EUROCONTROL Trends in Air Traffic | Volume 3

A Place to Stand: Airports in the European Air Network

EUROCONTROL

Acknowledgements

The momentum behind this volume of *Trends in Air Traffic* came from Paul Wilson, Head of the Airport Operations and Environment Division in EUROCONTROL, who has repeatedly pushed for better understanding of the role of airports in air traffic management and who, like the authors, puts confidence in the power of well-chosen statistics to complement operational expertise.

The Airports Council International (ACI) publishes statistics on flights, passengers and cargo at airports. We are grateful for the support and advice of ACI-Europe in preparation of this report and their permission to reproduce their statistics in section 6. For a broader selection of ACI statistics see *www.aci-europe.org.*

Particular thanks go to André Dauzat for his help in preparing the density maps in section 4, but also to his colleagues who keep the PRISME datawarehouse running smoothly. On the STATFOR side, Miguel Rodrigues continues to do an excellent and essential job of herding the data, even when they're at their most unruly.

The views in the document are those of the authors and do not represent an official policy of the EUROCONTROL Agency itself.

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Photo on front cover: Paris, Roissy-Charles de Gaulle airport.

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EUROCONTROL

Foreword

EUROCONTROL, through its Statistics and Forecast Service (STATFOR), provides a range of air traffic forecasts for Europe. These forecasts allow civil aviation authorities, air navigation service providers, airspace users, airports and others in the industry to have a view of the probable future air traffic demand and thereby allow them to better focus and scale the development of their respective businesses in the short-, medium- or long-term.

In developing these traffic forecasts, an in-depth study is made into the state of the industry and of current trends, using EUROCONTROL's unique historical database of flight movements. Until recently, such analyses were not published. This began to change with our study of low-cost carriers. Of course, there have been many interesting studies of the low-cost phenomenon in Europe, but few that addressed air traffic movements ('flights'), which are the primary interest of air traffic control and air traffic management. Our initial study has been followed up with twice-yearly updates of the statistics.

The process of publishing our analyses was formalised with the creation of the *Trends in Air Traffic* series. The first volume of Trends was a ground-breaking study of the rapidly growing business aviation sector, published in May 2006.

Like its predecessors in the *Trends in Air Traffic* series, this new volume aims to provide accessible and informative insights into how the air traffic industry works. It is based largely on data for 2006, but the lessons it contains about airports large and small will not go out of date rapidly. It complements rather than replaces the sorts of regular statistics on airports available from ACI-Europe, EUROCONTROL and elsewhere.

Understanding the 2,000 airports in Europe is a challenge. Often rankings are used to cope with the volume of data. Here we deliberately limit the use of rankings, and instead look systematically at a quarter of airports that accounts for 98% of IFR traffic. This does not answer all that could be asked about airports – later volumes in Trends will come back to the subject. But it gives us a privileged and fascinating view into the many interwoven segments that make up air traffic as a whole, and how air traffic contributes to the social and economic prosperity of Europe.

Conrad Cleasby
Head of Data, Information and Analysis Division
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Summary

The 170,000 links of the European air traffic network stand on a foundation layer of 2,000 airports. So understanding the variety of airports in Europe, their distribution, their traffic patterns, their aircraft mix, their strengths and their weaknesses is essential to understanding the strengths of the air traffic network as a whole. This third volume of Trends in Air Traffic aims to contribute to that understanding of airports.

With 2,000 airports to look at, it is easy to get lost in averages, totals and top tens. Of course, the largest airports are important - the top 35 generate 50% of all flights – so these aggregated or high-level views do help. However, as the first volume of Trends on business aviation - began to show, the 'European air traffic network' is really a collection of many, interwoven networks with an astounding range of density and of sparseness, both in time and geographically. Challenges for air traffic management arise where there is density, but also where different networks interact; and a solution that is appropriate for one network may not be for another.

This is the first look at airports in the Trends series, so this volume cuts a broad slice across airports as a whole. It looks at all airports with more than 1,000 departures a year (about 3/day) and systematically documents their characteristics: the typical and the unusual. In fact, this only covers 25% of airports (528 of them in 2006), but 98% of the traffic.

In summary, the report shows the following:

- The cities closest to Europe's busiest airports have between 4 and 46 airfields within 100km of the city centre. For 8 of the 10 cities close to Europe's biggest airports, a single airport handles 80% or more of all departures within 100km. (**Section 4**)

Summary

- The distribution of flight departures follows that of population and economic activity, except in some isolated regions or tourist destinations where aviation plays a special catalytic role. However, aviation is much more concentrated than either population or GDP: so in a cost-benefit analysis the gains are spread more widely than the pains. (**Section 5**)

- On a World scale, the largest European airports may not be top of the rankings against individual measurements, but they are generalists that rank highly on passengers, flights and on cargo. In that respect they are more like Chicago/O'Hare and Los Angeles than Atlanta, Memphis or Tokyo. (**Section 6**)

- The 528 airports studied have a total of 757 runways. But only 30 airports use three runways or more. (**Section 7**)

- The second-largest airport in a State usually has 10-20% of the market, regardless of the total traffic. (**Section 8**)

- Each of seven market segments (such as business or low-cost) flies to different sizes of airports: from the military and general aviation, operating mostly from airports with 10,000 departures per year or fewer; to the traditional scheduled operators, flying mostly from airports with 80,000 departures per year or more. (**Section 9 and 10**)

- As an airport grows, jets are used more often in place of turboprops and pistons: few airports with more than 50,000 departures have less than 80% jet traffic. For small and medium-sized airports, there is more variability. In particular, there is a group of airports where turboprops are unusually numerous; these airports are mainly coastal or regional, with relatively short-distance connections. (**Section 11**)

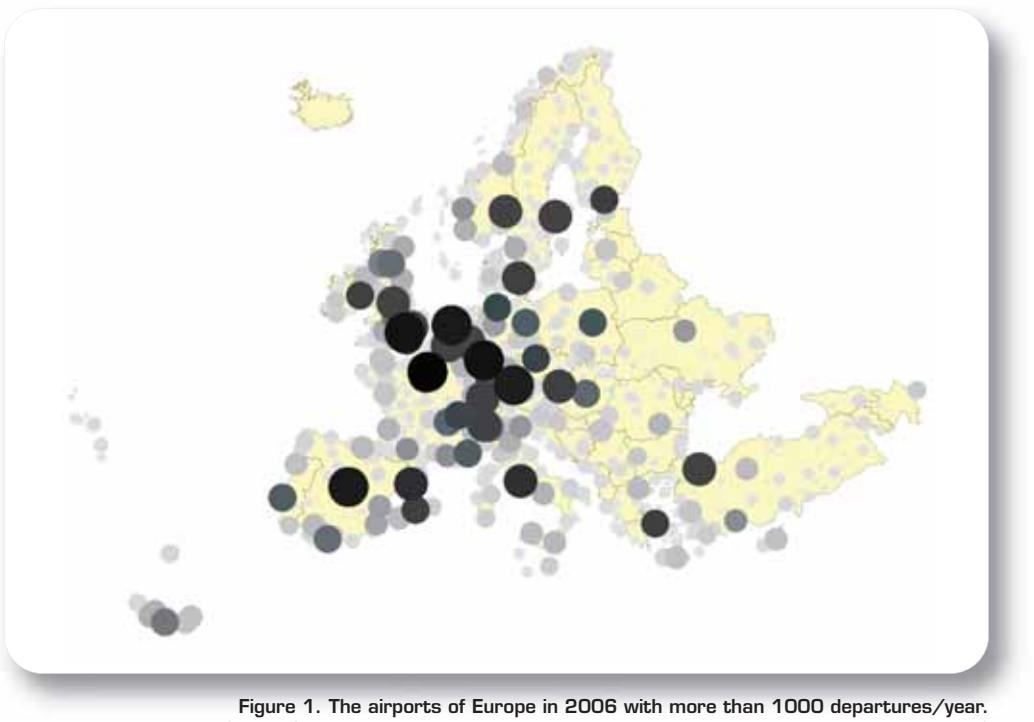

Figure 1. The airports of Europe in 2006 with more than 1000 departures/year.
(Area of circles is exaggerated to make the smallest airports visible. Iceland: No Data)

- Medium wake-turbulence category aircraft dominate the European fleet (55%) and even more so, the flights (86%). As airports grow past 50,000 departures the proportion of heavy aircraft increases to around 20%. There are around 30 smaller airports which still have 10%+ heavy aircraft. These tend to be cargo specialists, or military. But aircraft over 220 seats are rare at any but the largest six airports. (**Section 12 and 13**)

- Aside from aerial work and training missions, air traffic is about making connections. But the connections in the network and the main flows of traffic are very different things: most of the departures are from the largest airports; most of the connections are from the medium and smaller airports. (**Sections 14 and 15**)

Summary

- Flown distances are most often around 400km, from medium-sized airports up to even the very largest, showing the importance of the local network as well as the long-haul one. Small airports more commonly have shorter flights still. (**Section 16**)

- Three-quarters of extreme peak days are regular combinations of a weekly busy day and a Summer or Winter peak at the 'hedgehog airports'; the rest are down to one-off events, such as sporting fixtures. (**Section 17 and 18**)

- Small and medium airports have fewer delays but worse when it does occur. (**Section 19**)

- Flow and capacity management data gives only limited information on the current capacity of airports as a whole. (**Section 20**)

There is much more to be said about airports, based on EUROCONTROL's archives of data, than could be squeezed into a single report. We will return in subsequent volumes of *Trends in Air Traffic* to the subject of airports, in particular looking at how airports are changing and at the question of 'secondary' airports.

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1. Why airports?

"*Give me a place to stand, and I can move the Earth*", attributed to Aristotle

The European air traffic network contains some 170,000 links between airports, and every day achieves something equivalent to flying the 2.4 million people of Paris to the Black Sea, as well as supporting a range of other services such as express cargo. That isn't quite moving the Earth, but if air traffic is the lever it is definitely airports which are the fulcrum, the place where the network stands. Understanding the variety of airports in Europe, their distribution, their traffic patterns and their aircraft mix, is essential to understanding the strengths of the air traffic network.

On the ground, there are plans for airport expansions in Europe. However, the challenges of achieving these, especially near the bigger cities, is increasingly making evident the need to make more of the available capacity. This too, requires an understanding of what airports there are, and where they are in relation to demand.

So, this volume of *Trends in Air Traffic* aims to contribute to this understanding by taking a look at European airports as a whole: to identify groups, patterns and characteristics that should help in managing the network. It should thus be complementary to other studies[1], which typically look at the top N airports, or airports of a particular market segment or in a particular region.

There are two basic approaches to understanding how airports develop and grow:

(i) First, take a current-day cross-section through airports of different sizes and characterise the differences between small and larger airports. Here we find plenty such differences, and take this to have implications for how smaller airports will change as they grow.

(ii) Second, follow the development of many individual airports through time to identify patterns of change. Probably many of those patterns will be followed in the future, too.

There is more than enough to say about airports to fill several volumes. So, for this first look at airports we have taken a broad look at a range of topics, but with the emphasis on approach (i). Later volumes of *Trends in Air Traffic* will return to the subject of airports and investigate specific aspects in more detail and will take approach (ii).

- In the first sections we look at the airports as a whole: their distribution, and how the biggest rank on the World scale. (Sections 3 to 7);
- Next we take a look at the traffic quantities and traffic mix (sections 8 to 13);
- Then we look at network connections and distances (sections 14 to 16);
- Finally we look at traffic timing, delays and capacity (sections 17 to 20) before summarising.

The annexes provide supplementary detail to the main sections (A to F and H), a glossary (G) and an index of airports mentioned (I).

[1] For example, *Trends in Air Traffic* Volume 1 looked at Business Aviation airports.

2. Some definitions

In European regulations an "airport" is distinguished from other airfields by being 'open for commercial air transport operations'[2]. For the present study, of airports and their part in the air traffic network as a whole, this definition is too restrictive for example by excluding military airfields. We will use 'airport' in a looser sense, meaning the origin or destination of any 'IFR' flight (see next paragraph). This will include large international airports, regional airports, military airfields, heliports as well as smaller airfields which might or might not have paved runways.

The flights described in this report are all flights operating under 'instrument flight rules' ('IFR'), i.e. under the control of a (civilian) air traffic controller for some or all of the en route section of the flight. This includes nearly all commercial operations, and some military and general aviation. See section 9 for details of the market segments.

Statistics on flights under the alternative 'visual flight rules' (VFR) are difficult to obtain on a uniform basis across Europe. Some airports, especially those involved in training, generate a large number of VFR flights which are not included in this analysis. The restriction to IFR is not a significant limitation for our analysis, which is oriented towards the European air traffic network, but could be significant for studies of individual airports or of local airspace. National regulators often publish statistics for airports including VFR, and you will find links to many such websites at *www.eurocontrol.int/statfor*.

As an air traffic management organisation, our data are about flights. Therefore in this report, we consider only airside operations at airports. Issues such as passenger terminals, retail space or ground transportation infrastructure are outside the scope of the study.

In 2006 we have statistics for about 2100 airports in Europe. These have been grouped into classes, from the 231 airports that had just 1 recorded IFR departure in 2006, to 6 airports with 200,000 or more departures. These classes are summarised in Figure 2.

For this study, we wanted to cover a wide range of airport sizes, in order better to understand the role of airports in the European air traffic network. To achieve this, without being distracted by essentially random variation at tiny airports, we chose to include only airports with 1,000 or more annual IFR departures. Figure 2 shows that these 528 airports accounted for just 25% of airports, but 98% of the departures.

[2] See for example: Regulation (EC) No 437/2003 of the European Parliament and of the Council of 27 February 2003 on statistical returns in respect of the carriage of passengers, freight and mail by air.

Airport Class (2006 IFR departures)	Total IFR Departures in 2006 for this Class (Thousands)	Number of Airports in this Class	Ranks	Included the Analysis	Group
1	0.2	231		No	
2-4	1	235		No	
5-9	1	149		No	
10-19	2	152		No	
20-49	6	183		No	
50-99	10	134		No	
100-199	20	137		No	
200-499	62	191		No	
500-1k	105	147		No	
1k-2k	170	120	409-528	Yes	Very Small
2k-5k	522	163	246-408	Yes	Very Small
5k-10k	607	86	160-245	Yes	Small
10k-20k	862	60	100-159	Yes	Small
20k-50k	1652	56	44-99	Yes	Medium
50k-100k	1581	22	22-43	Yes	Large
100k-200k	1862	15	7-21	Yes	Large
200k-500k	1395	6	1-6	Yes	Very Large
		Total: 2087			

Figure 2. Airport classes

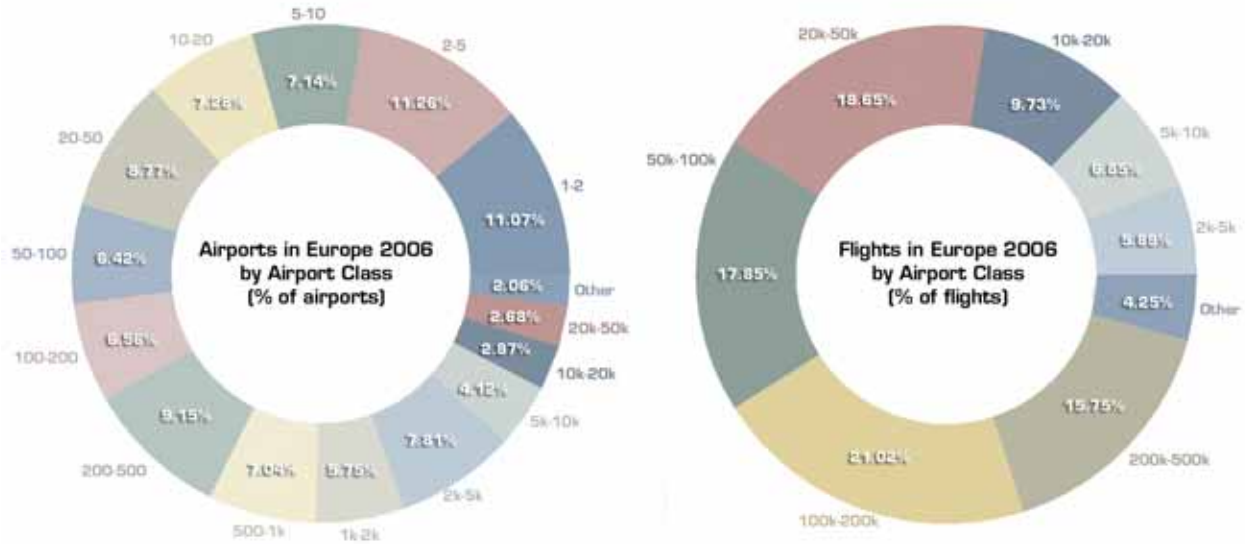

Figure 3. The 20-50,000 flight/year class includes 3% of airports but has 19% of departures.

3. A concentration of traffic

Just 25 out of Europe's 2100 airports generate 44% of all flights.

For all airports in Europe, Figure 4 shows the number of departures by rank of airport (inset). The figure also zooms in on the largest airports (main part) to illustrate that, for example, 44% of all departures come from the 25 largest airports in Europe, two-thirds of departures from the top 75 and 90% of all traffic comes from the largest 250 airports.

Figure 5 illustrates where the airports are located: larger and darker dots indicate airports with more traffic. There is a geographical concentration of airports in the region London-Amsterdam-Munich-Milan. This creates dense air traffic (Figure 6), with large numbers of climbing and descending aircraft: a significant challenge for air traffic management. Section 5 compares this density to population and the economy.

For more details on the largest airports in 2006 see annex A. The remaining airports may be small, but they still have an important role to play in particular markets – geographically or functionally - as the remainder of this report will demonstrate.

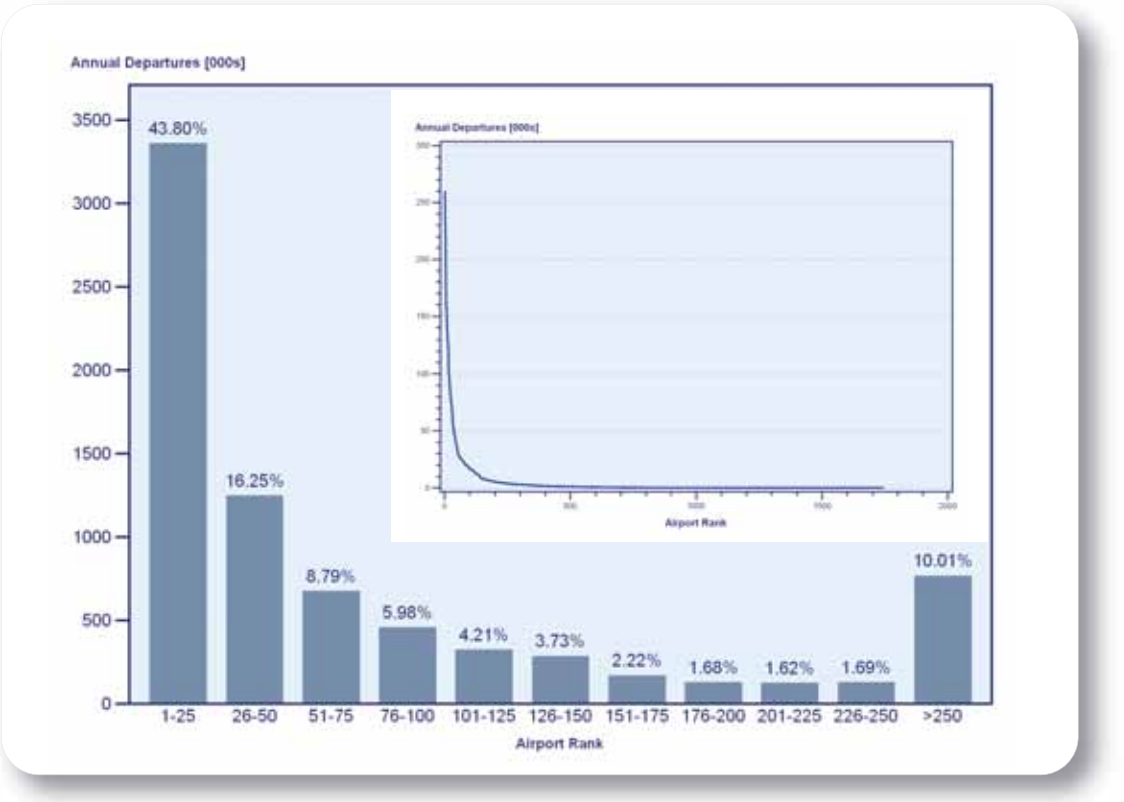

Figure 4. 90% of departures come from the largest 250 airports

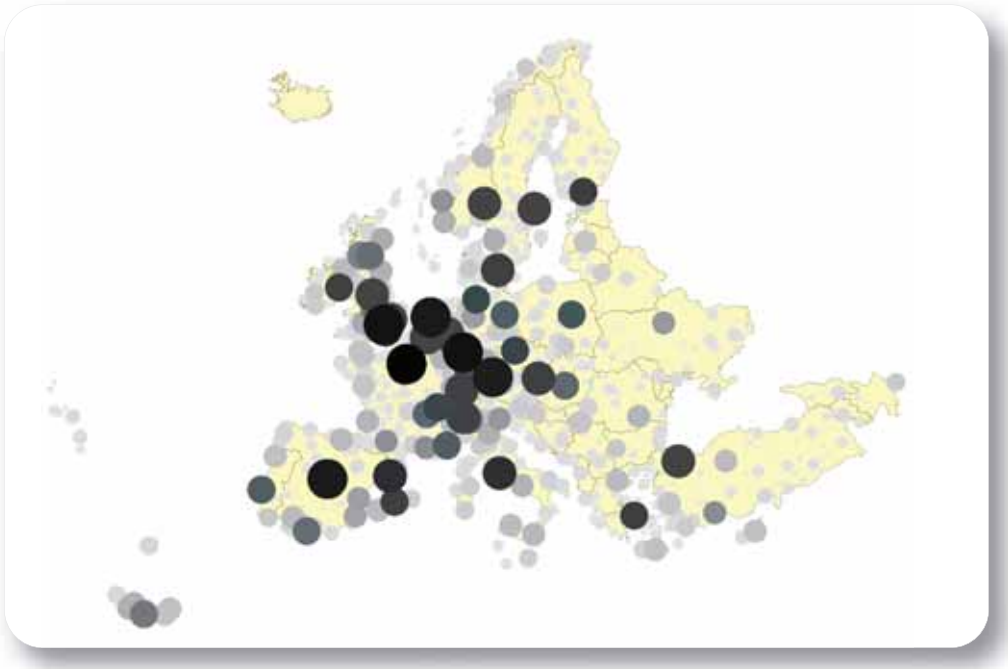

Figure 5. The airports of Europe in 2006 with more than 1000 departures/year. (Area of circles is exaggerated to make the smallest airports visible. Iceland: No Data)

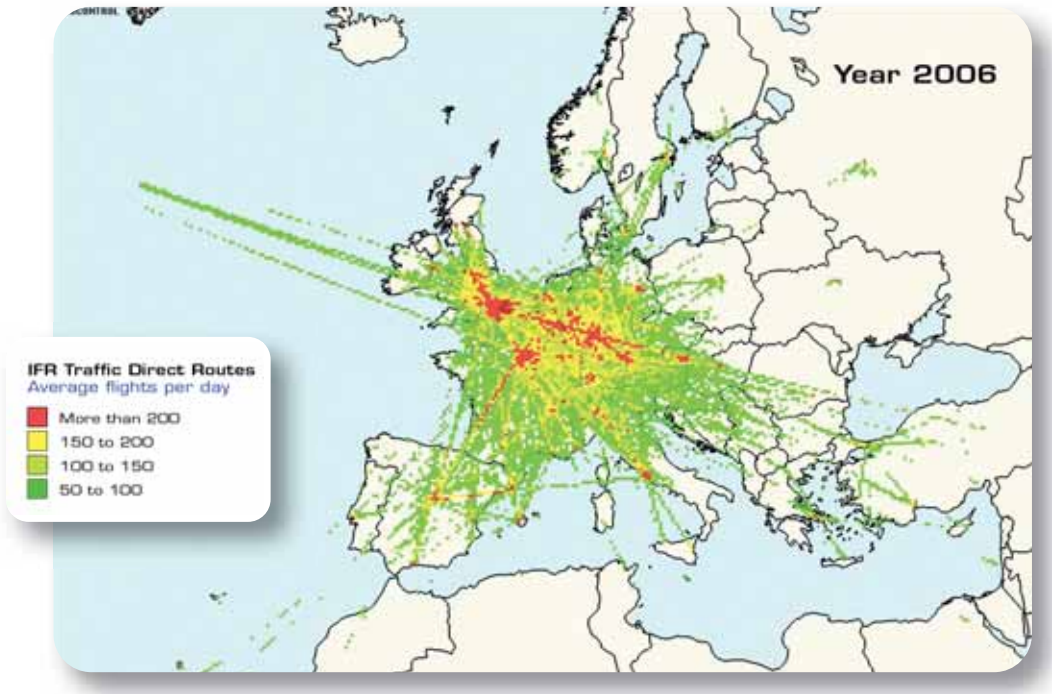

Figure 6. Traffic density in the airspace above Europe mirrors the concentration of major airports.

4. Close to the city

The cities closest to Europe's busiest airports have between 4 and 46 airfields within 100km of the city centre. For 8 of the 10 cities close to Europe's biggest airports, a single airport handles 80% or more of all departures within 100km.

Figure 7 looks at the ten cities which correspond to the 11 busiest airports in Europe in terms of IFR flights (Annex A lists these airports). London has the most airfields nearby: 46 within 100km. Barcelona has the fewest, only 4. These counts include heliports and oil rigs (of which Amsterdam has several nearby), because they too generate IFR flights.

The typical distance of these airports from the city centre (weighted by the number of flights) is 14-24km. Munich is an extreme case with a distance of 32.5km for the main airport. London flights typically depart 34km from the centre, but this is because London has several significant airports further out than the biggest.

City	Number of Airfields within 100km of City Centre	Distance from City Centre (weighted average) km	Total Departures (k)
Amsterdam	31	16.2	244
Barcelona	4	19.3	185
Copenhagen	21	16.3	155
Frankfurt	33	13.8	258
London	46	33.9	603
Madrid	8	13.8	233
Munich	28	32.5	224
Paris	28	20.8	441
Rome	9	21.1	196
Vienna	13	23.5	145

Figure 7. Airports and airfields of the busiest 10 European cities.

Figure 8 shows the same information, but plots the total amount of departures at each distance from the city centre. Each point marked corresponds to an airport or airfield, and it is clear that many of the airports have very few departures. Indeed for 8 of the 10 cities, one airport has 80% or more of the departures within 100km. The exceptions are Paris and London for which the shares are 62% and 40% respectively for Charles de Gaulle and Heathrow.

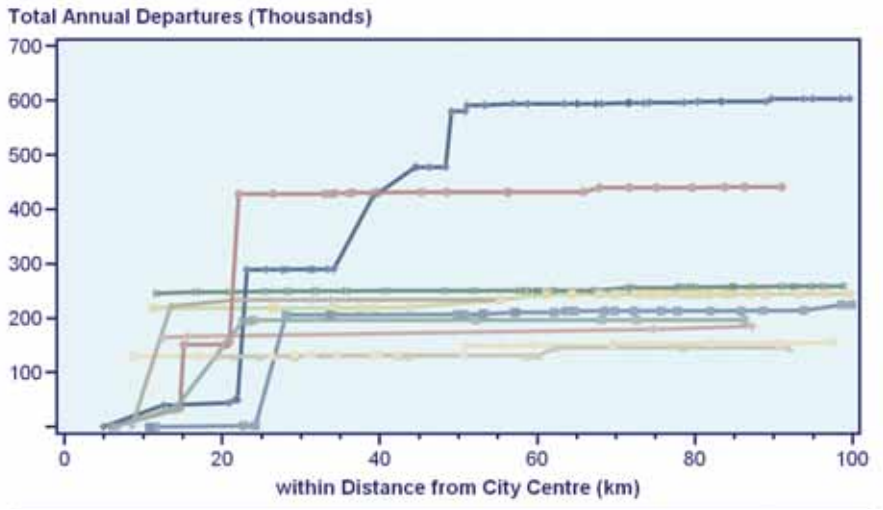

Figure 8. Most departures for the busy cities are 14-24km from the city centre.

Figure 9. The next large city/airport may be 150-200km away. Frankfurt has the most flight departures within 300km of the city centre: 1.2Million in 2006.

London has total departures of 603,000 in 2006, the largest number of departures from all airports within 100km of any of the 10 cities. Paris has 441,000 in total, and the remaining 8 have around 150,000 to 250,000 departures.

According to our placement of the city centre, Frankfurt/Hahn is 102km from Frankfurt, Southampton 105km from London. They appear in the wider-range graph Figure 9, which shows how few of the 10 large cities have large airports 50-150km away. Beyond 150km, the conurbations of Northern Europe begin to overlap, with Köln/Bonn airport 138km from Frankfurt, Brussels International 160km from Amsterdam, etc. But in the South, city separations are wider: Madrid may have the 4th or 5th largest airport 13km from the city centre, but the next airport with more than 100 departures/day is 290km away, at Valencia.

5. People, money and flights

The geographical distribution of flight departures follows that of population and economic activity, except in some isolated or tourist regions where aviation plays a special catalytic role. However, aviation is much more concentrated than either population or GDP.

To compare population, economic activity (measured by gross domestic product (GDP)) and air traffic, we have plotted three density maps. The key step to allow comparison is to use a scale that shows them all in more or less the same way: the 'half-log10 scale' where each gradation is obtained by dividing the previous one by 2 (or 2.5, to keep the values tidy). More concentrated distributions have a few dark regions and many in the lightest colours.

Of the three, population has the flattest distribution, though the cities still stand out on Figure 10. It is also noticeable that there are large regions of Eastern Europe where the population density is significantly higher than that of central France or Spain.

Economic wealth is more concentrated, in effect accentuating the points of concentration of population. A map in units of local 'purchasing power' rather than euros would have shown a flatter distribution, but since we are largely concerned with international air travel, we chose to use euros.

Of course, flights are concentrated, because they use airports, but what is remarkable in Figure 12 is how few regions have any significant density of flights. Again, the density builds on that of the previous map, except for a few more isolated regions (North Norway, Scottish islands) or tourist destinations (Aegean islands, Turkish Mediterranean coast) where aviation plays a special catalytic role in the economy. This disproportionate density of flights means that in a cost-benefit analysis the gains are spread more widely than the pains.

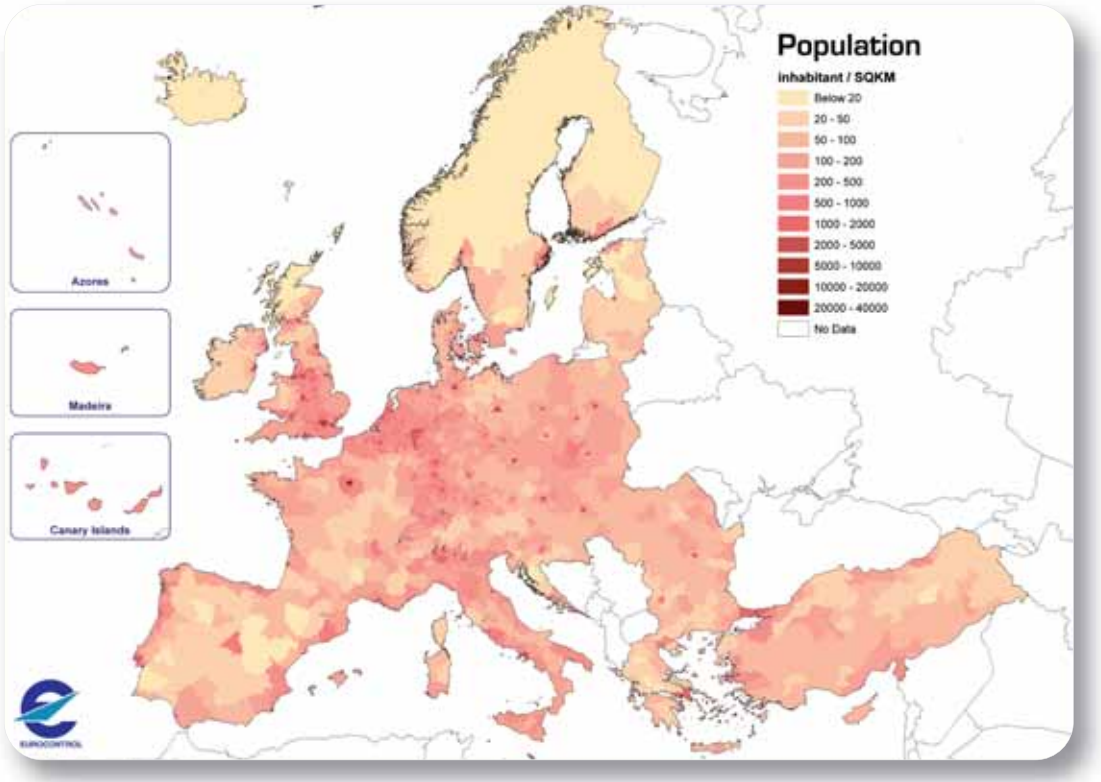

Figure 10. Population has the flattest distribution of the three. (Data source: Eurostat.)

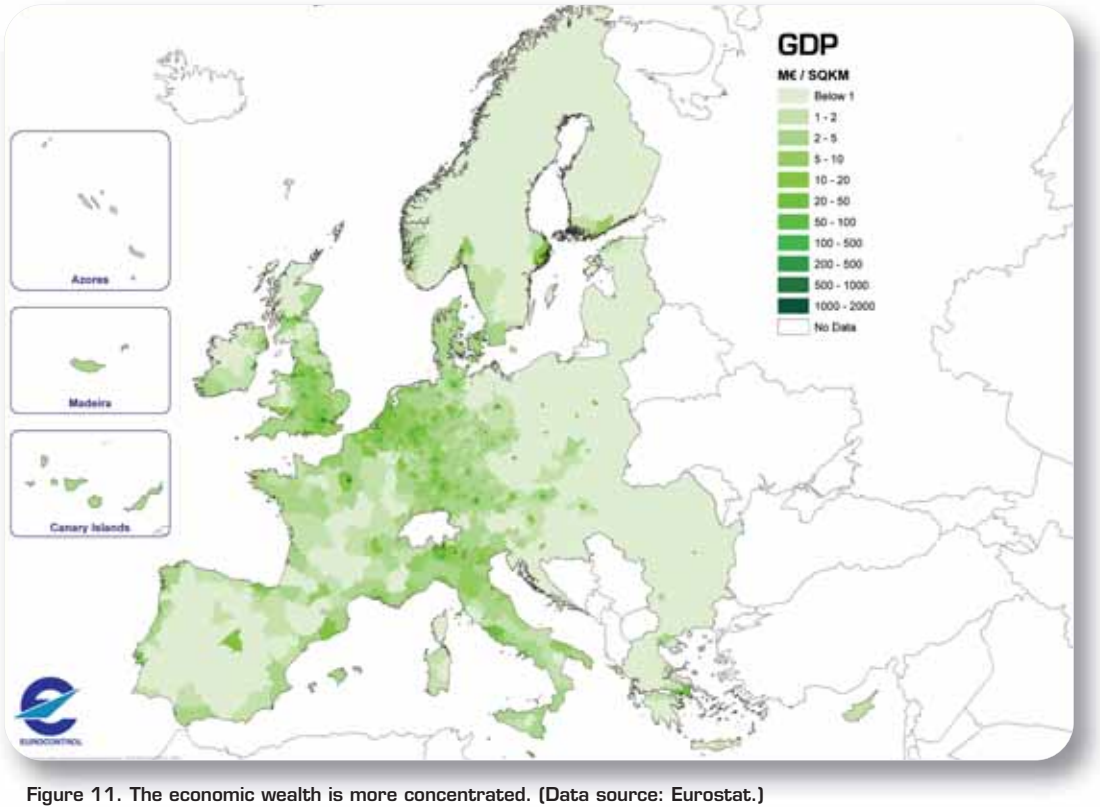

Figure 11. The economic wealth is more concentrated. (Data source: Eurostat.)

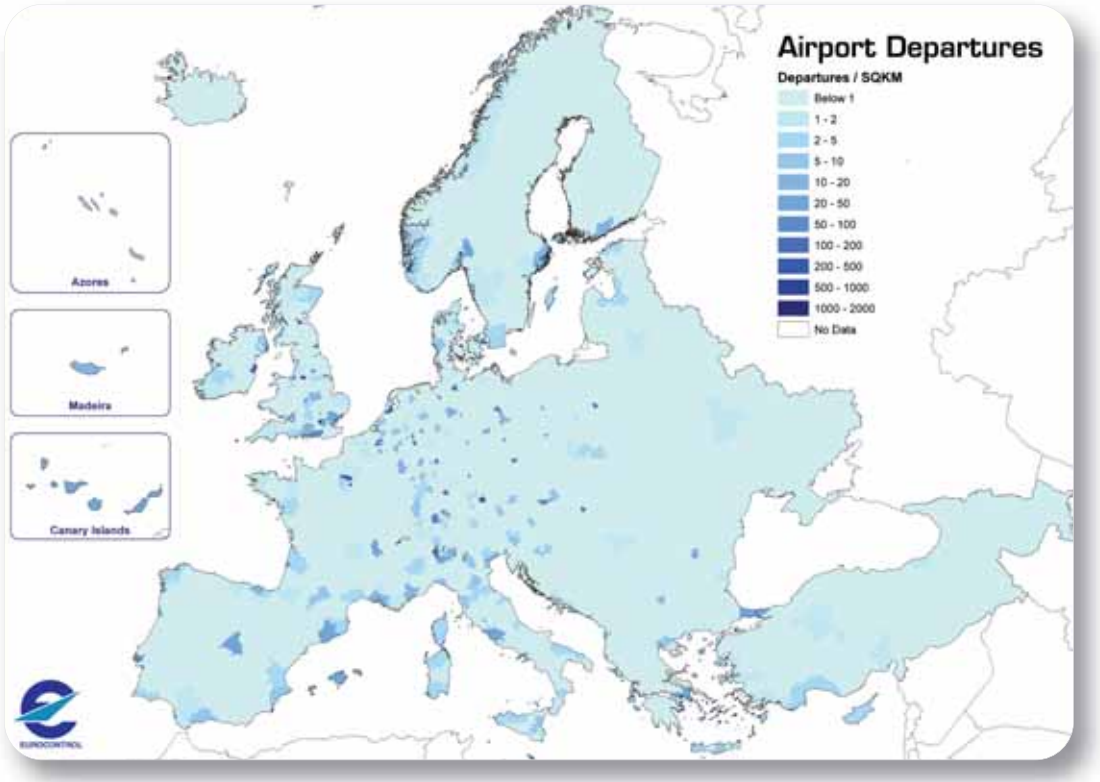

Figure 12. And the flights even more concentrated still, mostly where the wealth is. (Data source: EUROCONTROL.)

6. The largest European airports are generalists

The largest European airports are smaller than the largest US airports in terms of total flights and passengers and smaller than both US and Asian airports in terms of total cargo. However, top European airports are unusual in ranking highly in terms of flights, passengers and cargo; they are 'generalists'.

To see European airports on the World scale, we use data provided by Airports Council International Europe (ACI). ACI produce statistics for major airports in terms of flight movements, passengers and freight.

- Flight movements: The top 10 airports are all in the United States of America (Figure 13). Four European airports (Paris/Charles de Gaulle, Frankfurt/Main, London/Heathrow and Amsterdam/Schiphol) appear in the second 10. Atlanta International is nearly double the size of Paris/Charles de Gaulle.

- Passenger numbers: In terms of passengers, European airports are larger on a World scale, with 4 in the top 10, the same as the USA (Figure 14), London/Heathrow, Paris/Charles de Gaulle, Frankfurt/Main and Amsterdam/Schiphol. London/Heathrow is in third position and with its 68 millions passengers is only 21% smaller than Atlanta International.

- Cargo: The list of top cargo airports is rather different from the first two. However, four European airports (Paris/Charles de Gaulle, Frankfurt/Main, London/Heathrow and Amsterdam/Schiphol) still appear in the top 20 World airports (Figure 15). Paris/Charles de Gaulle and Frankfurt/Main ranking 6th and 7th have around 55% of the cargo traffic of the busiest, Memphis International.

The differences between Figure 13, Figure 14 and Figure 15 illustrate the differing operations at major airports: freight hubs such as Memphis; the large passenger aircraft of Tokyo; the many smaller aircraft at Philadelphia. Only six airports appear in all 3 tables, the 'generalist' airports with a mix of aircraft sizes, and significant cargo throughput. Four of these six airports are in Europe, only two are in the USA: Chicago/O'Hare and Los Angeles.

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Rank	ICAO Code	Airport	Total Movements (k)	% Change
1	KATL	ATLANTA INTL/HARTSFIELD	980	1.6
2	KORD	CHICAGO O HARE INTL	972	-2.0
3	KDFW	DALLAS/FORT WORTH	712	-11.6
4	KLAX	LOS ANGELES	651	-0.7
5	KLAS	LAS VEGAS/MCCARRAN INTL, NV.	605	11.1
6	KIAH	HOUSTON INTL/TEXAS	563	8.8
7	KDEN	DENVER INTERNATIONAL	561	0.1
8	KPHX	PHOENIX INTL/ARIZONA	555	1.5
9	KPHL	PHILADELPHIA	536	10.2
10	KMSP	MINNEAPOLIS	532	-1.6
11	LFPG	PARIS CH DE GAULLE	523	-0.6
12	KDTW	DETROIT/METROPOL WAY	522	-0.1
13	KCLT	CHARLOTTE MUN./N.C.	522	11.4
14	KIAD	WASHINGTON	509	8.5
15	KCVG	CINCINNATI/NTH KENTU	496	-4.1
16	EDDF	FRANKFURT MAIN	490	2.7
17	EGLL	LONDON/HEATHROW	478	0.4
18	KSLC	SALT LAKE CITY/INTER	455	10.6
19	KEWR	NEWARK	437	-0.4
20	EHAM	SCHIPHOL AMSTERDAM	421	0.5

Figure 13. In terms of total movements, airports in the USA are the busiest in the World. (Source: ACI 2005)

Rank	ICAO Code	Airport	Total Passengers (millions)	% Change
1	KATL	ATLANTA INTL/HARTSFIELD	86	2.8
2	KORD	CHICAGO O HARE INTL	77	1.3
3	EGLL	LONDON/HEATHROW	68	0.8
4	RJTT	TOKYO	63	1.6
5	KLAX	LOS ANGELES	61	1.3
6	KDFW	DALLAS/FORT WORTH	59	-0.4
7	LFPG	PARIS CH DE GAULLE	54	5.0
8	EDDF	FRANKFURT MAIN	52	2.2
9	EHAM	SCHIPHOL AMSTERDAM	44	3.8
10	KLAS	LAS VEGAS/MCCARRAN INTL, NV.	44	6.0
11	KDEN	DENVER INTERNATIONAL	43	2.6
12	LEMD	MADRID BARAJAS	42	8.4
13	KJFK	NEW YORK	42	8.9
14	KPHX	PHOENIX INTL/ARIZONA	41	4.3
15	ZBAA	BEIJING	41	17.5
16	VHHH	HONG KONG INTL	40	9.7
17	KIAH	HOUSTON INTL/TEXAS	40	8.7
18	VTBS	BANGKOK/SUVARNABHUMI INTL AIRPORT	39	2.7
19	KMSP	MINNEAPOLIS	38	2.4
20	KDTW	DETROIT/METROPOL WAY	36	3.2

Figure 14. Airports in the USA also appear most frequently among top 20 largest World airports in terms of total passengers. (Source: ACI 2005)

Rank	ICAO Code	Airport	Total Cargo (metric tonnes)	% Change
1	KMEM	MEMPHIS/TENNESSEE	3 598 500	1.2
2	VHHH	HONG KONG INTL	3 433 349	9.9
3	PANC	ANCHORAGE	2 553 937	13.4
4	RJAA	NEW TOKYO	2 291 073	-3.5
5	RKSI	SEOUL	2 150 140	0.8
6	LFPG	PARIS CH DE GAULLE	2 010 361	7.2
7	EDDF	FRANKFURT MAIN	1 962 927	6.7
8	KLAX	LOS ANGELES	1 938 430	1.3
9	ZSPD	SHANGHAI	1 856 655	13.1
10	WSSS	SINGAPORE/CHANGI	1 854 610	3.3
11	KSDF	LOUISVILLE/STANDIFORD	1 815 155	4.3
12	KMIA	MIAMI INTL/FLORIDA	1 754 633	-1.4
13	RCTP	TAIPEI/SUNGSHAN	1 705 318	0.3
14	KJFK	NEW YORK	1 660 717	-2.6
15	KORD	CHICAGO O HARE INTL	1 546 153	4.8
16	EHAM	SCHIPHOL AMSTERDAM	1 495 919	2.0
17	EGLL	LONDON/HEATHROW	1 389 589	-1.6
18	OMDB	DUBAI	1 314 906	12.5
19	VTBS	BANGKOK/SUVARNABHUMI INTL AIRPORT	1 140 836	7.8
20	KIND	INDIANAPOLIS	985 457	5.7

Figure 15. Asian airports appear most frequently among top 10 World airports in terms of total cargo. (Source: ACI 2005)

7. There's a lot of tarmac

The 528 airports have 757 runways between them, of which only 6% are grass or gravel. Thirty airports have three runways or more.

One way to get a sense of the size of the airports being considered is to look at the number of runways that they have. Figure 16 summarises, for each of the 528 airports, the number of known runways. The runway data was drawn from the US National Geospatial-Intelligence Agency database (October 2006) supplemented and updated by STATFOR to complete the coverage of these airports. Details by State are given in Annex C.

There are a few airports in Figure 16 with 0 runways. These are either heliports and oil platforms, or they are airports – such as Brussels/International and Brussels/Melsbroek – which share runways. A runway is counted only once in these statistics, but the two Brussels airports are counted separately throughout the report.

Not all of the runways listed are in frequent use, for example London/Gatwick is a two-runway airport, although its second runway is less well-equipped and typically only used during maintenance. In other cases, runways may be listed, but have fallen out of use because their configuration is not suited to current traffic needs. Figure 17 shows the same data as Figure 16, except that unused runways have been removed from the counts as far as is known. Figure 17 shows that from very small up to medium size, most airports (70%) use one runway and about 30% use two. The switchover is for the large airports, of which the majority use three runways. The six very large airports use between 2 and 6 runways.

Figure 18 shows that the number of grass or gravel runways is only 6% of the total or 757. Even for the smaller airports in the study they make up only 10% of the known runways. In total the runways are 1,700km long, enough to stretch from Istanbul to Milan.

Airports using three runways are quite rare: there are only 30 in the dataset. These are shown in Figure 19, with bold text used to indicate airports with more than 10,000 departures/year.

Number of Airports	Number of Known Runways at the Airport							
	0	1	2	3	4	5	6	All
Airport Annual IFR Departures								
1k-2k	7	86	22	5	.	.	.	120
2k-5k	2	114	40	5	1	1	.	163
5k-10k	.	63	20	3	.	.	.	86
10k-20k	.	40	18	1	.	1	.	60
20k-50k	.	33	18	4	1	.	.	56
50k-100k	.	3	14	5	.	.	.	22
100k-200k	.	1	6	8	.	.	.	15
200k-500k	.	.	2	1	2	.	1	6
All	9	340	140	32	4	2	1	528

Figure 16. Airports by size and number of known runways.

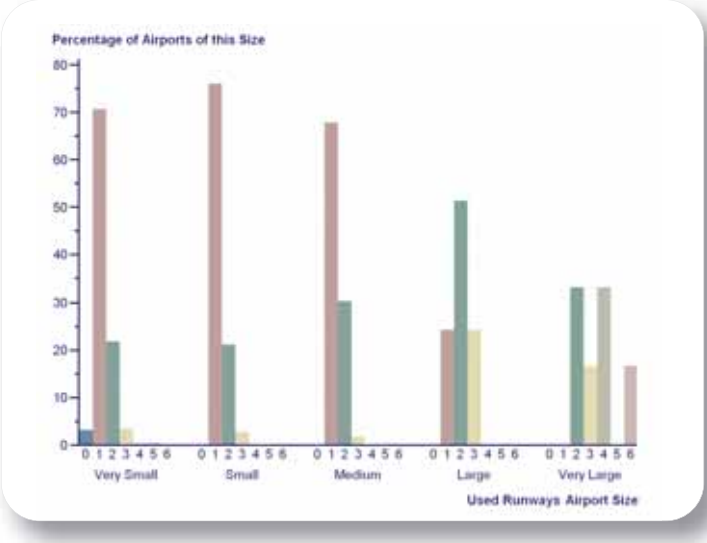

Figure 17. Most small-to-medium airports use one runway.

Number of Runways	Runway Surface		
	Grass or Gravel	Other	All
Airport Annual IFR Departures			
1k-2k	13	139	152
2k-5k	20	200	220
5k-10k	10	102	112
10k-20k	3	81	84
20k-50k	.	85	85
50k-100k	1	45	46
100k-200k	.	37	37
200k-500k	.	21	21
All	47	710	757

Figure 18. Grass and gravel runways make up only 6% of the total.

Figure 19. Airports with 3 or more runways in use (larger airports indicated by darker text).

8. Consistently second

The largest airport in a State loses market share as traffic in the State grows. Second-largest airports, however, commonly achieve 10-20% of the market regardless of the total traffic in the State.

Figure 20 shows for each State[3] the share of the largest and second-largest airport in the State. As might be expected, the share of the largest airport declines as the size of the market increases: for the smallest States (10,000 or fewer departures), the largest airport has 70% of the market, falling erratically to a 20-30% share for the largest States (400,000 or more departures).

Second-largest airports do not clearly show the opposite pattern: there is no gradual increase in their market share as the size of the market increases. Certainly in the smallest States, second airports tend to have less than 15% of the market. But from 20-40,000 departures upwards, there are second airports with around 10-20% of the market, which is the same share as achieved in the largest markets. The only sign of market share growth in Figure 20 is that fewer second airports in large markets have very small shares (< 10%): in markets of around 200,000 departures or more, only the Netherlands, (just under 300,000 departures) has a second airport with much under 10% of the traffic.

Figure 21 shows all of the second-largest airports. Only two have more than 25% of the market, in situations where accidents of geography or history favour development of a large second-place airport: Geneva with 35%, second to Zurich in Switzerland; and Ponta Delgada with 31%, behind Lajes Terceira in the Azores. Two more second-largest airports cross the 20% threshold: Paphos with 23%, second to Larnaca in Cyprus; and Varna with 22%, second to Sofia in Bulgaria.

Annex B summarises all of the airports, by State.

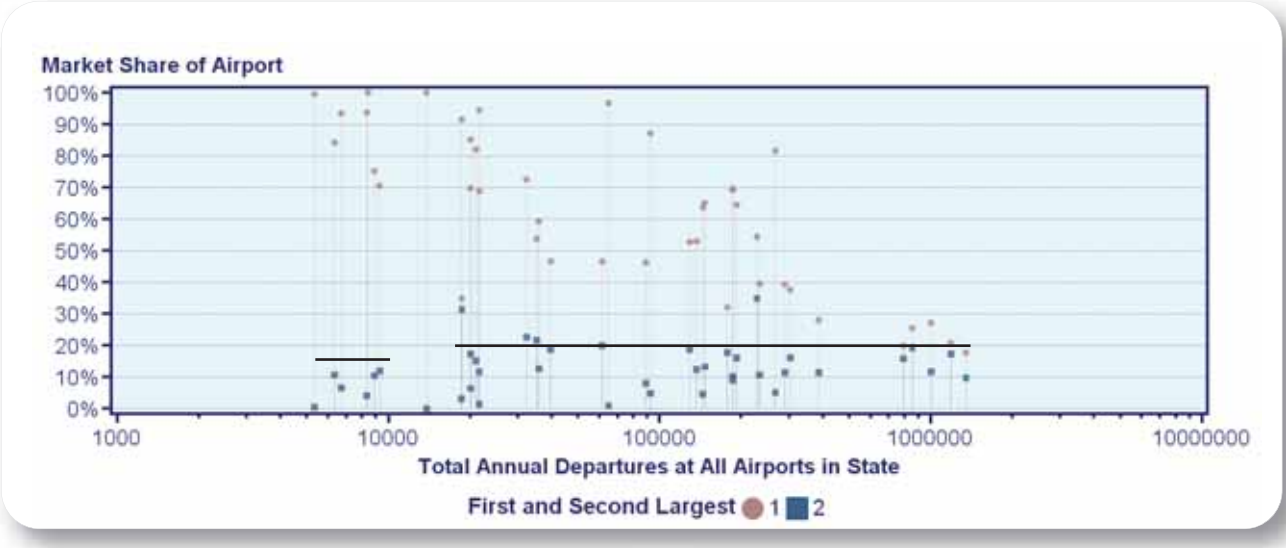

Figure 20. Only two second-largest airports have more than 25% of the traffic: Geneva, and Ponta Delgada in the Azores.

[3] Because of the way the airspace is organised, when referring to 'States', we separate the Azores from Portugal, and Canarias from Spain. Belgium and Luxembourg are treated together, as are Serbia and Montenegro.

Figure 21. Second-largest airports in Europe.
(Darker labels indicate those with 15% or more of their market. None for Albania, Latvia or Malta.)

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9. To each market segment an airport size

Each of seven market segments flies to different sizes of airports: from the military and general aviation, operating mostly from airports with 10,000 departures per year or fewer; to the traditional scheduled operators, flying mostly from airports with 80,000 departures per year or more.

We divide the air traffic market up into seven market segments: traditional and low-cost scheduled flights; non-scheduled; business aviation; military; all-cargo carriers; and others (see annex G for definitions). Figure 22 shows the numbers of flights in each segment in 2006: traditional scheduled and low-cost scheduled were the largest segments in terms of numbers of flights.

Figure 23 divides up the traffic shown in Figure 22 by airport size. Figure 24 shows the same data, but as a cumulative percentage of the segment, by overall airport size. These two figures show that each market segment has its own pattern:

- Military traffic flies from the smallest airports: half of military flights depart from airports with under 5k departures/year and nearly 75% from airports with fewer than 10k departures/ year.
- "Other" flights (typically non-commercial general aviation) also operate mostly from small airports: 75% of departures are from airports with 25k or fewer departures/year.
- Business aviation flies from a wide range of small airports: half of business departures from 20k or smaller airports, but you need to include airports up to about 60k/year to see 75% of the flights.
- Non-scheduled commercial (typically 'charter') are similar, but ranging to even larger airports. Figure 23 shows the most common airport size is 20k-50k departures/year for charter.
- All-cargo flights also most commonly depart from the 20k-50k airports, but also use the largest airports.
- Low-cost departures are most often from airports in the 50k-100k bracket, but the airport sizes to either side are also quite common, and half of low-cost departures are from airports with under 60k departures/year.
- Traditional scheduled flights depart most often from the 100k-200k airports, but airports from 20k-500k are also commonly used.

Annex H gives details of the busiest airports per market segment.

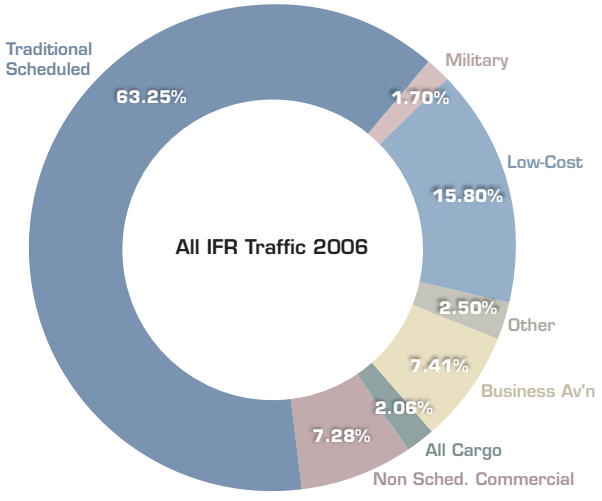


Figure 22. Scheduled (traditional and low-cost) are the largest segments of traffic in Europe.

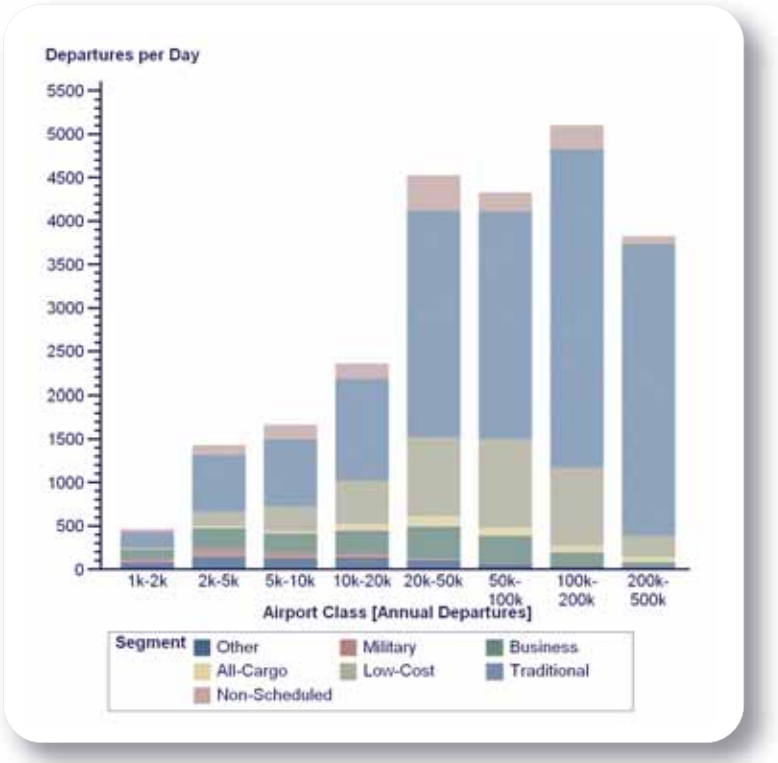


Figure 23. Traffic by market segment and airport size.

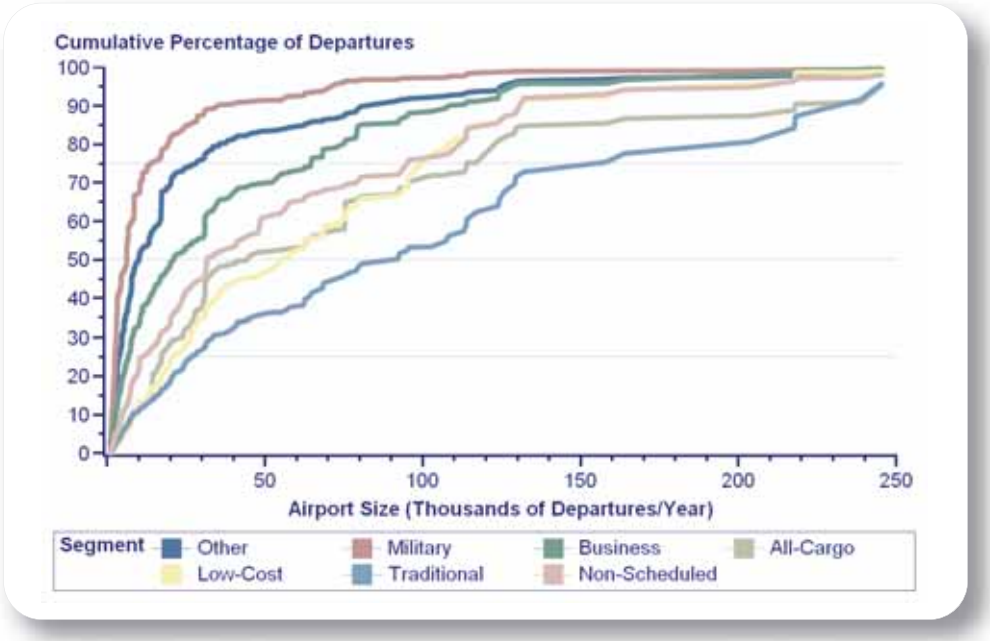


Figure 24. Each market segment specialises in a particular airport size.

10. Many mixed airports

Even if different market segments favour different airport sizes (section 9), there is a lot of overlap. 30% of airports have two substantial market segments, with low-cost/traditional scheduled being most often combined, followed by business and general aviation.

The statistics from ACI (section 6) show that the largest airports in Europe are generalist: operating a mix of freight and passenger services at moderate aircraft size. Using the market segments introduced in the last section, is the same true for other airports?

There are 528 airports in the study. Figure 26 counts these airports by their main market segment, that is the segment which accounts for the largest percentage of flights. It also indicates whether any other market segments account for more than 25% of the flights. So 153 airports have at least 25% of their traffic in each of two different segments, and just five have three main market segments. The most common grouping is traditional-scheduled with low-cost (or vice versa, depending on which is larger), accounting for 41 of these multi-segment airports. These mixed low-cost/traditional airports are shown in Figure 25, and perhaps reflect the continuing blurring of these segments.

The business aviation study[4] has already shown the wide dispersion of business aviation in Europe amongst many smaller airports; the evidence in Figure 23 confirms this. So, even with a market share of 7.4% of total flights (Figure 22), it is not surprising to find 52 (10%) of the airports in the study being principally business airports, and a further 40 where business aviation is more than 25% of departures. By contrast, all-cargo flights account for around 2% of total traffic, but are a major part of traffic at only 3 airports (0.6%). This small number of cargo-specialist airports arises because, as seen in section 9, the relatively small number of all-cargo departures typically fly from larger airports.

Figure 25. Most of the mixed low-cost/traditional airports are in the UK. (Darker labels indicate busier airports.)

[4] *Getting to the Point: Business Aviation in Europe*, EUROCONTROL *Trends in Air Traffic*, Volume 1, May 2006.

	Single Segment	Multi Segment	Total
All-Cargo alone	2	.	2
Business alone	24	.	24
Business with Low-Cost	.	1	1
Business with Military	.	4	4
Business with Non-Scheduled	.	1	1
Business with Other	.	10	10
Business with Traditional	.	11	11
Business with Traditional & Other	.	1	1
Low-Cost alone	34	.	34
Low-Cost with Business	.	5	5
Low-Cost with Non-Scheduled	.	2	2
Low-Cost with Other	.	2	2
Low-Cost with Traditional	.	17	17
Low-Cost with Traditional & Non-Scheduled	.	1	1
Military alone	20	.	20
Military with Business	.	2	2
Military with Traditional	.	3	3
Non-Scheduled alone	7	.	7
Non-Scheduled with Traditional	.	7	7
Non-Scheduled with Traditional & Low-Cost	.	1	1
Other alone	11	.	11
Other with All-Cargo	.	1	1
Other with Business	.	15	15
Other with Non-Scheduled	.	2	2
Other with Traditional	.	3	3
Traditional alone	272	.	272
Traditional with Business	.	16	16
Traditional with Business & Low-Cost	.	1	1
Traditional with Low-Cost	.	24	24
Traditional with Low-Cost & Business	.	1	1
Traditional with Military	.	2	2
Traditional with Non-Scheduled	.	16	16
Traditional with Other	.	9	9
Total	370	158	**528**

Figure 26. 30% of the airports studied have two market segments each accounting for 25% of their flights.

11. Engines evenly divided

As an airport grows, jet engine aircraft are used more often in place of turboprops and pistons: few airports with more than 50,000 departures have less than 80% jet traffic. For small and medium-sized airports, there is more variability. In particular, there is a group of airports where turboprops are relatively common; these airports are mainly coastal or regional, with relatively short-distance connections.

The mix of jet, turboprop and piston aircraft at an airport changes markedly with size. (Here traffic mix is based on the number of flights, rather than the number of individual aircraft visiting the airport.) As an airport grows, jets rapidly become the dominant type (Figure 27). Piston aircraft fly only a small proportion of IFR flights, and there are few airports over 5,000 movements/year with more than 10% of piston aircraft in their traffic mix.

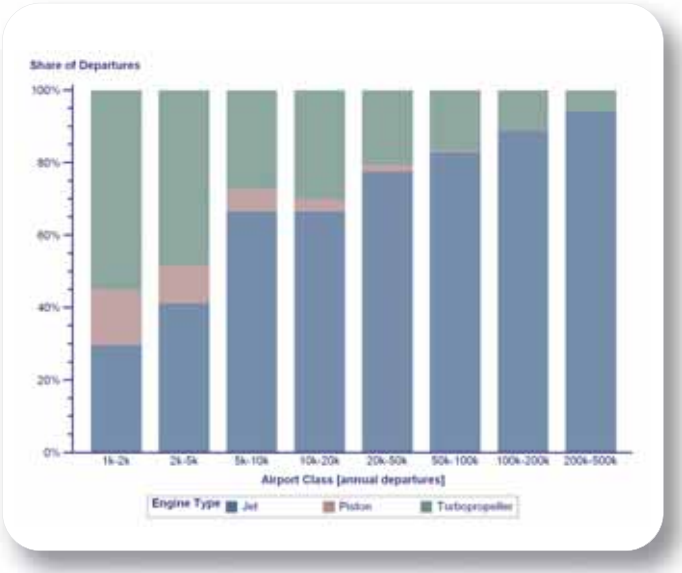


Figure 27. As an airport grows, jets become the dominant engine type, though this conceals some variation between airports.

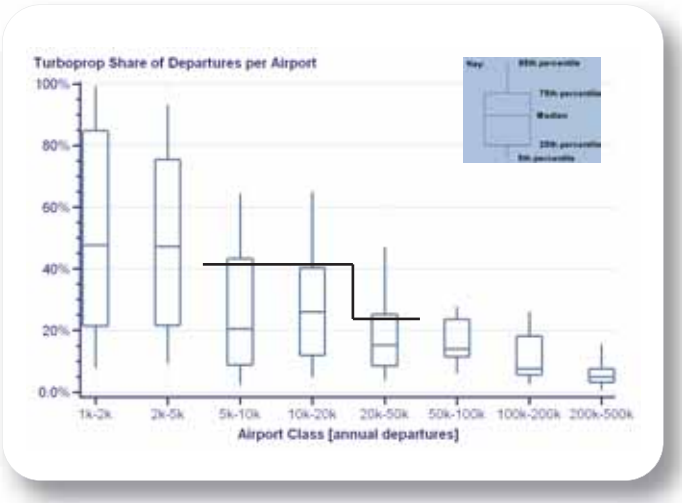


Figure 28. Small (5k-20k) airports with more than 40% turboprops are unusual. Similarly, medium (20k-50k) airports with more than 25% turboprops are unusual.

The very small airports as a whole (1k-5k annual departures) have on average 50% turboprop aircraft in their traffic mix. However, individual airports vary widely: anything between 20% and 80% turboprop is relatively common (Figure 28). For small and medium airports, the variation is much smaller: there are few small airports (5k-20k departures) with more than 40% turboprops and few medium airports (20k-50k) with more than 25% turboprops in their mix. The airports where turboprops are used more often than normal (above the line in Figure 28) have been located on Figure 29. They are mostly coastal, or if inland, clearly regional away from major hubs. As expected, this is also reflected in typical lengths of connections from these airports, which are 40% shorter than the average distance for their airport size. For the large and very large airports (50k+ departures), there are still some airports with 20-25% turboprops, but these are not

Figure 29. There are a number of small and medium-size airports with an unusually high proportion of turboprops. They are principally coastal or regional airports.

regional in the same way; they have typical flown distances the same as the other airports of their size. (Section 16 has more on flown distances.)

Large airports (50k-200k departures) typically have 90% jets in their traffic mix, and indeed, only a quarter have less than 80% jets (Figure 27). For the largest airports, this increases to 94% jets on average, and few with less than 90%.

A final perspective on engine type is shown in Figure 30, which shows how total departures from all European airports were divided amongst engine type and airport size. Jet departures are predominantly from the largest four classes (airports with 20k+ departures), and perhaps surprisingly evenly divided amongst these classes. The remaining airport sizes together account for fewer departures than any one of the large four. Turboprop traffic is predominantly and evenly divided amongst airports in the 2k-5k up to 100k-200k classes.

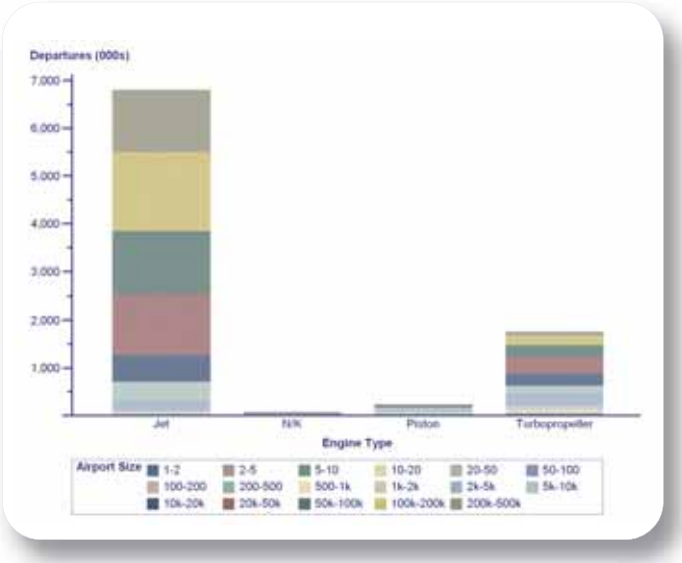


Figure 30. Jet traffic is evenly divided amongst the four largest categories of airport. For turboprop the departures are evenly split amongst airport groups from 2k – 200k departures.

12. Mostly medium

Medium-weight aircraft dominate the European fleet (55%) and even more so, the flights (86%). As airports grow past 50,000 departures the proportion of heavy aircraft increases to around 20%. There are around 30 smaller airports which still have 10%+ heavy aircraft. These tend to be cargo specialists, or military.

The weight of an aircraft is most often categorised in two ways: maximum certified take-off mass (MTOW) which might determine which runways can support it or landing fees; and wake turbulence category (WTC) which determines how far apart aircraft should be on landing, to avoid turbulence generated by the preceding aircraft. There are three WTCs: Heavy (H), Medium (M), Light (L). Some aircraft can be in two classes: we label these Light/Medium (L/M). Helicopters rarely fly with IFR flight plans, but when they do, we identify these as 'vertical' (V).

In Europe, 55% of registered aircraft are in the medium category (Figure 31), but they account for 86% of the departures. Thus the flights per day achieved by medium aircraft are far higher than the other classes. In the case of the heavy, this is because they will tend to be used in longer-haul flights. The light aircraft are being used in businesses which rely less on regular, frequent use each day: eg business aircraft are mostly a mix of light and medium. Helicopters usually fly visual flight rules (VFR) so do not appear in our statistics except for some regular oil-industry flights and a now-discontinued shuttle between Helsinki and Talinn (see Figure 33).

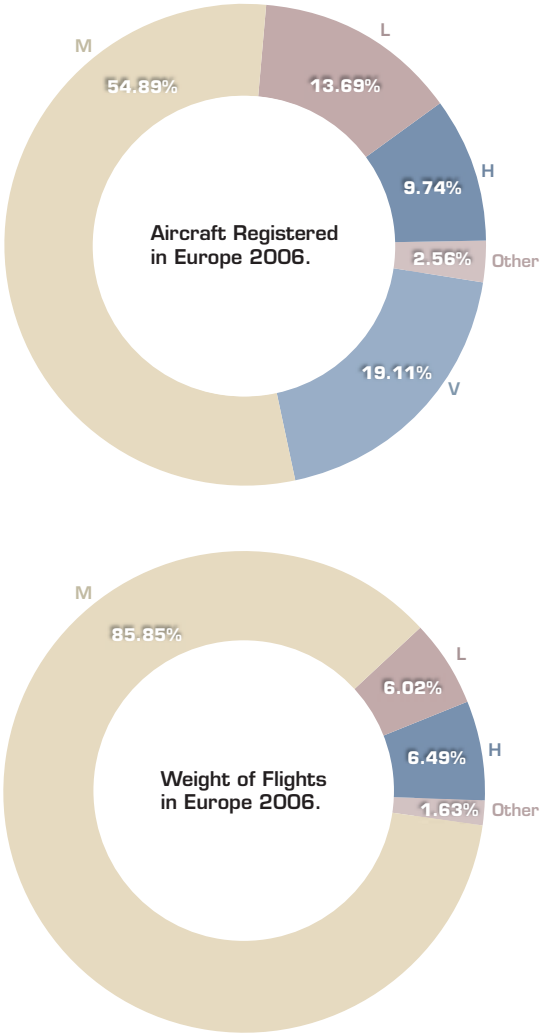


Figure 31. Medium wake turbulence category accounts for 55% of aircraft registered in Europe, but 86% of IFR flights.

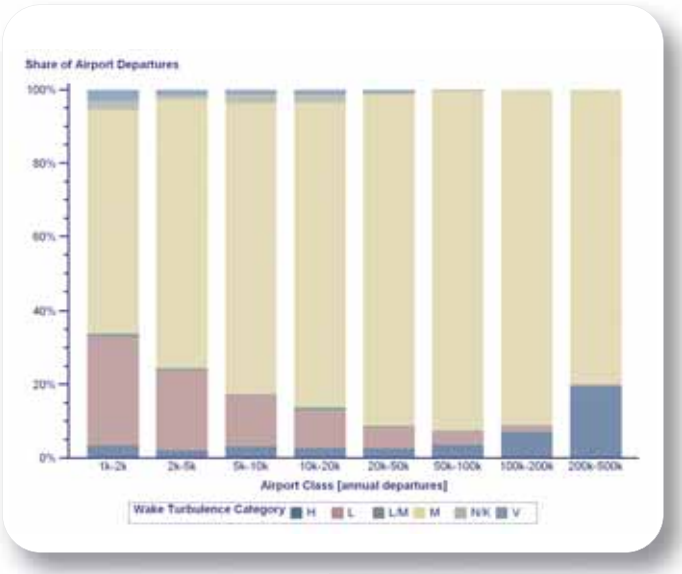


Figure 32. Medium wake turbulence category is most commonly used in Europe among all airport classes.

Figure 32 shows that around 30% of all departures at airports with 1k-2k annual departures are made by aircraft with low WTC, but this rapidly declines to only 1% in the very large airport class (200k to 500k annual departures). Conversely, the largest airports have around 20% heavy aircraft, which declines rapidly to 2-3% in smaller airports. The presence of heavy aircraft in the small airports is perhaps surprising. In fact there are some 30 airports with fewer than 50,000 departures, and more than 10% heavy aircraft. They tend to be cargo-specialists, or military airfields. Figure 33 shows these airports.

Figure 33. Airports with more than 10% helicopters tend to be oil-industry related. Small and medium airports with more than 10% heavy aircraft tend to be military or specialise in cargo.

13. Large aircraft only at the largest airports

Each size of aircraft operates from a typical airport size, except for the 26-40 seaters which operate frequently from both 2k-5k airports, and 20k-50k. Aircraft over 221 seats are rare at any but the largest six airports.

A finer-grained view of aircraft size at airports can be obtained by looking at the number of seats. This doesn't help for cargo aircraft and the data we have are based on typical seat configurations per type even when the types vary widely, but for a network-wide overview the data are quite adequate.

For forecasting purposes, we use 14 classes of aircraft, ranging from 0 seats up to 500 or more. Figure 34 shows what percentage of flights by each class depart from each size of airport. So, for example, 22% of departures by aircraft with 26-40 seats in 2006 were from airports with 2k-5k departures in total. That larger aircraft go with larger airports is clear: 53% of flights by 171-220 seaters departed from airports in the largest two brackets; 55% of flights by 26-40 seaters departed from airports with fewer than 20k departures. (The actual departure counts are shown in Figure 62 in annex D.)

Most aircraft sizes fly from one most-frequent airport size, with a wider or narrower distribution around this. The 26-40 seaters are the odd ones out, flying 22% of the time from both 2k-5k (mostly Dash 8/100 and Saab 34) and 20k-50k airports (many Embraer 135 and Jetstream 41). In fact, the 20k-50k airports have a remarkably uniform share: around 20% of all departures of aircraft from 1-170 seats.

The other way of looking at the same information is the typical size of aircraft at a given airport size. These results are summarised in Figure 35 and shown in full in Figure 63 in annex D. Figure 35 makes clear that it is only for the very small airports (<5k) that the small aircraft are the norm. Already for small airports, class 08 (141-170 seats) is the most common and for larger airports, 07 and 08 are the usual sizes, ie 121-170 seats. The largest aircraft classes (221+ seats) are under 5% of departures for all but the 6 very large airports.

Percent of Flights in this seat class	Airport Size (Annual Departures)								
	1k-2k	2k-5k	5k-10k	10k-20k	20k-50k	50k-100k	100k-200	200k-500k	All
Seat Class									
00: 0 seats	19	24	25	13	11	4	3	1	100
01: 1-14	8	17	15	17	19	14	7	2	100
02: 15-25	6	14	10	16	27	17	8	2	100
03: 26-40	8	22	9	16	22	13	9	3	100
04: 41-65	2	8	8	11	21	18	20	12	100
05: 66-90	1	5	7	11	20	22	19	14	100
06: 91-120	0	3	6	9	20	19	26	17	100
07: 121-140	0	2	4	8	21	22	27	16	100
08: 141-170	0	3	7	9	19	19	25	17	100
09: 171-220	0	2	4	5	16	19	29	24	100
10: 221-270	0	1	2	4	9	14	30	42	100
11: 271-320	1	1	1	4	3	8	22	59	100
12: 321-500	0	1	2	4	7	2	16	67	100
13: 501+	.	.	.	.	.	100	.	.	100
Not Known	11	20	20	23	12	7	4	3	100
All	2	6	7	10	19	18	22	16	100

Figure 34.Where does this aircraft size fly from? (Airports smaller than 1000 departures/year are not included)

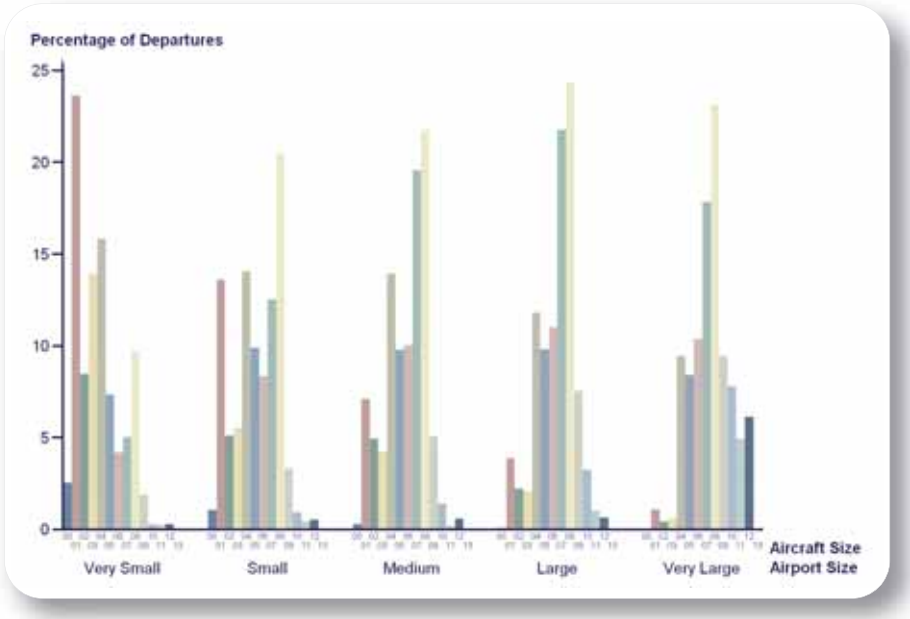


Figure 35. The largest aircraft are rare at all but the six very large airports.

14. A network built on the small to medium

Aside from aerial work and training missions, air traffic is about making connections. But the connections in the network and the main flows of traffic are very different things: most of the departures are from the largest airports; most of the connections are from the medium and smaller airports.

Figure 36 shows, for each size of airport, the number of other airports which were flown to during 2006. For the very large airports, 1400 destinations is typical (with 1000-1500 not unusual). For a medium airport with 10k-50k departures, 600 destinations is typical (with most falling in a 500-800 range). For these counts, a single flight during the year is enough to make a 'destination'. While this is low for scheduled traffic, it is important to count the one-offs in segments such as business aviation where connectivity, not frequency is the key. See section 15 for more on scheduled connectivity.

The result of this difference between flights and connections is shown in Figure 37: the busiest 30 airports account for half of the departures, but you need to include the busiest 150 airports to get half of the connections. Indeed, because there are more medium airports (56 airports with ranks 44-99 in order of number of departures), the medium group as a whole ends up with a larger number of connections. The number of connections is shown in Figure 38 as the size of the circles. The left-hand axis gives the frequency (departures per day), which emphasises that frequencies are very low for most of these connections. The largest circles are for the 20k-50k and the 2k-5k groups of airports, showing how they are the most important groups for the connectivity of the European air network.

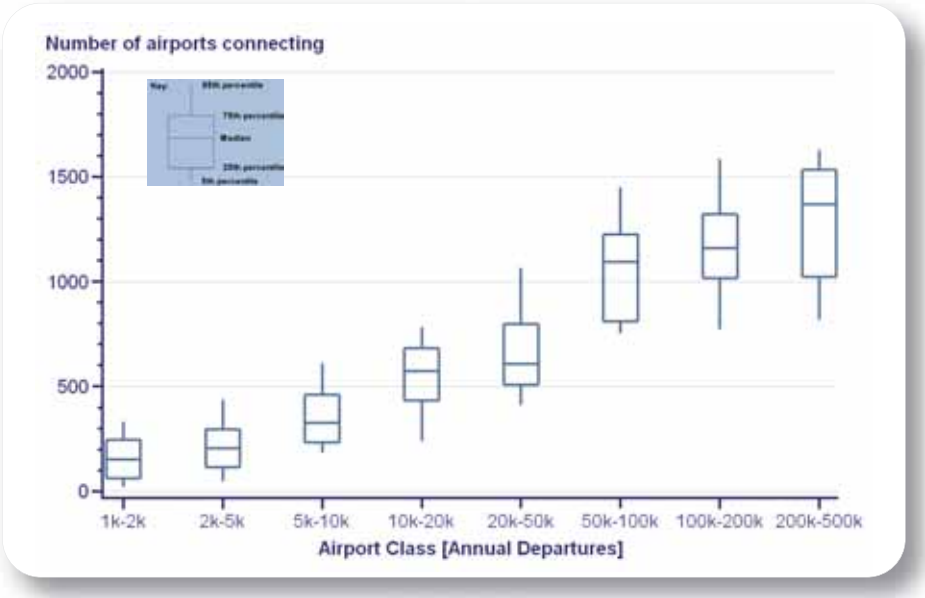


Figure 36. A medium-sized airport (20k-50k departures) has one tenth of the traffic of a very large one, but is connected to almost half the number of airports.

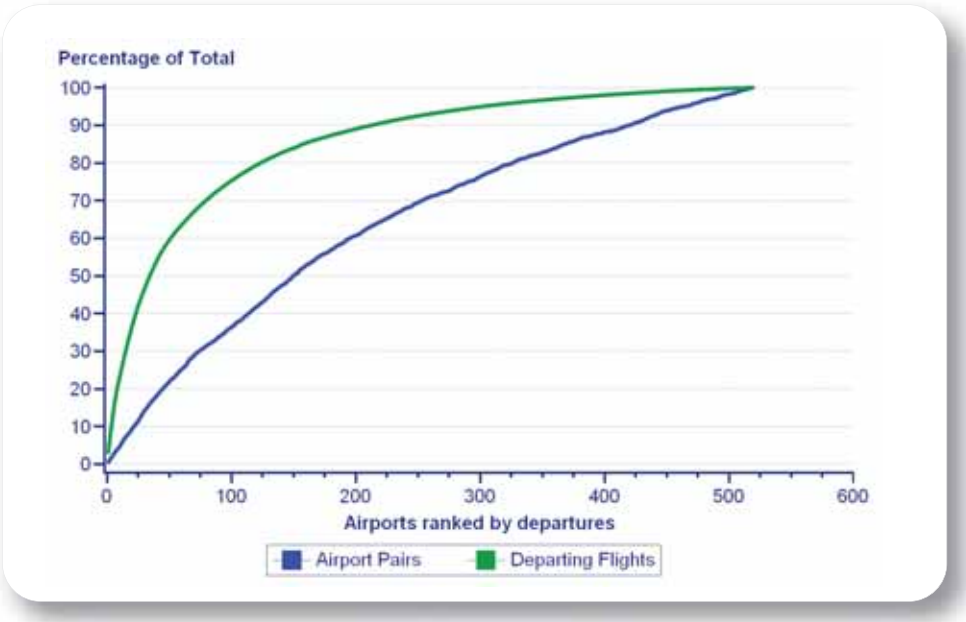


Figure 37. The airport connections are more uniformly distributed amongst the 528 airports in the study than are the flights.

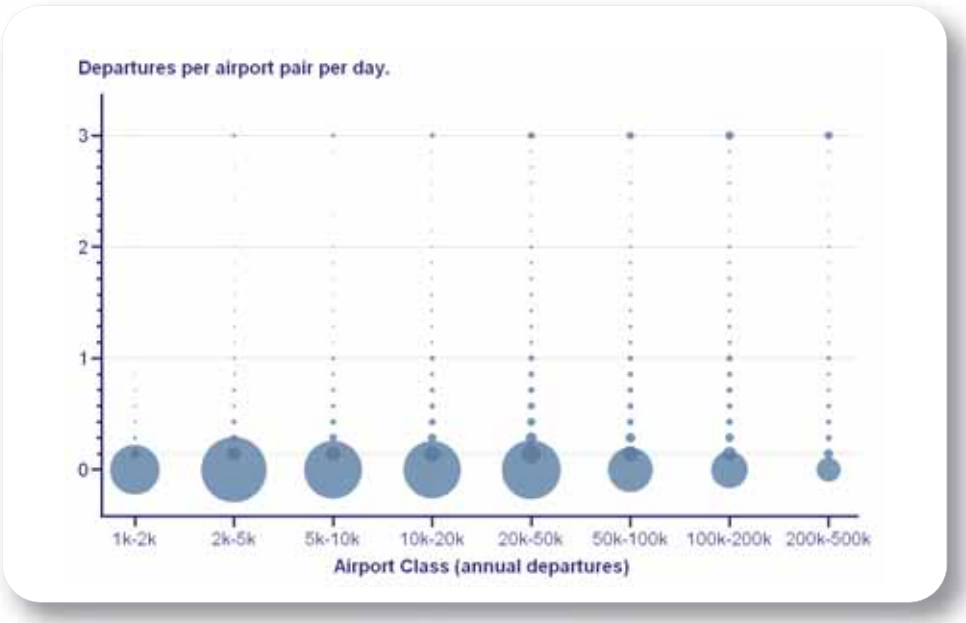


Figure 38. The connectivity of the network relies on the small and medium airports.
(Circle size indicates number of airport pairs.)

15. Scheduled connections: rarely to many, often to few

An airport's scheduled traffic grows by increasing the number of other airports it's connected to and by increasing the frequency on just a few connections. Most scheduled connections are made once/day or less often, from the largest airports and smallest airports alike. Once an airport reaches 10,000 departures, it takes about 60 additional scheduled connections for the airport to double in size.

Figure 39 shows all of the scheduled airport-pair connections in terms of their frequency of departure (left-hand axis) and airport size. There are clear bulges in each column at once/week, once/day and three or more departures per day. For all airport sizes, connections with frequency once/day or less make up most of the connectivity, but for the largest airports the most common frequency is three or more times per day.

Figure 40 summarises the same data. The typical (median) frequency is less than once/day for all airports: for example being very close to once/day for the largest airports. Frequency growth is concentrated in just a few destinations from each airport. The frequency of departures to the top 5% of destinations from an airport is usually between twice and four times per day (depending on the airport) for airports with 10k-20k departures, but this climbs to 8-11 departures per day for the largest airports.

These data include both low-cost and traditional scheduled carriers. The growth in frequencies to a few airports is more of a feature of traditional carriers than of low-cost. For low-cost a 'top 5%' connection is likely to have a frequency of 2-4 departures/day even from the largest airports. So high-frequency 'shuttle' services are much more likely to be run by traditional carriers.

Putting frequency aside, the number of scheduled connections per airport increases rapidly from about 20 for a 5k-10k airport to 200-300 for the largest airports (see Figure 41): it takes roughly 60 extra connections to double in size once an airport reaches 10k departures/year.

So scheduled traffic at an airport grows by adding connections, and by increasing frequency on a small proportion of those connections. The average airport-airport connection is made once per day or less, whatever the size of airport.

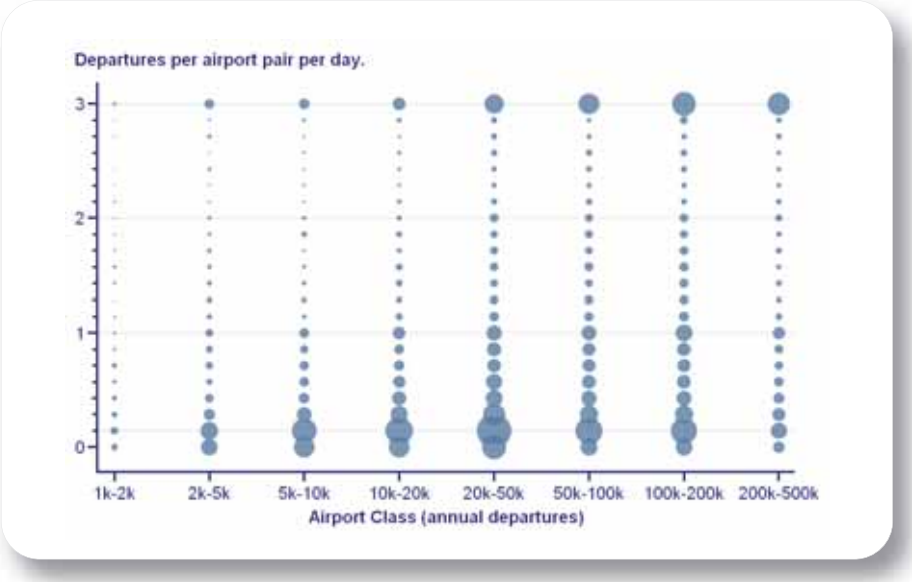


Figure 39. Scheduled connections fall mostly into two categories: those with 3 or more departures per day, or up to 1 per day. (Bubble size indicates number of airport-pairs.)

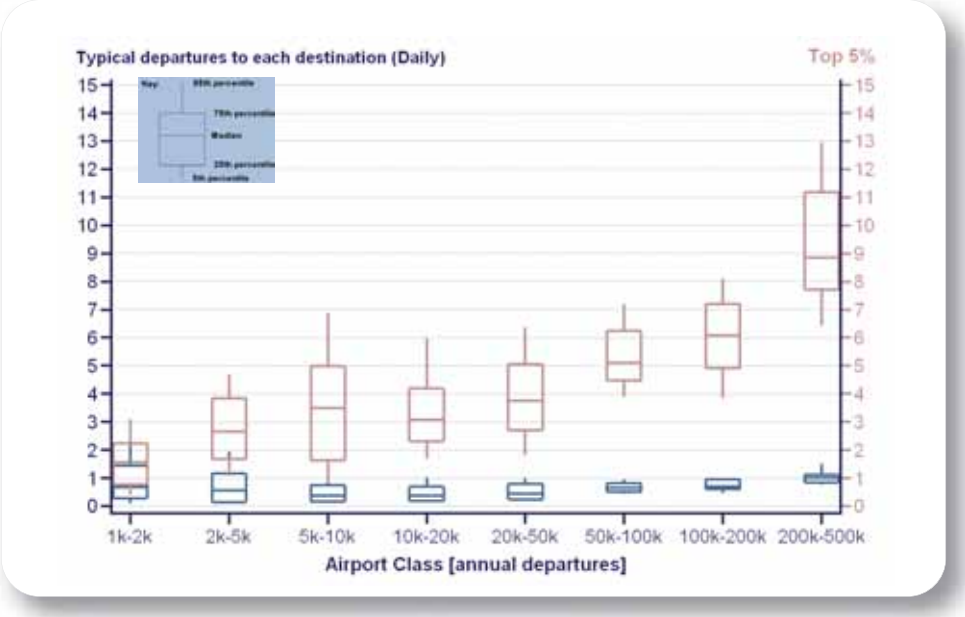


Figure 40. The typical frequency of connection at an airport is less than 1 flight/day for all airports: so growth is through new connections and a few very-frequent connections.

Figure 41. The number of scheduled destinations increases rapidly as the airport grows: after reaching 10k departures/year an airport adds perhaps 60 new destinations to double in size.

16. Distances remain short across the board

Flown distances are most often around 400km from medium-sized airports up to even the very largest, showing the importance of the local network as well as the long-haul one. Small airports more commonly have shorter flights still.

Figure 42 shows the (great-circle) distance flown by departures from the 528 airports in the study. Nearly three million departures travel a distance of 250-550km. On a coarser scale, Figure 43 shows that at smaller airports, departures most often travel less than 300km, and the number of more distant connections declines rapidly. Even at the large and very large airports, the 400km distance bracket is the most common, showing how they are connected to the local network as well as to a long-haul one. Perhaps because they are only six, the very large airports have only a small number of 1500-3500km flights, but they have the largest share of the 3500km+.

As usual, these general figures mask considerable variation between airports:

- Some 21 airports had median under 100km, ie with more than half of their departures going less than 100km. Typically these are airports which are mostly dedicated to a helicopter service or to operations other than transport, such as maritime patrol.

- There are also 26 airports with median distance flown greater than 1500km, shown in Figure 44. These are part of networks that are quite isolated from their State: usually they are tourist destinations, bringing tourists from Northern Europe to the South; or they are part of long-haul military networks.

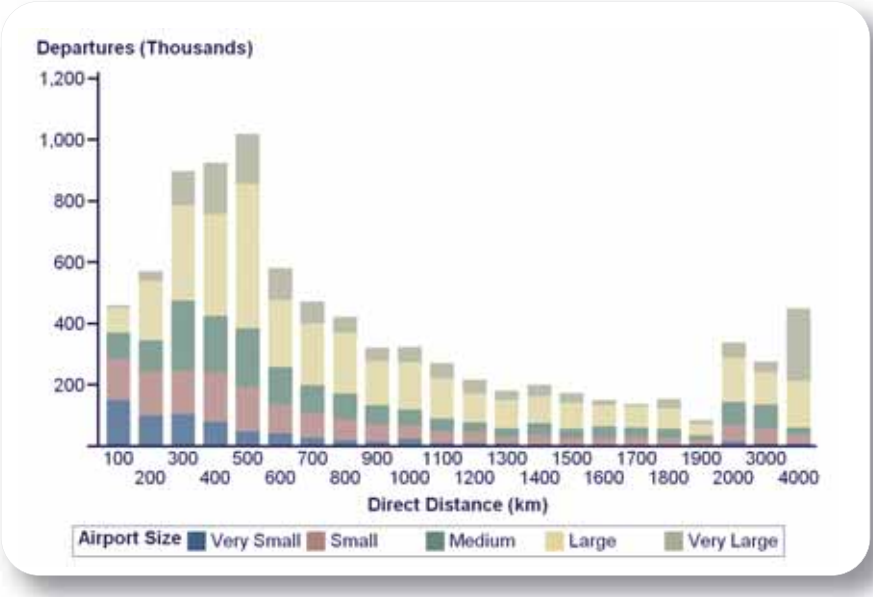


Figure 42. Across all airports in the study, departures typically fly a distance of 250-550km.

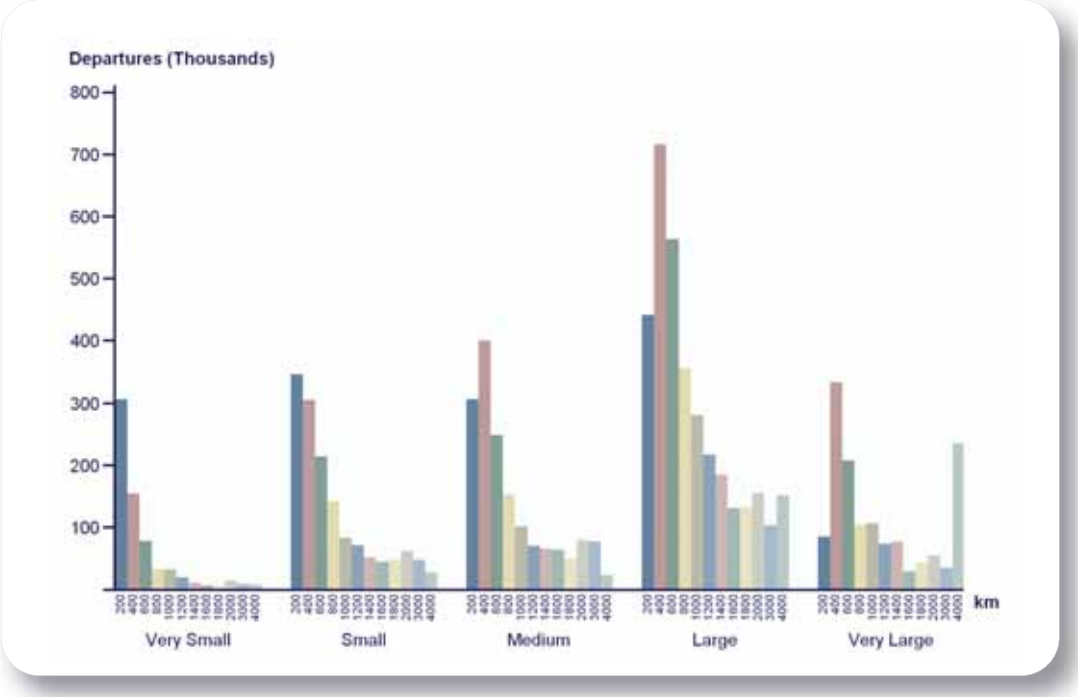


Figure 43. Even at large airports, departures peak at 400km and tail off with distance.

Figure 44. There are 26 airports where the typical flight is more than 1500km

17. Predictable peaks

A survey of 24 of the most extreme peak days showed that 18 were regular effects of a combination of a weekly busy day and a Summer or Winter peak; the rest are down to one-off events, such as sporting fixtures.

Figure 46 shows the busiest day at each airport in 2006 as a multiple of the average day's traffic. 80% of airports fall in the regions marked with 'box and whiskers'; extreme high and low airports are marked with crosses. For larger airports, the peaks are only 20% higher than average, and this may be nothing more than the typical variation within each week. Figure 45 shows an example of this: Copenhagen/Kastrup had a peak just 11% higher than the typical day.

At quieter airports, there is more scope for significant day-to-day changes. For example in the 10k-20k departure class, Berlin/Tempelhof saw a busy day 6.8 times busier than its typical traffic (see Figure 46). No coincidence that this was on 10 July, the day after the FIFA World Cup final. In the 20k-50k group the most extreme case was Ibiza, with a busiest day 4.4 times its typical traffic. This is mostly to do with Summer peaks, which are discussed further in section 18. So the extreme peaks marked in Figure 46 can be regular, or as a result of single events: a survey of the larger airports showed 18 extremes caused by routine weekly or annual patterns, and 6 extremes caused by one-off events. (Annex F gives details of these.)

In general, these extremes are rare: even for airports in the 5k-10k class - roughly 10 departures per day - most airports have a peak day which has less than twice the typical traffic volume. Figure 46 shows that just under 75% of these airports have a peak less than twice the typical day. On the other hand, for smaller airports, just a handful of flights can result in a large peak compared to the average.

Figure 47 shows peak days by day of the week. Peak days occur 40% of the time on Thursday or Friday. Some small airports may count twice in this chart, since they may achieve their annual maximum on two

Figure 45. Copenhagen/Kastrup is dominated by a weekly dip on Sundays, with some reduction during holidays. There is no particular peak day.

days in the year (or more). If the results are weighted by traffic, then Thursday and Friday account for 50% of peaks; so it is busy airports that have Friday peaks.

While annual distribution of peaks days roughly follows traffic, it is more exaggerated than the annual distribution of traffic. While July, August and September are the busiest days for traffic overall, June actually generates the most peak days (see Figure 48). This is probably related to June and September having more business demand and July and August having more leisure passenger traffic.

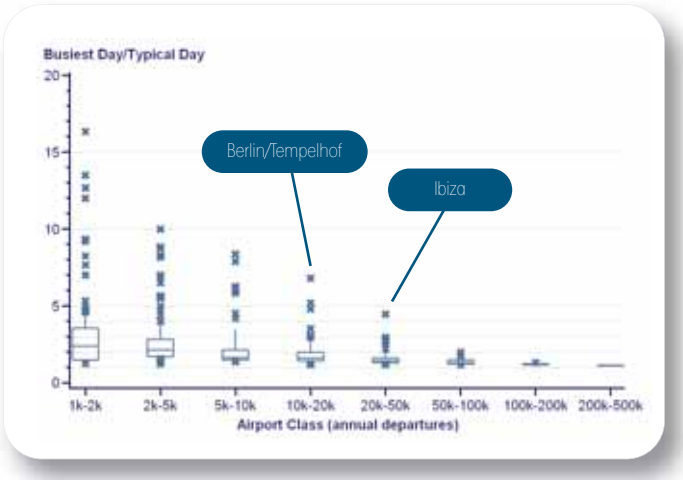
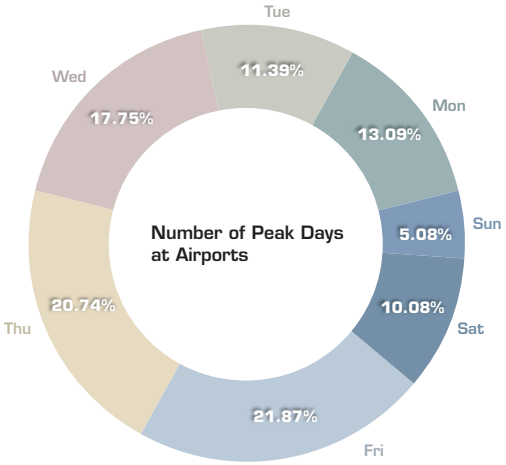


Figure 46. Majority of peak sizes are below twice the typical daily traffic.



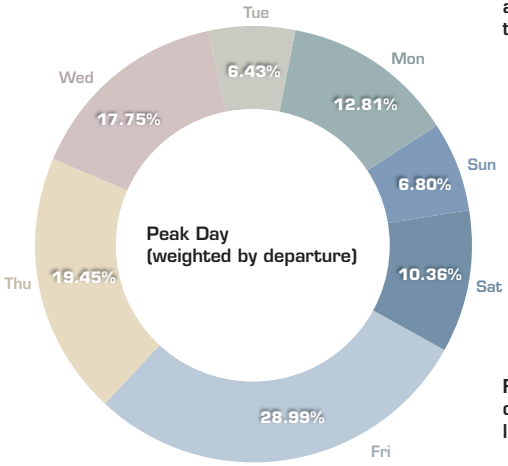


Figure 47. Peaks take place most often on Fridays, especially at larger airports.

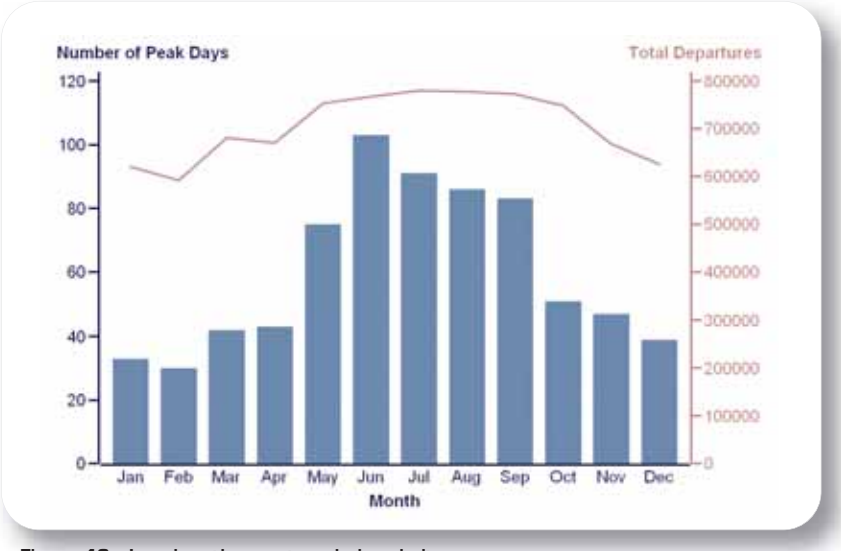


Figure 48. June has the most peak days in it.

18. Summer peaks: the hedgehog airports

A number of airports in Europe are quiet through much of the winter, have a Summer peak, coupled with a regular peak on one or two particular days of the week. These are the 'hedgehog' airports: quiet on average, but with potentially painful spikes causing disproportionate delay.

Looking at annual total statistics for an airport can be misleading. Some airports have a very large difference between Summer and Winter traffic levels. At holiday destinations this is often coupled with particular "changeover" days of the week, so that most of the demand is concentrated in just 20-30 days of the year. Kos in Greece is an example of this, see Figure 49.

Analysis of all daily flights in Europe in 2006 led to the identification of 39 hedgehog airports. They are shown in Figure 50, which uses darker text to indicate the busier ones (with 25 or more extra flights on their peak day). Annex E lists these airports and their peak days.

These peaks in demand - most of which are on Saturday or Sunday - can be the cause of delay. For example, on Saturday, 5 August 2006, the Saturday-hedgehog airports had 8% of the arrivals in Europe, but 20% of the flow delay (for en route and airport). The average delay per flight was 6 minutes at these airports, compared to 2.6 for arrivals at other airports in the same States, and 1.9 minutes elsewhere in Europe. Similar results occurred on other dates during the Summer, but not in the Winter: for example on Saturday 18 March, they had 2.7% of arrivals and 2.6% of delay.

For airports with Winter peaks, there is a wider variety of patterns of traffic that generate regular peaks (some examples in Figure 51):

- Some follow the reverse of the Summer pattern, with a general increase in traffic for the Winter, with the addition of regular, weekly peaks; but the season length is quite variable, in some cases

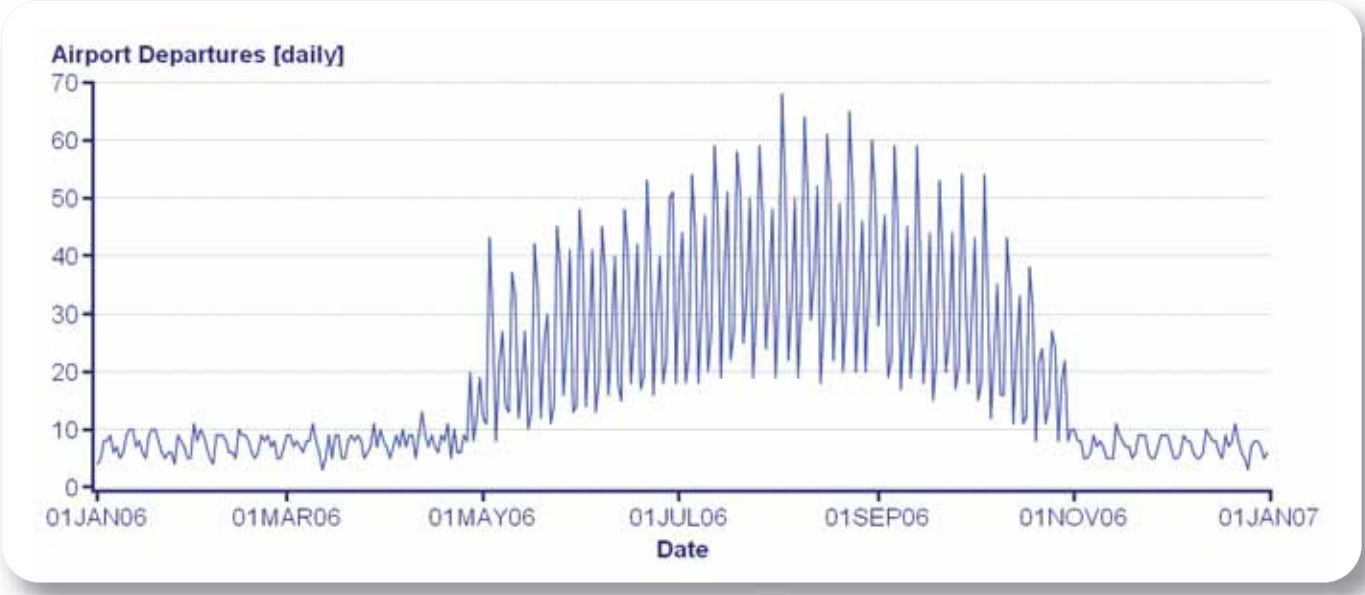


Figure 49. Kos has a combination of weekly and summer peaks.

driven by the Ski season (Chambéry) in other cases, 'Santa' flights to Northern Scandinavia (eg Rovaniemi).

- Some airports (eg Salzburg and Innsbruck) have the same general level of traffic throughout the year, with the addition of a weekly peak in the Winter;

Figure 50. There are 39 airports which follow a similar pattern to Kos, although the peak day-of-the-week varies. (Darker labels indicate more traffic.)

- Las Palmas and Tenerife have weekly peaks throughout the year, but have more traffic in Winter, so the winter peaks are higher;
- Others, such as Oulu and many other Nordic airports, appear to have Winter peaks, but this is more because the Summer months are very quiet.

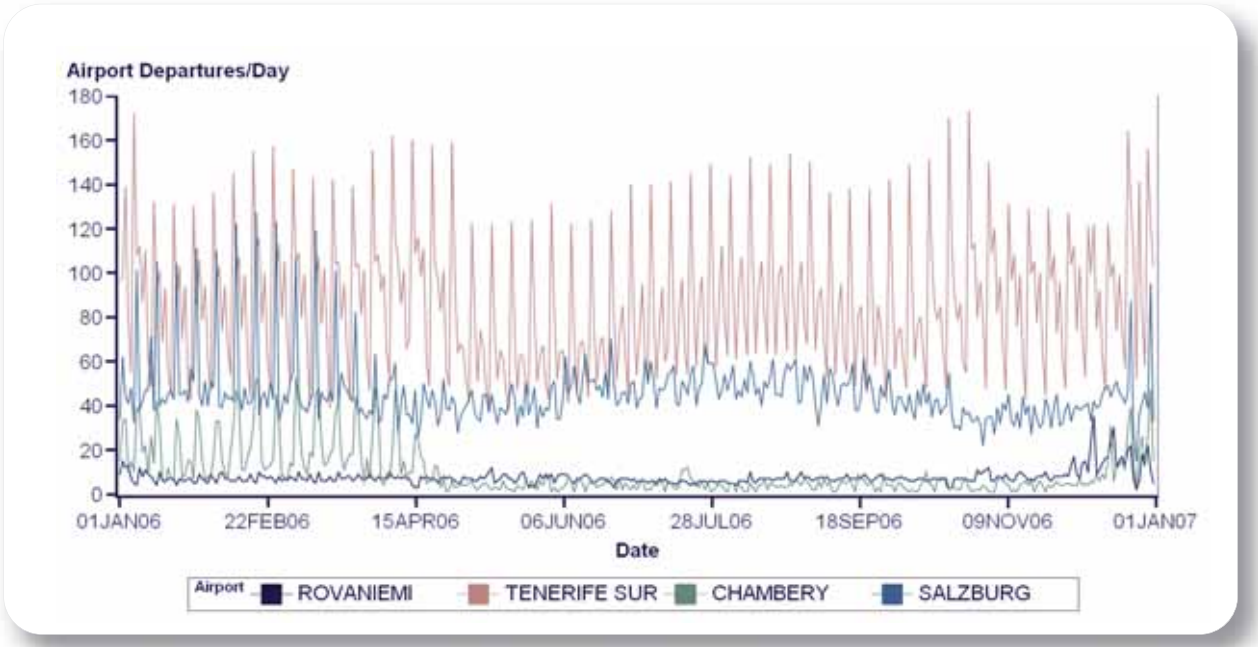


Figure 51. Winter peaks come in a wider variety of patterns.

19. Small airports have worse delay, but less of it

When there is flow-management delay at small or medium airports it is typically worse than at larger airports. But this is relatively infrequent, so it is the large airports which contribute most to the total of delay.

There are two commonly-reported measurements of delay in air traffic, both compiled by the Central Office for Delay Analysis (CODA) of EUROCONTROL and available on the eCODA website[5].

- Delays to flights from all causes is compiled from airline reports[6] for a large sample of major airlines.

- Air traffic flow and capacity regulations are applied to prevent overloads of air traffic control at airports or en route. Data on delays caused by these regulations ('ATFM delays') are available for all IFR flights.

When looking at the whole network, both of these sources are to some extent biased. For all-causes delays, the sampling method means that whilst large, scheduled airlines are well represented, the many sparser parts of the network (for example as discussed in 14) are not so thoroughly documented. For ATFM delays, the bias is that it is the larger airports which are more likely to (be able to) declare capacity restrictions and therefore generate ATFM delays on arrivals. (Section 20 discusses the use of restrictions.)

Figure 52 shows the ATFM delay in terms of the size of the arrival airport and the location of the delay. Most flights are not delayed. For flights which are delayed en route, there is little to distinguish airports by size: the typical delay for a delayed flight is 16 minutes in all cases. For delays on arrival the situation is rather different: if a flight to a medium or small airport is delayed it is likely to be delayed up to 50% longer than a flight to a large airport. Medium or small airports often lack the highly-developed infrastructure of the larger airports and hence are less able to respond to peaks in demand, expected or unexpected.

However, the total of delay on arrival at such airports is small (about 1 million out of 17 million minutes total). In Figure 53 the heights of the bars indicate the number of delayed flights, which further illustrates the limited number of delayed flights at the medium and small airports. So, even if the infrastructure at these airports were improved, the total gain would be relatively small: about 0.04 minutes/flight from an average of 1.9 minutes/flight.

[5] www.eurocontrol.int/eCoda
[6] See A matter of Time: Air Traffic Delay in Europe, EUROCONTROL *Trends in Air Traffic*, volume 2, September 2007.

		Total Flights	Delayed Flights	ATFM Delay	ATFM Delay per Delayed Flight	
		(Thousands)	(Thousands)	(Thousands of Minutes)	(Median, Minutes)	(Worst 5%, Minutes)
Location	Arrival Airport Size					
None or Unknown	All	**7,131**	**1**	**14**	**17.8**	**62.5**
En Route	Very Large	201	101	1,782	16.0	44.0
	Large	384	201	3,724	16.0	44.5
	Medium	167	90	1,698	16.0	46.0
	Small	135	72	1,375	16.0	45.0
	Very Small	38	21	463	16.0	51.0
	All	**926**	**484**	**9,042**	**16.0**	**45.0**
Arrival Airport	Very Large	214	127	2,913	18.3	54.0
	Large	313	174	3,529	18.7	54.5
	Medium	42	27	742	23.5	68.0
	Small	14	9	288	26.0	100.5
	Very Small	4	2	85	26.0	84.0
	All	**587**	**339**	**7,556**	**20.0**	**62.0**
Departure Airport	All	**13**	**8**	**294**	**26.0**	**106.0**
All		**8,656**	**832**	**16,905**	**16.9**	**49.0**

Figure 52. Medium and small airports have more delay when it arises, but the total is relatively small.

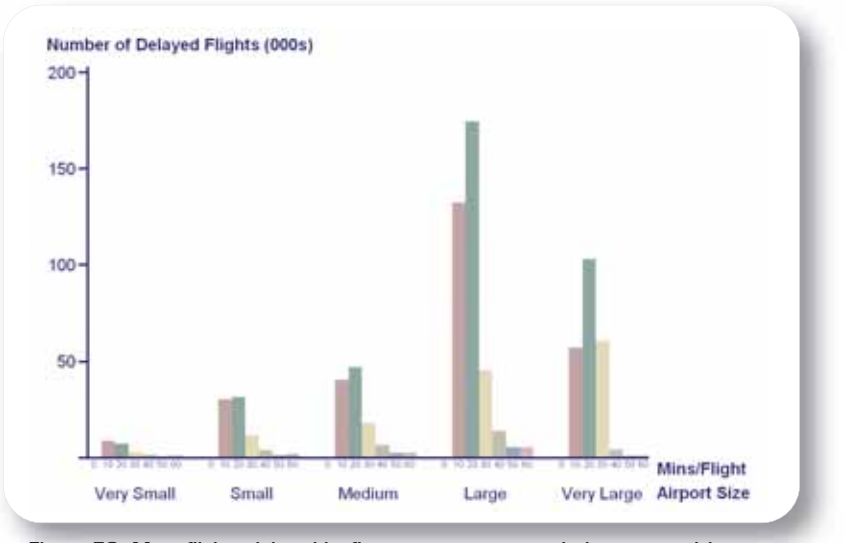


Figure 53. Most flights delayed by flow management regulations are arriving at large airports.

20. Limited capacity through restriction

The flow and capacity management process gives only limited information on the current capacity of the airports in the study because, except for 110 airports, it is more a description of restrictions than of capacity, and because of the differing ways in which the airspace around airports is arranged relative to the runway.

Airports declare capacity restrictions for the runway or nearby airspace ('TMA') to the Central Flow Management Unit of EUROCONTROL as a means to manage the flow of traffic, reducing the likelihood of overload and ensuring that, if delays are necessary, then they occur on the ground rather than the air, where they would be more expensive and worse for the environment. A declaration can range from zero (ie the runway is closed) up to a maximum number of flights/hour achievable in any operational situation. It is natural to ask whether these declarations can be used to come up with an idea of the capacity of the airports of the network.

Figure 54 shows that 244 of the 528 airports declared no restrictions at all in 2006. So there is no information on the capacity of their runways. However, they are mostly in the very small category (1k-5k departures). Nearly half of 5k-10k airports made some declaration, 73% of the 10k-20k and nearly all of the rest. The distinction between 'runway' and 'TMA' may be down to local conditions: for example Paris/Charles de Gaulle tends to make declarations that concern just the TMA (1 out of 6 = 17%); for the other very large airports, there are a mix of runway and TMA declarations. It is much more difficult to obtain a 'total airport capacity' figure if there are TMA restrictions, because the total depends on how the parts of the TMA connect together.

The 20 airports with more than 10,000 departures that made no capacity declaration in 2006 are illustrated in Figure 55. Some of these lie outside the full flow management area, so the lack of declaration is not surprising. Nearly half of the remainder are in the UK.

Just for the airports using runway restrictions (including 'runway plus TMA'), Figure 56 shows that in most categories 60% or more of the airports had the same declaration all year around, 110 airports in total. In this case, at least, the declared restriction might be a useful indicator of runway capacity for these 110.

	Capacity Defined at some Hour in 2006				Number of Airports in Class	Sum of Maximum Declared Runway Movements
	Both	Just Runway	Just TMA	Neither		
	%	%	%	%		Movement/ Hour
Airport Departure						
1k-2k	1	3	14	82	120	36
2k-5k	9	9	10	72	163	263
5k-10k	9	16	19	56	86	222
10k-20k	30	15	28	27	60	535
20k-50k	52	9	32	7	56	854
50k-100k	45	.	55	.	22	372
100k-200k	80	7	13	.	15	846
200k-500k	83	.	17	.	6	416

Figure 54. Most airports with more than 5k departures made some sort of capacity declaration.

Figure 55. Just 20 out of 160 airports with 10k+ departures did not use capacity restrictions in 2006

	Use of Runway Restrictions		
	One Rate All Year	Restriction All Year	Restriction Sometimes
	%	%	%
Airport Departure			
1k-2k	100	.	.
2k-5k	79	7	14
5k-10k	95	.	5
10k-20k	81	15	4
20k-50k	68	24	9
50k-100k	70	10	20
100k-200k	62	31	8
200k-500k	20	60	20

Figure 56. For airports using runway restrictions, typically more than 60% used the same flow rate all year.

21. Summary and further work

The 170,000 links of the European air traffic network stand on some 2,000 airports that are the foundation layer of the network. So understanding the variety of airports in Europe, their distribution, their traffic patterns, their aircraft mix, their strengths and their weaknesses is essential to understanding the strengths of the air traffic network as a whole. This third volume of *Trends in Air Traffic* has taken a first look at airports, cutting a broad slice across airports as a whole. It has examined all airports with more than 1,000 departures a year (about 3/day) and systematically documented their characteristics: the typical and the unusual. For a summary of the conclusions see the executive summary at the front of the report.

There is more to say about European airports from our data than could reasonably fit in one data mining report. Three areas in particular are highlighted to which future volumes of *Trends in Air Traffic* should turn:

- The growth of airports can be analysed not just from the cross-sectional point of view taken here, but also from a longitudinal one, looking at how individual airports change with time and what typical patterns can be identified.

- 'Secondary airports' are often mentioned as a potential solution to problems of lack of capacity at major airports. There are some implicit lessons about secondary airports in the current volume, but this area deserves deeper exploration.

- Little has so far been said about the patterns of traffic within the day at airports and on the network as a whole.


KOREAN AIR
Aer Lingus

A. The biggest 25 airports in Europe

This annex supplements section 3 with some more details of the busiest 25 airports in Europe.

Figure 57. The busiest 25 airports in Europe in 2006. (Circle area indicates relative size.)

Rank	Airport	Airport Name	State/Region	Departure in 2006 (thousands)	Relative Size
1	LFPG	PARIS CH DE GAULLE	France	271	2.95
2	EDDF	FRANKFURT MAIN	Germany	245	2.66
3	EGLL	LONDON/HEATHROW	United Kingdom	239	2.59
4	EHAM	SCHIPHOL AMSTERDAM	Netherlands	218	2.37
5	LEMD	MADRID BARAJAS	Spain	218	2.36
6	EDDM	MUENCHEN 2	Germany	204	2.21
7	LEBL	BARCELONA	Spain	164	1.78
8	LIRF	ROME FIUMICINO	Italy	158	1.72
9	EGKK	LONDON/GATWICK	United Kingdom	132	1.43
10	EKCH	COPENHAGEN KASTRUP	Denmark	130	1.41
11	LOWW	WIEN SCHWECHAT	Austria	129	1.40
12	LIMC	MILANO MALPENSA	Italy	126	1.37
13	LSZH	ZURICH	Switzerland	124	1.35
14	EBBR	BRUSSELS NATIONAL	Belgium/Luxembourg	124	1.35
15	LFPO	PARIS ORLY	France	117	1.27
16	LTBA	ISTANBUL-ATATURK	Turkey	114	1.24
17	ESSA	STOCKHOLM-ARLANDA	Sweden	114	1.24
18	EGCC	MANCHESTER	United Kingdom	113	1.23
19	ENGM	OSLO/GARDERMOEN	Norway	108	1.18
20	EDDL	DUESSELDORF	Germany	107	1.16
21	EGSS	LONDON/STANSTED	United Kingdom	103	1.11
22	EIDW	DUBLIN	Ireland	96	1.04
23	LEPA	PALMA DE MALLORCA	Spain	95	1.03
24	LGAV	ATHINAI E. VENIZELOS	Greece	93	1.01
25	EFHK	HELSINKI-VANTAA	Finland	92	1.00

Figure 58. The top 25 airports in Europe range in size by a factor of 3.

B. Airports per state

This annex gives counts of the numbers of airports of each size group per State[7], using the size groupings described in Figure 2. So Figure 59 shows that Germany has 7 airports with more than 50k departures. Figure 60 translates this into percentage of airport departures, so those 7 airports account for 72% of all departures from German airports.

	Number of Airports in Each Size Group						Total Airports
	Very Large (200k-500k)	Large (50k-200k)	Medium (20k-50k)	Small (5k-20k)	Very Small (1k-5k)	Other (<1k)	
Albania	.	.	.	1	.	.	1
Armenia	.	.	.	1	.	3	4
Austria	.	1	.	5	1	27	34
Azerbaijan	.	.	.	1	1	3	5
Belarus	.	.	.	1	2	11	14
Belgium/Luxembourg	.	1	1	3	3	22	30
Bosnia-Herzegovina	.	.	.	1	.	3	4
Bulgaria	.	.	.	3	1	4	8
Canary Islands	.	1	4	1	2	1	9
Croatia	.	.	.	3	3	10	16
Cyprus	.	.	1	1	1	.	3
Czech Republic	.	1	.	.	2	33	36
Denmark	.	1	.	4	5	32	42
Estonia	.	.	.	1	1	10	12
FYROM	.	.	.	1	.	1	2
Finland	.	1	.	4	12	28	45
France	1	3	7	14	52	249	326
Georgia	.	.	.	1	.	6	7
Germany	2	5	3	12	23	310	355
Greece	.	1	2	4	15	30	52
Hungary	.	1	.	.	.	13	14
Ireland	.	1	.	2	5	13	21
Italy	.	3	9	12	15	62	101
Latvia	.	.	1	.	.	11	12
Lisbon FIR	.	1	1	2	2	22	28
Lithuania	.	.	.	1	3	23	27
Malta	.	.	.	1	.	1	2
Moldova	.	.	.	1	.	1	2
Netherlands	1	.	.	4	2	67	74
Norway	.	1	3	8	30	81	123
Poland	.	1	.	5	4	45	55
Romania	.	.	1	2	5	10	18
Santa Maria FIR	.	.	.	2	2	4	8
Serbia&Montenegro	.	.	1	.	4	3	8
Slovakia	.	.	.	1	1	11	13
Slovenia	.	.	.	1	.	5	6
Spain	1	3	5	14	12	44	79
Sweden	.	1	2	5	25	105	138
Switzerland	.	2	.	2	4	35	43
Turkey	.	1	3	6	11	41	62
Ukraine	.	.	1	3	7	47	58
United Kingdom	1	7	11	12	27	132	190
All	6	37	56	146	283	1559	2087

Figure 59. Number of airports of each size group per State in 2006.

[7] Because of the way the airspace is organised, when referring to 'States', we separate the Azores ("Santa Maria FIR") from Portugal, and the Canary Islands from Spain. Belgium and Luxembourg are treated together, as are Serbia and Montenegro.

	Percentage of Departures per Airport Class						All Departure (Thousands)
	Very Large (200k-500k)	Large (50k-200k)	Medium (20k-50k)	Small (5k-20k)	Very Small (1k-5k)	Other (<1k)	
Albania	.	.	.	100.0	.	.	8
Armenia	.	.	.	93.6	.	6.4	8
Austria	.	69.3	.	29.2	0.6	0.9	186
Azerbaijan	.	.	.	82.0	15.0	3.0	21
Belarus	.	.	.	70.5	22.7	6.8	9
Belgium/Luxembourg	.	64.4	15.9	15.6	3.5	0.6	192
Bosnia-Herzegovina	.	.	.	75.2	.	24.8	9
Bulgaria	.	.	.	96.5	2.8	0.6	35
Canary Islands	.	32.0	60.2	5.8	2.0	0.0	178
Croatia	.	.	.	82.2	15.7	2.1	40
Cyprus	.	.	72.5	22.6	4.9	.	32
Czech Republic	.	87.1	.	.	9.5	3.4	92
Denmark	.	69.6	.	20.3	8.2	1.9	186
Estonia	.	.	.	85.1	6.4	8.5	20
FYROM	.	.	.	93.4	.	6.6	7
Finland	.	63.7	.	16.2	16.9	3.2	145
France	27.1	24.9	22.5	11.1	11.2	3.2	1,003
Georgia	.	.	.	84.2	.	15.8	6
Germany	37.9	34.2	8.7	12.8	4.4	2.0	1,186
Greece	.	39.5	20.4	18.0	17.5	4.7	234
Hungary	.	96.6	.	.	.	3.4	65
Ireland	.	65.0	.	24.8	8.5	1.7	147
Italy	.	43.9	33.4	16.1	5.2	1.4	794
Latvia	.	.	94.4	.	.	5.6	22
Lisbon FIR	.	52.8	18.7	23.2	2.7	2.7	129
Lithuania	.	.	.	68.8	29.0	2.2	22
Malta	.	.	.	100.0	.	0.0	14
Moldova	.	.	.	99.5	.	0.5	5
Netherlands	81.6	.	.	15.0	2.3	1.1	267
Norway	.	28.0	25.8	21.0	18.3	6.8	386
Poland	.	52.9	.	39.1	6.0	1.9	137
Romania	.	.	46.5	30.5	16.6	6.3	62
Santa Maria FIR	.	.	.	66.2	21.4	12.4	19
Serbia&Montenegro	.	.	59.2	.	38.9	1.9	36
Slovakia	.	.	.	69.8	17.4	12.9	20
Slovenia	.	.	.	91.5	.	8.5	19
Spain	25.5	37.6	17.7	14.5	4.2	0.6	855
Sweden	.	39.3	18.9	16.4	21.2	4.2	290
Switzerland	.	89.0	.	4.8	4.1	2.0	229
Turkey	.	37.5	30.9	19.4	9.0	3.2	304
Ukraine	.	.	46.2	21.7	23.4	8.7	89
United Kingdom	17.7	42.6	23.2	9.8	5.6	1.1	1,350
All	15.7	38.9	18.7	16.6	7.8	2.3	8,859

Figure 60. Percentage of departures per State at airports of each size group.

C. Number of runways

This annex supplements the discussion of runways in section 7.

Number of Airports	Number of Known Runways at the Airport							All
	0	1	2	3	4	5	6	
Albania	.	1	.	.	.	.	.	1
Armenia	.	1	.	.	.	.	.	1
Austria	.	3	3	1	.	.	.	7
Azerbaijan	.	.	2	.	.	.	.	2
Belarus	.	3	.	.	.	.	.	3
Belgium/Luxembourg	1	4	2	1	.	.	.	8
Bosnia-Herzegovina	.	1	.	.	.	.	.	1
Bulgaria	.	4	.	.	.	.	.	4
Canary Islands	.	7	1	.	.	.	.	8
Croatia	.	5	1	.	.	.	.	6
Cyprus	.	3	.	.	.	.	.	3
Czech Republic	.	2	.	1	.	.	.	3
Denmark	1	4	3	1	.	1	.	10
Estonia	1	1	.	.	.	.	.	2
FYROM	.	1	.	.	.	.	.	1
Finland	1	11	4	1	.	.	.	17
France	.	51	23	2	1	.	.	77
Georgia	.	1	.	.	.	.	.	1
Germany	.	21	20	4	.	.	.	45
Greece	.	19	2	1	.	.	.	22
Hungary	.	.	1	.	.	.	.	1
Ireland	.	4	2	1	.	1	.	8
Italy	.	25	13	1	.	.	.	39
Latvia	.	1	.	.	.	.	.	1
Lisbon FIR	.	4	2	.	.	.	.	6
Lithuania	.	3	1	.	.	.	.	4
Malta	.	.	1	.	.	.	.	1
Moldova	.	1	.	.	.	.	.	1
Netherlands	.	5	1	.	.	.	1	7
Norway	2	36	4	.	.	.	.	42
Poland	.	8	2	.	.	.	.	10
Romania	.	7	1	.	.	.	.	8
Santa Maria FIR	.	3	.	1	.	.	.	4
Serbia&Montenegro	1	3	1	.	.	.	.	5
Slovakia	.	1	1	.	.	.	.	2
Slovenia	.	1	.	.	.	.	.	1
Spain	1	21	10	2	1	.	.	35
Sweden	1	22	9	1	.	.	.	33
Switzerland	.	2	3	3	.	.	.	8
Turkey	.	14	4	3	.	.	.	21
Ukraine	.	8	2	1	.	.	.	11
United Kingdom	.	28	21	7	2	.	.	58
All	9	340	140	32	4	2	1	528

Figure 61. Airports per region and their number of runways.

D. Aircraft size

This annex supplements the information on aircraft sizes discussed in section 13.

Thousands of Departures	Airport Size								All
	1k-2k	2k-5k	5k-10k	10k-20k	20k-50k	50k-100k	100k-200	200k-500k	
Seat Class									
00: 0 seats	8	10	10	5	4	2	1		41
01: 1-14	53	110	95	105	117	90	44	15	630
02: 15-25	17	42	29	46	82	52	24	6	298
03: 26-40	25	72	28	53	71	42	30	9	329
04: 41-65	25	84	83	124	230	194	213	132	1,085
05: 66-90	10	41	56	90	162	183	155	117	813
06: 91-120	4	25	47	75	166	158	222	145	842
07: 121-140	4	31	68	116	324	336	414	249	1,541
08: 141-170	5	62	133	169	360	364	475	323	1,891
09: 171-220	2	11	22	27	84	104	156	132	538
10: 221-270		2	4	9	23	35	76	109	259
11: 271-320	1	1	1	5	3	9	26	69	116
12: 321-500		2	3	5	10	3	20	86	128
13: 501+	.	.	.	.	.		.	.	
Not Known	16	29	29	32	17	10	5	4	142
All	170	522	607	862	1,652	1,581	1,862	1,395	8,652

Figure 62. Summary of departures per aircraft and airport size in 2006.

Thousands of Departures	Airport Size								All
	1k-2k	2k-5k	5k-10k	10k-20k	20k-50k	50k-100k	100k-200	200k-500k	
Seat Class									
00: 0 seats	4	2	2	1	0	0	0	0	0
01: 1-14	31	21	16	12	7	6	2	1	7
02: 15-25	10	8	5	5	5	3	1	0	3
03: 26-40	15	14	5	6	4	3	2	1	4
04: 41-65	15	16	14	14	14	12	11	9	13
05: 66-90	6	8	9	10	10	12	8	8	9
06: 91-120	2	5	8	9	10	10	12	10	10
07: 121-140	2	6	11	14	20	21	22	18	18
08: 141-170	3	12	22	20	22	23	25	23	22
09: 171-220	1	2	4	3	5	7	8	9	6
10: 221-270	0	0	1	1	1	2	4	8	3
11: 271-320	1	0	0	1	0	1	1	5	1
12: 321-500	0	0	0	1	1	0	1	6	1
13: 501+	.	.	.	.	.	0	.	.	0
Not Known	9	6	5	4	1	1	0	0	2
All	100	100	100	100	100	100	100	100	100

Figure 63. Details for the bar chart shown in Figure 35.

E. The hedgehog airports

Section 18 discusses the 'hedgehog' airports: quiet in Winter, but with some sharp peaks in traffic. This appendix lists the airports and the scale of the peaks. So, for example, Palma has a peak day on Saturday in Summer, when typically in 2006 it handled 138 more flights than the quietest day that week.

			Extra Movements compared to Weekly Minimun					
			Sun	Mon	Tue	Wed	Fri	Sat
Rank	Airport							
1	LEPA	PALMA DE MALLORCA	.	.	.	.	.	138
2	LTAI	ANTALYA	96	.	.	.	.	98
3	LEIB	IBIZA	66	.	.	.	.	.
4	LGRP	DIAGORAS	65	.	.	.	.	.
5	LPFR	FARO	.	.	.	.	.	52
6	LTBS	MUGLA-DALAMAN	.	49	.	.	.	.
7	LDSP	SPLIT	.	.	.	.	.	48
8	LGKR	IOANNIS/KAPODISTRIAS	.	.	.	.	.	44
9	LGIR	NIKOS/KAZANTZAKIS	.	36	.	.	41	.
10	LCPH	PAPHOS	.	.	.	38	.	.
11	LEMH	MAHON/MENORCA	.	.	.	.	37	.
12	LCLK	LARNACA	35	.	.	34	.	.
13	LIEO	OLBIA COSTA SMERALDA	.	.	.	.	.	34
14	LGKO	KOS	.	.	.	31	.	.
15	LTFE	MILAS/BODRUM	26	30	.	.	.	.
16	LGSA	KHANIA SOUDA	.	.	.	.	.	27
17	LDDU	DUBROVNIK	25	.	.	.	.	.
18	LFKJ	AJACCIO	.	.	.	.	.	23
19	LIEE	CAGLIARI ELMAS	.	.	.	.	.	21
20	LTBJ	IZMIR-ADNAN-MENDERES	16	.	.	.	17	.
21	LGZA	ZAKINTHOS	17	.	.	.	15	.
22	LGKF	KEFALLINIA	16	.	.	.	.	.
23	LBWN	VARNA	.	.	.	.	16	.
24	LBBG	BURGAS	.	.	15	.	.	16
25	LYTV	TIVAT	.	.	.	.	.	14
26	LGPZ	PREVEZA/LEVKAS AKTIO	14	.	.	.	.	.
27	LFBT	TARBES OSSUN LOURDES	.	13	.	.	13	.
28	LGSK	SKIATHOS	.	.	.	.	13	.
29	LIBP	PESCARA	.	.	.	.	12	.
30	LFMD	CANNES MANDELIEU	12	.	.	.	.	.
31	LFKF	FIGARI	.	.	.	.	.	12
32	LERS	REUS	.	.	12	.	.	.
33	EDXM	WESTERLAND SYLT	12	.	.	.	.	.
34	LFKC	CALVI STE CATHERINE	11	.	.	.	.	10
35	LMML	MALTA LUQA	10	.	.	.	.	11
36	LPPD	PONTA DELGADA	.	10	.	.	.	.
37	LICA	LAMEZIA TERME	9	.	.	.	.	10
38	LIPR	RIMINI MIRAMARE	.	.	.	.	.	10
39	LGMK	MIKONOS	.	.	.	.	10	.

Figure 64. Details of the Summer 'hedgehog' airports.

F. The highest daily peaks and their causes

This annex gives details of the peak days discussed in section 17.

Airport	ICAO Code	State	Median Departures	Airport Size (Annual departures)	Peak Date (2006)	Week Day	Max Dep./ Med Dep.	Peak Description
IOANNIS/KAPODISTRIAS	**LGKR**	Greece	11	5k-10k	**26AUG**	Sat	8.4	Weekly and summer seasonality
BURGAS	**LBBG**	Bulgaria	9.5	5k-10k	**25JUL & 08AUG**	Tue	7.9	Weekly and summer seasonality
SPLIT	**LDSP**	Croatia	15	5k-10k	**22JUL & 12AUG**	Sat	6.3	Weekly and summer seasonality
KOS	**LGKO**	Greece	11	5k-10k	**02AUG**	Wed	6.2	Weekly and summer seasonality
MUGLA-DALAMAN	**LTBS**	Turkey	17	5k-10k	**28AUG**	Mon	6.2	Weekly and summer seasonality
MILAS/BODRUM	**LTFE**	Turkey	16	5k-10k	**14AUG**	Mon	6.0	Weekly and summer seasonality
VARNA	**LBWN**	Bulgaria	11	5k-10k	**21JUL & 11AUG**	Fri	5.8	Weekly and summer seasonality
CANNES MANDELIEU	**LFMD**	France	17	5k-10k	**29MAY**	Mon	4.5	Special event
DUBROVNIK	**LDDU**	Croatia	16	5k-10k	**25JUN**	Sun	4.2	Weekly and summer seasonality
TEMPELHOF-BERLIN	**EDDI**	Germany	43	10k-20k	**10JUL**	Mon	6.8	Special event
OLBIA COSTA SMERALDA	**LIEO**	Italy	26	10k-20k	**23JUL**	Sun	5.2	Weekly and summer seasonality
DIAGORAS	**LGRP**	Greece	30	10k-20k	**16JUL**	Sun	4.8	Weekly and summer seasonality
MAHON/MENORCA	**LEMH**	Spain	31	10k-20k	**04AUG**	Fri	3.5	Weekly and summer seasonality
INNSBRUCK	**LOWI**	Austria	26	10k-20k	**25FEB**	Sat	3.1	Weekly seasonality (stronger in winter)
SALZBURG	**LOWS**	Austria	43	10k-20k	**18FEB**	Sat	3.0	Weekly seasonality (stronger in winter)
MADEIRA	**LPMA**	Portugal	25	10k-20k	**02JAN**	Mon	2.9	Special event
IBIZA	**LEIB**	Spain	49	20k-50k	**20AUG**	Sun	4.4	Weekly and summer seasonality
SCHOENEFELD-BERLIN	**EDDB**	Germany	79	20k-50k	**10JUL**	Mon	3.0	Special event
NIKOS/KAZANTZAKIS	**LGIR**	Greece	54	20k-50k	**04AUG**	Fri	2.8	Weekly and summer seasonality
PARIS LE BOURGET	**LFPB**	France	85	20k-50k	**18MAY**	Thu	2.7	Special event
ANTALYA	**LTAI**	Turkey	119	20k-50k	**05AUG**	Sat	2.5	Weekly and summer seasonality
ARRECIFE LANZAROTE	**GCRR**	Spain	59	20k-50k	**26OCT**	Thu	2.2	Weekly seasonality
PALMA DE MALLORCA	**LEPA**	Spain	258	50k-100k	**05AUG**	Sat	2.0	Weekly and summer seasonality
NICE	**LFMN**	France	187	50k-100k	**29MAY**	Mon	1.7	Special event
MANCHESTER	**EGCC**	United Kingdom	306	100k-200k	**25AUG**	Fri	1.3	Weekly and summer seasonality

Figure 65. Highest peaks.

G. Definitions and glossary

5th percentile 5% of data (usually 5% of all airports of this size) are below it.

95th percentile 95% of data are below it.

ACI - Airports Council International.

Aircraft size – see Figure 34 for a list of the classes in terms of the typical number of seats.

Airfield – in this document is synonymous with 'airport'. It is used to emphasise that the group being discussed includes small airports.

Airport - in this document is any location which generates an IFR departure (see section 2 for discussion).

All-cargo - All IFR movements by operators with fleets consisting of 65% or more all-freight airframes.

Business aviation - All IFR movements by aircraft types in the list of business aircraft types (see STATFOR Business Aviation Report, May 2006, for the list).

Class - see Figure 2 for list of the classes of airport, by size.

Europe - throughout the report this term refers to the set of States for which data were available: Albania, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, FYROM, Finland, France, Georgia, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Moldova, Netherlands, Norway, Poland, Portugal, Romania, Serbia & Montenegro, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom.

GDP – Gross domestic product.

Group - see Figure 2 for list of the groups of airport, by size.

IFR – Flight under instrument flight rules.

Low-Cost - See STATFOR Document 150 for list of low-cost operators.

Market Segment is one of military, business aviation, low-cost, traditional-scheduled, non-scheduled (`charter'), all-cargo or other. Each is defined separately in this list.

Median - typical; if all observation are put in a ascending order than median is the value of the observation in the middle.

Military – All flights filing an ICAO flight type 'M' in their flight plan. In addition (mostly before 2003) all flights by operators or aircraft types for which 70%+ of 2003 flights were flight type 'M'.

Non-Scheduled segment of traffic consists of flights filing ICAO Flight Type = 'N' in the flight plan, except those falling into the categories low-cost, business-aviation, military or all-cargo.

NUTS – A Eurostat scheme which defines Europe as a hierarchy of regions.

'Other' segment of traffic consists of any IFR flights not falling into the other categories, and is typically non-commercial general aviation.

Peak Day - is a day in a year when the highest number of departures happens in a given airport. For smaller airports it is quite likely that the same highest number of departures happens several times a year. For bigger airports it is less likely, and thus we usually have one peak day a year.

PRISME – The EUROCONTROL datawarehouse.

Region – Indicated by ICAO airport code (ICAO Doc 7910) in table Figure 66.

Scheduled Flight defined by ICAO code 'S' in a flight plan.

Seasonality is a repetitive pattern. It could be either or both of:

Annual when the pattern repeats throughout the year. For example, traffic on a particular airport could be highest in August.

Weekly when the pattern repeats on a weekly basis. For example, traffic on a particular airport is lowest on Sundays.

Segment – See 'Market Segment'.

State - Because of the way the airspace is organised, when referring to 'States', we separate the Azores from Portugal, and Canarias from Spain. Belgium and Luxembourg are treated together, as are Serbia and Montenegro.

STATFOR – The EUROCONTROL Statistics and Forecast service.

Total Cargo loaded + unloaded freight + mail in metric tonnes.

Total Movements landing + take off of an aircraft.

Total Passengers arriving + departing passengers + direct transit.

Traditional Scheduled – Schedule flight which is not in the segments low-cost, business aviation, all-cargo or military.

Typical - is used to mean the median value.

VFR – Visual flight rules.

Weight – Typically in this report refers to wake turbulence category (WTC), and not to maximum certified take-off mass (MTOW).

WTC Wake Turbulence Category

Region	ICAO Location Indicators beginning
North Atlantic	K, C, B + PA, PO, PF, PP (except BKPR)
Middle-East	O+LL+LV
North-Africa	DA, HE, HL, GM, HS, DT
Southern Africa	G; D; H; F (except DA, HE, HL, GM, GE, HS, DT and GC)
Far-East	V, Z, R, W (except ZZZZ)
South-Atlantic	S
Former CIS Region	U

Figure 66. Summary of non-European traffic regions.

H. Busiest airports by market segment and flow

Figure 67 lists the top 25 airports in terms of IFR flight departures in 2006, for all departures and then for each market segment in turn. See annex G for definitions of the market segments.

Rank	IFR Departures (Thousands) in 2006							
	All		Military		Business		All-Cargo	
1	PARIS CH DE GAULLE	271	RAMSTEIN	6.0	PARIS LE BOURGET	27	KOELN-BONN	13
2	FRANKFURT MAIN	245	ADANA-INCIRLIK/MIL*	5.0	GENEVE COINTRIN	18	LIEGE/LIEGE	11
3	LONDON/HEATHROW	239	SIGONELLA	2.8	MILANO LINATE	14	BRUSSELS NATIONAL	11
4	SCHIPHOL AMSTERDAM	218	ATHINAI ELEFSIS	2.7	LONDON/LUTON	14	PARIS CH DE GAULLE	8.7
5	MADRID BARAJAS	218	KHANIA SOUDA	2.7	ROMA CIAMPINO	13	FRANKFURT MAIN	7.8
6	MUENCHEN 2	204	ZARAGOZA	2.7	NICE	11	EAST MIDLANDS	7.5
7	BARCELONA	164	ROTA	2.4	ZURICH	11	LUXEMBOURG	4.7
8	ROME FIUMICINO	158	MADRID TORREJON	2.3	FARNBOROUGH CIV	9.4	BERGAMO/ORIO ALSERIO	4.0
9	LONDON/GATWICK	132	AVORD	2.3	WIEN SCHWECHAT	8.5	LONDON/STANSTED	3.0
10	COPENHAGEN KASTRUP	129	ANKARA-ETIMESG./MIL*	2.0	MADRID TORREJON	8.3	ATHINAI E. VENIZELOS	2.9
11	WIEN SCHWECHAT	129	MADRID GETAFE	1.9	MUENCHEN 2	8.0	SCHIPHOL AMSTERDAM	2.8
12	MILANO MALPENSA	126	WARSZAWA/OKECIE	1.9	CANNES MANDELIEU	6.6	MADRID BARAJAS	2.7
13	ZURICH	124	MILDENHAL	1.6	STUTTGART	6.5	COPENHAGEN KASTRUP	2.6
14	BRUSSELS NATIONAL	124	LAJES TERCEIRA	1.5	TEMPELHOF-BERLIN	6.3	ISTANBUL-ATATURK	2.6
15	PARIS ORLY	116	KAYSER-ERKILET/MIL*	1.5	LONDON/CITY	6.3	DUBLIN	2.5
16	ISTANBUL-ATATURK	114	OTOPENI-INTL	1.4	BARCELONA	6.0	TOULOUSE BLAGNAC	2.4
17	STOCKHOLM-ARLANDA	114	SHANNON	1.4	PALMA DE MALLORCA	5.7	VITORIA	2.4
18	MANCHESTER	113	BRIZE NORTON	1.4	BRUSSELS NATIONAL	5.4	BARCELONA	2.3
19	OSLO/GARDERMOEN	108	AKROTIRI	1.4	ATHINAI E. VENIZELOS	5.3	BAKU/HEYDAR ALIYEV	2.2
20	DUESSELDORF	107	SEVILLA MORON	1.3	KOELN-BONN	5.3	MALMOE/STURUP	2.0
21	LONDON/STANSTED	103	MELSBROEK	1.3	DUESSELDORF	5.1	LEIPZIG/HALLE	2.0
22	DUBLIN	96	NIMES	1.3	SCHIPHOL AMSTERDAM	5.1	STOCKHOLM-ARLANDA	2.0
23	PALMA DE MALLORCA	95	ORLEANS BRICY	1.2	BIGGIN HILL	5.0	WIEN SCHWECHAT	1.8
24	ATHINAI E. VENIZELOS	93	ISTRES/LE TUBES	1.1	OLBIA COSTA SMERALDA	4.5	FERIHEGY-BUDAPEST	1.8
25	HELSINKI-VANTAA	92	LAS PALMAS	1.1	DUBLIN	4.5	ROMA CIAMPINO	1.7

Figure 67. Top 25 Airports by Market Segment

IFR Departures (Thousands) in 2006						Rank
Low-Cost		Traditional		Non-Scheduled		
LONDON/STANSTED	85	PARIS CH DE GAULLE	235	LONDON/GATWICK	21	1
LONDON/GATWICK	41	LONDON/HEATHROW	234	ANTALYA	21	2
DUBLIN	38	FRANKFURT MAIN	223	MANCHESTER	18	3
LONDON/LUTON	37	MADRID BARAJAS	193	ISTANBUL-ATATURK	15	4
SCHIPHOL AMSTERDAM	34	SCHIPHOL AMSTERDAM	170	PALMA DE MALLORCA	14	5
KOELN-BONN	32	MUENCHEN 2	167	PARIS CH DE GAULLE	11	6
PALMA DE MALLORCA	32	ROME FIUMICINO	138	LAS PALMAS	11	7
MANCHESTER	26	BARCELONA	123	TENERIFE SUR	10	8
BARCELONA	25	MILANO MALPENSA	106	DEN HELDER/DE KOOY	10	9
MALAGA	24	COPENHAGEN KASTRUP	106	MADRID BARAJAS	8.6	10
EDINBURGH	24	WIEN SCHWECHAT	104	ARRECIFE LANZAROTE	7.3	11
TEGEL-BERLIN	23	PARIS ORLY	100	BERGEN/FLESLAND	6.7	12
MUENCHEN 2	23	ZURICH	97	MILANO MALPENSA	6.5	13
OSLO/GARDERMOEN	23	BRUSSELS NATIONAL	92	BARCELONA	6.4	14
STOCKHOLM-ARLANDA	20	STOCKHOLM-ARLANDA	87	PRAHA RUZYNE	6.2	15
SCHOENEFELD-BERLIN	20	ISTANBUL-ATATURK	82	STAVANGER/SOLA	5.9	16
STUTTGART	20	DUESSELDORF	79	ROME FIUMICINO	5.7	17
LIVERPOOL	20	ATHINAI E. VENIZELOS	78	KIEV - BORISPOL	5.4	18
BELFAST/ALDERGROVE	19	OSLO/GARDERMOEN	78	NIKOS/KAZANTZAKIS	5.3	19
ALICANTE	19	HELSINKI-VANTAA	69	DUBLIN	5.1	20
DUESSELDORF	19	LONDON/GATWICK	68	LARNACA	5.0	21
GLASGOW	18	MANCHESTER	64	GLASGOW	4.8	22
BRISTOL/LULSGATE	18	LISBOA	57	BIRMINGHAM	4.8	23
BIRMINGHAM	18	PRAHA RUZYNE	57	BRUSSELS NATIONAL	4.6	24
HAMBURG	18	LYON SATOLAS	56	FUERTEVENTURA	4.2	25

H. Busiest airports by market segment and flow

Figure 68 lists the top 25 airports in terms of IFR flight departures in 2006, for each destination region in turn. See annex G for definitions of the traffic regions.

Rank	IFR Departures (Thousands) in 2006							
	Far-East		Former CIS Region		Middle-East		North Atlantic	
1	LONDON/HEATHROW	19	KIEV - BORISPOL	20	LONDON/HEATHROW	13	LONDON/HEATHROW	33
2	FRANKFURT MAIN	15	ISTANBUL-ATATURK	11	ISTANBUL-ATATURK	8.6	FRANKFURT MAIN	19
3	PARIS CH DE GAULLE	13	FRANKFURT MAIN	10	FRANKFURT MAIN	8.5	PARIS CH DE GAULLE	19
4	SCHIPHOL AMSTERDAM	8.7	ANTALYA	8.8	PARIS CH DE GAULLE	8.3	SCHIPHOL AMSTERDAM	14
5	MILANO MALPENSA	3.4	BAKU/HEYDAR ALIYEV	8.6	SCHIPHOL AMSTERDAM	6.3	LONDON/GATWICK	10
6	WIEN SCHWECHAT	3.0	WIEN SCHWECHAT	7.8	MILANO MALPENSA	3.4	SHANNON	5.3
7	ZURICH	2.9	PARIS CH DE GAULLE	5.7	LARNACA	3.4	MANCHESTER	5.2
8	MUENCHEN 2	2.6	SIMFEROPOL	5.3	WIEN SCHWECHAT	3.2	COPENHAGEN KASTRUP	5.2
9	COPENHAGEN KASTRUP	2.3	YEREVAN/ZVARTNOSJ	5.2	ATHINAI E. VENIZELOS	3.2	ZURICH	4.9
10	HELSINKI-VANTAA	2.3	MUENCHEN 2	4.4	ZURICH	2.8	MUENCHEN 2	4.7
11	ROME FIUMICINO	2.3	DONETSK	4.2	ADANA-INCIRLIK/MIL*	2.8	MILANO MALPENSA	4.1
12	ISTANBUL-ATATURK	2.1	LONDON/HEATHROW	4.1	MANCHESTER	2.6	ROME FIUMICINO	3.8
13	BRUSSELS NATIONAL	1.2	PRAHA RUZYNE	4.0	MUENCHEN 2	2.4	BRUSSELS NATIONAL	3.3
14	BAKU/HEYDAR ALIYEV	1.1	WARSZAWA/OKECIE	3.8	BAKU/HEYDAR ALIYEV	2.4	MADRID BARAJAS	3.3
15	STOCKHOLM-ARLANDA	0.8	ODESSA	3.7	ROME FIUMICINO	2.2	DUBLIN	2.7
16	LUXEMBOURG	0.6	KIEV - ZHULYANY	3.6	LONDON/GATWICK	2.1	LONDON/STANSTED	2.6
17	MANCHESTER	0.6	DNEPROPETROVSK	3.3	BRUSSELS NATIONAL	2.1	RAMSTEIN	2.1
18	KOELN-BONN	0.6	NAKHCHIVAN	3.1	RAMSTEIN	1.9	KOELN-BONN	1.8
19	ADANA-INCIRLIK/MIL*	0.5	SCHIPHOL AMSTERDAM	3.1	FERIHEGY-BUDAPEST	1.7	GLASGOW	1.8
20	LONDON/GATWICK	0.4	KHARKOV	3.0	KIEV - BORISPOL	1.6	STOCKHOLM-ARLANDA	1.7
21	ATHINAI E. VENIZELOS	0.4	TBILISI	2.9	LUXEMBOURG	1.5	DUESSELDORF	1.6
22	KIEV - BORISPOL	0.3	HELSINKI-VANTAA	2.7	GENEVE COINTRIN	1.4	LONDON/LUTON	1.5
23	LONDON/STANSTED	0.3	RIGA INTL	2.6	OTOPENI-INTL.	1.3	WARSZAWA/OKECIE	1.3
24	BIRMINGHAM	0.2	MILANO MALPENSA	2.6	MADRID BARAJAS	1.3	WIEN SCHWECHAT	1.1
25	FERIHEGY-BUDAPEST	0.2	FERIHEGY-BUDAPEST	2.3	ANTALYA	1.2	LISBOA	1.1

Figure 68. Top 25 Airports by Flow

IFR Departures (Thousands) in 2006						Rank
North-Africa		South-Atlantic		Southern Africa		
PARIS ORLY	15	MADRID BARAJAS	7.7	PARIS CH DE GAULLE	8.4	1
PARIS CH DE GAULLE	11	PARIS CH DE GAULLE	3.1	LONDON/HEATHROW	6.9	2
MILANO MALPENSA	6.2	LISBOA	2.8	FRANKFURT MAIN	3.4	3
BRUSSELS NATIONAL	5.6	FRANKFURT MAIN	1.4	SCHIPHOL AMSTERDAM	3.3	4
MARSEILLE PROVENCE	5.5	MILANO MALPENSA	1.2	LISBOA	2.1	5
ROME FIUMICINO	4.9	SCHIPHOL AMSTERDAM	0.9	LONDON/GATWICK	2.0	6
FRANKFURT MAIN	4.8	LONDON/HEATHROW	0.6	PARIS ORLY	1.9	7
LYON SATOLAS	4.8	ROME FIUMICINO	0.5	BRUSSELS NATIONAL	1.7	8
LONDON/GATWICK	4.8	PARIS ORLY	0.4	MILANO MALPENSA	1.6	9
SCHIPHOL AMSTERDAM	3.6	ZURICH	0.3	LAS PALMAS	1.2	10
MADRID BARAJAS	3.3	PORTO	0.3	ROME FIUMICINO	1.2	11
LONDON/HEATHROW	3.0	BARCELONA	0.3	MADRID BARAJAS	1.1	12
ISTANBUL-ATATURK	2.8	LAS PALMAS	0.2	ZURICH	1.0	13
BARCELONA	2.2	TENERIFE NORTE	0.2	MARSEILLE PROVENCE	0.5	14
GENEVE COINTRIN	2.0	MUENCHEN 2	0.2	MUENCHEN 2	0.4	15
MUENCHEN 2	2.0	TENERIFE SUR	0.1	PARIS LE BOURGET	0.4	16
TOULOUSE BLAGNAC	2.0	LUXEMBOURG	0.1	LUXEMBOURG	0.3	17
ZURICH	1.9	LONDON/GATWICK	0.1	CHALONS/VATRY	0.3	18
WIEN SCHWECHAT	1.9	MADEIRA	0.1	ATHINAI E. VENIZELOS	0.2	19
PRAHA RUZYNE	1.9	SANTA MARIA	0.0	DUESSELDORF	0.2	20
MANCHESTER	1.8	MADRID TORREJON	0.0	LYON SATOLAS	0.2	21
DUESSELDORF	1.8	KOELN-BONN	0.0	MANCHESTER	0.1	22
LAS PALMAS	1.8	PONTA DELGADA	0.0	OOSTENDE	0.1	23
NANTES	1.5	MANCHESTER	0.0	GENEVE COINTRIN	0.1	24
NICE	1.4	LONDON/LUTON	0.0	TENERIFE SUR	0.1	25

I. Index of airports mentioned

Airport	*Name*	*Section*
EDXW	Westerland Sylt	18,E
ETAD	Spangdahlem	12,16
ETAR	Ramstein	12, 16, H
Greece		
LGAV	Athinai E. Venizelos	A , H
LGEL	Athinai Elefsis	H
LGIR	Nikos/Kazantzakis	16, 18,E,H
LGKF	Kefallinia	18,E
LGKO	Kos	16, 18,E
LGKR	Ioannis/Kapodistrias	18,E
LGMK	Mikonos	18,E
LGPZ	Preveza/Levkas Aktio	18,E
LGRP	Diagoras	18,E
LGSA	Khania Souda	16, 18,E, H
LGSK	Skiathos	18,E
LGTS	Makedonia	8
LGZA	Zakinthos	16, 18,E
Hungary		
LHBP	Budapest	H
LHDC	Debrecen	8
Ireland		
EICK	Cork	10
EIDW	Dublin	10, A,H
EINN	Shannon	8,10,12,H
Italy		
LIBP	Pescara	18,E
LICA	Lamezia Terme	18,E
LICZ	Sigonella	12 , H
LIEA	Alghero	10
LIEE	Cagliari Elmas	18,20,E
LIEO	Olbia Costa Smeralda	18,E, H
LIMC	Milano Malpensa	8, A H
LIME	Bergamo/Orio Alserio	H
LIML	Milano Linate	H
LIPR	Rimini Miramare	18,E
LIPY	Ancona Falconara	11
LIRA	Roma Ciampino	H
LIRF	Rome Fiumicino	7, A , H
LIRP	Pisa San Giusto	10
Latvia		
EVRA	Riga Intl	11,20,H
Lithuania		
EYKA	Kaunas Intl	8,10
EYVI	Vilnius Intl	11,20
Luxembourg		
ELLX	Luxembourg	8,12,H
Malta		
LMML	Malta Luqa	16, 18,E

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Moldova		
LUBL	Balts	8
Montenegro		
LYTV	Tivat	18,E
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EHAM	Schiphol Amsterdam	6, 7, A,H
EHBK	Maastricht	12
EHKD	Den Helder/De Kooy	11, 12, 20,H
EHRD	Rotterdam	8
Norway		
ENAT	Alta	11
ENBN	Bronnoysund	12
ENBO	Bodo	11
ENBR	Bergen/Flesland	8, 11, 12,H
ENCN	Kristiansand/Kjevik	11
ENEK	Ekofisk/Phillips Oil	12
ENFL	Floro	12
ENGM	Oslo/Gardermoen	A,H
ENHF	Hammerfest	11
ENKB	Kristiansund/Kv	11,12
ENTC	Tromso/Langnes	11
ENTO	Sandefjord/Torp	11,20
ENVA	Trondheim/Vaernes	11
ENZV	Stavanger/Sola	11, 12,H
Poland		
EPGD	Gdansk/Lech Walesa	11
EPKK	Krakow/Balice	8,10
EPKT	Katowice/Pyrzowice	10
EPLL	Lodz/Lublinek	10
EPPO	Poznan/Lawica	11
EPWA	Warszawa/Okecie	H
EPWR	Wroclaw/Strachowice	11
Portugal		
LPAZ	Santa Maria	16,7, H
LPFR	Faro	16,18,E
LPLA	Lajes Terceira	12,11, H
LPMA	Madeira	H
LPPD	Ponta Delgada	8, 11,12, 18,E, H
LPPR	Porto	8, H
LPPT	Lisboa	H
GCLP	Las Palmas	18, H
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LJPZ	Portoroz	8
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LERT	Rota	12, 16 , H
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GCLA	La Palma	11
Sweden		
ESGG	Goteborg/Landvetter	8
ESMS	Malmoe/Sturup	20, H
ESSA	Stockholm-Arlanda	7,A, H
ESSB	Stockholm-Bromma	11
ESSV	Visby	10,11
ESTA	Angelholm	10
Switzerland		
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LSZA	Lugano	11
LSZB	Bern Belp	7, 11
LSZG	Grenchen	7
LSZH	Zurich	7,8, A, H
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LTAG	Adana-Incirlik/Mil*	12 , H
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LTBA	Istanbul-Ataturk	A , H
LTBJ	Izmir-Adnan-Menderes	18,E
LTBS	Mugla-Dalaman	12,16, 18,E
LTCE	Erzurum	7
LTFE	Milas/Bodrum	18,E

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Ukraine		
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UKCC	Donetsk	H
UKDD	Dnepropetrovsk	H
UKFF	Simferopol	H
UKHH	Kharkov	H
UKKK	Kiev - Zhulyany	H
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United Kingdom		
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EGAE	Londonderry/Eglinton	10
EGBB	Birmingham	10,H
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EGBJ	Gloucestershire	7
EGCC	Manchester	A, H
EGDL	Lyneham	16
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EGHI	Southampton	4,10,11,20
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EGJB	Guernsey	11
EGJJ	Jersey	10, 11
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EGLC	London/City	11,H
EGLF	Farnborough Civ	H
EGLL	London/Heathrow	4,6, A,H
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EGNM	Leeds And Bradford	10, 11
EGNR	Hawarden	12
EGNS	Isle Of Man/Ronaldsw	11,20
EGNT	Newcastle	10,11, 20
EGNV	Teesside	10
EGNX	East Midlands	12,H
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EGPB	Sumburgh	7
EGPD	Aberdeen	11
EGPE	Inverness	11,20
EGPF	Glasgow	10,H
EGPH	Edinburgh	10,H
EGPK	Prestwick	12,20
EGSC	Cambridge	7
EGSH	Norwich	11,10
EGSS	London/Stansted	A,H
EGTE	Exeter	11,20
EGTK	Oxford/Kidlington	7,
EGUN	Mildenhall	16,H
EGVN	Brize Norton	12,16,H

ISSN 1993-1425

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