West from 20% to 29% and in the East Midlands from 12% to 19%.

Table 8.3. 1997 Employment in Sectors which cover the Air Services and Airfreight Sectors

	Class	GB	South East	East Anglia	London	South West	West Mids	East Mids	Yorks & Hum	North West	North	Wales	Scotland
Scheduled air transport	6210	64,262	30,605	307	27,325	962	558	909	391	983	198	34	1,988
Non-scheduled air	6220	9,212	2,755	165	498	959	464	682	141	1,800	156	125	1,466

UK air freight study report

transport													
Cargo handling	6311	6,124	2,210	103	889	171	51	160	1,029	877	155	139	339
Storage and warehousing	6312	85,301	16,951	6,175	9,045	6,146	7,094	8,585	8,655	11,087	2,911	1,808	6,845
Other supporting air transport activities	6323	33,145	8,530	285	10,716	1,277	1,350	1,053	271	3,637	1,093	1,201	3,732
Activities of other transport agencies	6340	66,333	15,745	3,078	17,205	3,096	3,952	3,439	5,009	8,664	1,804	596	3,745
Courier activities	6412	38,431	6,787	1,283	8,968	2,483	5,218	3,556	2,141	3,262	1,151	956	2,624
Column Totals		302,808	83,583	11,396	74,646	15,094	4	18,384	17,637	30,310	7,468	4,859	20,739

Table 8.4. 1996 Employment in Sectors which cover the Air Services and Airfreight Sectors

	Classes	GB	South East	East Anglia	London	South West	West Mids	East Mids	Yorks & Hum	North West	North	Wales	Scotland
Scheduled air transport	6210	53,600	44,000		26,800	700	800		400	700	1,800		2,800
Non-scheduled air transport	6220	7,800	2,500	100		400	1,000	600	100	1,600			1,100
Cargo handling	6311	5,400	2,700		1,000	300		100	700	600			500
Storage and warehousing	6312	89,700	26,900	5,800	6,900	6,900	9,100	7,600	8,300	12,600	3,700	1,600	7,100
Other supporting air transport activities	6323	30,000	18,100		10,500	1,700		400	300	3,400	900	400	2,800
Activities of other transport agencies	6340	66,100	32,100	3,300	18,000	2,300	4,200	3,100	5,800	8,300	1,600	900	4,300
Courier activities	641	50,300	20,600	1,600	10,600	3,100	6,600	3,800	3,700	5,000	1,700	1,100	3,100

UK air freight study report

Column Totals		302,900	146,900	10,800	73,800	15,400	21,700	15,600	19,300	33,300	8,600	4,000	21,700
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Table 8.5. 1991 Employment in Sectors which cover the Air Services and Airfreight Sectors

	Class	GB	South East	East Anglia	London	South West	West Mids	East Mids	Yorks & Hum	North West	North	Wales	Scotland
Scheduled air transport	6210	55,495	14,857	C 710	34,163	C 680	758	C 235	C 316	1380	C 411	C 51	1,935
Non-scheduled air transport	6220	6,325	1,670	C 205	C 122	C 48	C 897	C 98	C 106	C 700	C 105	C 245	2,130
Cargo handling	6311	6,328	2,590	C 381	C 230	C 237	C 60	C 73	C 896	C 614	C 283	C 233	730
Storage and warehousing	6312	78,386	16,091	6,359	7,170	6,249	6,273	9,099	7,709	9,257	3,073	1,968	5,138
Other supporting air transport activities	6323	28,639	9,261	C 246	7,203	C 681	C 1,241	C 1,763	C 853	C 3,748	C 1,334	C 179	2,131
Activities of other transport agencies	6340	47,462	11,853	2,787	12,745	1,584	3,017	1,857	4,626	4,577	838	1,239	2,338
Courier activities	6412	24,539	4,293	875	6,689	1,553	2,303	2,168	1,180	2,424	719	C 777	1,557
Column Totals		247,174	60,615	11,563	68,322	11,032	14,549	15,293	15,686	22,700	6,763	4,692	15,959

The next largest source of job growth 1991-1997, accounting for 25% of the total job gain by these sectors was in SIC 64.12 - the pick-up, transport and delivery of non-Royal mail, mail-type parcels and packages by firms other than the national post. Again, just under half of the total gain occurred in London and the Rest of the South East (44%), with a further 21% accounted for by the West Midlands and 10% by the East Midlands.

By 1997, SICs 63.4 (including freight forwarding) and 64.12 (courier activity) accounted for 35% of employment in the sectors together, up from 29% in 1991. In the East Midlands, the share accounted for these sectors increased to 38% from 26%, in the West Midlands to 49% from 37%, in the North West to 38% from 31% and in Scotland to 31% from 24%.

Of the growth of 6,915 jobs in storage and warehousing (SIC 63.12 - the sector with the least relevance to airfreight), 54% is accounted by gains, shared more or less equally, in London and the North West.

Employment in cargo handling (SIC 63.11) actually fell in Britain as a whole between 1991 and 1997 by 3% - clearly, given the increase in passenger and freight traffic volumes over the period, a function of capital investment and productivity improvements although these were not evenly spread. Whereas in the Rest of the South East, employment in SIC 63.11 fell by 15%, it grew (from a low base) in London four fold, more than doubled in the East Midlands and increased by 42% in the North West.

### **8.7 The Share of Air Services Employment accounted for by Airfreight**

We tried several different approaches to estimating employment in the airfreight sector. Although we had some survey data which was collected as part of the wider survey undertaken for this study, we could not establish the sample fraction for this data and thus could not gross up to a total for the sector (or indeed even one part of it) from our survey findings. We also separately surveyed the airports, but again the results were partial and differences between the results for different airports could not be reconciled satisfactorily. Moreover, there are differences in how the airports count and classify employment on and off site that made it difficult to gross up at any level other than the individual airport. For example, even for airports for which we had comparatively good data, it proved impossible to use this accurately to predict employment at other airports for which we also had reasonable data. We also attempted to use CASS data on freight sales to airlines and employment numbers from the Plimsoll data, but again could not reconcile the two (both partial data sources) and derive a means of grossing up to a total figure which was consistent with either known data or the output estimates, nor were we able successfully to use either the CASS or the Plimsoll data to predict totals in parts of the sector that we did know. The information in both data sets also differed significantly in several cases from the primary survey data collected for this study.

We used in the end the three different approaches, which are summarised below, to estimating the numbers of employees in air freight. Despite the different answers produced and the large degree of speculation entailed with each, we conclude for the reasons explained that the industry as a whole employs directly in the order of 40,000 to 55,000 (including self-employed).

i. Derivation based on value-added per employee. If we assume that value-added per employee in airfreight will not deviate very significantly from the average in the airfreight-related sectors for which we have published ONS data for the UK, we can conclude that the average will be somewhere in the range of the following (all the estimates are for 1997, inflated to 1998 prices):

SIC 62 (scheduled and non-scheduled air services) £67,044 (value-added from the National Accounts for SIC62 in 1997 divided by total employee employment in GB in SIC 62 in 1997)

SIC 63.23 (other supporting air transport): £55,900

SIC 63.40 (other transport agencies including freight forwarders, all modes): £32,100

SIC 64.12 (couriers other than national post): £31,482

Our own estimate of value-added in the airfreight sector is, for 1996, £2.16 billion and for 1997 (on the growth assumptions suggested by the ONS data for SICs 63.23, 63.4 and 64.12), £2.57 billion. Dividing our estimate of value-added by the averages above produces an employment estimate of between 32,000, 47,000, 80,000 and 81,600. If this is correct, however, it would suggest that freight - if the OEF estimate is correct (which is for 1998) - accounts for between 18% and 45% of total employment in the air services industry (including ancillary on-airport activity). On the AES data (1997), the estimate would suggest that airfreight accounts for between 11% and 27% of all employment in the SIC classifications which cover airfreight activity (amongst other air service and freight transport activity).

Our view is that direct employment in airfreight is likely to be closer to the lower than the higher end of the range, although we have no real basis for concluding this apart from believing it unlikely that employment in airfreight would account for very much more than its share of gross output in all services (we estimate this to be 30%.) Recent evidence from work done on the European express sector in air services, however shows that this part of the airfreight industry is very labour intensive - which would suggest that value added per head is likely to be towards the lower end of the spectrum, and in turn that employment is at the higher end.

ii. Derivation based on airfreight's share of total gross domestic output in the sector.

If we assume that the airfreight share of air services employment is broadly equivalent to its share of value-added (30%), and assume additionally that the OEF estimate of total employment in air service activity is correct, this suggests that airfreight supports directly between 44,000 (if ancillary jobs in catering etc are excluded from the OEF estimate) and 54,700 jobs (if the ancillary jobs are included). The fact that this approach produces a range of employment of an order that is similar to the range derived using the value-added per head approach suggests gives some credence to the results.

iii. Derivation based on the survey data collected for this study.

We carried out two different surveys of employment in the airfreight industry. The first requested details of current employment from respondents to the main survey conducted for this study. The second was a survey of airports, with each airport asked to provide simply the numbers employed partly or wholly on air cargo activities both on and off airport (but related directly to the airport) and was carried out in an effort to replicate, but for airfreight only, the OEF approach and results. (The difficulty with this approach is that it will inevitably exclude the large number of employees in the express and integrator sectors which are based in locations well away from airports (e.g. in offices in city centres)).

The results of the first of the two surveys are summarised in Table 8.6 broken down by type of activity and region in which the reported jobs are located: Heathrow however is excluded (it did not respond to the survey). We have, however, no basis for determining the sample fraction represented by those interviewed and cannot therefore use the data directly to gross up to total employment in airfreight. Nonetheless, we are able to conjecture, on the basis of the following, that the industry employs in the order of about 42,500 to 45,000, a range which is broadly consistent with the two other approaches. This estimate is the sum of the following calculations:

Two integrators account for the whole of the 11,500 jobs in the integrator category, and these same two say that together they have 56% per cent of the UK market for integrated freight services. If employment is pro rata to market share, this would suggest that the total number of direct jobs in integrator activity amounts to some 20,500 jobs.

We can make a similar estimate for the freight forwarding sector. The three freight forwarders who supplied employment data account, on CASS data for 1997, for just under 7% of total sales to airlines by freight forwarders. Again, if employment is pro rata to sales, it would suggest that the freight forwarding industry in the UK employs directly in the order of 10,600.

Airports themselves employ directly very few in airfreight activity. Allowing for non-respondents to the survey and the fact that not all airports were surveyed, we would estimate that UK airports in total employ no more than about 150.

We have no idea what sample fraction the truckers surveyed represent, but believe this unlikely to be higher than about 5%. If this is the case, then we would estimate the trucking contribution to be in the order of 3,000 - 4,000 jobs.

The airlines surveyed together employ about 3,500 and account we estimate for about two-thirds to three-quarters of all UK-based direct employment by airlines in airfreight activity. Again using the pro rata assumption, this suggests a total of about 4,700 to 5,300 jobs in airlines in airfreight activity.

## UK air freight study report

We are similarly unable to estimate the sample fraction of the handling and transit sector, but judge that the firms surveyed account for some 30-40% of employment in the sector. On a pro rata basis, this suggests a total direct employment count of about 3,000 to 4,000 jobs.

Assuming that the general service agents interviewed account for about 10% of the GSA market suggests on the same pro rata assumption or the similarly suggests a direct job total for this sector of about 600.

The employment estimate based on the results of the second of the two surveys is summarised in Table 8.6 and is calculated by estimating the productivity of the airfreight sector measured by freight tonnes handled per employee where figures are known for both on and off airport employment in airfreight and can be compared to the CAA data on flown freight from the specific airport. Clearly this approach has difficulties because the figures for flown freight bear comparatively little relation, most particularly for the regional airports, to the actual volumes of freight handled because of the proportions which are trucked to (but also between) the London hubs. Averages of freight tonnage per employee measured by the CAA account will differ sharply between the regional and London airports because of this, making the regional airports, in comparison to the London airports, appear very inefficient. For example the average productivity for the London airports ranges from 145 tonnes per person for Heathrow to 239 tonnes per person for Gatwick. For the regional airports with known employment, estimates ranged from 86 tonnes per person for East Midlands to 116 tonnes per person for Manchester and 162 for Prestwick.

**Table 8.6: Employment by Region and Industry Sector as indicated by MDS survey of selected operators in the air freight industry**

	Integrators	Freight Forwarders	Airports	Truck Operators	Airlines	Handling and Transit	GSA	Totals
Total	11,500	733	83.5	168	3516	1205	60	17,265
Of which part-time	1375	41	20	5	46	49	0	1537
Regional Split:								
N/NE	318	35	5	0	0	7	0	364
Y&H	318	12	0.5	0	2	8	0	340
NW	513	41	7	20	116	185	12	893
EM	2,625	139	0	0	426	12	9	3211
WM	2,788	65	0	0	55	53	0	2960
L/SE	3,475	355	6	123	2432	793	37	7221
SW	578	5	10	0	400	7	0	1000
W	253	4	0	0	0	4	0	260
S	383	78	55	25	41	84	2	668
NI	253	0	0	0	19	52	0	324

UK air freight study report

Totals*	11,500	733	83.5	168	3,491	1,205	60	17,241
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NB some of the airline information was not broken down into employment by region - therefore the total at the bottom of the column does not match the total at the top of the column which is the correct aggregate figure.

In conjunction with their quinquennial survey of all on-airport companies, BAA produced an estimate of related off airport activity and judges that for every on-airport air cargo job, there is 0.38 (Gatwick) and 0.81 further jobs off airport in activities related to air cargo. Table 8.7 shows on-airport and off-airport cargo employment data.

Table 8.7 On and Off Airport Employment in Air Cargo at Heathrow and Gatwick		
	On-airport cargo related employment	Off-airport cargo related employment estimates
Heathrow	4877 (1992)	3950 (1991)
Gatwick	889 (1997)	340 (1999)

Source: BAA

The survey data exclude jobs (or fractions of jobs) which are only part involved in airfreight activity and exclude all airline jobs. There is no allowance at all for airline employment other than that directly engaged in air cargo activity and recorded as such by the airport.

Table 8.8 below sets out an estimate of employment in airfreight derived using survey data from a sample of airports covering airfreight jobs on airport and nearby and CAA data on freight flown from these airports to estimate, and then gross up to all airports from the result, the productivity of employees measured by the amount of flown freight per job.

Table 8.8 Estimated Airfreight Employment On and Nearby Airports Only (1998/99)		
	No of Employees 1998/99	Mail and Freight Tonnes Carried 1998
London Airports	Actual	Actual
HEATHROW	8,827	1,300,108
GATWICK	1,229	293,717
STANSTED	1,100	193,820
Sub total	11,156	1,787,645
Regional Airports	Estimated	Estimated
ALL OTHER	5,108	561,885
Total	5,108	561,885
TOTAL	16,264	2,349,530

The LHR survey was conducted in 1992. Figures for tonnage of mail and freight carried were provided by CAA Employment figures for the regional airports are based on average freight and mail flown per employee for East Midlands, Manchester, Birmingham and Prestwick airports - 110 tonnes per person employed.

Given, with reference to the value-added per head data and the other estimates of air cargo employment, that the 16,264 jobs are likely to be some fraction of the total, it is necessary to adjust the result to account for employment which will have not have been accounted by an employment which includes only jobs which are on or nearby airports. While again we have no basis for establishing what exactly the sample fraction is, we can conjecture.

First of all, it would be reasonable to conclude, given the AES distribution of employment in SIC 62 (London and the South East together account for 83% of GB employment), that the derived proportions of London/South East employment are wrong. We would expect proportionately more employment to be based in London/the South East than the estimates in Table 8.7 suggest. Second, it would be reasonable to conclude that the "on and nearby" airport data underestimate actual employment in airfreight. The fact that the integrators and freight forwarders alone account for some 31,000 jobs tends to validate this conclusion (this estimate is, exceptionally, based on good survey data coupled with reasonably robust data that allow us to estimate with confidence the sample fraction). Even if the integrators and freight forwarders alone accounted for 100% of employment in airfreight, their productivity, measured by freight tonnes flown per head, would be no more than 76 tonnes per employee - significantly less than the average suggested by the "on and nearby airport" data.

So, if we assume the same productivity ratio between London/South East and the regions as suggested by the Table 8.7 (i.e., 1.5) and use the derived productivity average for freight forwarders and integrators on their own as the "base" figure for London/South East, we produce an estimate of total employment of 34,327. The other methods of deriving the total employment in the sector would suggest that this is an underestimate, and the approach to deriving it is probably more speculative than the alternatives described. Moreover, we feel reasonably confident that the integrators and forwarders together account for more than half of all activity in the airfreight sector, but rather less than three-quarters - suggesting a total employment figure for the industry of somewhere between 42,000 and 56,000.

## **8.8 Summary: Estimated Direct Employment in Airfreight**

Thus while we cannot be confident of any precise estimate of employment in the airfreight sector, we are reasonably certain that the total lies between 40,000 and 55,000 jobs, and probably around the mid point of this range.

The main conclusion to be reached is that airfreight is a very significant employment sector in its own right.

## **8.9 Indirect and Induced Employment**

In addition to the direct employment provided by the providers of airfreight services is the employment in the businesses from whom the airfreight providers buy supplies and services (referred to as indirect employment), and in turn the employment that is supported by the spending of those working in the airfreight businesses and in the businesses which supply the airfreight businesses with goods and services (referred to as induced employment).

As there is no national measure of the indirect and induced employment supported by the airfreight sector - the so-called multiplier effect of the industry - we can only estimate the effect with reference to standard estimates of the multiplier effect of the air services sector as a whole.

OEF put together in their recent study the available studies on the multiplier effect of air services activity, most of which have been carried out to provide evidence to support the case for various

proposed increments in airport capacity in the country and range from 1.14 to 5.18 depending on the particular circumstances of the individual airport (i.e., for every direct job created a further 0.14 to 4.18 jobs is created elsewhere in the economy as a consequence of the indirect and induced multiplier effect).

As a general comment, we would consider the multipliers at the higher end of the range to be on the very high side indeed and not a useful guide to estimating a national multipliers. Indeed, we would expect the indirect and induced employment effect of the airfreight industry to be at the lower end of the range and certainly not more than 2.0. One reason, for example, that employment in the integrator sector is high is that the vast proportion of the supply chain is 'in-house'.

Assuming a multiplier of 2.0, and assuming direct employment of 40,000 - 55,000, we estimate that total direct, indirect and induced employment in the airfreight sector is in the order of 80,000 to 110,000 jobs, equivalent to a 0.3-0.4% share of jobs in the Great Britain workforce in 1997 (employed plus self-employed etc.).

### **8.10 The Importance of the Airfreight Industry as a Service to UK plc**

The contribution of airfreight to gross domestic product and employment, while significant, does not measure the sector's full value to the economy. Like other distribution services, airfreight is a key factor input to the supply chain for a major part of the UK economy. But more significantly, because of the kinds of traffics and types of businesses which tend to dominate the demand for airfreight services, its importance to national economic competitiveness is disproportionate and increasing. Advances in air services have been one of the major enablers of globalisation, making it possible to organise and manage production globally, and thus underpinning the very rapid growth in foreign direct investment (FDI); FDI, moreover continues to outpace growth in world trade and the UK, to its substantial advantage, still attracts a disproportionate share of this investment. Advances in air services (amongst other technological changes) make it possible to organise and manage production on a global scale and thereby to optimise, for each part of the value-added chain, the factor inputs available in different parts of the world economy; in turn the quality and costs of the air services available in different locations affects directly the cost and efficiency of each step in the supply chain.

A growing proportion, moreover, of the UK's FDI share, as well as of UK-owned production, is "moving up the value chain" with national economic performance increasingly dependent on the competitiveness of high value-added, R&D-intensive, short product-run, short shelf-life activity in which airfreight plays an increasingly significant role. At the same time, emerging markets are increasing their demand for UK products while they are also increasing their penetration of UK markets; India and China for example are significant and growing production centres for the fashion trade, the electronics sectors and perishable foods. Intensifying competition globally in the same high value-added sectors upon which UK is dependent for its prosperity is further reducing the length of product cycles (including intellectual properties) and, with the ever shrinking shelf life comes increasing pressures to keep stocks low and distribution efficiencies high.

As a consequence, the quality and cost of the airfreight services which are available to UK business, in consumer goods as well as in production and traded service activity, has a direct effect on national economic performance.

While we do not have any data which measures the impact on business competitiveness of the cost and quality of the airfreight services which are available in the UK, we do know that the efficiency with which individual businesses manage their supply chain plays a major part in national economic competitiveness. We also know that because airfreight tends to be used primarily for goods which have high ratio of value to weight and/or for time-sensitive and short shelf-life commodities (including documents and mail) that particular sectors of the economy are larger consumers of airfreight than others.

We provide below some snapshot insights into the dependence of the airfreight industry itself on high value-added globally traded activity.

OEF, using commodity data supplied by MSD T, attempted to fit commodity classifications to SICs as a means of assessing the relative importance of airfreight services to the economy. They concluded that the largest users by SIC for both exports to the EU and all other countries were, in rank order as follows, with the same sectors dominating both within and ex-EU exports:

Exports within EU	Rank	Exports outside the EU	Rank
Other transport	1	Computers & office equipment	1
Computers & office equipment	2	Precision & optical instruments	2
Other manufacturing	3	Other transport	3
Precision & optical instruments	4	Electrical engineering	4
Electrical engineering	5	Other manufacturing	5

The importance of these sectors is broadly confirmed by the survey undertaken for this study; each respondent was asked to state which were the most important sectors to their business currently, the sectors they expected to increase demand for airfreight and those they expected to reduce demand. The results are listed in rank order below:

Currently the most important sectors:

- Information technology/ electronics/ computers/ telecoms; automotive parts (integrators and forwarders); banking and printed material (for the integrators in particular); machinery (for airlines and forwarders); foodstuffs and other perishables (airlines); clothing; pharmaceuticals; machine parts

Sectors which are expected to grow in importance:

- Information technology/electronics/ computers/telecoms; pharmaceuticals; foodstuffs and other perishables; automotive; internet trading

Sectors which are expected to decline in importance:

- clothing

With some exceptions, these same sectors are those which offer the greatest opportunities for output and employment growth in the national economy.

OEF further conclude, based on assigning assumptions about the propensity to consume air services from the input output table data and the industry structure of the UK in comparison to that of its key competitors, that the UK tends to be more dependent on air services than either the US (after the EU, the UK's largest market by far) or Italy, and that there tends to be a positive relationship between airfreight usage and sectoral output growth (i.e. output growth is correlated with airfreight usage).

### 8.11 Overall importance of air freight for the UK economy

Our assessments of the value of the UK's airfreight sector to the UK economy leads us to conclude that the sector is of significant importance to national economic competitiveness:

Airfreight contributes about 30% of total output by the air services sector: an estimated £4.99 billion in 1996 (in 1998 prices).

## UK air freight study report

The airfreight industry employs directly between 40,000 and 55,000 people, and accounts for a total of between 80,000 and 110,000 jobs after account is taken additionally of the indirect and induced jobs supported by the sector.

Airfreight is consumed disproportionately by the high value-added, R&D-intensive, short product run, short shelf-life parts of the economy, the same sectors which are growing fastest and upon which future economic growth and prosperity are most dependent.

Access to internationally competitive airfreight services, providing a quality of product which will allow the cost efficient management by business of each step in the supply chain, is critical to the competitiveness of UK businesses and therefore to the competitiveness of the UK economy.

## 9 Summary and conclusions

### 9.1 Air Freight Industry Structure and Development

The air freight industry is characterised by fragmentation in terms of the numbers of companies involved and the fact that there is a lack of distinct separation in the roles played by some of those different companies. The larger forwarders in particular are becoming 'logistics providers', in some cases mirroring the activities of the integrators and offering a seamless door-to-door service, as well as offering traditional forwarding services; some act as wholesalers of airline capacity. Where the forwarders are involved, it is usually the case that a number of different companies provide the various links in the transport chain. The logistics providers offer value-added services, which distinguish them from the integrators door-to-door products, such as warehousing, inventory control, assembling products ('pick and pack') and distribution.

There is a wide choice in terms of choosing a forwarder or airline and there would appear to be significant competition within the industry.

Within the UK, the three London airports dominate the handling of air freight (as reported by CAA airport activity) - allowing for some 76-80% of the total. At the same time several regional airports have increased their cargo throughput substantially, largely as a result of handling the integrators growing traffic.

The air freight product can be defined as either 'general' air freight or 'express'. It is difficult to identify the precise split between the two categories. We estimate, based on a crude analysis of the freight and mail lifted by carrier reported by airport supplied by CAA, that the integrators could account for around 11% of total tonnes. If measured in numbers of consignments, given the nature of much of the integrators' traffic ie documents and small parcels, their significance is much higher. Their charges are in any event around three times higher than forwarders' traffic, as measured by weight.

Integrators fly traffic in their own aircraft (or contractors) between their UK sub-hub and their main European hub - Liege, Paris CDG, or Brussels, depending on the company. They also buy belly space. For example, DHL contract with BA for long haul destinations. The UK sub-hubs tend to be regional airports (such as East Midlands for DHL) but they do have a presence at the London airports. Others operate intercontinental routes flying directly to and from UK airports. Sometimes aircraft call at other European airports en route for example to American airport hubs.

The industry appears to believe that the express sector is the fastest growing and that the integrators are encroaching into traditional air freight. Forwarders believe they can compete with the integrators because the latter are geared to moving small parcels, which only constitute a proportion of air freight demand. Integrators do not necessarily offer a complete logistics package. In addition, forwarders are forming partnership with some airlines to offer 'time-critical' products.

Shippers variously argue that they want good quality of service but they also want cheap prices and do not see the two as mutually exclusive. Forwarders argue that shippers are very price conscious and behave accordingly. Forwarders have invested in 'consolidation' facilities around Heathrow and truck to and from the regions to maximise the throughput at those transit centres. Obviously the number of destinations served and the frequency of services to the large variety of destinations provided at Heathrow coupled to other London airports offers a strong attraction to the forwarder and the shipper. Consolidation enables the forwarder to buy in bulk from the airline. This suits all parties because the airline handles unit loads, which are quicker and easier; the forwarder negotiates a keen rate and the shipper benefits from a lower price. The forwarders therefore have a large vested interest in the dominance of Heathrow. Even where Gatwick and Stansted are used cargo is trucked between sheds at Heathrow and the aircraft at Gatwick and Stansted. Forwarders collect traffic from the regions and truck it down to Heathrow and vice versa.

Freighters have different requirements for airport infrastructure, obviously not needing passenger terminals but definitely requiring apron space for simultaneous loading and discharging of cargo rapidly plus ground handling facilities and equipment. The aircraft, especially when flying for integrators, have very tight windows to turnaround. Freighters may need to park during the day - though generally operators will wish to maximise the utilisation of their assets. Freighters do not need to be tied to passenger-friendly flight schedules and can be accommodated by airports out of the peak passenger hours. For the integrators, aircraft need to be allowed to fly in and out of airports at night. This is very important and leads to a critical issue, that of night flying restrictions being imposed arbitrarily by some regional airports. Integrators, because they are often working on a hub and spoke operational basis, need to have plenty of space for the aircraft to land and be handled simultaneously within a small time window. Integrators also require their own transit facilities to sort and distribute their traffic.

## **9.2 Environmental issues**

Analysis of the present structure of the industry and its likely development leads us to conclude that the specific environmental drivers which could affect the future development of the UK air freight market are:

the development of freight-only aircraft; and

the existing or future environmental constraints which could be placed upon the development or use of airport facilities.

In terms of development at specific airports the report has provided a summary of the environmental constraints at airports. No attempt has been made to rank these airports by constraint. However, it is very evident when considering both existing regulations and adjacent land uses that the most constrained are locations such as Birmingham, Luton and Glasgow whereas the least constrained are East Midland, Stansted and Prestwick.

## **9.3 Summary of the Estimated Output and Value-added Contribution of the Airfreight Sector to the UK Economy**

Our best estimate, on the data available to us, of the contribution of airfreight to the UK economy, measured by gross domestic output and value-added is for 1996 in 1998 prices:

£4.99 billion in gross domestic output

£2.16 billion in value-added including employment costs

£0.91 billion in value-added excluding employment costs

We estimate that airfreight activity accounts for about 30% of gross domestic output and value-added (which includes the value of exports earned by the sector) by the air services industry as a whole.

## **9.4 Estimated Direct Employment in Airfreight**

While we cannot be confident of any precise estimate of employment in the air freight sector, we are reasonably certain that the total is at least 40,000 and possibly as many as 55,000 jobs, and probably towards the lower end of this range. The main conclusion to be reached is that air freight is a very significant employment sector in its own right. We estimate that total direct, indirect and induced employment in the air freight sector is in the order of 60,000 to 82,500 jobs, equivalent to a 0.3-0.4% share of jobs in the Great Britain workforce in 1997 (employed plus self-employed etc.).